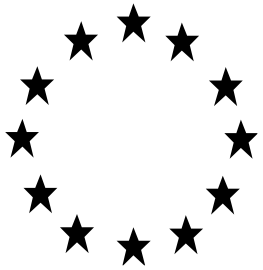
Regulation (EU) No 528/2012 concerning the making available on the market and use of biocidal products

PRODUCT ASSESSMENT REPORT OF A BIOCIDAL PRODUCT FOR NATIONAL AUTHORISATION APPLICATIONS



Product identifier in R4BP	**Jade Paste**
Product type:	14 (Rodenticide)
Active ingredient(s):	Bromadiolone
Case No. in R4BP	BC-XP014579-06
IE-0001750-0000	IE-0001136-0000
Evaluating Competent Authority	Ireland – Department of Agriculture, Food & the Marine
Internal registration/file no	**IE/BPA 70527**
Date	27.04.2018 (NA-RNL renewal)

Version 2.0

1 Version History

Date	Version	Reason for revision
2012/09/30	Version 1.0	Initial PAR
2018/04/27	Version 2.0	Updated at 1st Renewal of authorisation RNL

2 Overview of applications

Application type	refMS	Case number in the refMS	Decision date	Assessment carried out (i.e. first authorisation / amendment /renewal)	Page
National Authorisation Dir.98/8/EC	IE	n/a	2012/09/30	1st Authorisation	88
NA-RNL	IE	BC-XP014579-06	2018/04/27	Renewal	28

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1st Renewal PAR – April 2018

Regulation (EU) No 528/2012 concerning the making available on the market and use of biocidal products

PRODUCT ASSESSMENT REPORT OF A BIOCIDAL PRODUCT FOR THE RENEWAL OF A NATIONAL AUTHORISATION (NA-RNL)

Product identifier in R4BP	**Jade Paste**
Product type:	14 (Rodenticide)
Active ingredient(s):	Bromadiolone
Case No. in R4BP	BC-XP014579-06
IE-0001750-0000	IE-0001136-0000
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1 Conclusion

The Irish CA for the authorisation of biocidal products has processed an application for renewal for the biocidal product **Jade Paste** which contains the active substance Bromadiolone (0.005 % w/w).
The assessment presented in the Product Assessment Report for the first authorisation showed acceptable efficacy but unacceptable risks for the environment, if the product is used as a rodenticide (product-type 14) for use in and around buildings, by the general public, professionals and trained professionals, and in open areas and waste dumps, by professionals and trained professionals.

The conditions for granting an authorisation according to Article 19 (1) of Regulation (EU) No 528/2012[1] (BPR) are not fulfilled.
In consequence the product can only be authorised in accordance with Article 19 (5) BPR, as this Article provides Member States with the legal basis to authorise products in cases where not authorising the product would result in disproportionate negative impacts for society when compared to the risks to human health arising from the use of the biocidal product.

Detailed information on the uses appropriate at the renewal of authorisation are presented in section 2.4.
General directions for use of the product are summarised in section 2.5.

Prior to renewing the approval of anticoagulant active substances and renewing the authorisations of the respective products discussions took place at EU-level to harmonise use instructions and risk mitigation measures to the greatest possible extend. As an outcome of these discussions a set of three standard SPCs (Summary of Product Characteristics) compiling the relevant sentences for the uses that may be authorised for each of the three user categories (general public, professionals and trained professionals) has been produced (for details please refer to document CA-Nov16-Doc.4.1.b – Final).

The specific conditions from Commission Implementing Regulation (EU) 2017/1380[2] for the active substance Bromadiolone were considered for the re-assessment.

The Irish CA concludes that the conditions set out in Article 5(2) b) and c) of the BPR are currently met. Anticoagulant rodenticides are considered essential to ensure appropriate rodent control in Ireland by

[1] Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products, last amended by Regulation (EU) No 334/2014 of the European Parliament and of the Council of 11 March 2014.

[2] Commission Implementing Regulation (EU) 2017/1380 of 25 July 2017 renewing the approval of bromadiolone as an active substance for use in biocidal products of product-type 14

efficient pest management and as a consequence, to prevent or control any serious danger to human and animal health in which rodents are involved.
Rodent control in Ireland currently relies largely on the use of anticoagulant rodenticides, the non-renewal of which could lead to insufficient rodent control in Ireland. This may not only cause significant negative impacts on human or animal health or the environment, but may also affect the public's perception of its safety with regard to exposure to rodents or the security of a number of economic activities that could be vulnerable to rodents, resulting in economic and social consequences in Ireland.

The product has been classified according to the 9th ATP of Regulation (EC) No 1272/2008[3]. Detailed information on classification and labelling is provided in Section 2.3.
As a consequence of the new harmonised classification, the active substance Bromadiolone meets the criteria for exclusion according to Article 5(1) BPR as well as for substitution according to Article 10 BPR Therefore, in line with Article 23 (1) BPR a comparative assessment for the product **Jade Paste** has been conducted (for details see Section 3.10).

Comparative assessment
In line with Article 23 (1) BPR a comparative assessment for the product has been conducted (for details see Section 3.10).
In summary it can be concluded that the criteria according Article 23(3) a), b) BPR are not fulfilled.
According to Article 23 (6) BPR the authorisation of the product will be renewed for 5 years.

Approval of the active substance
The active substance Bromadiolone is included in the Union list of approved active substances and the specific provisions laid down there are fulfilled:

The authorisations of biocidal products containing Bromadiolone are subject to the conditions listed in the Annex to Commission Implementing Regulation (EU) 2017/1381:

Composition and formulation
The ready-to-use product is a paste bait and contains the active substance Bromadiolone.
No substance of concern has been identified.
Please refer to section 5.1 for detailed information.

Physical, chemical and technical properties
No new data was provided nor had new guidance to be taken into account for the renewal evaluation.

[3] Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

Accordingly, the conclusion from the former assessment regarding physical, chemical and technical properties remains valid.

Physical hazards and respective characteristics

No new data was provided, nor had new guidance to be taken into account for the renewal evaluation. Accordingly, the conclusion from the former assessment regarding physical hazards and respective characteristics remains valid.

Methods for detection and identification

No new data was provided, nor had new guidance to be taken into account for the renewal evaluation. Accordingly, the conclusion from the former assessment regarding methods for detection and identification remains valid.

Efficacy

The IE CA considers that the efficacy data has confirmed that Jade Paste is effective in the proposed areas for use, at the recommended dose rate when used as per label recommendations. No new data was provided nor had new guidance to be taken into account for re-assessment as there were no additions to the original studies submitted.
An evaluation of the studies provided demonstrated that the product proved to be both palatable to and effective against infestations of rats (*Rattus norvegicus* and *Rattus rattus*) and house mice (*Mus musculus/domesticus*).

The conclusion from the former assessment regarding the product's efficacy against target organisms remains valid and the product may be authorised.

Risk assessment for human health

The human health risk assessment for this product is based on the active substance.
According to the BPC Opinion the EFSA-Guidance on dermal absorption had been taken into account when reviewing the dermal absorption of the product.
Based on the risk assessment of the active substance, a risk for professional users resulting from the intended use is unlikely.
For risk mitigation measures please refer to section 2.
Due to the new classification (Repr.1A) it is not allowed to grant authorisation for the use by general public (Article 19 (4) and (5) BPR). Therefore the product will not be authorised for the non-professional user.
Based on the risk assessment it is unlikely that the intended use(s) cause any unacceptable acute or chronic risk to professional users, bystanders and residents. Regarding the trained professional users health protection, there are no objections against the intended uses if the directions for use are followed (For details see section 2).

Risk assessment for the environment

No new data was provided. The only area where new guidance was relevant was with respect to the groundwater assessment. Following discussion at the CG-18 meeting and subsequent agreement, Tier II PEC groundwater was calculated using the FOCUS models PEARL or PELMO in the instances where Tier I indicated an exceedance of the relevant trigger value.

According to the risk assessment, the risk for poisoning of non-target predator birds and mammals during primary (acute and long-term exposure) and secondary poisoning is high as the trigger value is exceeded in all cases.

No safe use was established for the Bromadiolone product at a concentration of 50 ppm in the ecotoxicology risk assessment.

In consequence the product can only be authorised in accordance with Article 19 (5) BPR.

Overall conclusion

The assessment of the biocidal product **Jade Paste** remains valid. However, the authorisation has to be adapted where necessary taking into account the points mentioned above.

The biocidal product will be authorised according to Article 19 (5) BPR in conjunction with Article 23 (6) BPR.

According to Article 23 (6) BPR the authorisation of the product will be renewed for 5 years.

2 Summary of the product assessment

2.1 Administrative information

2.1.1 Identifier in R4BP

Jade Paste

2.1.2 Authorisation holder

Name and address of the authorisation holder	**Name**	LODI S.A.S.
	Address	Parc d'Activités des Quatre Routes 35390 Grand Fougeray France
Authorisation number	IE/BPA 70527	
Date of the authorisation	27.04.18	
Expiry date of the authorisation	27.04.23	

2.1.3 Manufacturer(s) of the product

Name of manufacturer	Compagnie Générale des Biocides (CGB)
Address of manufacturer	Parc d'Activités des Quatre Routes 35390 Grand Fougeray France
Location of manufacturing sites	Parc d'Activités des Quatre Routes 35390 Grand Fougeray France

2.1.4 Manufacturer(s) of the active substance(s)

Active substance	Bromadiolone
Name of manufacturer	PelGar International Limited
Address of manufacturer	Unit 13, Newman Lane Alton Hampshire

	GU34 2QR UK
Location of manufacturing sites	Prazska 280 02 Kolin Czech Republic

2.2 Product composition and formulation

2.2.1 Qualitative and quantitative information on the composition

Table 1

Common name	IUPAC name	Function	CAS number	EC number	Content (%)
Bromadiolone	**3-[3-(4'-bromobiphenyl-4-yl)-3-hydroxy-1-phenylpropyl]-4-hydroxycoumarin**	Active substance	**28772-56-7**	**249-205-9**	0.005

- The product contains a bittering agent and a dye.
  - ➢ Information on the full composition is provided in the confidential[4] annex (see chapter 4).
- According to the information provided the product contains no nanomaterials as defined in Article 3 paragraph 1 (z) of Regulation No. 528/2012:

2.2.2 Information on the substance(s) of concern

There are no substances of concern.

2.2.3 Candidate(s) for substitution

The following substance was identified as a candidate for substitution:

- Bromadiolone

Bromadiolone meets the following exclusion criteria according to Article 5(1) BPR:

- toxic for reproduction category 1B
- persistent, bioaccumulative and toxic

[4] Access level: "Restricted" to applicant and authority

Therefore Bromadiolone meets the conditions laid down in Article 10 BPR, and is consequently a candidate for substitution.

2.2.4 Type of formulation

Ready-to-use bait: paste

2.3 Classification and Labelling according to the Regulation (EC) No 1272/2008[5]

Table 2

Classification **Hazard classes, Hazard categories**	**Hazard statements**
STOT RE 1	H372: Causes damage to organs (blood) through prolonged or repeated exposure
Repr. 1B	H360D: May damage the unborn child.

Table 3

Labelling	**Code**	**Pictogram / Wording**
	GHS08	
Signal word		Danger
Hazard statements	STOT RE 1	H372: Causes damage to organs (blood) through prolonged or repeated exposure
	Repr. 1B	H360D: May damage the unborn child.
Supplemental label elements		
Precautionary statements:	P201	Obtain special instructions before use

5 Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

	P202	Do not handle until all safety precautions have been read and understood.
	P260	Do not breathe dust.
	P264	Wash hands thoroughly after handling.
	P270	Do not eat, drink or smoke when using this product.
	P280	Wear protective gloves.
	P308+P313	IF exposed or concerned: Get medical advice/attention.
	P314	Get Medical advice/attention if you feel unwell.
	P405	Store locked up.
	P501	Dispose of contents in accordance with local/regional/national /international regulations
Note		

2.4 Uses appropriate for further authorisation[6]

Table 4: Summary Table of Uses

No.	Use
1	House mice – professionals – indoor
2	Rats – professionals – indoor
3	House mice and/or rats – professionals – outdoor around buildings
4	House mice and/or rats – trained professionals – indoor
5	House mice and/or rats – trained professionals – outdoor around buildings
6	Rats – trained professionals – Outdoor open areas & waste dumps

2.4.1 Use 1 appropriate after renewal of the authorisation – House mice – professionals – indoor

Product Type(s)	14
Where relevant, an exact description of the use	Rodenticide
Target organism(s) (including development stage)	House mouse (*Mus musculus / Mus domesticus*) – adults and juveniles

6 Member States might refuse to grant an authorisation or adjust the terms and conditions of the authorisation to be granted according to Article 37 BPR.

Field(s) of use	Indoors
Application method(s)	Ready-to-use bait to be used in tamper-resistant bait stations
Application rate(s) and frequency	Mice Low infestation – 20 - 30g bait in bait points every 5 metres High infestation – 20 - 30g bait in bait points every 2 metres
Category(ies) of users	Professionals
Pack sizes and packaging material	Minimum pack size 2.5 kg **Grams of bait in individual sachet:** 10 **Packaging material and size:** **Bucket: (PP,PE)** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cardboard box with inner PE liner** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cartridge in PP**: 50 g, 100g, 150g, 200g, 250g, 260g , 270g, 280g, 310g, 500g Outer packaging - cardboard box with pack sizes of: 50 cartridges of 50g, 25 cartridges of 100g, 20 cartridges of 150g, 15 cartridges of 200g, 10 cartridges of 250g, 12 cartridges of 250g, 18 cartridges of 250g, 10 cartridges of 260g, 12 cartridges of 260g, 18 cartridges of 260g, 10 cartridges of 270g, 12 cartridges of 270g, 18 cartridges of 270g, 10 cartridges of 280g, 12 cartridges of 280g, 18 cartridges of 280g, 10 cartridges of 310g, 12 cartridges of 310g, 18 cartridges of 310g or 5 cartridges of 500g. **Pre-baited station (PP,PS,PVC)**: 2*10g or 3*10g in cardboard box of 2.5 kg, 3 kg, 3.5 kg, 4 kg, 4.5 kg and 5 kg

2.4.1.1 Use-specific instructions for use

- The bait stations should be visited at least every 2 to 3 days at the beginning of the treatment and at least weekly afterwards, in order to check whether the bait is accepted, the bait stations are intact and to remove rodent bodies. Re-fill bait when necessary.
- - [When available] Follow any additional instructions provided by the relevant code of best practice.

2.4.1.2 Use-specific risk mitigation measures

- None

2.4.1.3 Where specific to the use, the particulars of likely direct or indirect effects, first aid instructions and emergency measures to protect the environment

When placing bait stations close to water drainage systems, ensure that bait contact with water is avoided.

2.4.1.4 Where specific to the use, the instructions for safe disposal of the product and its packaging

None

2.4.1.5 Where specific to the use, the conditions of storage and shelf-life of the product under normal conditions of storage

None

2.4.2 Use 2 appropriate after renewal of the authorisation – Rats – professionals – indoor

Product Type(s)	14
Where relevant, an exact description of the use	Rodenticide
Target organism(s) (including development stage)	Brown rats (*Rattus norvegicus*) – adults and juveniles Roof rats (*Rattus rattus*) – adults and juveniles
Field(s) of use	Indoors
Application method(s)	Ready-to-use bait to be used in tamper-resistant bait stations
Application rate(s) and frequency	Rats Low infestation – 60 - 100g bait in bait points every 10 metres High infestation – 60 - 100g bait in bait points every 5 metres
Category(ies) of users	Professionals
Pack sizes and packaging	Minimum pack size 2.5 kg

material	**Grams of bait in individual sachet:** 10 **Packaging material and size:** **Bucket: (PP,PE)** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cardboard box with inner PE liner** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cartridge in PP**: 50 g, 100g, 150g, 200g, 250g, 260g , 270g, 280g, 310g, 500g Outer packaging - cardboard box with pack sizes of: 50 cartridges of 50g, 25 cartridges of 100g, 20 cartridges of 150g, 15 cartridges of 200g, 10 cartridges of 250g, 12 cartridges of 250g, 18 cartridges of 250g, 10 cartridges of 260g, 12 cartridges of 260g, 18 cartridges of 260g, 10 cartridges of 270g, 12 cartridges of 270g, 18 cartridges of 270g, 10 cartridges of 280g, 12 cartridges of 280g, 18 cartridges of 280g, 10 cartridges of 310g, 12 cartridges of 310g, 18 cartridges of 310g or 5 cartridges of 500g. **Pre-baited station (PP,PS,PVC)**: 2*10g or 3*10g in cardboard box of 2.5 kg, 3 kg, 3.5 kg, 4 kg, 4.5 kg and 5 kg

2.4.2.1 Use-specific instructions for use

- The bait stations should be visited only 5 to 7 days after the beginning of the treatment and at least weekly afterwards, in order to check whether the bait is accepted, the bait stations are intact and to remove rodent bodies. Re-fill bait when necessary.
- -[When available] Follow any additional instructions provided by the relevant code of best practice.

2.4.2.2 Use-specific risk mitigation measures

None.

2.4.2.3 Where specific to the use, the particulars of likely direct or indirect effects, first aid instructions and emergency measures to protect the environment

When placing bait stations close to water drainage systems, ensure that bait contact with water is avoided.

2.4.2.4 Where specific to the use, the instructions for safe disposal of the product and its packaging

None

2.4.2.5 Where specific to the use, the conditions of storage and shelf-life of the product under normal conditions of storage

None

2.4.3 Use 3 appropriate after renewal of the authorisation – House mice and/or rats – professionals – outdoor around buildings

Product Type(s)	14
Where relevant, an exact description of the use	Rodenticide
Target organism(s) (including development stage)	House mouse (*Mus musculus* / *Mus domesticus*) – adults and juveniles Brown rats (*Rattus norvegicus*) – adults and juveniles Roof rats (*Rattus rattus*) – adults and juveniles
Field(s) of use	Outdoors around buildings
Application method(s)	Ready-to-use bait to be used in tamper-resistant bait stations
Application rate(s) and frequency	Mice Low infestation – 20 - 30g bait in bait points every 5 metres High infestation – 20-30g bait in bait points every 2 metres Rats Low infestation – 60 - 100g bait in bait points every 10 metres High infestation – 60 - 100g bait in bait points every 5 metres
Category(ies) of users	Professionals
Pack sizes and packaging material	Minimum pack size 2.5 kg

	Grams of bait in individual sachet: 10 **Packaging material and size:** **Bucket: (PP,PE)** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cardboard box with inner PE liner** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cartridge in PP**: 50 g, 100g, 150g, 200g, 250g, 260g , 270g, 280g, 310g, 500g Outer packaging - cardboard box with pack sizes of: 50 cartridges of 50g, 25 cartridges of 100g, 20 cartridges of 150g, 15 cartridges of 200g, 10 cartridges of 250g, 12 cartridges of 250g, 18 cartridges of 250g, 10 cartridges of 260g, 12 cartridges of 260g, 18 cartridges of 260g, 10 cartridges of 270g, 12 cartridges of 270g, 18 cartridges of 270g, 10 cartridges of 280g, 12 cartridges of 280g, 18 cartridges of 280g, 10 cartridges of 310g, 12 cartridges of 310g, 18 cartridges of 310g or 5 cartridges of 500g. **Pre-baited station (PP,PS,PVC)**: 2*10g or 3*10g in cardboard box of 2.5 kg, 3 kg, 3.5 kg, 4 kg, 4.5 kg and 5 kg

2.4.3.1 Use-specific instructions for use

- - Protect bait from the atmospheric conditions (e.g. rain, snow, etc.). Place the bait stations in areas not liable to flooding.
- The bait stations should be visited [for mice - at least every 2 to 3 days at] [for rats - only 5 to 7 days after] the beginning of the treatment and at least weekly afterwards, in order to check whether the bait is accepted, the bait stations are intact and to remove rodent bodies. Re-fill bait when necessary.
- Replace any bait in a bait station in which bait has been damaged by water or contaminated by dirt.
- [When available] Follow any additional instructions provided by the relevant code of best practice.

2.4.3.2 Use-specific risk mitigation measures

- Do not apply this product directly in the burrows.

2.4.3.3 Where specific to the use, the particulars of likely direct or indirect effects, first aid instructions and emergency measures to protect the environment

- When placing bait stations close to surface waters (e.g. rivers, ponds, water channels, dykes, irrigation ditches) or water drainage systems, ensure that bait contact with water is avoided.

2.4.3.4 Where specific to the use, the instructions for safe disposal of the product and its packaging

None

2.4.3.5 Where specific to the use, the conditions of storage and shelf-life of the product under normal conditions of storage

None

2.4.4 Use 4 appropriate after renewal of the authorisation – House mice and/or rats – trained professionals – indoor

Product Type(s)	14
Where relevant, an exact description of the use	Rodenticide
Target organism(s) (including development stage)	House mouse (*Mus musculus / Mus domesticus*) – adults and juveniles Brown rats (*Rattus norvegicus*) – adults and juveniles Roof rats (*Rattus rattus*) – adults and juveniles
Field(s) of use	Indoors
Application method(s)	Ready-to-use bait to be used in covered bait points or in tamper-resistant bait stations
Application rate(s) and frequency	Mice Low infestation – 20 - 30g bait in bait points every 5 metres High infestation – 20-30g bait in bait points every 2 metres Rats Low infestation – 60 - 100g bait in bait points every 10 metres High infestation – 60 - 100g bait in bait points every 5 metres Permanent baiting – Mice

	Low infestation – 20 - 30g bait in bait points every 5 metres High infestation – 20-30g bait in bait points every 2 metres Rats Low infestation – 60 - 100g bait in bait points every 10 metres High infestation – 60 - 100g bait in bait points every 5 metres
Category(ies) of users	Trained Professionals
Pack sizes and packaging material	Minimum pack size 2.5 kg **Grams of bait in individual sachet:** 10 **Packaging material and size:** **Bucket: (PP,PE)** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cardboard box with inner PE liner** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cartridge in PP**: 50 g, 100g, 150g, 200g, 250g, 260g , 270g, 280g, 310g, 500g Outer packaging - cardboard box with pack sizes of: 50 cartridges of 50g, 25 cartridges of 100g, 20 cartridges of 150g, 15 cartridges of 200g, 10 cartridges of 250g, 12 cartridges of 250g, 18 cartridges of 250g, 10 cartridges of 260g, 12 cartridges of 260g, 18 cartridges of 260g, 10 cartridges of 270g, 12 cartridges of 270g, 18 cartridges of 270g, 10 cartridges of 280g, 12 cartridges of 280g, 18 cartridges of 280g, 10 cartridges of 310g, 12 cartridges of 310g, 18 cartridges of 310g or 5 cartridges of 500g. **Pre-baited station (PP,PS,PVC)**: 2*10g or 3*10g in cardboard box of 2.5 kg, 3 kg, 3.5 kg, 4 kg, 4.5 kg and 5 kg

2.4.4.1 Use-specific instructions for use

- Remove the remaining product at the end of treatment period. - For outdoor use, baiting points must be covered and placed in strategic sites to minimise the exposure to non-target species For permanent baiting: - Where possible, it is recommended that the treated area is revisited every 4 weeks at the latest in order to avoid any selection of a resistant population. - [When available] Follow any additional instructions provided by the relevant code of best practice.-

2.4.4.2 Use-specific risk mitigation measures

- - Where possible, prior to the treatment inform any possible bystanders (e.g. users of the treated area and their surroundings) about the rodent control campaign *[in accordance with the applicable code of good practice, if any]*.
- - Consider preventive control measures (e.g. plug holes, remove potential food and drinking as far as possible) to improve product intake and reduce the likelihood of reinvasion.
- - To reduce risk of secondary poisoning, search for and remove dead rodents during treatment at frequent intervals, in line with the recommendations provided by the relevant code of best practice.
- Do not use the product in pulsed baiting treatments.

2.4.4.3 Where specific to the use, the particulars of likely direct or indirect effects, first aid instructions and emergency measures to protect the environment

When placing bait stations close to water drainage systems, ensure that bait contact with water is avoided.

2.4.4.4 Where specific to the use, the instructions for safe disposal of the product and its packaging

None

2.4.4.5 Where specific to the use, the conditions of storage and shelf-life of the product under normal conditions of storage

None

2.4.5 Use 5 appropriate after renewal of the authorisation – House mice and/or rats – trained professionals – outdoor around buildings

Product Type(s)	14

Where relevant, an exact description of the use	Rodenticide
Target organism(s) (including development stage)	House mouse (*Mus musculus* / *Mus domesticus*) – adults and juveniles Brown rats (*Rattus norvegicus*) – adults and juveniles Roof rats (*Rattus rattus*) – adults and juveniles
Field(s) of use	Outdoors around buildings
Application method(s)	Ready-to-use bait to be used in covered bait points or in tamper-resistant bait stations, or in direct application of ready-to-use bait into the burrow.
Application rate(s) and frequency	Mice Low infestation – 20 - 30g bait in bait points every 5 metres High infestation – 20-30g bait in bait points every 2 metres Rats Low infestation – 60 - 100g bait in bait points every 10 metres High infestation – 60 - 100g bait in bait points every 5 metres - In burrows: 60-100g of bait per burrow. Permanent baiting – Mice Low infestation – 20 - 30g bait in bait points every 5 metres High infestation – 20-30g bait in bait points every 2 metres Rats Low infestation – 60 - 100g bait in bait points every 10 metres High infestation – 60 - 100g bait in bait points every 5 metres
Category(ies) of users	Trained Professionals
Pack sizes and packaging material	Minimum pack size 2.5 kg **Grams of bait in individual sachet:** 10 **Packaging material and size:** **Bucket: (PP,PE)** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cardboard box with inner PE liner** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cartridge in PP**: 50 g, 100g, 150g, 200g, 250g, 260g , 270g, 280g, 310g, 500g Outer packaging - cardboard box with pack sizes of: 50 cartridges of 50g, 25 cartridges of 100g, 20 cartridges of 150g, 15 cartridges of 200g, 10 cartridges of 250g, 12 cartridges of 250g, 18 cartridges of 250g, 10 cartridges of 260g, 12 cartridges of 260g, 18 cartridges of 260g, 10 cartridges of 270g, 12 cartridges of 270g, 18 cartridges of 270g, 10 cartridges of 280g, 12 cartridges of 280g, 18 cartridges of 280g, 10 cartridges of 310g, 12 cartridges of 310g, 18 cartridges of

	310g or 5 cartridges of 500g. **Pre-baited station (PP,PS,PVC)**: 2*10g or 3*10g in cardboard box of 2.5 kg, 3 kg, 3.5 kg, 4 kg, 4.5 kg and 5 kg

2.4.5.1 Use-specific instructions for use

- - Protect bait from the atmospheric conditions. Place the baiting points in areas not liable to flooding.
- - Replace any bait in baiting points in which bait has been damaged by water or contaminated by dirt.
- - Remove the remaining product at the end of treatment period [Not applicable where explicitly authorised according to addenda 4].
- - [When available] Follow any additional instructions provided by the relevant code of best practice.
- -[For outdoor use, baiting points must be covered and placed in strategic sites to minimise the exposure to non-target species].
- [When available] Follow any additional instructions provided by the relevant code of best practice.
- For burrow baiting:
  -Baits must be placed to minimise the exposure to non-target species and children.
  - Cover or block the entrances of baited burrows to reduce the risks of bait being rejected and spilled.
  - [When available] Follow any additional instructions provided by the relevant code of best practice.
- For permanent baiting:
  - Where possible, it is recommended that the treated area is revisited every 4 weeks at the latest in order to avoid any selection of a resistant population.
  - [When available] Follow any additional instructions provided by the relevant code of best practice.

2.4.5.2 Use-specific risk mitigation measures

- Where possible, prior to the treatment inform any possible bystanders (e.g. users of the treated area and their surroundings) about the rodent control campaign [in accordance with the applicable code of good practice, if any].

- - Consider preventive control measures (plug holes, remove potential food and drinking as far as possible) to improve product intake and reduce the likelihood of reinvasion.
- - To reduce risk of secondary poisoning, search for and remove dead rodents during treatment at frequent intervals, in line with the recommendations provided by the relevant code of best practice.
- Do not use this product in pulsed baiting treatments.
- Permanent baiting is strictly limited to sites with a high potential for reinvasion when other methods of control have proven insufficient.
- The permanent baiting strategy shall be periodically reviewed in the context of integrated pest management (IPM) and the assessment of the risk for re-infestation.

2.4.5.3 Where specific to the use, the particulars of likely direct or indirect effects, first aid instructions and emergency measures to protect the environment

When placing bait points close to surface waters (e.g. rivers, ponds, water channels, dykes, irrigation ditches) or water drainage systems, ensure that bait contact with water is avoided.

2.4.5.4 Where specific to the use, the instructions for safe disposal of the product and its packaging

None

2.4.5.5 Where specific to the use, the conditions of storage and shelf-life of the product under normal conditions of storage

None

2.4.6 Use 6 appropriate after renewal of the authorisation – Rats – trained professionals – Outdoor open areas & waste dumps

Product Type(s)	14
Where relevant, an exact	Rodenticide

description of the use	
Target organism(s) (including development stage)	Brown rats (*Rattus norvegicus*) – adults and juveniles Roof rats (*Rattus rattus*) – adults and juveniles
Field(s) of use	Outdoor open areas & waste dumps
Application method(s)	Ready-to-use bait to be used in covered bait points or in tamper-resistant bait stations, or in direct application of ready-to-use bait into the burrow.
Application rate(s) and frequency	Rats Low infestation – 60 - 100g bait in bait points every 10 metres High infestation – 60 - 100g bait in bait points every 5 metres - In burrows: 60-100g of bait per burrow. Permanent baiting – Mice Low infestation – 20 - 30g bait in bait points every 5 metres High infestation – 20-30g bait in bait points every 2 metres Rats Low infestation – 60 - 100g bait in bait points every 10 metres High infestation – 60 - 100g bait in bait points every 5 metres
Category(ies) of users	Trained Professionals
Pack sizes and packaging material	Minimum pack size 2.5 kg **Grams of bait in individual sachet:** 10 **Packaging material and size:** **Bucket: (PP,PE)** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cardboard box with inner PE liner** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cartridge in PP**: 50 g, 100g, 150g, 200g, 250g, 260g , 270g, 280g, 310g, 500g Outer packaging - cardboard box with pack sizes of: 50 cartridges of 50g, 25 cartridges of 100g, 20 cartridges of 150g, 15 cartridges of 200g, 10 cartridges of 250g, 12 cartridges of 250g, 18 cartridges of 250g, 10 cartridges of 260g, 12 cartridges of 260g, 18 cartridges of 260g, 10 cartridges of 270g, 12 cartridges of 270g, 18 cartridges of 270g, 10 cartridges of 280g, 12 cartridges of 280g, 18 cartridges of 280g, 10 cartridges of 310g, 12 cartridges of 310g, 18 cartridges of 310g or 5 cartridges of 500g. **Pre-baited station (PP,PS,PVC)**: 2*10g or 3*10g in cardboard box of 2.5 kg, 3 kg, 3.5 kg, 4 kg, 4.5 kg and 5 kg

2.4.6.1 Use-specific instructions for use

- Protect bait from the atmospheric conditions. Place the bait stations in areas not liable to flooding.
- Replace any bait in baiting points in which bait has been damaged by water or contaminated by dirt.
- Remove the remaining product at the end of treatment period *[Not applicable where explicitly authorised according to addenda 4]*.
- *[When available]* Follow any additional instructions provided by the relevant code of best practice.
- [For outdoor use, baiting points must be covered and placed in strategic sites to minimise the exposure to non-target species].
- [When available] Follow any additional instructions provided by the relevant code of best practice.
•For burrow baiting:
-Baits must be placed to minimise the exposure to non-target species and children.
- Cover or block the entrances of baited burrows to reduce the risks of bait being rejected and spilled.
- [When available] Follow any additional instructions provided by the relevant code of best practice.

2.4.6.2 Use-specific risk mitigation measures

Where possible, prior to the treatment inform any possible bystanders (e.g. users of the treated area and their surroundings) about the rodent control campaign *[in accordance with the applicable code of good practice, if any]*.
- To reduce risk of secondary poisoning, search for and remove dead rodents during treatment at frequent intervals, in line with the recommendations provided by the relevant code of best practice.
- Do not use this product in pulsed baiting treatments.
For Burrow baiting:
- Where possible, prior to the treatment inform any possible bystanders about the rodent control campaign [in accordance with the applicable code of good practice, if any]

2.4.6.3 Where specific to the use, the particulars of likely direct or indirect effects, first aid instructions and emergency measures to protect the environment

When placing bait points close to surface waters (e.g. rivers, ponds, water channels, dykes, irrigation ditches) or water drainage systems, ensure that bait contact with water is avoided.

2.4.6.4 Where specific to the use, the instructions for safe disposal of the product and its packaging

None

2.4.6.5 Where specific to the use, the conditions of storage and shelf-life of the product under normal conditions of storage

None

2.5 General directions for use

2.5.1 Instructions for use

Professional - - Read and follow the product information as well as any information accompanying the product or provided at the point of sale before using it. - Carry out a pre-baiting survey of the infested area and an on-site assessment in order to identify the rodent species, their places of activity and determine the likely cause and the extent of the infestation. - Remove food which is readily attainable for rodents (e.g. spilled grain or food waste). Apart from this, do not clean up the infested area just before the treatment, as this only disturbs the rodent population and makes bait acceptance more difficult to achieve.

- The product should only be used as part of an integrated pest management (IPM) system, including, amongst others, hygiene measures and, where possible, physical methods of control.
- Consider preventive control measures (e.g. plug holes, remove potential food and drinking as far as possible) to improve product intake and reduce the likelihood of reinvasion.
- Bait stations should be placed in the immediate vicinity of places where rodent activity has been previously observed (e.g. travel paths, nesting sites, feedlots, holes, burrows etc.).
- Where possible, bait stations must be fixed to the ground or other structures.
- Bait stations must be clearly labelled to show they contain rodenticides and that they must not be moved or opened *(see section 5.3 for the information to be shown on the label)*.
- *[If national policy or legislation require it]* When the product is being used in public areas, the areas treated should be marked during the treatment period and a notice explaining the risk of primary or secondary poisoning by the anticoagulant as well as indicating the first measures to be taken in case of poisoning must be made available alongside the baits.
- Bait should be secured so that it cannot be dragged away from the bait station.
- Place the product out of the reach of children, birds, pets and farm animals and other non-target animals.
- Place the product away from food, drink and animal feeding stuffs, as well as from utensils or surfaces that have contact with these.
- Wear protective chemical resistant gloves during product handling phase (nitrile gloves EN 374-2).
- When using the product do not eat, drink or smoke. Wash hands and directly exposed skin after using the product.
- If bait uptake is low relative to the apparent size of the infestation, consider the replacement of bait stations to further places and the possibility to change to another bait formulation.
- If after a treatment period of 35 days baits are continued to be consumed and no decline in rodent activity can be observed, the likely cause has to be determined. Where other elements have been excluded, it is likely that there are resistant rodents so consider the use of a non-anticoagulant rodenticide, where available, or a more potent anticoagulant rodenticide. Also consider the use of traps as an alternative control measure.
- Remove the remaining bait or the bait stations at the end of the treatment period.

Trained Professional -

- Read and follow the product information as well as any information accompanying the product or provided at the point of sale before using it.
- Carry out a pre-baiting survey of the infested area and an on-site assessment in order to identify the rodent species, their places of activity and determine the likely cause and the extent of the infestation.

- Remove food which is readily attainable for rodents (e.g. spilled grain or food waste). Apart from this, do not clean up the infested area just before the treatment, as this only disturbs the rodent population and makes bait acceptance more difficult to achieve.
- The product should only be used as part of an integrated pest management (IPM) system, including, amongst others, hygiene measures and, where possible, physical methods of control.
- The product should be placed in the immediate vicinity of places where rodent activity has been previously explored (e.g. travel paths, nesting sites, feedlots, holes, burrows etc.).
- Where possible, bait stations must be fixed to the ground or other structures.
- Bait stations must be clearly labelled to show they contain rodenticides and that they must not be moved or opened (see section 5.3 for the information to be shown on the label).
- [If national policy or legislation requires it] When the product is being used in public areas, the areas treated should be marked during the treatment period and a notice explaining the risk of primary or secondary poisoning by the anticoagulant as well as indicating the first measures to be taken in case of poisoning must be made available alongside the baits.
- Bait should be secured so that it cannot be dragged away from the bait station.
- Place the product out of the reach of children, birds, pets and farm animals and other non-target animals.
- Place the product away from food, drink and animal feeding stuffs, as well as from utensils or surfaces that have contact with these.
- Wear protective chemical resistant gloves during product handling phase (nitrile gloves EN 374-2).
- When using the product do not eat, drink or smoke. Wash hands and directly exposed skin after using the product.
- The frequency of visits to the treated area should be at the discretion of the operator, in the light of the survey conducted at the outset of the treatment. That frequency should be consistent with the recommendations provided by the relevant code of best practice.
- If bait uptake is low relative to the apparent size of the infestation, consider the replacement of bait points to further places and the possibility to change to another bait formulation.
- If after a treatment period of 35 days baits are continued to be consumed and no decline in rodent activity can be observed, the likely cause has to be determined. Where other elements have been excluded, it is likely that there are resistant rodent so consider the use of a non-anticoagulant rodenticide, where available, or a more potent anticoagulant rodenticide. Also consider the use of traps as an alternative control measure.

2.5.2 Risk mitigation measures

Professional -

- Where possible, prior to the treatment inform any possible bystanders (e.g. users of the treated area and their surroundings) about the rodent control campaign [in accordance with the applicable code of good practice, if any]".
- To reduce risk of secondary poisoning, search for and remove dead rodents at frequent intervals during treatment (e.g. at least twice a week). [Where relevant, specify if more frequent or daily inspection is required].
- Products shall not be used beyond 35 days without an evaluation of the state of the infestation and of the efficacy of the treatment.
- Do not use baits containing anticoagulant active substances as permanent baits for the prevention of rodent infestation or monitoring of rodent activities.
- The product information (i.e. label and/or leaflet) shall clearly show that:
the product shall not be supplied to the general public (e.g. "for professionals only").
the product shall be used in adequate tamper resistant bait stations (e.g. "use in tamper resistant bait stations only").
users shall properly label bait stations with the information referred to in section 5.3 of the SPC (e.g. label bait stations according to the product recommendations").
- Using this product should eliminate rodents within 35 days. The product information (i.e. label and/or leaflet) shall clearly recommend that in case of suspected lack of efficacy by the end of the treatment (i.e. rodent activity is still observed), the user should seek advice from the product supplier or call a pest control service.
- Do not wash the bait stations with water between applications.
- Dispose dead rodents in accordance with local requirements [The method of disposal shall be described specifically in the national SPC and be reflected on the product label].

Trained Professional –

- Where possible, prior to the treatment inform any possible bystanders about the rodent control campaign [in accordance with the applicable code of good practice, if any]".
- The product information (i.e. label and/or leaflet) shall clearly show that the product shall only be supplied to trained professional users holding certification demonstrating compliance with the applicable training requirements (e.g. "for trained professionals only".
- Do not use in areas where resistance to the active substance can be suspected.
- Products shall not be used beyond 35 days without an evaluation of the state of the infestation and of the efficacy of the treatment [unless authorised for permanent baiting treatments].
- Do not rotate the use of different anticoagulants with comparable or weaker potency for resistance management purposes. For rotational use, consider using a non-anticoagulant rodenticide, if available, or a more potent anticoagulant.
- Do not wash the bait stations or utensils used in covered and protected bait points with water between applications.

- Dispose dead rodents in accordance with local requirements [The method of disposal shall be described specifically in the national SPC and be reflected on the product label].

2.5.3 Particulars of likely direct or indirect effects, first aid instructions and emergency measures to protect the environment

This product contains an anticoagulant substance. If ingested, symptoms, which may be delayed, may include nosebleed and bleeding gums. In severe cases, there may be bruising and blood present in the faeces or urine.
Antidote: Vitamin K1 administered by medical/veterinary personnel only.

In case of: Dermal exposure, wash skin with water and then with water and soap.
Eye exposure, rinse eyes with eyes-rinse liquid or water, keep eyes lids open at least 10 minutes.
Oral exposure, rinse mouth carefully with water. Never give anything by mouth to unconscious person. Do not provoke vomiting. If swallowed, seek medical advice immediately and show the product's container or label.
Contact a veterinary surgeon in case of ingestion by a pet.

Bait stations must be labelled with the following information: "do not move or open"; "contains a rodenticide"; "product name or authorisation number"; "active substance(s)" and "in case of incident, call a poison centre [insert national phone number]".

Hazardous to wildlife.

2.5.4 Instructions for safe disposal of the product and its packaging

At the end of the treatment, dispose of uneaten bait and the packaging in accordance with local requirements.

2.5.5 Conditions of storage and shelf-life of the product under normal conditions of storage

Shelf-life: 24 months

Store in a dry, cool and well ventilated place. Keep the container closed and away from direct sunlight.

Store in places prevented from the access of children, birds, pets and farm animals.

Keep only in original container.

2.5.6 Other information

Because of their delayed mode of action, anticoagulant rodenticides may take from 4 to 10 days to be effective after consumption of the bait. Rodents can be disease carriers. Do not touch dead rodents with bare hands, use gloves or use tools such as tongs when disposing them. This product contains a bittering agent and a dye.

2.5.7 Documentation

2.5.7.1 Data submitted in relation to product application

Please see General Annexes section 4.1

2.5.7.2 Access to documentation

The applicant supported the evaluation of the active substance at EU level and has full access to the documents submitted by the taskforce for the EU review programme.

3 Assessment of the product

3.1 Proposed Uses

3.1.1 Use 1 – House mice – professionals – indoor

Product Type(s)	14
Where relevant, an exact description of the use	Rodenticide
Target organism(s) (including development stage)	House mouse (*Mus musculus* / *Mus domesticus*) – adults and juveniles
Field(s) of use	Indoors
Application method(s)	Ready-to-use bait to be used in tamper-resistant bait stations
Application rate(s) and frequency	Mice Low infestation – 20 - 30g bait in bait points every 5 metres High infestation – 20 - 30g bait in bait points every 2 metres
Category(ies) of users	Professionals
Pack sizes and packaging material	Minimum pack size 2.5 kg **Grams of bait in individual sachet:** 10

	Packaging material and size: **Bucket: (PP,PE)** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cardboard box with inner PE liner** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cartridge in PP**: 50 g, 100g, 150g, 200g, 250g, 260g , 270g, 280g, 310g, 500g Outer packaging - cardboard box with pack sizes of: 50 cartridges of 50g, 25 cartridges of 100g, 20 cartridges of 150g, 15 cartridges of 200g, 10 cartridges of 250g, 12 cartridges of 250g, 18 cartridges of 250g, 10 cartridges of 260g, 12 cartridges of 260g, 18 cartridges of 260g, 10 cartridges of 270g, 12 cartridges of 270g, 18 cartridges of 270g, 10 cartridges of 280g, 12 cartridges of 280g, 18 cartridges of 280g, 10 cartridges of 310g, 12 cartridges of 310g, 18 cartridges of 310g or 5 cartridges of 500g. **Pre-baited station (PP,PS,PVC)**: 2*10g or 3*10g in cardboard box of 2.5 kg, 3 kg, 3.5 kg, 4 kg, 4.5 kg and 5 kg

3.1.2 Use 2 – Rats – professionals – indoor

Product Type(s)	14
Where relevant, an exact description of the use	Rodenticide
Target organism(s) (including development stage)	Brown rats (*Rattus norvegicus*) – adults and juveniles Roof rats (*Rattus rattus*) – adults and juveniles
Field(s) of use	Indoors
Application method(s)	Ready-to-use bait to be used in tamper-resistant bait stations
Application rate(s) and frequency	Rats Low infestation – 60 - 100g bait in bait points every 10 metres High infestation – 60 - 100g bait in bait points every 5 metres
Category(ies) of users	Professionals
Pack sizes and packaging material	Minimum pack size 2.5 kg **Grams of bait in individual sachet:** 10 **Packaging material and size:** **Bucket: (PP,PE)** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10)

	Cardboard box with inner PE liner 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cartridge in PP**: 50 g, 100g, 150g, 200g, 250g, 260g , 270g, 280g, 310g, 500g Outer packaging - cardboard box with pack sizes of: 50 cartridges of 50g, 25 cartridges of 100g, 20 cartridges of 150g, 15 cartridges of 200g, 10 cartridges of 250g, 12 cartridges of 250g, 18 cartridges of 250g, 10 cartridges of 260g, 12 cartridges of 260g, 18 cartridges of 260g, 10 cartridges of 270g, 12 cartridges of 270g, 18 cartridges of 270g, 10 cartridges of 280g, 12 cartridges of 280g, 18 cartridges of 280g, 10 cartridges of 310g, 12 cartridges of 310g, 18 cartridges of 310g or 5 cartridges of 500g. **Pre-baited station (PP,PS,PVC)**: 2*10g or 3*10g in cardboard box of 2.5 kg, 3 kg, 3.5 kg, 4 kg, 4.5 kg and 5 kg

3.1.3 Use 3 - House mice and/or rats – professionals – outdoor around buildings

Product Type(s)	14
Where relevant, an exact description of the use	Rodenticide
Target organism(s) (including development stage)	House mouse (*Mus musculus* / *Mus domesticus*) – adults and juveniles Brown rats (*Rattus norvegicus*) – adults and juveniles Roof rats (*Rattus rattus*) – adults and juveniles
Field(s) of use	Outdoors around buildings
Application method(s)	Ready-to-use bait to be used in tamper-resistant bait stations
Application rate(s) and frequency	Mice Low infestation – 20 - 30g bait in bait points every 5 metres High infestation – 20-30g bait in bait points every 2 metres Rats Low infestation – 60 - 100g bait in bait points every 10 metres High infestation – 60 - 100g bait in bait points every 5 metres
Category(ies) of users	Professionals
Pack sizes and packaging material	Minimum pack size 2.5 kg **Grams of bait in individual sachet:** 10 **Packaging material and size:** **Bucket: (PP,PE)** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10)

	Cardboard box with inner PE liner 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cartridge in PP**: 50 g, 100g, 150g, 200g, 250g, 260g , 270g, 280g, 310g, 500g Outer packaging - cardboard box with pack sizes of: 50 cartridges of 50g, 25 cartridges of 100g, 20 cartridges of 150g, 15 cartridges of 200g, 10 cartridges of 250g, 12 cartridges of 250g, 18 cartridges of 250g, 10 cartridges of 260g, 12 cartridges of 260g, 18 cartridges of 260g, 10 cartridges of 270g, 12 cartridges of 270g, 18 cartridges of 270g, 10 cartridges of 280g, 12 cartridges of 280g, 18 cartridges of 280g, 10 cartridges of 310g, 12 cartridges of 310g, 18 cartridges of 310g or 5 cartridges of 500g. **Pre-baited station (PP,PS,PVC)**: 2*10g or 3*10g in cardboard box of 2.5 kg, 3 kg, 3.5 kg, 4 kg, 4.5 kg and 5 kg

3.1.4 Use 4 - House mice and/or rats – trained professionals – indoor

Product Type(s)	14
Where relevant, an exact description of the use	Rodenticide
Target organism(s) (including development stage)	House mouse (*Mus musculus / Mus domesticus*) – adults and juveniles Brown rats (*Rattus norvegicus*) – adults and juveniles Roof rats (*Rattus rattus*) – adults and juveniles
Field(s) of use	Indoors
Application method(s)	Ready-to-use bait to be used in covered bait points or in tamper-resistant bait stations
Application rate(s) and frequency	Mice Low infestation – 20 - 30g bait in bait points every 5 metres High infestation – 20-30g bait in bait points every 2 metres Rats Low infestation – 60 - 100g bait in bait points every 10 metres High infestation – 60 - 100g bait in bait points every 5 metres
Category(ies) of users	Trained Professionals
Pack sizes and packaging material	Minimum pack size 2.5 kg **Grams of bait in individual sachet:** 10 **Packaging material and size:** **Bucket: (PP,PE)** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10)

	Cardboard box with inner PE liner 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cartridge in PP**: 50 g, 100g, 150g, 200g, 250g, 260g , 270g, 280g, 310g, 500g Outer packaging - cardboard box with pack sizes of: 50 cartridges of 50g, 25 cartridges of 100g, 20 cartridges of 150g, 15 cartridges of 200g, 10 cartridges of 250g, 12 cartridges of 250g, 18 cartridges of 250g, 10 cartridges of 260g, 12 cartridges of 260g, 18 cartridges of 260g, 10 cartridges of 270g, 12 cartridges of 270g, 18 cartridges of 270g, 10 cartridges of 280g, 12 cartridges of 280g, 18 cartridges of 280g, 10 cartridges of 310g, 12 cartridges of 310g, 18 cartridges of 310g or 5 cartridges of 500g. **Pre-baited station (PP,PS,PVC)**: 2*10g or 3*10g in cardboard box of 2.5 kg, 3 kg, 3.5 kg, 4 kg, 4.5 kg and 5 kg

3.1.5 Use 5 - House mice and/or rats – trained professionals – outdoor around buildings

Product Type(s)	14
Where relevant, an exact description of the use	Rodenticide
Target organism(s) (including development stage)	House mouse (*Mus musculus* / *Mus domesticus*) – adults and juveniles Brown rats (*Rattus norvegicus*) – adults and juveniles Roof rats (*Rattus rattus*) – adults and juveniles
Field(s) of use	Outdoors around buildings
Application method(s)	Ready-to-use bait to be used in covered bait points or in tamper-resistant bait stations
Application rate(s) and frequency	Mice Low infestation – 20 - 30g bait in bait points every 5 metres High infestation – 20-30g bait in bait points every 2 metres Rats Low infestation – 60 - 100g bait in bait points every 10 metres High infestation – 60 - 100g bait in bait points every 5 metres
Category(ies) of users	Trained Professionals
Pack sizes and packaging material	Minimum pack size 2.5 kg **Grams of bait in individual sachet:** 10 **Packaging material and size:** **Bucket: (PP,PE)** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10)

	Cardboard box with inner PE liner 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cartridge in PP**: 50 g, 100g, 150g, 200g, 250g, 260g , 270g, 280g, 310g, 500g Outer packaging - cardboard box with pack sizes of: 50 cartridges of 50g, 25 cartridges of 100g, 20 cartridges of 150g, 15 cartridges of 200g, 10 cartridges of 250g, 12 cartridges of 250g, 18 cartridges of 250g, 10 cartridges of 260g, 12 cartridges of 260g, 18 cartridges of 260g, 10 cartridges of 270g, 12 cartridges of 270g, 18 cartridges of 270g, 10 cartridges of 280g, 12 cartridges of 280g, 18 cartridges of 280g, 10 cartridges of 310g, 12 cartridges of 310g, 18 cartridges of 310g or 5 cartridges of 500g. **Pre-baited station (PP,PS,PVC)**: 2*10g or 3*10g in cardboard box of 2.5 kg, 3 kg, 3.5 kg, 4 kg, 4.5 kg and 5 kg

3.1.6 Use 6 - Rats – trained professionals – Outdoor open areas & waste dumps

Product Type(s)	14
Where relevant, an exact description of the use	Rodenticide
Target organism(s) (including development stage)	Brown rats (*Rattus norvegicus*) – adults and juveniles Roof rats (*Rattus rattus*) – adults and juveniles
Field(s) of use	Outdoor open areas & waste dumps
Application method(s)	Ready-to-use bait to be used in covered bait points or in tamper-resistant bait stations
Application rate(s) and frequency	Rats Low infestation – 60 - 100g bait in bait points every 10 metres High infestation – 60 - 100g bait in bait points every 5 metres
Category(ies) of users	Trained Professionals
Pack sizes and packaging material	Minimum pack size 2.5 kg **Grams of bait in individual sachet:** 10 **Packaging material and size:** **Bucket: (PP,PE)** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10) **Cardboard box with inner PE liner** 10 g: 2.5 kg (250*10), 3 kg (300*10), 3.5 kg (350*10), 4 kg (400*10), 4.5 kg (450*10), 5 kg (500*10), 5.5 kg (550*10), 6 kg (600*10), 6.5 kg (650*10), 7 kg (700*10), 7.5 kg (750*10), 8 kg (800*10), 8.5 kg (850*10), 9 kg (900*10), 9.5 kg (950*10), 10 kg (1000*10)

	Cartridge in PP: 50 g, 100g, 150g, 200g, 250g, 260g , 270g, 280g, 310g, 500g Outer packaging - cardboard box with pack sizes of: 50 cartridges of 50g, 25 cartridges of 100g, 20 cartridges of 150g, 15 cartridges of 200g, 10 cartridges of 250g, 12 cartridges of 250g, 18 cartridges of 250g, 10 cartridges of 260g, 12 cartridges of 260g, 18 cartridges of 260g, 10 cartridges of 270g, 12 cartridges of 270g, 18 cartridges of 270g, 10 cartridges of 280g, 12 cartridges of 280g, 18 cartridges of 280g, 10 cartridges of 310g, 12 cartridges of 310g, 18 cartridges of 310g or 5 cartridges of 500g. **Pre-baited station (PP,PS,PVC)**: 2*10g or 3*10g in cardboard box of 2.5 kg, 3 kg, 3.5 kg, 4 kg, 4.5 kg and 5 kg

3.2 Physical, chemical and technical properties

No new data was provided nor had new guidance to be taken into account for the renewal evaluation. Accordingly, the conclusion from the former assessment regarding physical, chemical and technical properties remains valid.

The conclusion of the 2 year shelf life study is reported below.

<table>
<tr>
<td>Shelf life (storage ambient temperatures)</td>
<td>GIFAP monograph no17.</td>
<td>
Physical State:
<table>
<tr><th>Aspect</th><th>Odour</th><th>Colour</th></tr>
<tr><td>Malleable paste</td><td>Slight odour of hazelnut</td><td>10GY7/6</td></tr>
<tr><td>Malleable paste</td><td>Slight odour of hazelnut</td><td>10GY7/6</td></tr>
<tr><td>Malleable paste</td><td>Slight odour of hazelnut</td><td>10GY7/6</td></tr>
</table>
Content of active substance:
<table>
<tr><th></th><th>Active ingredient content (ppm)</th><th>Deviation from T_0</th></tr>
<tr><td>T_0</td><td>45.1</td><td>-</td></tr>
<tr><td>$T_{1\ year}$</td><td>41.7</td><td>-7.54 %</td></tr>
<tr><td>$T_{2\ year}$</td><td>465</td><td>3.10 %</td></tr>
</table>
Note: The declared value of the active substance was 50 mg/kg.
</td>
<td>Carried out to GLP. The results are acceptable.</td>
<td>“Chemical stability of Bromadiolone paste bait stored for 2 years under 20^{o}C conditions”. Study no. LODI.44/2011. 2012-07-17. Sandra Richerioux.</td>
</tr>
</table>

3.3 Physical hazards and respective characteristics

No new data was provided, nor had new guidance to be taken into account for the renewal evaluation. Accordingly, the conclusion from the former assessment regarding physical hazards and respective characteristics remains valid.

3.4 Methods for detection and identification

No new data was provided, nor had new guidance to be taken into account for the renewal evaluation. Accordingly, the conclusion from the former assessment regarding methods for detection and identification remains valid.

3.5 Efficacy against target organisms

The results from laboratory palatability and efficacy studies and field trials previously evaluated demonstrate that the product is both palatable to, and effective in controlling target populations of rats (*Rattus norvegicus* and *Rattus rattus*) and house mice (*Mus musculus/domesticus*) when applied according to the label advice. Jade Paste proved to be both attractive to and effective against infestations of rats and house mice in the trials and achieved excellent control of the infestations treated based upon census baiting and tracking data.

Resistance to the first generation anticoagulants has been widely reported in both *Rattus norvegicus* and *Mus domesticus* since the late 1950's. The incidence of resistance to first generation anticoagulants in areas in which it is established is commonly 25-85%.
The enzyme vitamin K 2, 3 epoxide reductase (VKOR) is the target for anticoagulants. Modifications in the protein structure due to polymorphisms on the gene coding the VKOR may induce anticoagulant resistance. Most resistant strains are characterised by one single nucleotide polymorphism (SNP). These SNPs cause the exchange of one amino acid in the VKOR enzyme. The biochemical mechanism of anticoagulant resistance has been studied in several geographic strains/VKORC1-variants of the Norway rat. Amino acid substitutions in the VKOR seem to alter its structure and function, resulting in decreased sensitivity to anticoagulant inhibition, depending on strain characteristics.
For house mice, a dominant autosomal warfarin-resistance gene was determined on chromosome 7 in house mice. Three VKORC1 sequence variants mediating resistance to anticoagulants seem to be widely distributed. House Mice carrying the homozygous of one of these variants (Y139C) were found highly resistant to warfarin and bromadiolone.

For roof rats, experiments on warfarin resistant rats indicated considerable instability in the resistance and suggested a multifactorial basis for resistance.

Some degree of resistance to difenacoum has been reported in the UK, Denmark, France and Germany but this is usually found in certain populations of rodents highly resistant to first generation anti-coagulants (Greaves et al., 1982[7]; Lund, 1984[8]; Pelz et al. 1995[9]). The resistance factor tells how much the anticoagulant dose has to be multiplied to kill resistant individuals compared to sensitive ones. The resistant factors for difenacoum in the brown rats ranged from 1.1 to 8.6 (Greaves and Cullen-Ayres 1988[10]). The study included rats resistant to warfarin and difenacoum. Resistance factors for warfarin ranged from approx. 50 to 2300. Greaves et al. (1982) reported a fivefold difenacoum dose needed to kill difenacoum resistant rats. Considerable doubt exists as to the significance of reports in UK of resistance to second-generation anticoagulants and in the UK control failures with the second-generation products are increasingly being attributed to baiting problems rather than physiological resistance (Greaves and Cullen Ayres, 1988; Quy et al. 1992a,b[11]).

Studies carried out in different European countries, in the UK more particularly (Kerins et al, 2001; see annex 1) revealed the occasional occurrence of cross-resistances to second-generation anticoagulants, such as difenacoum and bromadiolone on resistant brown rats populations to coumafene. Moreover, a publication (Baer et al., 2012) has demonstrated that the majority (91%) of warfarin resistant rat trapped in East and West parts of Belgium were also resistant to bromadiolone. The rats trapped in the region of Flanders (Northern Belgium) carried mutation Y139F. This mutation is found extensively in France where it also confers resistance to bromadiolone (Grandemange et al., 2009). The same mutation was also found in UK (Prescott et al., 2011) where applications of bromadiolone had been unsuccessful. Difenacoum is also thought to be partially resisted by rats which carry Y139F.

House mice carrying the homozygous Y139C sequence variant were found to be highly resistant to warfarin and bromadiolone. It is important to understand that all known resistance mutations, in both rats and mice, are capable of effective control with applications of the most potent second-generation anticoagulants (brodifacoum, difethialone and flocoumafen) and that no practical resistance to any of these active substances is presently known.

So, resistance to second generation anticoagulant rodenticides should not be underestimated.

7 Greaves J. H.; Shepherd D. S.; Gill, J. E. (1982): An investigation of difenacoum resistance in Norway rat populations in Hampshire. *Annals of Applied Biology* 100, 581–587.

8 LUND, M. (1984): Resistance to the second generation anticoagulant rodenticides. *In Proceedings of 11th vertebrate pest conference*, Sacramento, Ca. March 6-8, 1984: 89-94.

9 Pelz H-J, Ha¨nisch D, Lauenstein G (1995) Resistance to anticoagulant rodenticides in Germany and future strategies to control *Rattus norvegicus. Pestic Sci* 43, 61–67

10 Greaves J. H.; Cullen-Ayres P. B. (1988): Genetics of difenacoum resistance in the rat. In: J. W. Suttie (Ed.), Current advances in vitamin K research, Elsevier, N.Y., 381–388.

11 Quy R.J., Shepherd D.S., Inglis I.R. (1992): Bait avoidance and effectiveness of anticoagulant rodenticides against warfarin- and difenacoum-resistant populations of Norway rats (Rattus norvegicus). *Crop Protection*, Volume 11, Issue 1, February 1992, Pages 14-20

An exhaustive study carried out at the French and European levels could enable to point-out resistant areas with first generation anticoagulants and potential cross-resistances to second-generation anticoagulants. It is one of the actions undertaken since 2010 in France by a group of scientists (Rodent program “impacts of anticoagulants rodenticides on ecosystems-adaptations of target rodents and effects on their predators”).

The document CropLife International (RRAC 2015) provides guidance to advisors, national authorities, professionals, practitioners and others on the nature of anticoagulant resistance in rodents, the identification of anticoagulant resistance, strategies for rodenticide application that will avoid the development of resistance and the management of resistance where it occurs.

The following are the essential elements of an effective program: survey, use of physical and chemical control techniques, environmental management, record keeping, monitoring and review.

The authorization holder should report any observed resistance incidents to the Competent Authorities or other appointed bodies involved in resistance management at the renewal of the product.

To ensure a satisfactory level of efficacy and avoid the development of resistance, the recommendations proposed in the SPC have to be implemented.

3.6 Risk assessment for human health

A dermal absorption value of 0.7% was used for bromadiolone for the paste product based on reinterpretation of the original dermal absorption study presented in the CAR for bromadiolone using EFSA Guidance on dermal absorption (2012) .

3.6.1 Assessment of effects of the active substance on human health

See section 3.6.3.

3.6.2 Assessment of effects of the product on human health

See section 3.6.3.

3.6.3 Exposure assessment

The chronic AEL ($1.2x10^{-6}$ mg/kg bw/day) has been used for the trained and non-trained professional users. The risk assessment has been conducted using a DA of 0.7% and the HEEG recommendations 9, 10 and 12. The risk assessment used a critical usage of 100g of paste in sachets of 10g for both trained and non-trained professional users. A reverse

reference calculation was used to determine the amount of loose paste product required to remain on hands with and without PPE to exceed 100% of the AEL.

For the 'transient mouthing of poison bait' scenario, 10 mg (TNsG, with bittering agent/repellent) of the product is assumed to be swallowed by an infant per poisoning event as stated in: The Human Exposure to Biocidal Products (Technical Notes for Guidance – June 2002). The weight of the infant is assumed to be 10 Kg. The risk assessment for toddlers used the acute AEL of 2.3×10^{-6} mg/kg bw/day. An oral absorption of 100% was assumed in the mouthing scansions for the toddler risk assessment.

Biocidal Exposure Risk assessment for Jade paste bromadiolone rodenticide (50 ppm).

Professional user

	Paste
Without PPE	1662.6% of AEL (0.00002 mg/kg bw/day)
With PPE	83.1% of AEL (0.000000998 mg/kg bw/day)
Cartridge and spatula application Without PPE	3940 mg of loose paste product requirted to remain on hands to exceed 100% of the AEL
Cartridge and spatula application With PPE	7.88 g of loose paste product required to remain on hands to exceed 100% of the AEL
Carthage application	

Non-trained professional user (farmer)

	Paste
Without PPE	148.9% of AEL (0.00000179 mg/kg bw/day)
With PPE	7.4% of AEL (0.0000000894 mg/kg bw/day)

Exposure to children (Toddler)

	Paste
Oral exposure -treated with repellent	2173.9% AEL

	(0.00005 mg/kg bw/day)
Oral exposure - without repellent	1086956.2% AEL (0.025 mg/kg bw/day)

Derived values indicated a no safe usage scenario for professional users handling the bromadiolone paste product without PPE and a safe usage scenario with PPE. Derived values for professional users handling the paste product without PPE were 0.00002 mg/kg bw/day (1662.6% AEL). Derived values for professional users handling the paste product with PPE were 0.000000998 mg/kg bw/day (83.1% AEL).

Derived values for professional users handling the paste product cartridge without PPE indicated that 394 mg of product remaining on operators hands would exceed 100% of the AEL. However, if PPE are utilised as recommended the amount of loose paste product required to remain in hands to exceed 100% would be 7.8 g.Derived values indicated safe usage for non-trained professional users handling the paste product with and without PPE. Derived values for non-trained professional users handling the paste product without PPE were 0.00000179mg/kg bw/day (148.9% AEL). Derived values for non-trained professional users handling the paste product with PPE were 0.0000000894mg/kg bw/day (7.4% AEL).

Derived values indicated no safe exposure scenarios for toddlers through oral exposure/transient mouthing of the paste product. Derived values for oral exposures in the toddler found transient mounting of a paste not containing a repellent to result in a dose of 0.00005 mg/kg bw/day (2173.9% AEL). Derived values for oral exposures in the toddler found transient mounting of a paste containing a repellent to result in a dose of 0.025 mg/kg bw/day (1086956.2% AEL). However, the design of the rat bait boxes will incorporate a tamper-proof seal system to prevent easy access to internal compartments. As a result of incorporating a tamper proof seal system toddlers are not expected to be able to gain access to the rodenticides and subsequent mouthing scenarios are deemed unlikely.

3.6.4 Risk characterisation for human health

3.6.4.1 Risk for professional users

As shown in section 3.6.2.

3.6.4.2 Risk for the general public

Not relevant.

3.6.4.3 Risk for consumers via residues in food

No new data was provided nor had new guidance to be taken into account for the renewal evaluation. Accordingly, the conclusion from the former assessment regarding risks for consumers via residues in food remain valid.

3.6.4.4 Risk characterisation from combined exposure to several active substances or substances of concern within a biocidal product[12]

The biocidal product does not contain other substances in quantities that would be of toxicological concern in the production formulation.

3.6.4.5 Summary of risk characterisation

Derived values indicated a no safe usage scenario for professional users handling the bromadiolone paste product without PPE and a safe usage scenario with PPE. Derived values for professional users handling the paste product without PPE were 0.00002 mg/kg bw/day (1662.6% AEL). Derived values for professional users handling the paste product with PPE were 0.000000998 mg/kg bw/day (83.1% AEL).

Derived values for professional users handling the paste product cartridge without PPE indicated that 394 mg of product remaining on operators hands would exceed 100% of the AEL. However, if PPE are utilised as recommended the amount of loose paste product required to remain in hands to exceed 100% would be 7.8 g.

Derived values indicated safe usage for non-trained professional users handling the paste product with and without PPE. Derived values for non-trained professional users handling the paste product without PPE were 0.00000179mg/kg bw/day (148.9% AEL). Derived values for non-trained professional users handling the paste product with PPE were 0.0000000894mg/kg bw/day (7.4% AEL).
Derived values indicated no safe exposure scenarios for toddlers through oral exposure/transient mouthing of the paste product. Derived values for oral exposures in the toddler found transient mounting of a paste not containing a repellent to result in a dose of 0.00005 mg/kg bw/day (2173.9% AEL). Derived values for oral exposures in the toddler found transient mounting of a paste containing a repellent to result in a dose of 0.025 mg/kg bw/day (1086956.2% AEL). However, the design of the rat bait boxes will incorporate a tamper-proof seal system to prevent easy access to internal compartments. As a result of incorporating a tamper proof seal system toddlers are not expected to be able to gain access to the rodenticides and subsequent mouthing scenarios are deemed unlikely.

3.7 Risk assessment for animal health

No new data was provided, nor had new guidance to be taken into account for the renewal evaluation. Accordingly, the conclusion from the former assessment regarding animal health remains valid.

3.8 Risk assessment for the environment

The exposure assessment carried out for this product in 2013 is still valid. Regarding groundwater, the recent CG decision requires this now be assessed:

Groundwater assessment for rodenticides
As required by Article 31(3) of the BPR and Article 2(1)(f) of Regulation 492/2014, when carrying out their assessment of whether the conclusions of the first authorisation regarding Article 19(1)(iv) remain valid, applicants will have to address the groundwater assessment. Since no new guidance was agreed in the past that could become applicable at the time of the completion of the applications for renewal by 28/02/2017, the guidance of reference are the existing methods that are applied since years as standard tools for the assessment of active substances:
- Tier I according to Vol. IV Part B (the former TGD), as provided in chapter 2.3.8.6 of this guidance document.
- Tier II using the FOCUS models PEARL or PELMO for refinements in case Tier I would lead to an exceedance of the relevant trigger values.

The previous exposure assessment contained a Tier 1 assessment of groundwater PECs. The following is an extract from the report:

Exposure of groundwater may occur as a result of soil exposure which occurs via residues present in sewage sludge after using the product in sewers and via direct (spillages) and disperse release (urine and faeces) after the use of the product in the scenarios in and around buildings, open areas and waste dumps. As an indication for potential groundwater levels, the concentration in soil porewater in the various scenarios was examined. It should be noted that this is a worst-case assumption, neglecting transformation and dilution in deeper soil layers. A summary of the PECs obtained are presented in the table below. The calculated value for the open areas scenario exceeds the EU trigger value of 0.1 µg/L. However this figure is derived from a soil concentration value in a small localised area in the immediate vicinity of the baiting point. When taken in the context of a larger area (field, park, etc.) this figure would be several orders of magnitude lower. The same argument applies to the figure calculated for the in and around buildings scenario which is driven principally by direct release in the vicinity of the baiting point. In addition it must be noted that these two scenarios give a value for groundwater under industrial soil – not agricultural soil as specified by the ESD.

Scenario	*In and around buildings*		*Open area*	*Waste dumps*	
	Worst case	*Realistic*		*Worst case*	*Realistic*
PEC groundwater (mg/l)	*2.55E-04*	*5.30E-05*	*9.43E-04*	*4.45E-05*	*1.11E-05*

As the values for the open areas scenario and the in and around buildings scenario exceed the trigger (0.943μg/L and 0.255μg/L) the eCA has performed a Tier II assessment using FOCUS PEARL v4.4.4. The open areas scenario is clearly the worst case and will be used to cover the risk from the in and around buildings scenario as well. The PT14 ESD describes placement of the grain bait at the bottom of a cylindrical hole of radius 4cm and depth 30cm. A larger soil cylinder of radius 28cm is assumed to be exposed to the bait. From the soil exposure performed in the 2013 evaluation, 0.0025g of active substance is deposited each campaign (Elocalsoil). The base of the cylinder has an area of $0.062m^2$ (π x 0.14^2). 0.0025g spread over an area of $0.062m^2$ gives an application rate of $0.0406gm^{-2}$ or $0.406kgha^{-1}$. This application rate assumes the bait is placed uniformly across the field or park. In reality bait is placed in specific burrows at distances of 5m or greater where rodents are active. Therefore the actual use rate will be considerably lower than 0.406kg/ha. The ESD proposes a 6 day campaign during which the rodenticide is applied. This allows for a possibility of approximately 50 campaign per year. Again this is likely to be significantly greater than the actual number of campaigns per year so our assessment is expected to be highly conservative in nature. The input parameters are summarised below:

Input parameter	**Unit**	**Bromadiolone**
Physicochemical parameters		
Molecular weight	$g\ mol^{-1}$	527.4
Water solubility	$mg\ L^{-1}$	12.5 (25°C)
Molar enthalpy of dissolution	$kJ\ mol^{-1}$	27 (default)
Saturated vapour pressure	Pa	2.13E-08 (25°C)
Molar enthalpy of vaporisation	$kJ\ mol^{-1}$	95 (default)
Diffusion coefficient in water	$m^2\ d^{-1}$	4.3E-05 (default)
Diffusion coefficient in air	$m^2\ d^{-1}$	0.43 (default)
Degradation parameters		
Half-life at reference condition	d	23.6 (20°C)
Molar activation energy	$kJ\ mol^{-1}$	65.4 (default)
Exponent for the effect of liquid	-	0.7 (default)
Sorption parameters		

Kom value (=Koc/1.724)	L kg^{-1}	6028.4
Freundlich exponent 1/n	-	1.0 (worst case assumption)
Method of subroutine	-	pH independent
Crop related parameters		
FOCUS crop	-	Grassland
Crop uptake factor	-	0
Application parameters		
Number of applications per annum	-	50
Application rate	kg ha^{-1}	0.406
Application type	-	Injection at 30 cm
Number of applications per annum	-	50

The 80th percentile PEC_{GW} values are shown below. Based on this assessment it can be concluded that there is no risk to groundwater from use of the product.

PEARL SCENARIO	**$PEC_{groundwater}$ (µg/L)**
Châteaudun	<0.001
Hamburg	<0.001
Jokioinen	<0.001
Kremsmünster	<0.001
Okehampton	<0.001
Piacenza	<0.001
Porto	<0.001
Seville	<0.001
Thiva	<0.001
• Levels above 0.1 µg/L exceed the drinking water limit for pesticides	

Primary and Secondary Poisoning

The concentration in the final product is 0.005% for the active substance Bromadiolone. The assessments were carried out according to the ESD PT14 (CA-Jun03-Doc.8.2-PT14 and the TGD

(2003). It involves tiered approaches for assessing the risks through both primary and secondary poisoning.

$PNEC_{oral}$ values for birds and mammals exposed to Bromadiolone

Organism group	Species / test	Results[1]	Assessment factor	PNEC (concentration in food, mg/kg)[3]	PNEC (dose, mg/kg b.w./d)[3]
Acute					
Birds	Partridge, short-term toxicity study (10 days)	LC_{50}= 28.9 mg/kg food	3 000	0.00963	0.00120
Mammals	Rats, 28 days repeated dose test	NOAEL[2] = 2.5 *10^{-3} mg/kg b.w./d	300	1.67*10^{-4}	8.33*10^{-6}
Long-term					
Birds	Japanese quail Reproduction test 42 days	NOEC = 0.039 mg/kg b.w./day	30	0.0104	0.0013
Mammals	Rabbit 90 days	NOAEL = 5*10^{-4} mg/kg b.w./day	90	0.000186	0.0000056

[1] CAR Bromadiolone

[2] According to TGD, the $PNEC_{mammal}$ can be calculated from toxicity studies of 28 days, 90 days or chronic. Therefore, the acute $PNEC_{mammal}$ is based on NOAEL from 28-d toxicity study.

[3] Calculated using conversion factor from Table 22 in the TGD: 8 for birds, 20 for rats and 33.3 for rabbit.

Primary Poisoning

In the first tier scenario, the risk is characterised by the ratio between PEC_{oral} and $PNEC_{oral}$. The ratios PEC/PNEC are above 1 for both short and long term exposure (data not shown). This indicates a potential risk, which must be refined.

Acute risk assessment for primary poisoning of a non-target organism:

Tier 2:

In the refined risk assessment the daily uptake (ETE) is compared to the PNEC for birds and mammals. The PNEC values for each representative animal are compared with the ETE values to provide an indication of the risk to non-target animals ingesting a daily dose of the product.

Tier 2 acute risk assessment: $PEC_{oral}/PNEC_{oral}$ for non-target animals accidentally exposed to bait containing Bromadiolone after one meal

Non-target animals	ETE, concentration of Bromadiolone after one meal (one day) (mg/kg b.w.)		$PNEC_{oral}$ (dose, mg/kg b.w./d)	PEC/PNEC	
	Step 1	Step 2		Step 1	Step 2
Tree sparrow	17.3	12.4	0.00120	14417	10333
Chaffinch	15.00	10.8	0.00120	12500	9000
Wood pigeon	5.42	3.90	0.00120	4517	3250
Pheasant	5.39	3.88	0.00120	4492	3233
Dog	3.0	2.16	$8.33*10^{-6}$	360144	259303
Pig	0.375	0.27	$8.33*10^{-6}$	45018	32413
Pig, young	1.2	0.864	$8.33*10^{-6}$	144058	103721

The ratios PEC/PNEC are above 1 indicating a potential risk even after refinement.

Long-risk assessment for primary poisoning of a non-target organism:

Tier 2:

In the long-term risk assessment, the EC (expected concentration of active substance in the animal) after metabolism and other elimination is calculated and used to calculate the $EC_{oral/}PNEC_{ratio}$after 1-day and 5-day elimination of Bromadiolone. The $EC_{oral/}PNEC_{ratio}$ are above 1 after 1-day elimination of

Bromadiolone indicating a potential risk (data not shown). The $EC_{oral}/PNEC_{ratio}$ for the 5-day elimination of Bromadiolone are shown below.

Tier 2 long-term risk assessment: $EC_{oral}/PNEC_{oral}$ ratio after 5-day elimination

Species	**EC_{oral} after 5 days (mg/kg b.w./d) with excretion factor = .3, AV = 1, PT = 1 (mg/kg bw)[a]**	**EC_{oral} after 5 days (mg/kg b.w./d) with excretion factor = 0.3, AV = 0.9, PT = 0.8 (mg/kg bw)[a]**	**$PNEC_{oral}$ (mg/kg b.w./d)**	**Ratio $EC_{oral}/PNEC_{oral}$**
Tree sparrow	30.7	22	0.0013	16503
Chaffinch	26.6	19	0.0013	14321
Wood pigeon	9.61	6.7	0.0013	5169
Pheasant	9.55	6.7	0.0013	5141
Dog	5.3	3.72	0.0000056	667485
Pig	0.664	0.466	0.0000056	83272
Pig, young	2.13	2	0.0000056	376215

[a] calculation according to equation 21 in the ESD

The ratios PEC/PNEC are above 1 indicating a potential risk even after refinement.

Conclusion:

Overall, all acute and long-term $PEC_{oral}/PNEC_{oral}$ ratios are still above the trigger value of 1 indicating acute and long-term unacceptable risks.

Secondary Poisoning

A Tier 1 risk assessment was carried out to assess the risk for poisoning of non-target predator birds and mammals during acute and long-term exposure via rodents poisoned. The $PEC_{oral}/PNEC_{oral}$ values exceeded the trigger value of 1 (data not shown). Therefore, a refined tier 2 assessment was carried out, based on representative species. The refined tier 2 risk assessment considers exposure of relevant species of predators, based on their bodyweights and food intakes. The Bromadiolone concentrations in non-target mammals and birds consuming contaminated rodents is calculated ($ETE_{oral\ predators}$) and compared to the $PNEC_{oral}$.

Tier 2 risk assessment of secondary poisoning (non-resistant and resistant rodents)

Species	Exposure	ETE $_{oral\ predators}$ (mg a.s./kg/d)	$PNEC_{oral}$ (mg a.s./kg/d)	Ratio ETE $_{oral\ predators}$ / $PNEC_{oral}$
Barn owl	Day 5 before the last meal	1.10	0.0013	849
	Day 5 after the last meal	1.72		1326
	Day 14 after the last meal	2.06		1583
Kestrel	Day 5 before the last meal	1.68	0.0013	1288
	Day 5 after the last meal	2.62		2013
	Day 14 after the last meal	3.12		2404
Little owl	Day 5 before the last meal	1.25	0.0013	968
	Day 5 after the last meal	1.97		1512
	Day 14 after the last meal	2.35		1806
Tawny owl	Day 5 before the last meal	1.01	0.0013	780
	Day 5 after the last meal	1.58		1218
	Day 14 after the last meal	1.89		1455
Fox	Day 5 before the last meal	0.41	0.0000056	$7.25*10^4$
	Day 5 after the last meal	0.63		$1.13*10^5$
	Day 14 after the last meal	0.76		$1.35*10^5$
Polecat	Day 5 before the last meal	0.85	0.0000056	$1.51*10^5$
	Day 5 after the last meal	1.32		$2.36*10^5$
	Day 14 after the last meal	1.58		$2.82*10^5$
Stoat	Day 5 before the last meal	1.21	0.0000056	$2.16*10^5$
	Day 5 after the last meal	1.89		$3.37*10^5$
	Day 14 after the last meal	2.26		$4.03*10^5$
Weasel	Day 5 before the last meal	1.74	0.0000056	$3.11*10^5$
	Day 5 after the last meal	2.72		$4.86*10^5$
	Day 14 after the last meal	3.25		$5.81*10^5$

All ratios $ETE_{oral\ predators}$ / $PNEC_{oral}$ are above the trigger value of 1 indicating an unacceptable risk of secondary poisoning.

Overall conclusion

According to this risk assessment the risk for poisoning of non-target predator birds and mammals during primary (acute and long-term exposure) and secondary poisoning is high as the trigger value is exceeded in all cases.

No safe use was established for the Bromadiolone product at a concentration of 50 ppm in the ecotoxicology risk assessment.

3.9 Assessment of a combination of biocidal products

A use with other biocidal products is not intended.

3.10 Comparative assessment

The Irish CA for biocides has processed an application for renewal for this biocidal product which contains the active substance Bromadiolone. The active substance Bromadiolone meets the criteria for exclusion according to Article 5(1) BPR as well as for substitution according to Article 10 BPR (for details see chapter 2.2.3).
Therefore, in line with Article 23 (1) BPR, a comparative assessment for this product has to be conducted.

At the 60th meeting of representatives of Members States Competent Authorities for the implementation of the BPR held on 20 and 21 May 2015, all Member States submitted to the Commission a number of questions to be addressed at Union level in the context of the comparative assessment to be carried out at the renewal of anticoagulant rodenticide biocidal products ('anticoagulant rodenticides'). The questions submitted were the following:

(a) Is the chemical diversity of the active substances in authorised rodenticides in the Union adequate to minimise the occurrence of resistance in the target harmful organisms?;
(b) For the different uses specified in the applications for renewal, are alternative authorised biocidal products or non-chemical means of control and prevention methods available?;
(c) Do these alternatives present a significantly lower overall risk for human health, animal health and the environment?;
(d) Are these alternatives sufficiently effective?;
(e) Do these alternatives present no other significant economic or practical disadvantages?

The information addressing these questions is provided in the Annex of the Commission Implementing Decision (EU) 2017/1532[13]. In accordance with Article 1 of Commission Implementing Decision (EU) 2017/1532, the Irish CA considered the information in the Annex during the comparative assessment of anticoagulant rodenticide biocidal products.

[13] Commission Implementing Decision (EU) 2017/532 of 7 September 2017 addressing questions regarding the comparative assessment of anticoagulant rodenticides in accordance with Article 23(5) of Regulation (EU) No 528/2012 of the European Parliament and of the Council.

Conclusion

Based on the information provided in the Annex of the Commission Implementing Decision (EU) 2017/1532 the Irish CA came to the conclusion that in the absence of anticoagulant rodenticides, the use of rodenticides containing other active substances would lead to an inadequate chemical diversity to minimize the occurrence of resistance in the target harmful organisms. These products also showed some significant practical or economical disadvantages for the relevant uses.

The Irish CA also considered a number of non-chemical control or prevention methods ("non-chemical alternatives"), which in our view do not provide sufficient alternatives to anticoagulant rodenticides.

In summary it can be concluded that the criteria according Article 23(3) a), b) BPR are not fulfilled. Therefore, the authorisation of this product will be renewed for 5 years.

4 General Annexes

4.1 List of studies for the biocidal product (family)

Author	Year	Title	Publication	Report no.	Legal entity owner	Report date	GLP/ GEP	Data Protection Claimed

4.2 Output tables from exposure assessment tools

None

4.3 New information on the active substance

Under the 9th Adaptation to Technical Progress of the Classification and Labelling regulation (Commission Regulation (EU) 2016/1179), anticoagulant rodenticides were classified as Toxic to Reproduction Category 1A or 1B with a specific concentration limit of 0.003%. Under Article 19 of the Biocidal Products Regulation, biocidal products with such classifications (including anticoagulant rodenticides at this and higher concentrations) shall not be authorised for use by the general public.

4.4 Residue behaviour

No assessment necessary.

4.5 Summaries of the efficacy studies (B.5.10.1-xx)[14]

Function and field of use envisaged	Test substance	Test organism(s)	Test method, test system/concentrations applied/ exposure time	Test results; effects	Reference
PT14: Rodenticide	Jade Paste, freshly manufactured 0.005 w/w bromadiolone	CD-1 mice (*Mus musculus*) 10 animals (5 males, 5 females)	Laboratory test. Choice feeding test: fresh baits. 4-day pre-test control diet intake assessment, 4-day bait feeding period and 14-day control bait period. Unrestricted access to the test bait and to palatable and familiar alternative food (challenge diet) during the 4-day test period. The quantity of food placed in each pot was sufficient to meet each animal's daily needs.	The mean acceptance of the test item was 47.0% (S.D. 20.1%). 90% mortality was observed. One male survived. The mean time to death was 4.3 days (3 to 5 days) after the first intake of treated baits. The efficacy was good: 90% in 14 days.	Rovetto I. (2010a)
PT14: Rodenticide	Jade Paste, stored at 54°C for a period of 2 weeks. 0.005 w/w bromadiolone	CD-1 mice (*Mus musculus*) 10 animals (5 males, 5 females)	Laboratory test. Choice feeding test: aged baits. 4-day pre-test control diet intake assessment, 4-day bait feeding period and 14-day control bait period. Unrestricted access to the test bait and to palatable and familiar alternative food (challenge diet) during the 4-day test period. The quantity of food placed in each pot was sufficient to meet each animal's daily needs.	The mean acceptance of the test item was 44.5% (S.D. 17.2%). Total mortality was observed in both male and female mice. The mean time to death was 4.6 days (3 to 5 days) after the first intake of treated baits. The efficacy is total: 100% in 14 days.	Rovetto I. (2010b)
PT14: Rodenticide	Jade Paste, freshly manufactured 0.005 w/w bromadiolone	CD Norway rat (*Rattus norvegicus*). 10 animals (5 males, 5 females)	Laboratory test. Choice feeding test: fresh baits. 4-day pre-test control diet intake assessment, 4-day bait feeding period and 14-day control bait period. Unrestricted access to the test bait and to palatable and familiar alternative food (challenge diet) during the 4-day test period. The quantity of food placed in each pot was sufficient to meet each animal's daily needs.	The mean acceptance of the test item was 34.6% (S.D. 9.7%). Total mortality was observed in both male and female mice. The mean time to death was 4.0 days (2 to 5 days) after the first intake of treated baits. The efficacy is total: 100% in 14 days.	Rovetto I. (2010c)
PT14:	Jade Paste,	CD Norway rat	Laboratory test.	The mean acceptance of the test item was 48.9% (S.D.	Rovetto I. (2010d)

[14] If an IUCLID file is not available, please indicate here the summaries of the efficacy studies.

Rodenticide	stored at 54°C for a period of 2 weeks. 0.005 w/w bromadiolone	(*Rattus norvegicus*). 10 animals (5 males, 5 females)	Choice feeding test: aged baits. 4-day pre-test control diet intake assessment, 4-day bait feeding period and 14-day control bait period. Unrestricted access to the test bait and to palatable and familiar alternative food (challenge diet) during the 4-day test period. The quantity of food placed in each pot was sufficient to meet each animal's daily needs.	12.0%). Total mortality was observed in both male and female mice. The mean time to death was 3.7 days (3 to 5 days) after the first intake of treated baits. The efficacy is total: 100% in 14 days.	
PT14: Rodenticide	Jade Paste 0.005 w/w bromadiolone	Wild house mouse (*Mus musculus*). At least 152, estimated by pre-treatment bait census	Field test carried out in a farm raising cows. After a pre-bait until the mice were feeding readily on the bait (25 days), baiting were carried out. The non-poisoned baits were replaced by the product to be tested for 6 days. At each day's treatment, the bait stations were emptied then refilled. Post-baiting (4 days) is done to assess the level of the survival rodent population.	The efficacy measured was 92.99%	Biannic M.-L (2009)
PT14: Rodenticide	Jade Paste 0.005 w/w bromadiolone	Wild Norway rat (*Rattus norvegicus*). At least 57, estimated by pre-treatment bait census	Field test carried out in a farm raising cows. After a pre-bait until the mice were feeding readily on the bait (18 days), baiting were carried out. The non-poisoned baits were replaced by the product to be tested for 5 days. At each day's treatment, the bait stations were emptied then refilled. Post-baiting (5 days) is done to assess the level of the survival rodent population.	The efficacy measured was 93.2%	Biannic M.-L (2009)
PT14: Rodenticide	Jade Paste 0.005 w/w bromadiolone	Wild black rats/roof rats (*Rattus rattus*).	The test was carried out in a pig stable in a farm newly infested with *Rattus rattus.* 7 days of pre-baiting, and 14 days of baiting were carried out. Duration of the whole test: 35 days / Exposure time: 14 days.	The calculated efficacy was thus 93.98%.	Feys J.L. (2012)

4.6 Other

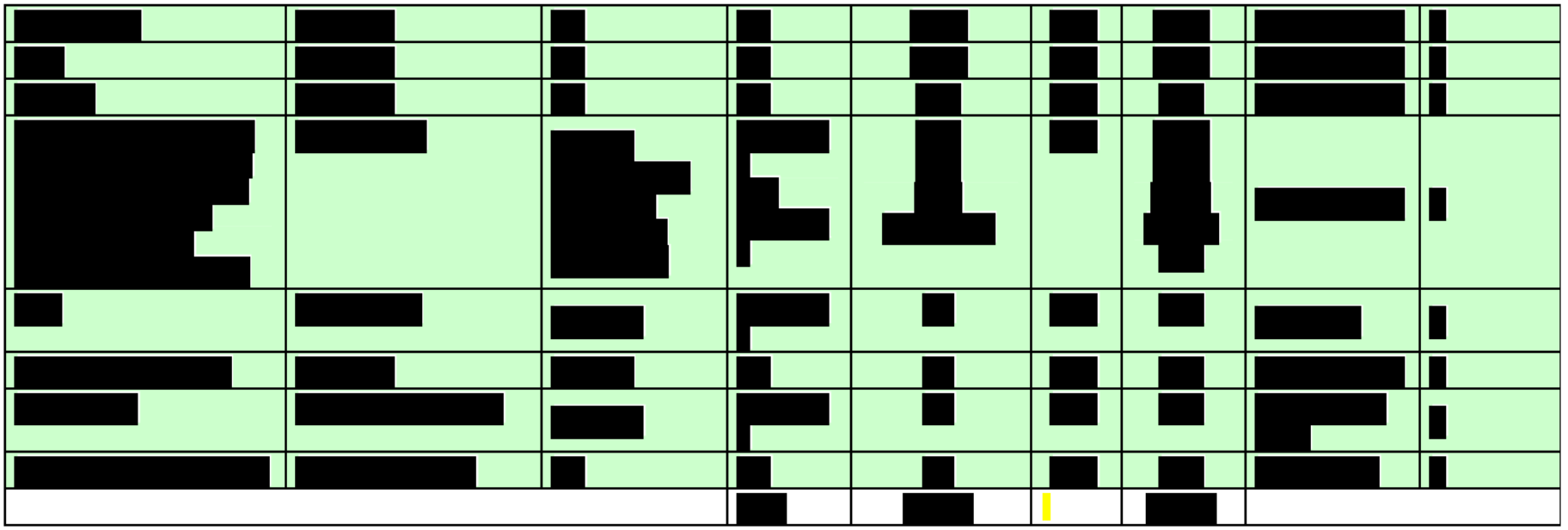
None.

5 Confidential annex (Access level: “Restricted” to applicant and authority)

5.1 Full composition of the product

Active substance(s)				Contents				
Common name	IUPAC name	CAS No.	EINECS No.	Concentration	Unit[15]	w/w (%)	Min purity (% w/w)	Same source as for Annex I inclusion (Y/N)
Bromadiolone	3-[3-(4’-bromobiphenyl-4-yl)-3-hydroxy-1-phenylpropyl]-4-hydroxycoumarin	28772-56-7	249-205-9	0.05	g/kg	0.005	[redacted]	[redacted]
Co-formulants				Contents				
Common name	Function	CAS No.	EC No.	Concentration	Unit	w/w (%)	Classification	Substance of concern (Y/N)
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

15 g/l, g/kg, other. For biological products, the concentration should state the number of activity units/units of potency (as appropriate) per defined unit of formulation (e.g. per gram or per litre).



Annex 1 - Initial PAR – September 2012

Product Assessment Report

Jade Paste (Green, Red)

Active substance:	**Bromadiolone (0.005% w/w)**
Product-type:	**PT 14**
Type of application:	**Authorisation**
Authorisation No:	**IE/BPA 70167 (Professional)** **IE/BPA 70168 (Non-professional)**
Date:	**30 September 2012**

Biocidal Product Assessment Report (PAR) related to Product Authorisation under Directive 98/8/EC.

Department of Agriculture, Food and the Marine
An Roinn Talmhaíochta, Bia agus Mara

Pesticide Registration and Control Division
Department of Agriculture, Food and the Marine
Backweston Campus
Young's Cross
Celbridge
Co. Kildare
Ireland

CONTENTS

1. General information about the product application

An application for authorisation was made to the Pesticide Registration and Control Division of the Department of Agriculture Fisheries and Food by Lodi S.A.S for the biocidal product Jade Paste on 1st July 2011 in accordance with the provisions set out by Commission Directive 2009/92/EC and Directive 98/8/EC.

This Product Assessment Report is for:

Trade name:	Jade Paste
Authorisation No.:	IE/BPA 70167 (Professional) IE/BPA 70168 (Non-professional) Please refer to the Frame Formulation document attached to this PAR: Products with the suffix -001 contain the green colour dye. Products with the suffix -002 contain the red colour dye.

Jade Paste trade names in other Member States (based on R4BP data):

Trade name	Member State
Arorex B 0.005 RB	Greece
Bromapesce Pâte	France
Jade Bromapaste	UK, Ireland
Jade Pasta	Germany, Austria, Romania, Italy
Maxsimon 5 Mehka Vaba	Slovenia
Ratta + Bromapaste	UK
Rattolin Pasta	Belgium
Verminex Predator Pasta Bait	UK

1.1 Applicant/ Authorization Holder

Company Name:	Lodi S.A.S
Address:	Parc d'Activities des Quatre Routes F-35390 Grand Fougeray FRANCE
Tel:	[redacted]
E-mail:	[redacted]

1.2 Representative of the Applicant

Company Name:	[redacted]
Address:	[redacted]
Tel:	[redacted]

1.3 Marketing/Distributing Company (where applicable)

Company Name:	LODI (UK)
Address:	Pensnett Trading Estate Building 69 3rd Avenue Kingswinford West Midlands, DY6 7FD UK
Tel:	[redacted]

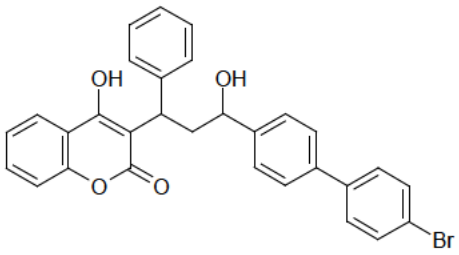
1.4 General Information on the Biocidal Product

Trade name:	Jade Paste
Manufacturer's development code number(s):	N/A
Active substance content:	0.005% w/w Bromadiolone
Main group:	MG03 Pest Control
Product type:	PT14 (Rodenticides)
Product Specification:	See Confidential Annex
Site of product formulation:	See Confidential Annex
Frame formulation (yes/no):	Yes
Formulation type:	RB Ready-to-use bait
Ready to use product (yes/no):	Yes
Chemical/micro-organism:	Chemical Substance
Contain or consist of GMOs[16] (yes/no):	N/A
Is the product already notified/authorised (yes/no); If yes: product name:	Yes Jade Bromapaste Amateur (PCS 96223) Jade Bromapaste Professional (PCS 96224)
Is the biocidal product equivalent to the product assessed for the purpose of Annex I inclusion to 98/8/EC (yes/no):	No.

Manufacturer of Formulated Product:	CBG (Compagnie Générale des Biocides) LODI S.A
Address:	Parc d'Activities des Quatre Routes F-35390 Grand Fougeray FRANCE
Tel:	[redacted]
E-mail:	[redacted]

16 A copy of any written consent(s) of the competent authorities to the deliberate release into the environment of the GMOs for research and development purposes where provided for by Part B of the above-mentioned Directive was provided.

1.5 Information on active substance(s)[17]

Active substance chemical name:	Bromadiolone
IUPAC name:	3-[3-(4'-bromobiphenyl-4-yl)-3-hydroxy-1-phenylpropyl]-4-hydroxycoumarin
CAS No:	28772-56-7
EC No:	249-205-9
Purity (minimum, g/kg or g/l):	>980 g/kg
Molecular formula:	$C_{30}H_{23}BrO_4$
Structural Formula:	
Manufacturing site:	See Confidential Annex
Specification of pure active substance:	See Confidential Annex
Is a new active substance data package (source) supplied (yes/no):	No
If yes, Is the active substance equivalent to the active substance listed in Annex I to 98/8/EC (yes/no):	Yes
If no, does the applicant have a LoA to the active substance data packaged used to support Annex I inclusion (yes/no):	Yes (Pelgar International Ltd.)

Manufacturer of active substance(s):	Pelgar International Ltd.
Address:	Unit 13 Newman Lane Industrial Estate Alton. Hants. GU34 2 QR UK
Tel:	[redacted]
E-mail:	[redacted]

1.6 Information on the intended use(s) of the biocidal product

Main Group:	MG03 (Pest control)
Product-type:	PT14 (Rodenticide)
Intended use:	Bromadiolone paste bait to control rodents indoors and outdoors for the protection of public health, stored products and materials.
Target organisms:	(I.1) Rodents (I.1.1) Murids (I.1.1.1) Brown rats (*Rattus Norvegicus*)

[17] Please insert additional columns as necessary

	(I.1.1.2) House rat, roof rat, black rat (*Rattus rattus*) (I.1.1.3) House mouse (*Mus musculus*) (I.1.1.4) Field mouse (Other *Muride*)
Development stage:	(II.1) Juveniles (II.2) Adults
Function:	Rodenticide
Mode of action:	Anticoagulant III.2 long-term action III.2.1 anticoagulant III.2.1.1 ingestion toxin III.2.1.1.1 ingestion by eating
Application aim:	Organisms or objects to be protected: VII.1 Stored products VII.2 Health protection VII.3 Materials protection (historical buildings, technical objects)
Category of users:	V.3 Trained professionals V.2 Professionals V.1 Non-professional (general public/amateur)
Area of use (indoors/outdoors):	IV.1 Indoors (warehouses, houses, outbuildings) IV.2 Outdoors (in and around buildings), (waste dumps, open areas – IE/BPA 70167 only)
Application method:	Baiting (Bait blocks contained and covered in secured bait stations)
Directions for use including minimum and maximum application rates, typical size of application area:	Indoors and outdoors (in and around buildings and open areas) Rats (Adult and Juvenile): Secure 60-100g of blocks in covered, tamper resistant baiting stations spaced 10m apart (5m apart in areas of high infestation) in areas where rats are active. Regularly check bait consumption and replace consumed or spoilt bait until consumption has stopped. Repeat treatment in situations where there is evidence of new infestation (e.g. fresh tracks or droppings). Mice (Adult and Juvenile): Secure 10-30g of blocks, in covered, tamper resistant baiting stations spaced 5m apart (2m apart in high infestation areas) in areas where mice are active. Regularly check bait consumption and replace consumed or spoilt bait until consumption has stopped. Repeat treatment in situations where there is evidence of new infestation (e.g. fresh tracks or droppings).

Potential for release into the environment (yes/no):	Yes
Potential for contamination of food/feedingstuff (yes/no):	No

1.7 Documentation

1.7.1 Data submitted in relation to product application

A full new product dossier was submitted by Lodi S.A. in support of the product Jade Paste containing bromadiolone.

Please see the attached reference list in Annex IV.

[redacted]

[redacted]

[redacted]

[redacted]

2. *Classification, labelling and packaging*

Under this heading the assessment of the classification, labelling and packaging should be summarised. Further, any result of the assessments made under the following headings that require recommendations or restrictions appearing on the label should be summarised here.

2.1. Harmonised classification of the active substance

Bromadiolone is not currently classified in Annex I of Council Directive 67/548/EEC or according to Annex VI of Regulation (EC) no 1907/2006 (REACH). The following classification and labelling is proposed on the basis of available data resulting from the review programme for bromadiolone and is provided in the table below according to Directive 67/548/EEC/Regulation (EC) 1272/2008. Additionally, the extrapolation of these proposals using the BG RCI converter tool (http://www.gischem.de/ghs/konverter) is also provided in the table below in accordance with Regulation (EC) 1272/2008.

Classification of the active substance, bromadiolone, according to Directive 67/548/EEC and CLP Regulation (EC) 1272/2008:

Symbol(s):		**Pictogram(s):**	
Indication(s) of danger:	T+ Very Toxic N Dangerous for the Environment	**Signal word(s):**	Danger
Risk phrases:	R26/27/28: Very toxic by inhalation, in contact with skin and if swallowed. R48/23/24/25: Toxic: Danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed. R61: May cause harm to the unborn child. R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.	**Hazard statements:**	H300: Fatal if swallowed. H310: Fatal in contact with skin. H330: Fatal if inhaled. H360D: Suspected of damaging the unborn child. H372: Causes damage to organs through prolonged or repeated exposure through inhalation . H400: Very toxic to aquatic life H410: Very toxic to aquatic life with long lasting effects.
Safety phrases:	S45: In case of accident or if you feel unwell, seek medical advice immediately. Show label where possible. S53: Avoid exposure – obtain special instructions before use. S60: This material and its container must be disposed of as hazardous waste. S61: Avoid release to the environment. Refer to special instructions/safety data sheet.	**Precautionary statements:**	P201: Obtain special instructions before use. P273: Avoid release to the environment. P308 + P313: IF exposed or concerned: Get medical advice/attention. P314: Get medical advice/attention if you feel unwell. P501: Dispose of contents/container to hazardous waste facilities in accordance with national regulations.

Specific concentration limits for bromadiolone are proved below in accordance with Directive 67/548/EEC:

Specific concentration limits:	C≥0.5% 0.25%≤C<0.5% 0.025%≤C<0.25% 0.0025%≤C<0.025%	T+;R61-26/27/28 - T; R48/23/24/25 T+; R26/27/28 – T; R48/23/24/25 T; R23/24/25 – T; R48/23/24/25 Xn; R20/21/22 – R48/20/21/22

Additionally, bromadiolone is thermally stable below 200°C, its melting point. It is not classified as highly flammable and does not undergo self ignition below its melting point. It is not considered to be explosive or to have oxidising properties. There is no record that it has reacted with any storage container during many years of industrial production. It is concluded therefore, that there are no hazards associated with its physico-chemical properties under normal conditions of use.

2.2. Harmonised classification and labelling of the biocidal product

The current classification and labelling, based on the biocidal product evaluation for Jade Paste, is provided in the tables below according to Directive 99/45/EC and Regulation (EC) 1272/2008, Annex VI, Part 3.

Classification and Labelling of the biocidal product according to Directive 99/45/EC:

Symbol(s):	N/A	N/A
Indication(s) of danger:	N/A	N/A
Risk phrases:	N/A	
Safety phrases:	S1+S2: Keep locked up and out of reach of children S13: Keep away from food, drink and animal feeding stuffs. S20 + S21: When using do not eat, drink or smoke. S35: This material and its container must be disposed of in a safe way. S46: If swallowed, seek medical advice immediately and show this container or label. S49: Keep only in the original container. S61: Avoid release to the environment. Refer to special instructions/safety data sheet.	

Classification and Labelling of the biocidal product according to the CLP Regulation (EC) 1272/2008:

Pictogram(s):	N/A
Signal word(s):	N/A
Hazard statements:	N/A
Precautionary statements	P102: Keep out of reach of children. P103: Read label before use. P220: Keep/Store away from food, drink and animal feedingstuffs.

	P270: Do not eat, drink or smoke when using this product. P273: Avoid release to the environment. P301 + 310: IF SWALLOWED: Immediately call a poison centre or doctor/physician. P404 + 405: Store locked up in a closed container. P501: Dispose of contents/container in accordance with national regulations.

Physical-chemical properties:
Not explosive, oxidising or highly flammable and therefore does not classify from a physical-chemical point of view.

Toxicology:
There is no toxicology classification for the product under the Directive 99/45.

There is no toxicology classification for the product under the CLP Regulation 1272/2008.

Environment:
There is no environmental classification for the product under the Directive 99/45.

There is no environmental classification for the product under the CLP Regulation 1272/2008.

Other:
Further, the content of the label should be updated to comply with the labelling requirements established (for biocidal products) where the labelling requirements in Article 20(3) of Directive 98/8/EC has been implemented. The safety data sheet should comply with the requirements in Regulation (EC) 1907/2006.

Additional Labelling Requirements:

Addition safety Information:	To avoid risks to human health and the environment, comply with the instructions for use. Harmful to wildlife Use bait containers clearly marked “poison” at all surface baiting points. Remove all remains of bait, dead rodents during and after treatment and dispose of safely. Apply only in positions inaccessible to children and pets.
Special labelling provisions for Ireland:	Use Biocides Safely and Sustainably (IE/BPA 70167) Not For Amateur Sale It is illegal to use this product for uses or in a manner other than that prescribed on this label.
If a separate leaflet is attached to or supplied with the product, add the following information to the front label:	Read attached instructions before use

2.3. Packaging

The packaging details for the biocidal product, Jade Paste, as presented by the applicant, are outlined below for amateur and professional users.

Nomenclature: PP = polypropylene, PS = polystyrene, PE = polyethylene, HDPE = high-density polyethylene, PVC = polyvinylchloride

Amateur product packaging:
On the basis of the packaging details presented, it is considered appropriate to limit aspects of the packaging for amateur users as a risk mitigation measure. Packaging restrictions are to be limited to pre-baited bait stations and refill packs with a **maximum pack-size of 500g**. Additionally, the paste bait should be supplied to the amateur market in sachets/wrapped in order to reduce exposure risks to amateur operators during application to bait stations.

Professional product amendment to packaging:

On the basis of the proposed amendment for Jade Paste to be contained in a cartridge for use with a caulking gun, although Lodi did not have "cartridge" packaging as part of their original submission for Jade Paste they did have packaging which was made of PP and which was deemed acceptable. Since we know that Bromadiolone containing products don't have any negative interaction with packaging made from PP, it is considered that the inclusion of the "cartridge" packaging type is acceptable for Jade Paste.

Amateur product packaging: Bucket and Case

Container description:	Bucket		
Pack size(s):	~~1kg~~	~~2.5kg~~	~~2.5kg~~
Baits per pack:	~~100x10g~~	~~250x10g~~	~~250x10g~~
Pack dimensions (LxWxH Packaging materials:):	~~260x170x130~~	~~290x200x210~~	~~300x210x160~~
Packaging materials:	PP or PE bucket	PP or PE bucket	Cardboard case
Ready-to-use (yes/no)	Yes, all baits are wrapped.		
Shelf-life:	2 years.		
Conditions of storage:	Store in dry, cool area. Store in tightly closed packaging. Keep in original containers. Store away from damp or wet conditions. Keep away from children.		

Amateur product packaging: Sachets

Container description:	Sachets					
Pack size(s):	200g	240g	240g	400g	480g	~~800g~~
Baits per	2x10g	24x10g	9x30g	15x20g	12x30g	~~80x10g~~

pack:						
Pack dimensions (LxWxH):	190x140x55	100x170x240 190x140x55	140x55x180	140x70x210	140x70x120	~~180x260x70~~
Packaging materials:	200g PP sachet	Doypack	Inner sachet in a cardboard box.	2 x 200g PP sachet	PP sachet	~~Inner sachet in a cardboard box.~~
Ready-to-use (yes/no)	Yes, all baits are wrapped in paper teabag.					
Shelf-life:	2 years.					
Conditions of storage:	Store in dry, cool area. Store in tightly closed packaging. Keep in original containers. Store away from damp or wet conditions. Keep away from children.					

Amateur product packaging: Pre-baited bait station (Mice Only)

Container description:	Pre-baited bait station	
Pack size(s):	10g	20g
Baits per pack:	1x10g	2x10g
Pack dimensions (LxWxH):	135x42x80	135x42x80
Packaging materials:	PVC, PP, PS pre-baited bait box	
Ready-to-use (yes/no)	Yes	
Shelf-life:	2 years.	
Conditions of storage:	Store in dry, cool area. Store in tightly closed packaging. Keep in original containers. Store away from damp or wet conditions. Keep away from children.	

Professional product packaging: Bucket and cardboard

Container description:	Bucket and case			
Pack size(s):	5kg	5kg	10kg	20kg
Baits per pack:	500x10g	500x10g	1000x10g	2000x10g
Pack dimensions (LxWxH):	290x200x270	290x200x270	930x290x240	400x400x370
Packaging	PE or PP Bucket	Cardboard box	PE or PP Bucket	Cardboard box

materials:				including PE liner
Ready-to-use (yes/no)	Yes			
Shelf-life:	2 years			
Conditions of storage:	Store in dry, cool area. Store in tightly closed packaging. Keep in original containers. Store away from damp or wet conditions. Keep away from children.			

Professional product packaging: Pre-baited bait station (Mice Only)

Container description:	Pre-baited bait station	
Pack size(s):	10g	20g
Baits per pack:	1x10g	2x10g
Pack dimensions (LxWxH):	135x42x80	135x42x80
Packaging materials:	PVC or PP pre-baited bait box	
Ready-to-use (yes/no)	Yes	
Shelf-life:	2 years.	
Conditions of storage:	Store in dry, cool area. Store in tightly closed packaging. Keep in original containers. Store away from damp or wet conditions. Keep away from children.	

Professional product packaging: Cartridge (for use with caulking gun)

Container description:	Cartridge					
Pack size(s):	80g	150g	280g	310g	400g	500g
Baits per pack:	N/A	N/A	N/A	N/A	N/A	N/A
Pack dimensions (LxWxH):	145*Ø28 ;	124,5* 46,2	216*Ø46,2	256*Ø46,8	216*Ø58.2	
Packaging materials:	PP	PP	PP	PP	PP	PP
Ready-to-use (yes/no)	Yes					
Shelf-life:	2 years					
Conditions of storage:	Store in dry, cool area. Store in tightly closed packaging. Keep in original containers. Store away from damp or wet conditions. Keep away from children.					

Pack size: IE/BPA 70168 – **Maximum Amateur refill pack size of 500g**

Pre-baited stations (PVC/PP/PS): 10g: 1 x 10g, 20g: 2 x 10g (mice only)

Sachet: 200g, 400g

	Cardboard box case: 240g, 480g Re-sealable plastic bag (Doypack): 240g (the bait must be supplied in inner packs or units, each containing enough bait for one point) Bait sizes: 10g
	IE/BPA 70167: Professional packs. Pre-baited stations (PVC/PP): 10g: 1 x 10g, 20g: 2 x 10g (mice only) Bucket (PP/PE) and lined cardboard box: 5kg, 10kg, 20kg Bait sizes: 10g Cartridge (PP): 80, 150, 280, 310, 400, 500g
Container materials[18]:	Lined box container – cardboard, (inner lining: PE) Bucket container – PP or PE Re-sealable plastic bag (Doypack) – PE Sachet – PP Pre-baited bait station – PVC or PP pre-baited bait box. Bait sachet/wrapping: Tea paper Cartridge: PP
Safety features:	Covered bait stations (tamper resistant) Wrapped bait (sachets)

[18] PP = polypropylene, PS = polystyrene, PE = polyethylene, HDPE = high-density polyethylene, PVC = polyvinylchloride

3. Summary of the product assessment

3.1. Physico/chemical properties and analytical methods

Active substance (taken from the CAR):

Bromadiolone does not exhibit hazardous physical-chemical properties. Bromadiolone is a white odourless powder. It has low vapour pressure; Henry's law constant (8.99 x 10^{-7} $Pa.m^3.mol^{-1}$ or 4.25 x 10^{-4} $Pa.m^3.mol^{-1}$) was calculated based on an experimentally derived (extrapolated) value of 2.13 x 10^{-8} Pa at 25 °C or on a published vapour pressure of 2 x 10^{-6} Pa at 20 °C. The solubility of bromadiolone in water is pH dependant with the highest solubility of 0.18-1.2 g/l at pH 9-10 and 20°C (~0.1 mg/l at pH 4-5 and 2.48-18.4 mg/l at pH 7 and 20°C). Correspondingly, the log P_{ow} ranges between 2.5-3.2 at pH 9-10 to >5 at pH 4-5 (3.8-4.1 at pH 7). The pH dependency is thought to be due to the dissociation of the hydroxyl-group in the coumarin moiety of bromadiolone with predicted relevant pKa's of 4.5 and 9.0 for the enolic and ketalic forms respectively (i.e. technically not feasible to experimentally determine the pKa). The solubility in organic solvents tested ranged from 3 mg/l in n-heptane to 15 g/l in methanol at 20°C. The melting point was determined as a broad range of 172.4-201.7°C (98.8%) or as 198.3-199.8°C (~100%). Given that bromadiolone is a mixture of two diasteromers, which can have different physical and chemical properties, the broad range is not considered atypical. Bromadiolone decomposes before boiling. Bromadiolone is not highly flammable, explosive or oxidizing.

Biocidal product:

The biocidal product Jade Paste is not explosive, oxidising or highly flammable and does not classify from a physical chemical point of view. The test item is stable for 1 year at ambient temperatures. The packaging material is stable after storage at ambient temperatures for 1 year. The test item is a ready-to-use paste bait and is not intended to be added or mixed with any other product.

3.1.1. Identity related issues

The source of active substance used in the biocidal product Jade Paste is not the same source of active substance that is listed in Annex I of 98/8/EC. However, the two sources have been deemed equivalent.

Composition of the biocidal product Jade Paste

Component	% w/w	g/l	Chemical name	CAS no	Function
Concentrate containing: - Bromadiolone 2.5% + other components which are identified in the confidential section.	0.2 (0.005% technical active substance)	2.0 (0.05 g/kg technical active substance)	3-[3-(4'-bromobiphenyl-4-yl)-3-hydroxy-1-phenylpropyl]-4-hydroxycoumarin	28772-56-7	Active ingredient

Co-formulants	See Confidential Data and Information (Annex I)

Note: The biocidal product Jade Paste is not the same as the representative biocidal product accompanying the Annex I inclusion. See confidential Annex for details of the composition of Jade Paste.

3.1.2. Physico-chemical properties

The source of active substance used in the biocidal product Jade Paste is not the same source of active substance that is listed in Annex I of 98/8/EC. Poland did an equivalence check on the PelGar International Ltd. source of Bromadiolone compared with the Activa source of Bromadiolone. Poland found the two sources to be equivalent. The RefMS accepts Poland's assessment. PelGar International Ltd. provided a letter of access to LODI S.A for their source of active substance.

3.1.3. Physical, Chemical and Technical Properties of the Biocidal Product

Summary of the Physical and Chemical Properties of the Biocidal Product Jade Paste

Section	Study	Method	Results	Comment	Reference
1.1	Appearance	OPPTS 830.6303 OPPTS 830.6304 OPPTS 830.6302	Physical state: Crisped paste Odour: Slightly flour Colour: Green (10GY 7/4)	Carried out to GLP. Carried out at 20°C. The study is acceptable.	"Determination of physical properties of Bromadiolone paste bait". Study no. LODI.06/2011. 2011-03-02. C. Magnier.
1.2.1	Explosive properties	Examination of the components.	"The test substance is a mixture of components. It's composed of lard, hazelnut flavour agent, sorbic acid, butylhydroxytoluene, fish oil, phodesweet, green colouring agent, Bromadiolone 2,5% with bitter agent and wheat flour. Examination of the components in the test substance establishes beyond reasonable doubt that they do not contain any chemically instable of highly energetic groups that might lead to an explosion. Lard, hazelnut flavour agent, acid sorbic, butylhydroxytoluene, fish oil, phodesweet, green colouring agent and wheat flour are food products without explosive properties. Bromadiolone contains alcohol, ester and halocarbon groups. These groups are no plosophores (bond grouping known to give explosive properties). The bitter agent contains carboxylic acid, amid and quaternary ammonium groups. These groups are not considered as plosophores. It is furthermore not to be expected that an interaction between the different components occurs" Not explosive.	The RefMS accepts the Notifiers justification. The paste bait is not explosive.	"Explosive properties of Bromadiolone paste bait". Study no. LODI.39/2011. 2011-06-23. S. Richerioux.

Section	Study	Method	Results	Comment	Reference
1.2.2	Oxidising properties	Examination of the components.	"The test substance is a mixture of components. Examination of components establishes beyond reasonable doubt that the test item is incapable of showing a positive result in the test described in the EC. A17 guideline. The components do not contain any group that might act as an oxidising agent. The oxygen atoms that are present in fats animal, acid sorbic, phodesweet are bonded to carbon as an alcohol or an acid group. Hence, these components do not have oxidising properties. Green colouring, flour and aroma hazelnut have an unknown structure but it is expected that these component do not contain oxidising properties. It is furthermore not to be expected that an interaction between the different components occurs resulting in an oxidising chemical." Not oxidising.	The RefMS accepts the Notifiers justification. The paste bait is not oxidising.	"Oxidising properties of Bromadiolone paste bait". Study no. LODI.07/2011. 2011-05-05. C. Magnier.
1.3.1	Flash point			Not required for solids. See 1.3.2 below.	
1.3.2	Flammability	EEC method A 10, A 11 or A 12.	"The flame of the gas burner did ignite the test substance pile. The test substance turned red then turned into a charred residue. A light grey smoke was observed. After removal of the ignition source, the smoke disappears , no propagation of combustion was observed." Not highly flammable.	Carried out to GLP. The preliminary test was performed. There was no propagation of combustion along 200 mm length of the pile within 4 minutes. Therefore performance of the main test was not required. The paste bait is considered "not highly	"Flammability of Bromadiolone paste bait". Study no. LODI.08/2011. 2011-04-21. C.Magnier.

Section	Study	Method	Results	Comment	Reference
				flammable". The study is acceptable.	
1.3.3	Auto-flammability			See section 1.3.2 above.	
1.4.1	Free acidity/ Alkalinity	CIPAC MT 191	Not required as the pH(1%) is 5.87 after 10 minutes at 20°C. [If the pH is between 4 and 10 then the determination of acidity or alkalinity is not required.]	Carried out to GLP. The acidity or alkalinity test was not required and thus was not performed. The RefMS agrees that the acidity/ alkalinity test is not required. The study is acceptable.	"Acidity-Alkalinity of Bromadiolone paste bait". Study no. LODI.10/2011. 2011-05-05. C. Magnier.
1.4.2	pH (1 %)	CIPAC MT 75.3	pH(1%) = 5.87 after 10 minutes at 20°C.	See 1.4.1 above.	See 1.4.1 above.
1.5.1	Viscosity			Not applicable as the product is a solid (paste).	
1.5.2	Surface tension			Not applicable as the product is a solid (paste).	
1.6	Relative density	OECD 109. NF T20-053	1.151	Carried out to GLP. Carried out with a pycnometer at 20°C ± 2°C. The study is acceptable.	"Relative density of Bromadiolone paste bait". Study no. LODI.09/2011. 2011-05-04. C.Magnier.
1.7.1	Storage stability (accelerated	CIPAC MT 46 GIFAP monograph	**Aspect:** T_0 = Green malleable fresh paste T_{14} = Green malleable fresh paste	Carried out to GLP. The test item is stable for 14 days at 54°C, which	"Chemical stability after accelerated storage of Bromadiolone fresh paste

<table>
<tr><th>Section</th><th>Study</th><th>Method</th><th>Results</th><th>Comment</th><th>Reference</th></tr>
<tr><td></td><td>storage – 14 days at 54^{o}C)</td><td>no17.</td><td>Odour =
T_0 = Hazelnut
T_{14} = Hazelnut

Content of active substance:<table><tr><th></th><th>Conc. (mg/kg)</th><th>Deviation from declared content</th><th>Deviation from T_0</th></tr><tr><td>T_0</td><td>51.13</td><td>+2.26%</td><td></td></tr><tr><td>T_{14}</td><td>40.59</td><td>-18.82%</td><td>-20.61%</td></tr></table>Note: The declared value of the active substance was 50 mg/kg.</td><td>indicates that the test item will be stable when stored for 2 years at ambient temperatures. The study is acceptable.

Note: the apparent change in active substance content is high at -20.61%, which is <25% (FAO criteria) and so is acceptable. Also, Bromadiolone has been shown not to degrade after storage for 2 years at ambient temperature. Degradation products were only found when the test item was subjected to acid degradation (see section 3.1.4).</td><td>baits 0.005%”. Study no. LODI.03/2010. 2010-02-15. Elodie, Meriadec.</td></tr>
<tr><td>1.7.2</td><td>Shelf life (storage ambient temperatures)</td><td>GIFAP monograph no17.</td><td>Physical state:<table><tr><th>Aspect</th><th>Odour</th><th>Colour</th></tr><tr><td>Malleable paste</td><td>Slight odour of hazelnut</td><td>10GY7/6</td></tr><tr><td>Malleable paste</td><td>Slight odour of hazelnut</td><td>10GY7/6</td></tr></table></td><td>Carried out to GLP. The results are acceptable.

The aged bait (2 weeks at</td><td>“Chemical stability of Bromadiolone paste bait stored for 2 years under 20^{o}C conditions”. Study no.</td></tr>
</table>

<table>
<tr><th>Section</th><th>Study</th><th>Method</th><th>Results</th><th>Comment</th><th>Reference</th></tr>
<tr><td></td><td></td><td></td><td>Content of active substance:
<table><tr><th></th><th>Active ingredient content(ppm)</th><th>Deviation from T_0</th></tr><tr><td>T_0</td><td>45.1</td><td>-</td></tr><tr><td>$T_{1\ yr}$</td><td>41.7</td><td>-7.54%</td></tr></table>
Note: The declared value of the active substance was 50 mg/kg.</td><td>54^{o}C) which simulates bait that has been stored for two years at ambient temperature was found to be 100% efficacious for both mice and rats. Its palatability was also deemed acceptable. Please see section 3.2 Efficacy of the Biocidal Product for full evaluation.</td><td>LODI.44/2011. 2012-07-17. Sandra Richerioux.</td></tr>
<tr><td>1.7.3</td><td>Packaging stability</td><td></td><td>Physical properties observed for the grain bait in all packaging types:
T_0 = Green paste in individual bag – presence of grease on individual bag
T_{6m} = Green paste in individual bag – presence of grease on individual bag
T_{1year} = Green paste in individual bag – presence of grease on individual bag

PE bag with cardboard box:
<table><tr><th></th><th colspan="4">Weight</th></tr><tr><th></th><th>PE bag (g)</th><th>Cardboard box (g)</th><th>Test item (g)</th><th>Total (g)</th></tr><tr><td>T_0</td><td>3.588</td><td>23.312</td><td>201.61</td><td>228.50</td></tr><tr><td>$T_{6months}$</td><td>3.678</td><td>23.509</td><td>199.32</td><td>226.50</td></tr></table></td><td>Carried out to GLP. Carried out at ambient temperatures (20 ± 2^{o}C). Deviation in the weights of the packaging and test item are all lower than 5% for all the packaging after 6 months and 1 year at ambient temperature. No significant changes were observed in the aspect of the packaging and test item after 6 months and 1 year storage.

The packaging tested is</td><td>“Packagings stability used for Bromadiolone Paste Bait”. Study LODI.49/2011. 2012-07-19. Sandra Richerioux.</td></tr>
</table>

<table>
<tr><th>Section</th><th>Study</th><th>Method</th><th>Results</th><th>Comment</th><th>Reference</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>Deviation</td><td>+2.51%</td><td>+0.85%</td><td>-1.14%</td><td>-0.88%</td></tr>
<tr><td>T_{1year}</td><td>3.678</td><td>23.919</td><td>198.77</td><td>226.37</td></tr>
<tr><td>Deviation</td><td>+2.51%</td><td>+2.60%</td><td>-1.41%</td><td>-0.93%</td></tr>
</table>
T_0 = Transparent bag – cardboard box with grey and dry internal wall
$T_{6months}$ = Presence of grease on internal wall of the bag – no grease on cardboard box
T_{1year} = Presence of grease on internal wall of the bag – dry cardboard box

PP bag with cardboard box:
<table>
<tr><td></td><td colspan="4">Weight</td></tr>
<tr><td></td><td>PP bag (g)</td><td>Cardboard box (g)</td><td>Test item (g)</td><td>Total (g)</td></tr>
<tr><td>T_0</td><td>7.781</td><td>23.175</td><td>214.64</td><td>245.60</td></tr>
<tr><td>$T_{6months}$</td><td>7.919</td><td>23.327</td><td>212.93</td><td>244.18</td></tr>
<tr><td>Deviation</td><td>+1.77%</td><td>+0.66%</td><td>-0.80%</td><td>-0.58%</td></tr>
<tr><td>T_{1year}</td><td>7.946</td><td>23.702</td><td>211.92</td><td>243.58</td></tr>
<tr><td>Deviation</td><td>+2.12%</td><td>+2.27%</td><td>-1.27%</td><td>-0.82%</td></tr>
</table>
T_0 = Transparent bag – cardboard box with grey and dry internal wall
$T_{6months}$ = Presence of grease on internal wall of the bag – no grease on cardboard box
T_{1year} = Presence of grease on internal wall of the bag – dry cardboard box

Doypack:
<table>
<tr><td></td><td>Weight</td></tr>
</table>
</td><td>acceptable.</td><td></td></tr>
</table>

Section	Study	Method	Results	Comment	Reference

	Doypack (g)	Test item (g)	Total (g)
T_0	11.775	194.27	206.04
$T_{6months}$	12.111	193.72	205.84
Deviation	+2.85%	-0.28%	-0.10%
T_{1year}	12.133	193.48	205.62
Deviation	+3.04%	-0.41%	-0.20%

T_0 = Non porous internal wall

$T_{6months}$ = Presence of grease on internal wall of the doypack

T_{1year} = Presence of grease on internal wall of the doypack

PS prebaited baitbox:

	Weight (g)				
	Bait station	Sample 1	Sample 2	Sample 3	Total
T_0	11.831	7.770	9.459	11.561	40.621
$T_{6months}$	12.095	7.615	9.275	11.300	40.293
Deviation	+2.23%	-1.99%	-1.95%	-2.26%	-0.8%
T_{1year}	12.104	7.724	9.405	11.450	40.690
Deviation	+2.31%	-0.59%	-0.57%	-0.96%	+0.17%

T_0 = Black box with non-porous internal wall

$T_{6months}$ = Presence of grease on internal wall of the box

T_{1year} = Presence of grease on internal wall of the box at the location of the paste.

PP prebaited baitbox:

	Weight (g)

Section	Study	Method	Results	Comment	Reference

	Bait station	Sample 1	Sample 2	Sample 3	Total
T_0	47.632	8.510	7.367	10.840	74.349
$T_{6months}$	47.896	8.354	7.208	10.577	74.038
Deviation	+0.55%	+1.83%	-2.16%	-2.43%	-0.42%
T_{1year}	47.907	8.485	7.320	10.717	74.434
Deviation	+0.58%	-0.29%	-0.64%	-1.13%	+0.11%

T_0 = Black box with non-porous internal wall

$T_{6months}$ = Presence of grease on internal wall of the box

T_{1year} = Presence of grease on internal wall of the box at the location of the paste.

Bag composed of polymer mixture:

	Weight		
	Bag (g)	Test item (g)	Total (g)
T_0	6.006	159.11	165.11
$T_{6months}$	6.143	156.86	163.00
Deviation	+2.28%	-1.14%	-1.28%
T_{1year}	6.224	157.44	163.66
Deviation	+3.63%	-1.05%	-0.88%

T_0 = Dry internal wall

$T_{6months}$ = Presence of grease on internal wall of the bag

T_{1year} = Presence of grease on internal wall of the bag

PP Bucket:

<table>
<tr><th>Section</th><th>Study</th><th>Method</th><th>Results</th><th>Comment</th><th>Reference</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><th></th><th colspan="3">Weight</th></tr>
<tr><th></th><th>Bucket (g)</th><th>Test item (g)</th><th>Total (g)</th></tr>
<tr><td>T_0</td><td>43.989</td><td>309.98</td><td>353.97</td></tr>
<tr><td>$T_{6months}$</td><td>44.288</td><td>309.33</td><td>353.62</td></tr>
<tr><td>Deviation</td><td>+0.68%</td><td>-0.21%</td><td>-0.10%</td></tr>
<tr><td>T_{1year}</td><td>44.305</td><td>308.78</td><td>353.09</td></tr>
<tr><td>Deviation</td><td>+0.72%</td><td>-0.39%</td><td>-0.25%</td></tr>
</table>
T_0 = Bucket with non-porous internal wall
$T_{6months}$ = Presence of grease on internal wall of the bucket
$T_{6months}$ = Presence of grease on internal wall of the bucket
</td><td></td><td></td></tr>
<tr><td>1.8.1</td><td>Wettability</td><td></td><td></td><td>Not required. The product is a ready to use paste bait.</td><td></td></tr>
<tr><td>1.8.2</td><td>Persistent foaming</td><td></td><td></td><td>Not required. The product is a ready to use paste bait.</td><td></td></tr>
<tr><td>1.8.3.1</td><td>Suspensibility</td><td></td><td></td><td>Not required. The product is a ready to use paste bait.</td><td></td></tr>
<tr><td>1.8.3.2</td><td>Dispersibility</td><td></td><td></td><td>Not required. The product is a ready to use paste bait.</td><td></td></tr>
<tr><td>1.8.4</td><td>Wet/dry sieving test</td><td></td><td></td><td>Not required. The product is a ready to use paste</td><td></td></tr>
</table>

Section	Study	Method	Results	Comment	Reference
				bait. This is only required for WPs, SCs, granules and tablets.	
1.8.5	Particle size distribution in suspension			Not applicable. The product is a ready to use paste bait. This is only required for powders and granules.	
1.8.6	Water content			Not required. The product is a ready to use paste bait.	
1.8.7	Emulsion stability			Not required. The product is a ready to use paste bait.	
1.8.8	Flowability, pourability and dustability			Not required. The product is a ready to use paste bait.	
1.9	Physical compatibility			Not applicable. The product is a ready to use paste bait and is not intended to be mixed with any other product.	

Conclusions:

The biocidal product Jade Paste is not explosive, oxidising or highly flammable and does not classify from a physical/chemical point of view. The test item is stable after storage for two weeks at 54^{o}C. The test item is stable for 1 year at ambient temperatures. The packaging material is stable after storage at ambient temperatures (20^{o}C ± 2^{o}C) for 1 year with all deviations in packaging and sample weights being below 5%. There were no significant changes of characteristics of the test item or packaging observed after 1 year storage. The Bromadiolone paste bait is considered compatible with all the packaging tested. The test item is a ready-to-use paste bait and is not intended to be added or mixed with any other product.

Data requirements:

1. Information on the reactivity of the paste bait towards the container material for the 2 year time point has been requested and will be provided when complete *(the approximate date of submission is week 29, 2013).*
2. The results of the 2-year storage stability study at ambient temperatures has been requested and will be submitted when complete *(the approximate date of submission is week 29, 2013)*.

The paste bait is compatible with the following packaging:

PE bag with cardboard box, PP bag with cardboard box, Doypack, PS prebaited baitbox, PP prebaited baitbox, Bag composed of polymer mixture and PP Bucket.

Provisional shelf life for the paste bait:

Although the 2-year storage stability data at ambient temperatures has not yet been provided a provisional shelf-life of 2 years is proposed for the paste bait. There was an apparent decrease in active substance content after storage for 2 weeks at 54^{o}C (-20.61%). A separate study showed that Bromadiolone did not degrade after storage for 2 years at ambient temperature. Degradation products were only found when the test item was subjected to acid degradation (see section 3.1.4). The aged bait (2 weeks at 54^{o}C) which simulates bait that has been stored for two years at ambient temperature was found to be 100% efficacious for both mice and rats. Its palatability was also deemed acceptable.

Overall, since the paste bait remains 100% efficacious, palatable, and does not generate breakdown products of toxicological concern after storage, and since the test item is stable after storage for 1 year at ambient temperatures, a provisional two year shelf life is proposed.

Provisional shelf life: 2-years.

3.1.4. Analytical methods

Jade Paste was not assessed as part of the Annex I inclusion process therefore the Notifer has submitted the following method of analysis to cover the outstanding data gap.

<table>
<tr><td>Report:</td><td>No information given.</td></tr>
<tr><td>Title:</td><td>“Analytical validation for determination of Bromadiolone in Paste Bait”</td></tr>
<tr><td>Author(s):</td><td>S. Richerioux</td></tr>
<tr><td>Date:</td><td>2011-06-24</td></tr>
<tr><td>GLP: Yes/No</td><td>No. The study was conducted according to LodiGroup SOPs.</td></tr>
<tr><td>Principle of the Method:</td><td>The test item is quantified by liquid chromatograpy using a reverse phase column and a UV detector (310 nm).

Extraction method:
Extraction solution: n-butyl acetate/methanol/acetic acid (90/8/2 %v/v)
Preparation of the test item solutions:
The paste bait is cut in 0.5cm cube. A quantity of about 5g of the test item is weighed into a 100mL flask. A volume of 50mL of extraction solution is added. The solution is put on ultrasonic bath for 15 minutes and is shaken on magnetic stirrer for 30 minutes. The solution is decanted for minimum 4 hours. 5mL of the extracted solution is transferred into 10mL volumetric flask. 2mL of internal standard solution (400mg/L) is added and the flask is made to volume with methanol. The diluted solution is filtered on 0.20µm PTFE filter.</td></tr>
<tr><td>Linearity:</td><td>The calibration curve was provided and was linear. The operator prepared 5 solutions containing 80%, 90%, 100%, 110% and 120% of the concentration of test item in solution. Three injections were carried out at each concentration (2.0mg/L; 2.25mg/L; 2.50mg/L; 2.75mg/L and 3.0mg/L).

The correlation coefficient, r^2 was 0.9946.</td></tr>
<tr><td>Precision/repeatability:</td><td>Three solutions were prepared of a concentration C (~ 2.4825 mg/l) of the product. Three injections of each solution were carried out and the RSD was calculated.

Intermediary fidelity (mg/l):
<table>
<tr><th></th><th>1st Injection</th><th>2nd Injection</th><th>3rd Injection</th></tr>
<tr><td>Solution a</td><td>2.18</td><td>2.15</td><td>2.13</td></tr>
<tr><td>Solution b</td><td>2.12</td><td>2.12</td><td>2.15</td></tr>
<tr><td>Solution c</td><td>2.15</td><td>2.15</td><td>2.19</td></tr>
</table>
% RSD = 1.062

Intralaboratory fidelity (mg/l):
<table>
<tr><th></th><th>1st Injection</th><th>2nd Injection</th><th>3rd Injection</th></tr>
<tr><td>Solution a</td><td>2.18</td><td>2.15</td><td>2.13</td></tr>
<tr><td>Solution b</td><td>2.20</td><td>2.17</td><td>2.15</td></tr>
<tr><td>Solution c</td><td>2.15</td><td>2.15</td><td>2.19</td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td>% RSD = 0.999</td></tr>
<tr><td>Accuracy:</td><td>The operator spiked a placebo with 50, 100 and 150% of the theoretical concentration of test item. Three injections were carried out per solution. The mean recovery (MR) was calculated for each solution, see table below.

<table>
<tr><th></th><th>50% doped placebo</th><th>100% doped placebo</th><th>150% doped placebo</th><th>Average of MR</th></tr>
<tr><td>Recoveries</td><td>105.28,
102.06,
101.88</td><td>93.40,
102.37,
96.74</td><td>102.86,
104.11,
104.64</td><td rowspan="2">101.49</td></tr>
<tr><td>Mean recovery (MR)</td><td>103.09</td><td>97.50</td><td>103.88</td></tr>
</table>

The recoveries are in the range 90-110%. The accuracy is acceptable.</td></tr>
<tr><td>Specificity:</td><td>The specificity was investigated by analysing a placebo in solution and the test item in solution stressed with acetic acid. The sample was stressed by adding 5ml of acetic acid. If a peak appears the resolution must be greater than 2.

The placebo contained no interfering peak.
The stressed paste bait had Rs = 6.25 (the resolution was greater than 2).</td></tr>
<tr><td>Interferences</td><td>No interfering peak was observed in chromatogram of the placebo paste.</td></tr>
<tr><td>Limit of quantification:</td><td>The operator injected a solution containing 50 ppm of test item and calculated the S/N ratio. The operator divided by 10 then by 2 the concentration of the test item until obtaining a S/N ratio lower than 10.

LOQ = 0.25 mg/kg</td></tr>
<tr><td>Limit of detection:</td><td>The operator injected a solution containing 10 ppm of test item and calculated the S/N ratio. The operator divided by 10 then by 2 the concentration of the test item until obtaining a S/N ratio lower than 3.

LOD = 0.05 mg/kg</td></tr>
</table>

Conclusion:
The method of analysis is acceptable for the determination of Bromadiolone in the paste bait.

Data requirements:
None.

A report investigating the possible breakdown products of Bromadiolone after 2 years of storage at ambient temperatures was submitted by the Applicant. The results are outlined below.

Report:	Biolytics study no 12-TOX007
Title:	"Analysis of Bromadiolone with the evidence of no degradation products in 2 years old bait"
Author(s):	Isabelle Fourel.
Date:	April 2012
GLP: Yes/No	No.
Background:	The aim of the study was to show the evidence or non-evidence of degradation products of Bromadiolone in "fresh" bait and in 2 year old bait kept in controlled temperature conditions. The "fresh" bait was then artificially deteriorated to demonstrate that there is no evidence of degradation products in the 2 year old matrix.
Principle of the Method:	The Bromadiolone grain bait was aged for 2 years at ambient temperatures (20^{o}C with no light). The 2-year old bait and the "fresh" grain bait were then analysed by LC/MS Triple Quadripole. The Bromadiolone bait were degraded through forced degradation by: 1. Heat degradation – two samples of each specimen (weighed dry baits) plus a sample of pure Bromadiolone powder are kept in a drying oven at 60^{o}C ± 5^{o}C away from light, for 5 days. 2. Acid degradation – two samples of the specimen (weighed dry baits) were mixed with 5ml chlorhydric acid 0.1N in methanol and kept in a drying oven for 2 hours at 60^{o}C away from light. 5ml of NaOH 0.1N in methanol was added to neutralise prior to analysis. Pure Bromadiolone was put through the heat and acid degradation procedure as well.
Chromatograms:	Chromatograms for the fresh bait (grain), two year old bait (grain), the acid stressed baits, the heat stressed baits, the heat stressed Bromadiolone, the non-stressed pure Bromadiolone and blanks were provided.
Mass spectra:	Analyses showed that no fragment ion was common between the Bromadiolone mass spectrum and the degradation products mass spectra.
Results:	The chromatograms of the non-deteriorated baits and the deteriorated baits were compared. Acid stress led to the production of degradation products. <u>Acid stress:</u> The degradation products which appeared after the acid stress of the grain bait were found at m/z 425.4 (RT 18.9/19.2/19.5/20.68/20.8 min), 447 (RT 20.2 min), 495 (RT 20.4 min), 427.5 (RT 22.4/22.8 min), 351.4 (RT 23.9 min), 395.3 (RT 24.5/24.7 min), 407.4 (RT 25 to 26 min) and 377.4 (RT 28.4 min). <u>Heat stress:</u> No degradation products were present in the baits after being left at 60^{o}C during 5 days. <u>Pure Bromadiolone:</u> No degradation product was present in the Bromadiolone after being left at 60^{o}C

	for 5 days. The degradation products observed appeared when baits where acid stressed but were missing from fresh and two year old baits. No degradation product was present in the bait after being heat stressed. No degradation product was present in heat stressed Bromadiolone.
Conclusion	The aim of the study was to look for degradation products of Bromadiolone in two kinds of baits: fresh bait and bait that has been kept in controlled temperature conditions for two years. In order to prove that Bromadiolone did not lead to degradation products during storage of baits, fresh bait was submitted to acid and heat forced degradation tests. After LC-MS analysis, the mass spectra were compared and no fragment ions were common between Bromadiolone mass spectrum and the ones of the observed degradation products (acid stressed bait). There is no similarity between Bromadiolone and the observed degradation products from the acidified baits. Bromadiolone is very stable in the bait during the storage.

Conclusion:
Bromadiolone does not degrade during storage for two years at ambient temperatures.

Data requirements:
None.

3.1.5. Analytical method for the relevant impurities, isomers and co-formulants in the biocidal product

Not applicable.

3.2 Efficacy of the Biocidal Product

Bromadiolone is intended to be used to control rodent pests, both indoors and outdoors, in and around buildings, open areas and waste sites (only wax block formulation for use in sewers). The target species are brown rat (*Rattus norvegicus*), black rat/roof rat (*Rattus rattus*), house mouse (*Mus musculus*/*domesticus*) and other murids (other *Muridae*). Comprehensive laboratory and field data submitted for annex I inclusion and evaluated in the CAR confirmed that bromadiolone is an effective rodenticide for the control of mice and rats. In addition, new data using the paste formulation was provided in the form of laboratory and field studies to verify the proposed label claims.

JADE PASTE is a ready-to-use rodenticide paste bait containing 0.005% (w/w) bromadiolone. The efficacy of the product was assessed against the proposed label claims. The ready-to-use baits are available in sachets and pre-baited bait stations.

The applicant has provided supplementary effectiveness data from seven trials carried out under a range of conditions (laboratory & field) using fresh and aged baits. These were conducted according to a variety of standards and protocols. Four studies were conducted under laboratory conditions (2 on mice; 2 on rats) whilst three field based studies assessed efficacy against mice (one trial) & rats (two trials). The laboratory studies were all choice tests conducted to suitable standards. The studies have demonstrated that JADE PASTE is palatable to and effective in controlling populations of house mice and brown rats according to the criteria given in the TNsG on product evaluation.

The first two studies evaluated fresh and aged baits using house mice. The freshly manufactured paste bait proved palatable to and effective against house mice, with a mean palatability of 47.0% resulting in 90% mortality after a 4-day choice between this formulation and challenge diet. Using aged bait in a similar study achieved a mean acceptance of 44.5% resulting in 100% mortality after a mean of just 4 days. A mean palatability of 34.6% was observed using fresh bait on Norway rats with 100% mortality achieved in a mean of 4 days. When aged bait was used on Norway rats a mean acceptance of 48.9% was observed with the mean time to achieved 100% mortality recorded as less than 4 days. The first of the field trials was conducted on a farm with an estimated population based on census baiting of over 152 individuals. A 25 day baiting phase resulted in a 93% reduction in consumption compared to pre-baiting levels. Effectiveness against wild Norway rats on a farm was evaluated in the next trial with and estimated population of >57. An 18 day baiting phase resulted in an efficacy rating of over 93% being achieved. Wild black rats were the target for the final field trial conducted on a piggery. Pre-baiting and baiting lasted 7 and 14 days respectively. 94% efficacy was achieved.

According to the European Commission document (European Commission, 2008), Section 4.1 “Norms and Criteria”: “In the bait choice feeding test, the percentage of ingested bait containing the product should be normally ≥20%. When the test results in ≥90% mortality, a lower level than 20% of the total food consumption is acceptable.”

JADE PASTE is therefore deemed to be effective against brown rats, black rats and mice. The paste formulation has proven to be attractive, palatable and effective against both rats and mice under natural conditions. The data confirmed that ageing of the bait did not adversely affect its palatability or efficacy.

3.2.1 Function/Field of use

Main Group (MG): 3 – Pest control
Product Type (PT): 14
Function: Rodenticide
VIII.4.1.1 Ready-for-use (sachets and other)

Field of use
IV.1 Indoor use
IV.2 Outdoor use

User category
V.1 non professional / general public
V.2 professional
V.3 specialised professional

Function / Mode of action
III.2 long term action
III.2.1 anticoagulant
III.2.1.1 ingestion toxin
III.2.1.1.1 ingestion by eating

Target organisms to be controlled
I.1.1.1 Brown rat: *Rattus norvegicus*
I.1.1.2 Roof rat: *Rattus rattus*
I.1.1.3 House mouse: *Mus musculus*
I.1.1.4 Other *Muridae* (Field mouse)

Developmental stages of target organisms to be controlled
II.1 Juveniles
II.2 Adults

Organisms or objects to be protected
VII.1 Stored product protection/food protection
VII.2 Health protection
VII.3 Material protection (historical buildings, technical objects)

Method of application
VI.2: covered application
VI.2.1: covered application in bait stations.
VI.2.21: other covering

3.2.2 Dose/Mode of action

Bait sachets should be placed in discrete locations within the infested area and placed in secure, (preferably dry) tamper-proof baiting stations, bait boxes of pipe sections. Rodenticide baits containing 50 ppm bromadiolone as the active substance are intended for use in and around buildings, in open areas and waste dumps. They are used as a response to an infestation. The number of baits depends on the site type and the infestation level.
The paste containing sachets are easy to place where the rodents are active, near rodent burrows, against walls, along travel routes (runways) and should preferably be positioned between the rodents' place of shelter and their food supply.

Application rates:
Mice: place 20-30g of bait every 2 to 5 metres
Rats: place 60-100g of bait every 5 to 10 metres.
Adapt the number of baits and the distances according to the infestation level.

3.2.4 Effects on the target organisms (efficacy)

Bromadiolone is a second generation anticoagulant which acts by antagonism to vitamin K. Anticoagulant rodenticides, including bromadiolone, are vitamin K antagonists. The main site of action is the liver, where several of the blood coagulation precursors undergo vitamin K dependent post translation processing before they are converted into the respective procoagulant zymogens. The specific point of action is thought to be the inhibition of K1 epoxide reductase. The anticoagulants accumulate and are stored in the liver until broken down. The plasma prothrombin (procoagulant

factor II) concentration provides a suitable guide to the severity of acute intoxication and to the effectiveness and required duration of the antidote therapy (vitamin K1).

Signs of poisoning in rodents and other mammals are those associated with an increased tendency to bleed, leading ultimately to profuse haemorrhage. After feeding on bait containing bromadiolone for 2-3 days the animal becomes lethargic and slow moving. Signs of bleeding are often noticeable and blood may be seen around the nose and anus. As symptoms develop the animal will lose its appetite and will remain in its burrow or nest for increasingly long periods of time. Death will occur within 4-7 days of ingesting a lethal dose and animals often die out of sight in their nest or burrow.

Bromadiolone is a second-generation anticoagulant which blocks recycling of vitamin K in the liver causing the reserves of active vitamin K in the blood to be gradually depleted. Second-generation anticoagulants are long acting and so a single dose is effective. Vitamin K contributes to the formation of blood clotting factors and in doing so is converted from an "active" form to an inactive form. The inactive form is returned to the lover where it is regenerated by an enzyme to be re-used. Once this recycling enzyme is blocked by bromadiolone, the reserves of active vitamin K in the blood are gradually depleted. The rodent dies due to the failure of its blood clotting system.

3.2.5 Known limitations (e.g. resistance)

Resistance to the first generation anticoagulants has been widely reported in both *Rattus norvegicus* and *Mus domesticus* since the late 1950s. The incidence of resistance to first generation anticoagulants in areas in which it is established is commonly 25-85%. Some degree of resistance to difenacoum and bromadiolone has been reported in the UK and Denmark and other European countries both for Norwegian rats and house mice.

Studies of second generation anticoagulants like bromadiolone indicate that anticoagulant tolerance in resistant strains is affected by genotype, sex, vitamin K status and age and thus presumably more complex involving more genes than the vitamin K reducing gene.
Several elements of behaviour such as neophobia and conditioned or unconditioned aversion to bait can help rodents to avoid ingesting a fatal dose and may explain treatment failures that cannot be accounted for by physiological resistance. The enhancement of such behaviour can constitute a novel defence mechanism and was termed behavioural resistance by Humphries et al. (1992) working with mice. Similarly Brunton et al. cited enhanced neophobia in the Norway rat as an example of behavioural resistance.

CropLife International has published a strategy for resistant management of rodenticides (RRAC 2003). The habitat management is addressed in the strategy in addition to chemical control. The access of rodents should be restricted by physical barriers and no food should be available for rodents. Rotation between different anticoagulants is not a reliable means of managing the anticoagulant resistance, as all anticoagulants have the same mode of action and the nature of resistance is also similar. The resistant individuals can be identified by conducting a blood clotting response (BCR) test (Gill et al. 1993, RRAC 2003).

Resistance management strategies

The immediate aim of resistance management is to prevent or retard the development of resistance to a given anticoagulant while, as far as is not counterproductive, permitting its continued use.

To this extent the applicant suggests the following measures to aid in the prevention of resistance:

- Maximum use of non-chemical control techniques.
- Preferential use of rodenticides and formulations to which resistance rarely develops.
- Ensure the complete eradication of the target population whenever a rodenticide is used.
- Avoid the use of first generation anticoagulants, to which resistance develops relatively easily.
- Maintain uncontrolled, susceptible populations in refugia from which emigration can occur.

It is recommended that the label states that any instances of resistance are referred to the manufacturer of the a.s.

In order to prevent the development and spreading of resistance, some resistance management strategies measures such as those from the Codes of Good Practices in rodent control[19] are recommended:

- The population size of the target rodent should be evaluated before a control campaign. The number of baits and the timing of the control campaign should be in proportion to the infestation level.
- A complete elimination of rodents in the infested area should be achieved.
- The use instruction of products should contain guidance on resistance management for rodenticides.
- Resistant management strategies should be developed, and bromadiolone should not be used in an area where resistance to this substance is suspected.
- The authorisation holder shall report any observed resistance incident to the Competent Authorities or other appointed bodies involved in resistance management.

The proposed labels contain detailed instructions for use.

- The population size of the target rodent should be evaluated before a control campaign.
- The number of baits and the timing of the control campaign must be in proportion to the infestation level.
- Baits must be placed in a safe manner inaccessible to children and non-target species and not be applied to areas where food/feed, food utensils or food processing surfaces may come into contact with, or be contaminated by the product.
- Bait consumption should be regularly checked and consumed or spoilt bait replaced until consumption has stopped. The remaining baits and material must be removed and disposed of safely at the end of the treatment according to local/national wastes disposal regulation.
- Water must not be contaminated with the product or its container.
- The rodents' bodies all along the treatment must be disposed of according to local/national regulation.

In addition to the above applicant and label recommendations the RMS advocates the adoption of the following advice to avoid the development of resistance in susceptible rodent populations.

- Details of treatment should be recorded.
- Apply effective Integrated Pest Management measures (remove alternative food sources, remove water sources, remove harbourage and proof susceptible areas against rodent access).
- Inspected baiting points weekly and replace old bait where necessary.
- Do not routinely use anticoagulant rodenticides as permanent baits. Use permanent baits only where there is a clear and identified risk of immigration or introduction or where protection is

19 EPPO standards - Guidelines on Good Plant Protection Practice – Rodent control for crop protection and on farms- PP 2/5

afforded to high-risk areas. (*The RMS view is that routine use of anticoagulant baits should not be recommended in above described situations.*) .

- Where rodent activity persists due to problems other than resistance, use alternative baits or baiting strategies, extend the baiting programme or apply alternative control techniques to eliminate the residual infestation (acute or sub-acute rodenticides, gassing or trapping).

Treatment of rodent infestations containing resistant individuals

- Where rodent infestations containing resistant individuals are identified, immediately use an alternative anticoagulant of higher potency. If in doubt, seek expert advice on the local circumstances.
- Alternatively use an acute or sub-acute but non-anticoagulant rodenticide.
- In both cases it is essential that complete elimination of the rodent population is achieved. Where residual activity is identified apply intensive trapping to eliminate remaining rodents. Gassing or fumigation may be useful in specific situations.
- Apply thorough Integrated Pest Management procedures (environmental hygiene, proofing and exclusion).

Application of area or block rodent control to eliminate resistance

- Where individual infestations are found to be resistant or contain resistant individuals it is possible that the resistance extends further to neighbouring properties.
- Where there are indications that resistance may be more extensive than a single infestation, apply area or block control rodent programmes.
- The area under such management should extend at least to the boundaries of the area known resistance and ideally beyond.
- These programmes must be effectively coordinated and should encompass the procedures identified above.

3.2.6 Humaneness

The use of anti-coagulant rodenticides is necessary as there are at present no other viable measures available to control the rodent population in the European Union. Rodent control is needed to prevent disease transmission, contamination of food and feeding stuffs and structural damage. It is recognised that such substances do cause pain in rodents but it is considered that this is not in conflict with the requirements of Article 5.1 of Directive 98/8/EC ‘to avoid unnecessary pain and suffering of vertebrates’, as long as effective, but comparable less painful alternative biocidal substances or biocidal products or even non-biocidal alternatives are not available.

Conclusion:

The effectiveness data provided has demonstrated that JADE PASTE is attractive, palatable and efficacious against the intended target organisms, in the proposed areas for use at the proposed dose rate.

Table 3.2.1: Effectiveness data - JADE PASTE

Test product	Test organisms	Test system / Concentrations applied / exposure time	Test conditions	Test results: effects, mode of action, resistance	Reference
Jade Paste, freshly manufactured	CD-1 mice (*Mus musculus*) 10 animals (5 males, 5 females)	Laboratory test. Choice feeding test: fresh baits. 4-day pre-test control diet intake assessment, 4-day bait feeding period and 14-day control bait period. Unrestricted access to the test bait and to palatable and familiar alternative food (challenge diet) during the 4-day test period. The quantity of food placed in each pot was sufficient to meet each animal's daily needs.	The animals were individually caged. Normal laboratory requirements: 18 - 24°C, a relative humidity range of 30% to 80%, with between 10 and 25 air changes per hour, and with a 12-hour light-dark cycle	The mean acceptance of the test item was 47.0% (S.D. 20.1%). 90% mortality was observed. One male survived. The mean time to death was 4.3 days (3 to 5 days) after the first intake of treated baits. The efficacy was good: 90% in 14 days.	Rovetto I. (2010a) B5.10.1
Jade Paste, stored at 54°C for a period of 2 weeks.	CD-1 mice (*Mus musculus*) 10 animals (5 males,	Laboratory test. Choice feeding test: aged baits.	The animals were individually caged. Normal laboratory	The mean acceptance of the test item was 44.5% (S.D. 17.2%).	Rovetto I. (2010b) B5.10.2

Test product	Test organisms	Test system / Concentrations applied / exposure time	Test conditions	Test results: effects, mode of action, resistance	Reference
	5 females)	4-day pre-test control diet intake assessment, 4-day bait feeding period and 14-day control bait period. Unrestricted access to the test bait and to palatable and familiar alternative food (challenge diet) during the 4-day test period. The quantity of food placed in each pot was sufficient to meet each animal's daily needs.	requirements: 18 - 24°C, a relative humidity range of 30% to 80%, with between 10 and 25 air changes per hour, and with a 12-hour light-dark cycle	Total mortality was observed in both male and female mice. The mean time to death was 4.6 days (3 to 5 days) after the first intake of treated baits. The efficacy is total: 100% in 14 days.	
Jade Paste, freshly manufactured	CD Norway rat (*Rattus norvegicus*). 10 animals (5 males, 5 females)	Laboratory test. Choice feeding test: fresh baits. 4-day pre-test control diet intake assessment, 4-day bait feeding period and 14-day control bait	The animals were individually caged. Normal laboratory requirements: 18 - 24°C, a relative humidity range of 30% to 80%, with between 10 and 25 air	The mean acceptance of the test item was 34.6% (S.D. 9.7%). Total mortality was observed in both male and female mice. The mean time to death was	Rovetto I. (2010c) B5.10.3

Test product	Test organisms	Test system / Concentrations applied / exposure time	Test conditions	Test results: effects, mode of action, resistance	Reference
		period. Unrestricted access to the test bait and to palatable and familiar alternative food (challenge diet) during the 4-day test period. The quantity of food placed in each pot was sufficient to meet each animal's daily needs.	changes per hour, and with a 12-hour light-dark cycle	4.0 days (2 to 5 days) after the first intake of treated baits. The efficacy is total: 100% in 14 days.	
Jade Paste, stored at 54°C for a period of 2 weeks.	CD Norway rat (*Rattus norvegicus*). 10 animals (5 males, 5 females)	Laboratory test. Choice feeding test: aged baits. 4-day pre-test control diet intake assessment, 4-day bait feeding period and 14-day control bait period. Unrestricted access to the test bait and to palatable and familiar	The animals were individually caged. Normal laboratory requirements: 18 - 24°C, a relative humidity range of 30% to 80%, with between 10 and 25 air changes per hour, and with a 12-hour light-dark cycle	The mean acceptance of the test item was 48.9% (S.D. 12.0%). Total mortality was observed in both male and female mice. The mean time to death was 3.7 days (3 to 5 days) after the first intake of treated baits. The efficacy is total:	Rovetto I. (2010d) B5.10.4

Test product	Test organisms	Test system / Concentrations applied / exposure time	Test conditions	Test results: effects, mode of action, resistance	Reference
		alternative food (challenge diet) during the 4-day test period. The quantity of food placed in each pot was sufficient to meet each animal's daily needs.		100% in 14 days.	
Jade Paste	Wild house mouse (*Mus musculus*). At least 152, estimated by pre-treatment bait census	Field test carried out in a farm raising cows. After a pre-bait until the mice were feeding readily on the bait (25 days), baiting were carried out. The non-poisoned baits were replaced by the product to be tested for 6 days. At each day's treatment, the bait stations were emptied then refilled. Post-baiting (4 days) is done to assess the level	Natural conditions. The quantity of food placed in each bait stations was sufficient to meet each animal's daily needs.	The efficacy measured was 92.99%	Biannic M.-L (2009) B5.10.5

Test product	Test organisms	Test system / Concentrations applied / exposure time	Test conditions	Test results: effects, mode of action, resistance	Reference
		of the survival rodent population.			
Jade Paste	Wild Norway rat (*Rattus norvegicus*). At least 57, estimated by pre-treatment bait census	Field test carried out in a farm raising cows. After a pre-bait until the mice were feeding readily on the bait (18 days), baiting were carried out. The non-poisoned baits were replaced by the product to be tested for 5 days. At each day's treatment, the bait stations were emptied then refilled. Post-baiting (5 days) is done to assess the level of the survival rodent population.	Natural conditions. The quantity of food placed in each bait stations was sufficient to meet each animal's daily needs.	The efficacy measured was 93.2%	Biannic M.-L (2009) B5.10.6

Test product	Test organisms	Test system / Concentrations applied / exposure time	Test conditions	Test results: effects, mode of action, resistance	Reference
Jade Paste	Wild black rats/roof rats (*Rattus rattus*).	The test was carried out in a pig stable in a farm newly infested with *Rattus rattus.* 7 days of pre-baiting, and 14 days of baiting were carried out. Duration of the whole test: 35 days / Exposure time: 14 days.	Natural conditions. The quantity of food placed in each bait stations was sufficient to meet each animal's daily needs.	The calculated efficacy was thus 93.98%.	Feys J.L. (2012) B5.10.7

3.3. Biocidal Product Risk Assessment (Human Health and the Environment)

3.3.1. Description of the intended use(s)

The product Jade Paste is a rodenticide. It is a ready-to-use paste bait which contains 50 ppm (0.005% w/w) Bromadiolone (CAS No.28772-56-7) used by professional and amateur users. These Bromadiolone baits are used indoors and outdoors to kill mice and rats, in non-agricultural open areas and in waste dumps: they are placed at the appropriate places in bait stations or covered under a curved tile, a wooden board or in a piece of tube; the animals eat some of the product and die.

3.3.2. Hazard Assessment for Human Health

No new exposure studies have been submitted for evaluation. Signs of poisoning in rodents and other mammals are those associated with an increased tendency to bleed, leading ultimately to profuse haemorrhage. Non-target organisms are most at risk from secondary poisoning, i.e. consumption of rodent carcasses by predators such as raptors.

3.3.2.1. Toxicology of the active substance

Bromadiolone is a second-generation single-dose anticoagulant rodenticide. It disrupts the normal blood clotting mechanisms resulting in increased bleeding tendency and, eventually, profuse haemorrhage and death. Like all anticoagulant rodenticides, bromadiolone is structurally similar to vitamin K. Blood forms a clot at the site of injury by virtue of a complicated 'clotting cascade', involving numerous clotting factors. The clotting factors are made in the liver as inactive precursors, converted to active form and allowed to circulate in the bloodstream. Vitamin K is employed in the liver in the activation process, and is used in a continuous cyclic process involving several enzymes. The anticoagulant rodenticides block these enzymes, preventing regeneration of the vitamin K and preventing activation of the clotting factors.

Bromadiolone requires labelling with the symbol T^+ and the risk phrases R 28 'Very toxic if swallowed'; R27 'Very toxic in contact with the skin' and R26 'Very toxic by inhalation'. Bromadiolone is not classified as a skin irritant, eye irritant or a skin sensitiser.
Repeated dosing studies show effects on blood coagulation and death at low doses (µg/kg bw/day), and therefore labelling with R48/23/24/25 is warranted.

The Commission Working Group of Specialised Experts on Reproductive Toxicity has unanimously recommended that all AVK rodenticides should collectively be regarded as human teratogens due to the structural similarity to and the same mode of action as the known developmental toxicant warfarin (meeting in Ispra, 19-20 September 2006). Therefore based on read across data from warfarin, bromadiolone is considered to be a possible developmental toxicant and requires the classification as Reprotoxic with the labelling R61, may cause harm to the unborn child.

No oral absorption value could be set on the LiphaTech study, but the absorption was > 70 % of the administered dose, based on (carcass, bile- and urinary excretion, Task Force study). The major route of excretion was via the faeces accounting for ca 50-60 % of the dose, whilst approximately 1-5 % was excreted via urine. Bile investigations showed that biliary elimination plays a major role in the excretion. No parent bromadiolone was excreted in bile or urine. The main retention site was the liver. A non-guideline study in three cows was completed (LiphaTech). According to this study bromadiolone does not seem to accumulate into milk. The information from the ADME studies was not enough to propose a full metabolism pathway for any of the applicants but the study provided by LiphaTech identified one major metabolite in faeces as a hydroxylated analogue of bromadiolone; hydroxylation was proposed on the benzylic carbon atom. No dermal absorption study were performed on the active substance alone (it was only provided for the formulated product or mixed with bait), but a default value of 10% could be used if considered necessary.
Dermal penetration in humans was estimated as < 1.6% for a powdered product. Based on data from in vitro human skin studies with two representative products containing bromadiolone, the dermal absorption was less than 0.3% for the wax block formulations.

In acute oral toxicity studies, bromadiolone was very toxic to rats with a LD50 to the rat of between 0.56 and 1.31 mg/kg bw. Bromadiolone is slightly less toxic to dogs with a LD50 value of 8.1 mg/kg

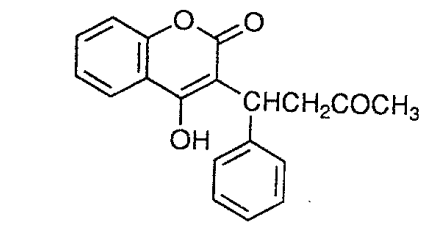
bw. The symptoms were observed 1-2 days prior to death and included signs of internal haemorrhage, which were confirmed at necropsy. Bromadiolone was also acutely toxic by dermal administration, with an LD50 of 1.71 mg/kg bw in rabbits (LiphaTech) and with a combined sexes dermal LD50 value of 23.3 mg/kg in rats (Task Force). The LC50 by inhalation, in rats was 0.43 µg/L (LiphaTech). Waiving of inhalation studies has been accepted for Task Force, since operator exposure through inhalation is unlikely to occur based in the information presented concerning production procedures and based on the physical-chemistry data showing low vapour pressure. However, a classification as R26 'Very toxic by inhalation' is warranted based on the other applicant's data (LiphaTech).
Bromadiolone is not considered to be a skin or eye irritant or a skin sensitiser.

Summary of bromadiolone subchronic, chronic, mutagenic and reproductive toxicity.

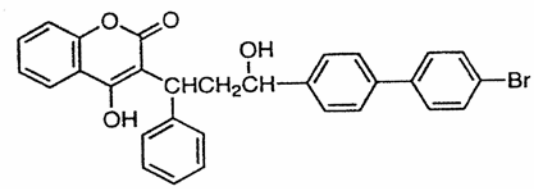
Repeated dose oral studies showed that at doses as low as 20 µg/kg/day in the dog, lethal effects developed after 64 to 85 days administration. The clinical signs, haematological and post mortem data were consistent with the known pharmacological action of the active substance; impairment of the clotting cascade and increased prevalence of haemorrhage leading to death. There were no indications of other secondary toxicities: histopathology revealed no hypertrophy or hyperplasia of the target organ, the liver. In the 90-day oral exposure study in rabbits (data provided by Task Force), a significant increase in prothrombin time was seen in the 1 µg/kg dose group. The overall NOAEL for repeat dose effects for both applicants is 0.5 µg/kg/day based on the absence of adverse effects in this dose group. The dermal exposure is expected to be low as the use of gloves when handling the baits is expected, and route-to-route extrapolation based on data from the acute oral and dermal studies does not indicate that dermal exposure constitutes a greater risk than oral exposure. Therefore, waiving of a repeat dose dermal toxicity study has been accepted. Also, due to that bromadiolone has a low vapour pressure and exposure via inhalation is expected to be negligible both during production and during the use of bait blocks, waiving of the repeat dose inhalation study has been accepted. The subchronic dermal toxicity study is also waived. A subchronic oral study has been performed for bromadiolone using the rabbit as test species, which may be used in route-to-route extrapolation. The highly cumulative nature of the material means that lower doses, administered over several days, can also be predicted to cause death. In all cases death was caused by the specific pharmacological action of the molecule, inducing fatal haemorrhage. The mechanism of clotting inhibition caused by hydroxy coumarin type anticoagulant rodenticides is dependent on inhibition of vitamin K epoxide or vitamin K reductases and is unaffected by route of application. Therefore specific repeat dose dermal or inhalation studies would not provide any additional useful information to that obtained in various species in repeat dose and subchronic studies by the oral route.

A non-guideline study in the dog submitted by LiphaTech demonstrated that after ingestion of a single lethal dose or repeated administration of sublethal doses of bromadiolone on five occasions at 48 hour intervals, antidotal therapy consisting of slow intravenous injection of vitamin K followed by 7 days of oral administration of vitamin K resulted in rapid and complete recovery.
A study in rat with bromadiolone pellets (50 ppm end use product) submitted by LiphaTech also showed that vitamin K can reverse the effects. However, the effectiveness varied with the duration of exposure to bromadiolone.

Bromadiolone was not mutagenic in a standard range of in vitro and in vivo tests. The carcinogenicity study and the chronic toxicity study were waived. Performing long-term exposure studies is technically difficult when studying highly toxic substances such as bromadiolone, since dose levels, at which toxicity is identifiable but without rendering high levels of lethality, are hard to predict. The waiving is accepted, also considering the lack of genotoxicity.
The molecules both have significant structural similarity to vitamin K. This structural similarity is responsible for the ability to interfere with i.e. block the enzymes used to regenerate vitamin K. The major differences in the active substances lie in their 'tails', which have varying degree of lipophilicity. There is long term experience with warfarin, widely used in anti-clotting therapy in humans for over forty years, with no association with increased incidence of cancer. The absence of adverse effects in millions of humans following four decades of long term warfarin therapy is considered sufficient evidence that warfarin is not carcinogenic. The structural similarity of bromadiolone to warfarin (see below), together with the negative results in the guideline mutagenicity tests, indicates that bromadiolone is not carcinogenic.



Warfarin



Bromadiolone

In addition, evidence is presented to show that it would not be possible to perform a meaningful long-term study in any species because of the accumulative nature and high toxicity of the active substance.
Reproductive effects of bromadiolone can not be excluded by the submitted two-generation reproduction toxicity study (Task Force), but since long term exposure studies are technically hard to perform for such highly toxic substances as bromadiolone, no new study will be required. As with carcinogenicity, the primary reason for not requiring such a study is the long-term use of the structurally similar molecule warfarin in humans without association with adverse effects on fertility. The 2-generation study is therefore accepted as waived for both applicants. A teratogenicity study on rabbit showed severe fetal malformations following exposure to maternally toxic levels of bromadiolone (Task Force). However, the possibility that the effects seen may have been due to non-specific influences such as generalised toxicity cannot be excluded. Bromadiolone was not embryotoxic or teratogenic in guideline studies in rat and rabbit (LiphaTech). However, based on the structural similarity to and the same mode of action as warfarin, bromadiolone is considered as a possible developmental toxicant. The Commission Working Group of Specialised Experts on Reproductive Toxicity has unanimously recommended that all AVK rodenticides should collectively be regarded as human teratogens due to the structural similarity to and the same mode of action as the known developmental toxicant warfarin (meeting in Ispra, 19-20 September 2006). Therefore based on read across data from warfarin, bromadiolone is considered to be a possible developmental toxicant and requires the classification as Reprotoxic with the labelling R61, may cause harm to the unborn child.

The toxicological studies do not indicate any neurotoxic effects. A neurotoxicity study would be scientifically unjustified and would not provide any new data. Based on this and animal welfare grounds it is deemed unnecessary to conduct a neurotoxicity study and applicant's justification is accepted. Also, the mechanism for bromadiolone as an anticoagulant is well known and no mechanistic studies were considered necessary.

There are no case reports from the manufacturer concerning adverse effects in users applying the products. The Task Force submitted data on poisoning cases with bromadiolone. During the time period 1996–1999 a total of 115 calls concerning bromadiolone were received by the Milan Poisons Center, 98 of which involved clinical cases among humans or animals. The most common route of exposure was through ingestion and in 55% of the cases children under the age of four years were exposed. The symptoms were reported in eleven human cases and included vomiting, gastric pyrosis and itching. Only one case was reported with haematological problems. Vitamin K1 is the antidote, and it is important to monitor the clotting ability of the blood (prothrombin time) to continue the treatment long enough. If diagnosis is made quickly and appropriate therapy is instituted the prognosis is good.

The derivation of an acceptable level of exposure value for single use (AELacute) is based on the teratogenicity study in rabbits submitted by Task Force. It is based on the LOAEL of 2 µg/kg bw, using a safety factor of 600 (10 for interspecies and 10 for intraspecies variability, 2 for using LOAEL instead of NOAEL and an extra factor of 3 for severity of effects) and with correction of 70% oral absorption, resulting in an AELacute of 0.0023 µg/kg bw. To derive an AELmedium, for repeated exposure, the subchronic study in rabbit submitted by Task Force is used. The NOAEL in this study is 0.5 µg/kg bw based on the prolonged prothrombin time seen at 1 µg/kg bw. With a safety factor of 300 and with correction of of 70% oral absorption, this would lead to an AELmedium of 0.0012 µg/kg bw.

Data requirements: (List if applicable)
None.

3.3.2.2. Toxicology of the biocidal product

The toxicology of the biocidal product was examined appropriately according to standard requirements. The product was not a dummy product in the EU- review program for inclusion of the active substance in Annex I of Directive 98/8/EC.

Summary of acute toxicity data for the biocidal product Jade Paste

Parameter	Test material	Species	Result	Classification	Ref.
Acute Oral Toxicity	Bromadiolone wax block bait. Batch: BB201101 broma	Rat, female, Sprague-Dawley, SPF Caw, 6 in total.	LD_{50} > 2000 mg/kg bw	none.	[redacted] (2011a). study number: TAO423-PH-11/0018
	Acceptable (Y/N): Yes		**Method:** OECD 423 (2002)		**GLP (Y/N): Yes**
	Comments: No mortality occurred during the study at 2000mg/kg. There were no clinical signs observed. 2g of paste bait was powdered and mixed with 10 ml water before use. Considering the water solubility of the active substance is extremely low, the use of a water vehicle for gavage is questionable. A less polar vehicle may have been more appropriate.				
Acute Dermal Toxicity	Bromadiolone wax block bait. Batch: BB201101 broma	Rat, male & female, Sprague-Dawley, SPF Caw, 10 in total.	LD_{50} > 2000 mg/kg bw	none.	[redacted] 2011b). study number: TAD-PH-11/0018
	Acceptable (Y/N): Yes		**Method:** OECD 402 (1987)		**GLP (Y/N): Yes**
	Comments: No mortality occurred during the study at 2000mg/kg. No cutaneous reactions or systemic clinical signs related to the administration of the test item were observed. Some green colouration for the paste dye was noted. Considering the water solubility of the active substance is extremely low, the use of a water vehicle for dermal application is questionable.				
Acute Inhalation Toxicity	none	none	none	none	none
	Acceptable (Y/N):		**Method:**		**GLP (Y/N):**
	Comments: Inhalation exposure is not appropriate for a paste formulation. Active substance has very low volatility and is only present at 0.005% (w/w) in the solid, wax product. Company justification accepted.				
Information on mixture of biocidal products	none	none	none	none	none
	Acceptable (Y/N): Yes		**Method:**		**GLP (Y/N):**
	Not applicable since following the proposed uses of paste bait and the label claims, the rodenticide paste bait is not intended to be used in a mix with other biocidal products. Company justification accepted.				
Acute Skin Irritation	Bromadiolone wax block bait. Batch: BB201101 broma	Rabbit, male, NZW, 3 in total	No irritation	none	[redacted] (2011c). study number: IC-OCDE-PH-11/0018.
	Acceptable (Y/N): Yes		**Method:** OECD 404 (2002)		**GLP (Y/N): Yes**
	Comments: The test item was applied as supplied at a dose of 0.5 g, on an undamaged skin area of one flank of each animal for 4 hours. No cutaneous reactions (erythema and oedema) were observed on the treated areas.				
Acute Eye	Bromadiolone wax	Rabbit, male,	Slight	none	[redacted]

<table>
<tr><th>Parameter</th><th>Test material</th><th>Species</th><th>Result</th><th>Classification</th><th>Ref.</th></tr>
<tr><td rowspan="3">Irritation</td><td>block bait.
Batch: BB201101
broma</td><td>NZW, 3 in total</td><td>irritation</td><td></td><td>(2011d). study number: IO-OCDE-PH-11/0017.</td></tr>
<tr><td colspan="2">Acceptable (Y/N): Yes</td><td colspan="2">Method: OECD 405 (2002)</td><td>GLP (Y/N): Yes</td></tr>
<tr><td colspan="6">Comments: The test item was reduced to a fine powder. The test item was applied at a dose of 0.1 g instilled into the conjunctival sac of one eye in each animal.
<table>
<tr><th></th><th colspan="3">Cornea</th><th colspan="3">Iris</th><th colspan="6">Conjunctivae</th></tr>
<tr><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th colspan="3">Redness</th><th colspan="3">Chemosis</th></tr>
<tr><th>Time/Animal</th><th>1</th><th>2</th><th>3</th><th>1</th><th>2</th><th>3</th><th>1</th><th>2</th><th>3</th><th>1</th><th>2</th><th>3</th></tr>
<tr><td>24 hours</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>2</td><td>2</td><td>0</td><td>2</td><td>0</td></tr>
<tr><td>48 hours</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td><td>0</td></tr>
<tr><td>72 hours</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Mean individual scores 24, 48 and 72 h</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.3</td><td>1.3</td><td>1.0</td><td>0.0</td><td>1.0</td><td>0.0</td></tr>
</table>
No Classification required.</td></tr>
<tr><td rowspan="3">Skin Sensitisation (M&K)</td><td>Bromadiolone wax block bait.
Batch: BB201101
broma</td><td>Guinea Pig, female, Dunkin-Hartley strain, 5 in negative control, 11 in treated groups.</td><td>negative</td><td>none</td><td>[redacted] (20011e). study number: SMK-PH-11/0018</td></tr>
<tr><td colspan="2">Acceptable (Y/N): No</td><td colspan="2">Method: OECD 406 (1992)</td><td>GLP (Y/N): Yes</td></tr>
<tr><td colspan="5">Comments: No cutaneous reactions (erythema and oedema) were observed on the treated areas.</td></tr>
</table>

Conclusion:
According to the results of the toxicological studies, Jade Paste does not classify with respect to Directive 1999/45/EC or Regulation (EC) No 1272/2008. However, safety phrases and precautionary statements are proposed by the Rapporteur. One issue that does not seem to be addressed by the acute studies above is the solubility of bromadiolone in aqueous media. This insolubility could affect the amount of active substance in doses applied.

Data requirements: (List if applicable)
None.

3.3.2.3. Toxicology of the co-formulants (substances of concern)

The biocidal product contains no other substances in quantities that would be of toxicological concern. The majority of these components are food grade materials and are not classified.

3.3.3. Exposure Assessment for Human Health

The most relevant route of exposure to the active substance is the dermal route. For exposure assessment only active substance from paste has been modelled. The paste product typically takes the form of a solid waxy block with a strong sweet smell containing 0.005% w/w bromadiolone.

In the final CAR for bromadiolone, LiphaTech a worst case dermal absorption of 1.6% was used for the products Super Caid Bloc and Super Caid AS Appat. However, the dermal absorption is lower for wax bloc products, which has also been shown for Task Force. Therefore the exposure to wax block products are recalculated for a dermal absorption of 0.32% which is similar to what was used for Task Force (i.e. 0.36% even though data for this applicant suggest that the dermal absorption of Protect-B as a wax block is even lower).

The products Jade Block, Jade Paste and Jade Cluster Grain were regarded as similar to wax blocks in nature and thus best represented with a dermal absorption of 0.36% as agreed for wax blocks in the Bromadiolone CAR.

The active substance has a low vapour pressure, therefore the potential for evaporation is low, and hence the potential for inhalation exposure is low. Inhalation exposure is only of concern during the formulation process where the active substance has a potential for becoming airborne when mixed with dry bait ingredients. In the case of wax blocks, inhalation exposure is irrelevant. Inhalation exposure from handling grain bait during loading/application and cleaning is also proposed as negligible. The only relevant inhalation exposure is assumed to be that from the decanting of loose grain, pellets and granules due to the potential release of airborne dusts.

Any potential oral exposure will be indirect exposure via possible release to the environment. Other possible exposure scenarios include dermal contact with dead animals and accidental ingestion of poison baits by children.

Key Endpoints for Exposure Assessment

The derivation of an acceptable level of exposure value for single use (AEL_{acute}) is based on the teratogenicity study in rabbits submitted by Task Force. It is based on the LOAEL of 2 µg/kg bw, using a safety factor of 600 (10 for interspecies and 10 for intraspecies variability, 2 for using LOAEL instead of NOAEL and an extra factor of 3 for severity of effects) and with correction of 70% oral absorption, resulting in an AELacute of 0.0023 µg/kg bw. To derive an AELmedium, for repeated exposure, the subchronic study in rabbit submitted by Task Force is used. The NOAEL in this study is 0.5 µg/kg bw based on the prolonged prothrombin time seen at 1 µg/kg bw. With a safety factor of 300 and with correction of of 70% oral absorption, this would lead to an AELmedium, chronic of 0.0012 µg/kg bw.

3.3.3.1. Exposure to professional users

MG/PT	Field of uses envisaged	Likely concentrations at which a.s. will be used
Main group 03; PT 14	**Professional uses**	
	Rodenticide used in and around buildings Use in sewerage (only against rats)	0.005% w/w
	Non-professional uses	
	Rodenticide used in and around buildings	0.005% w/w

There are two groups of humans which may be potentially exposed to the rodenticide baits : those who handle, apply and dispose of the product or other residues such as carcasses or faeces (direct exposure) and those who may be incidentally exposed while the product is in use (incidental exposure).

Method of application

Jade Paste bait is made of paste to which the active substance has been added. These Bromadiolone baits are used indoors and outdoors to kill mice and rats, in non-agricultural open areas and in waste dumps: they are placed at the appropriate places in bait stations or covered under a curved tile, a wooden board or in a piece of tube; the animals eat some of the product and die.
Baits must be deposited in a way to minimize the risk for non-target animals and for children. Where possible, baits are secured so that they cannot be dragged away by the rodents. Preferably bait stations will be used where the bait can't be hidden, fixed or locked up.
The common strategy is to explore the site, locate runs, burrows, droppings or signs of damage and place the bait boxes at entry points into buildings and around areas where rats are known to feed. For the mice control, as mice are sporadic feeders, many bait points are placed throughout the areas where mice are known to feed.

For house and field mice control, the recommended dose is 10 to 30 g per bait point every 2 to 5 meters.
For rat control, the recommended dose is 30 to 60 g of bait every 5 to 10 meters.

There are three phases for the human exposure:

- Application phase: application of rodenticides by professionals and non-professionals.
In and around buildings, in open areas and in waste dumps the product is applied manually, at measured amounts, in bait boxes or covered. Professional users are assumed to wear protective gloves when handling the product unlike amateur users.
Bait points are controlled regularly. Any bait eaten or damaged has to be replaced. Depending on infestation rate, an advised frequency of inspection is 3 to 5 days. During the bait inspections, also a search in the zone will be done for dead rodents.

- Use phase: Post-application, *i.e.* from the use of rodenticide products and from contact with the product (*e.g.* residential exposure including indoor air contamination, contact with the product during use). The use phase is the period when the biocidal product is waiting to be consumed by the target organism. This means that no primary exposure of humans is intended and should not take place (please refer to point 3.2.4 Secondary exposure).

- Disposal phase: Disposal (including handling of surplus formulated product, burning/incineration, dumping, empty containers, dead rodents (carcasses) disposal).
When no further bait take is observed, bait stations must not been left in place. All bait stations must be removed from the site, cleaned up and the bait and bait remainders must be disposed of in accordance with local requirements.

Human exposure assessment

Identification of main paths of human exposure towards active substance from its use in biocidal product

Exposure path	Industrial use[1)]	Professional use[2)]	General public[3)]	*via* the environment[4)]
Inhalation[5)]	Not appropriate	Yes	Yes	No
Dermal[6)]	Not appropriate	Yes	Yes	No
Oral	Not appropriate	No	Yes	No

[1)] Industrial use (manufacture of active substance and formulation of products) is not covered by BPD. Workers in formulation manufacture are not exposed to levels of a.s. that would affect blood clotting.
[2)] Includes non-trained professionals.
[3)] Indirect exposure due to transient mouthing by infants is included in the scenarios for the general public.
[4)] According to the TNsG, indirect exposure *via* the environment is considered to be of minor importance as the release of rodenticides to the environment is limited.

[5)] The skin is the main exposure route with a small proportion of inhalation exposure to dust when grain-based baits are mechanically handled by professionals. The active substance is of low volatility and it is incorporated at very low concentrations into a solid, non-volatile matrix. Therefore inhalation exposure is considered as negligible.
[6)] Except for the grain block bait which is always packed in individual sachets for both professionals and general public and for grain bait only for the amateurs, dermal contact with the product is a realistic scenario.

The magnitude of human exposure to paste bait can be assessed by applying standard exposure models of TNsG[20] for human exposure (2007) or the Harmonised approach for the assessment of rodenticides (anticoagulants) endorsed at TM II 2011 for professionals and amateurs users. Moreover, CONSEXPO 4.1 model can be used to assess the exposure to the biocidal product used by non-professionals.

The following basic primary exposure pathways have to be considered for a risk assessment in order to sum up the exposure of humans to Bromadiolone. The main exposure path is direct skin contact during the use of the biocidal product.
Ingestion is a secondary pathway or an accidental primary exposure during the use of the biocidal product.
Inhalation is considered as negligible.
According to the various pathways, the following absorptions will be applied in the assessment:

- Inhalatory uptake fraction: 1 (default value of 100%);
  Inhalation rate: 1.25 m^3/h (default value)
- Dermal uptake: 0.36% for a wax block, paste and grain block and 10% when no data is available on the formulation (*loose* grain).
- Oral uptake fraction 1 (default value of 100% as a worst-case scenario), and 0.7 (refinement as oral absorption is 71-77% in ADME study).

Professional exposure

For professional use, the operator is trained in the correct use of the bait, *i.e.* placement, number of bait points/boxes required based on the infestation rate area, the amount of bait or number of bait place packs per bait point/box and safe handling procedures.
The use of PPE - disposable gloves and a dust mask may be employed when decanting bait and disposable gloves may be employed when loading bait boxes and disposing of remaining bait and carcasses. However, when the bait is contained within a bait box there will be no exposure of the operator to the product.
PPE (coverall, boots and gloves) is required as standard when the bait is used in sewage systems.

Exposure calculations – professionals

The CEFIC/EBPF Rodenticides Data Development Group conducted an operator exposure study using flocoumafen (which may be considered a suitable surrogate for all other second generation anti-coagulants) to determine exposure during simulated use of rodenticide baits (*Chambers* 2004, unpublished, confidential). This study examined exposure to wax blocks (20g wax block baits, 5 blocks/bait box) and grain bait. Guidance is also taken from a confidential paper entitled "Harmonised Approach for Rodenticides" by the German Competent Authority, Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA).
The daily exposure frequency and its division between different tasks are based on a survey organised by CEFIC (and based on a questionnaire answered by selected pest control companies in several EU countries), and on an agreement between Member States on the common approach for exposure assessment and ECB guidelines. Based on an in vitro study of formulated active (bait:saline incorporated bromadiolone 0.00255 w/w) and a representative wax block formulation (0.005 % w/w) a worst case value of 0.36% was obtained that was used for this risk assessment (Bromadiolone LOEP).
The application of Jade Block bait is regarded as a suitable worst case scenario for Jade Paste, Jade Grain and Jade Cluster Bait. In the Chambers study operators secured 5 compressed wax blocks (each of 20g, in total 100g bait per box) into a bait station by pushing bait mounting pegs in the

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stations through holes in wax blocks. The paste is individually packed in a filter paper bag thus minimising dermal contact. The cluster bait is also packed in individual sachets for both professionals and general public use. Considering the packaging of the paste and cluster grain products block bait values are considered appropriate as worst case.

The Chambers study determined exposure from the application phase from the following scenario: 5 operators secured 5 compressed wax blocks (each of 20g, in total 100g bait per box) into a bait station by pushing bait mounting pegs in the stations through holes in wax blocks. Three trials were conducted with 1, 5 and 10 times securing of these wax blocks. Since the results of 1, 5 and 10 securing are similar all trials were included in the calculation of the 75th percentile by the RMS. The proposed value of **28mg (of wax bait) per manipulation** is valid for loading of one bait box with 100g of wax blocks (a single manipulation constitutes the placement of a single bait station). Since the recommended amount for rat control is up to 200g bait per bait point, this exposure value is multiplied by a factor of 2 because only 100g was used in the Chambers Study. The proposed value of **56mg (of wax bait) per manipulation** is valid for loading of one bait box with 200g of wax blocks.

For professional operators the potential total daily dermal exposure (assuming the previously agreed number of 60 manipulations from TM III/10 is applied) from the application-phase is **3360mg** wax block product (i.e. 56mg × 60 bait sites).

The Chambers study determined exposure from the disposal or post-application phase from the following scenario: 5 operators emptied a loaded bait station by sliding the wax block off the mounting pegs into a 10 L plastic bucket. This is done 1, 5 and 10 times. The proposed value of **5.75 mg per manipulation (determined by the RMS, Bromadiolone CAR 2009)** is valid for cleaning of one bait box. For the resulting potential dermal exposure of post-application-phase the agreed number of 15 manipulations (TM III/10) should be taken into account. For the post-application phase the potential total daily dermal exposure is **86 mg** wax block product (i.e. 5.75mg x 15 disposal manipulations). The size of one bait block is ignored and the figure is valid for different sized blocks (e.g. 10g, 100 g).

The calculation of PCO (pest control operator) and amateur dermal exposure in placing and clean-up of rodenticidal wax blocks, taking into account measured values (75th percentiles), defaults according to ECB guidelines and the common agreement on daily exposure frequencies (TM III/10) is presented in the following table.

Pest Control Operator, No PPE:	
Amount of exposure to product (75th percentile) during securing of 10 wax blocks (200g). Value is for placement of 1 bait station.	56.0 mg
Amount of bromadiolone on fingers/hands (0.005% in wax block)	56 mg × (0.005 / 100) = 2.8×10^{-3} mg
Systemic dose per application at 1 bait station: (dermal absorption 0.36%, bw 60kg)	(2.8×10^{-3} mg × (0.36 / 100)) / 60kg = 1.68×10^{-7} mg/kg
Amount of exposure to product (75th percentile) during clean-up and disposal per bait station	5.75 mg
Systemic dose (bromadiolone concentration 0.005%, dermal absorption 0.36%, bw 60 kg) per clean-up of one bait station.	1.73×10^{-8} mg/kg
Assuming 'reasonable worst case' scenario of 60 bait sites and 15 clean-ups, systemic dose per day	((1.68×10^{-7} mg/kg × 60) + (1.73×10^{-8} mg/kg × 15)) = **1.034×10^{-5} mg/kg/day** **0.01034 µg/kg/day**
<u>Expressed as a % of the AEL:</u>	
AEL = **0.0012 µg/kg/day**	**861%**

Pest Control Operator, With PPE (gloves)	
Default 10-fold reduction of exposure.	**1.034×10^{-6} mg/kg/day** **0.001 µg/kg/day**
Expressed as a % of the AEL:	
AEL = **0.0012 µg/kg/day**	**83%**
Non-Trained Professional (e.g. farmer), No PPE:	
Systemic dose resulting from application of product to five bait sites plus five bait sites cleaned per day, no PPE (bromadiolone concentration 0.005%, dermal absorption 0.36%, bw 60 kg).	$((1.68\times10^{-7}$ mg/kg × 5) + $(1.73\times10^{-8}$ mg/kg × 5)) = **9.27×10^{-7} mg/kg/day**
Expressed as a % of the AEL:	**0.0009 µg/kg/day**
AEL = **0.0012 µg/kg/day**	**75%**
Non-Trained Professional (e.g. farmer), With PPE (gloves):	
Default 10-fold reduction of exposure.	**9.27×10^{-8} mg/kg/day**
	0.00009 µg/kg/day
Expressed as a % of the AEL:	
AEL = **0.0012 µg/kg/day**	**7.5%**

3.3.3.2. Exposure to non-professional users

Bait boxes for use by the general public may be supplied as sealed units or as lockable, tamper-proof units that may be refilled by the user. Bait may be used in covered/protected bait points, rather than bait boxes, where appropriate.
Calculations for non-professional exposure are presented below; the first scenario assumes no exposure during application phase while the second scenario assumes that the bait boxes would have to be loaded by the user. As for the non-trained professionals, it is assumed that a non-professional user places ten bait blocks per site (200g) on five bait sites and cleans five bait sites per day.

Product type	Exposure scenario	PPE	Inhalation uptake	Dermal uptake
14	Non-professional (amateur)	None	Not relevant	8.63×10^{-8} mg/kg/day[1)]
14	Non- professional (amateur)	None	Not relevant	9.27×10^{-7} mg/kg/day[2)]

1) scenario 1, 2) scenario 2.

Scenario 1: No dermal contact during placing of baits due to sealed bait boxes. Potential exposure is only during clean-up. Default exposure value for cleanup is 5.75mg product per bait site, bromadiolone present at a concentration of 0.005% (w/w), 60kg body mass, 0.36% dermal absorption value. The value is calculated from the cleanup exposure per bait station of $((1.73\times10^{-8}$ mg/kg) × 5).
Scenario 2: Assuming that conventional bait boxes are loaded then the exposure is equal to that of the non-trained professional (e.g. farmer) with no PPE. As a worst case scenario, scenario 2 can be taken forward to risk assessment.

3.3.3.3. Exposure to children/workers/general public

Bait points should be covered or protected in such a way to prevent access to the bait. However, the ingestion of wax block bait by infants has been assessed as a potential secondary exposure route associated with the use of bromadiolone in rodenticide products. Secondary exposure is anticipated to be acute in nature. Two different scenarios of secondary exposure are available, the 'handling of dead

rodents' scenario and the 'transient mouthing of poison bait' scenario. The former is excluded from the risk assessment due to unrealistic assumptions. The estimated exposure for the 'transient mouthing of poison bait' scenario is either $2.5\times10^{-}2$ mg/kg or 5.0×10^{-5} mg/kg, depending on the default assumptions. This results in Margin of Exposure MOE values of 0.004 or 10 (NOAEL modified for severity of effect and use of LOAEL) respectively. It shows that infants are at significant risk for secondary exposure, i.e. there is no safe use for children.
For the 'transient mouthing of poison bait' scenario, either 5g (User Guidance) or 10 mg (TNsG, with bittering agent) of the product is assumed to be swallowed by an infant per poisoning event.

Oral exposure infant. TNsG Assumptions: Transient mouthing of poison bait (10mg) treated with repellent: (10mg × 0.00005) / 10kg bw

Transient mouthing infant. User Guidance Assumptions: Transient mouthing of poison bait (5000mg) without repellent; (5000mg × 0.00005) / 10kg bw

	Total dose (mg/kg b.w./day)	% AELacute (0.0023 µg/kg b.w.)
Oral exposure infant	0.075	$3.2 * 10^{6}$%
Transient mouthing infant	0.000 035	1521

The RMS considered that in connection with transient mouthing of poison baits, infants are also exposed via the dermal route while handling the bait. This however is assumed to play a minor role relative to the amount that could be ingested. It is therefore not included in the overall exposure scenario.

3.3.3.4. Exposure to consumers from residues in food

Not applicable.

3.3.3.5. Overall Summary

The exposure data based on measurements in simulated use conditions are acceptable and should be used in risk assessment. The models assume that inhalation exposure is of minor importance compared with dermal exposure. The calculations have been made with the assumptions of rat control, and there are no separate calculations to assess exposure in mice control in which smaller bait sizes are used.

3.3.4. Risk Characterisation for Human Health

3.3.4.1. Professional users

The exposure assessment for professional pest control operators (PCOs) under reasonable worst case assumptions (60 loadings and 15 clean-ups/day), as presented in section 3.3.3.1, yielded a potential dermal exposure leading to a systemic dose 0.01µg/kg/day day for an unprotected operator during bait handling operations. Comparison to calculated NOAEL for MOE shows that the use of rodenticide baits containing 0.005% bromadiolone results in a margin of exposure of 12.
Since pest control operators wear protective gloves by default during pest control operations, a refined assessment is conducted. The resulting margin of exposure (MOE = 120) indicates that the use of rodenticide baits containing 0.005% bromadiolone does not cause a risk for PCOs if gloves are worn.

Likewise, the exposure assessment for non-trained professionals (e. g., farmers) under reasonable worst case assumptions (five loadings and five clean-ups/day), yielded a potential dermal exposure leading to a systemic dose of 9.27×10^{-7} mg/kg/day for an unprotected person. Even without PPE, the resulting margin of exposure (MOE = 133) indicates that use of rodenticide baits containing 0.005 % bromadiolone is not a risk at the stated exposure frequency. A refined assessment was, nevertheless,

conducted since wearing of protective gloves is recommended in the instructions for use. The resulting margin of exposure (MOE = 1333) indicates a high level of protection for non-trained professional users when gloves are worn.

The result of the risk assessment concerning use of bromadiolone in bait blocks indicates that the acceptable exposure level is exceeded for trained professionals (PCOs) without using PPE (gloves) and that the AEL is not exceeded for professionals with PPE and non-trained professionals using the product with or without PPE (gloves). The risk is at an acceptable level without gloves for non-trained professionals. However, use of protective gloves is recommended in all cases for hygiene reasons. Exposure during manufacture of the active substance and formulation of products is beyond the scope of BPD and therefore has not been addressed in this document.

3.3.4.2. Non-professional users

Blocks are supplied either in pre-sealed units or as loose blocks for use in covered/protected bait points or refillable bait boxes. An exposure assessment has been performed taking into account potential exposure both from application and post-application tasks as a worst-case scenario. In the calculations, amateurs were assumed to load five bait points and clean five bait points per day without PPE. The estimated daily systemic dose, 9.27×10^{-7} mg/kg/day, results in an MOE value of 133 showing that there is also little risk to amateurs.

3.3.4.3. Children/Workers/general public

As a potential secondary exposure route, associated with the use of bromadiolone in rodenticide products, ingestion of wax block bait by infants has been assessed. Secondary exposure is anticipated to be acute in nature. The estimated exposure for the scenario, 2.5×10^{-2} mg/kg/day or 5.0×10^{-5} mg/kg/day, depending on the default assumptions, results in MOE values of 0.004 or 10 (NOAEL modified for severity of effect and use of LOAEL), respectively indicating that infants are at risk of poisoning. This should be addressed by ensuring all bromadiolone products targeted for amateur use are provided in sealed packs and tamper resistant bait boxes with a bittering agent. The potential exposure due to dermal contact with poisoned rodents is not included in the risk assessment because the available scenarios are unrealistic.

3.3.4.4. Consumers from residues in food

Not applicable, product is not used to treat food stuffs.

3.3.4.5. Overall Summary

The calculations presented have been made with the assumptions of rat control, and there are no separate calculations to assess exposure for mice control in which smaller bait sizes are used.

Using both the MOE and AEL approaches for risk assessment indicates that there is a satisfactory margin between the predicted exposure and the NOAEL (LOAEL) as well as exposures below the threshold value for the AEL for all intended uses by trained professionals with PPE, untrained professionals and amateurs (with and without PPE). The product is deemed suitable for authorisation and appropriate personal protective equipment is advised.

Secondary exposure from transient mouthing of the product exceeds the AEL reference value (0.0023µg/kg/day), both with the assumption of 0.01 g and 5 g of product ingested by infants. This is of concern. There is no margin of safety using the existing data and models. There is no safe scenario for indirect exposure if estimated according to TNsG and User Guidance. Mitigation and protection measures such as the inclusion of bittering agents and the enclosure of product in sealed packs and tamper resistant bait boxes are essential to reducing the risk of secondary exposure. Baits should not be placed where food, feeding stuffs or drinking water could be contaminated.

Workplace operation	**PPE**	**Exposure path**	**Dose (µg/kg/day)**	**MOE**	**%AEL**
Trained Professional: Placing of wax block baits and clean-up	None	Dermal, hands	0.01034	11.6	861
Trained Professional: Placing of wax block baits and clean-up	Protective gloves	Dermal, hands	0.001034	116	86
Non-Trained Professional: Placing of wax block baits and clean-up	None	Dermal, hands	0.0009	133	75
Non-Trained Professional: Placing of wax block baits and clean-up	Protective gloves	Dermal, hands	0.00009	1333	7.5
Amateur: Placing of wax block baits and clean-up	None	Dermal, hands	0.0009	133	75
Secondary Exposure Transient Mouthing of bait by infants	--	Oral	5.0×10^{-5} (TNsG) 2.5×10^{-2} (User Guidance)	10 0.004	-- --

3.3.5. HAZARD ASSESSMENT FOR THE ENVIRONMENT

The Swedish Competent Authority completed an assessment report of the active substance Bromadiolone in 2008 (updated 2010). The environmental fate and behaviour and ecotoxicology of the active substance were examined extensively according to the standard biocide legislative information requirements.

The results of this environmental assessment can be found in the CAR. No further fate and behaviour or ecotoxicology studies were identified as necessary to support the authorisation of the active substance. The endpoints and labelling regarding the environmental risks for the active substance must be taken into consideration for the product.

An overview of the EU review of environmental fate and behaviour and ecotoxicology for Bromadiolone are now presented.

3.3.5.1. Environmental fate and behaviour of the active substance

Bromadiolone is not readily biodegradable under environmentally relevant conditions or during sewage treatment processes. It is also not inherently biodegradable. No hydrolysis was found at the investigated pH 7, and 9, so hydrolysis of Bromadiolone is not expected to be a significant process in the environment. Photolysis of Bromadiolone in aqueous solution is rapid with a half-life of 12 hours or less. Degradation studies in soil have not been performed by the Bromadiolone Task Force and their justification for not conducting the studies state that the release of Bromadiolone is only local. This justification has been accepted.

Bromadiolone is strongly adsorbed to soil and the K_{OC} values range between 1563 and 41600 ml/g, which corresponds to 'slightly mobile' to "non-mobile" according to the SSLRC classification index. It can be estimated that Bromadiolone, even if released indirectly to soil in small quantities, is unlikely to reach groundwater in significant quantities.

The rapid photolysis rate in air (t½ ca 2 hours), the low vapour pressure of Bromadiolone and the low Henry's law constant together show that the active substance is not expected to volatilise to or persist in air in significant quantities.

A strong tendency to adsorb to sediment combined with a high degree of photo-instability means that Bromadiolone is unlikely to remain in the water column of surface waters.

BCF was derived by calculation from log K_{ow}, resulting in BCF values of 339 to 575. It can be concluded that Bromadiolone has a slight potential to bioaccumulate.

3.3.5.2. Environmental hazard of the active substance (ecotoxicology)

No further ecotoxicological studies were identified as necessary to support the authorisation of the active substance and no studies were submitted to support the authorisation of the biocidal product.

Table 3.3.5.2-1 Summary of the environmental and eco-toxicological data for the active substance Bromadiolone

Parameter	Test material	Species	Result	Classification	Ref.
Lethality/ LC50 Acute toxicity (Fish) – aquatic compartment	Bromadiolone	Rainbow trout	Bromadiolone is acutely toxic to fish with an LC50 of 2.86 mg/l (nominal concentration),	99/45 Toxic to aquatic organisms 1272/2008 No classification	A 7.4.1.1
	Acceptability (Y/N): Y		**Method:** OECD TG 203		**GLP (Y/N):** Y
	Comments: No further studies on toxicity to fish have been submitted with the argument that there is only limited and local exposure to fish. These arguments are considered acceptable.				
Lethality/ LC50 Acute toxicity (Invertebrates) – aquatic compartment	Bromadiolone	Daphnia Magna	Bromadiolone is acutely toxic to invertebrates with an LC50 of 5.79 mg/l (nominal concentration),	99/45 Toxic to aquatic organisms 1272/2008 No classification	A 7.4.1.2
	Acceptability (Y/N): Y		**Method:** OECD 202		**GLP (Y/N):** Y
	Comments: No further studies on toxicity to invertebrates have been submitted with the argument that there is only limited and local exposure to the water compartment. These arguments are considered acceptable.				
Growth inhibition on Algae 72h EC50 – aquatic compartment	Bromadiolone	*Pseudokirchneriella subcapitata*	Bromadiolone is acutely toxic to alga with an EC50 of 1.14 mg/l (nominal concentration),	99/45 Toxic to aquatic organisms 1272/2008 No classification	A 7.4.1.3
	Acceptability (Y/N): Y		**Method:** OECD TG 201		**GLP (Y/N):** Y
	Comments: The alga was found to be the most sensitive of the three aquatic organisms tested, with an ErC50 of 1.14 mg/L.				
Growth inhibition of aquatic plants	Bromadiolone	*Lemna minor*	No toxicity was detected at any stages of the study.	No classification	A 7.5.3.5.2
	Acceptability (Y/N): Y		**Method:** OECD Guideline Lemna Growth Inhibition Test (March 2006)		**GLP (Y/N):** Y
	Comments: The two most significant points are first that the solubility of the test substance was very low compared to what was found both in water solubility tests and in other aquatic studies and second that only one test concentration was used. The study gives no information that is useful for the risk assessment and will not be used further.				
Microorganisms Aerobic	Bromadiolone	Activated sludge – 3 hours	EC_{50} = 132.8 mg/L	No classification	

microbial processes in aquatic compartment			(nominal)		
	Acceptability (Y/N): Y		**Method:** OECD TG 209		**GLP (Y/N):** Y
	Comments: The test with micro-organisms in activated sludge showed that concentrations that cause inhibition of these micro-organisms are high indicating that it is not likely that Bromadiolone will have a negative impact on the microbial processes in a sewage treatment plant.				
Effects on sediment dwelling organisms	N/A	N/A	N/A	N/A	N/A
	Acceptability (Y/N): N/A		**Method:** N/A		**GLP (Y/N):** N/A
	Comments: The applicant for active substance approval justifies the absence of studies on sediment dwelling organisms with the argument that there only will be limited exposure for organisms in the aquatic compartment. The RMS for active substance approval (Sweden) considers the applicant's justification acceptable. When no tests on sediment toxicity have been performed the PNEC for sediment dwelling organisms can be calculated with the equilibrium partitioning method according to TGD II, section 3.5.2.3., equation 70.				
Toxicity to earthworms	Bromadiolone	*Eisenia fetida*	No effects of Bromadiolone were found on earthworms in any of the concentrations.	No classification	A7.5.1.2
	Acceptability (Y/N): Y		**Method:** OECD TG 207		**GLP (Y/N):** Y
	Comments: Tests with micro-organisms and plants are not considered necessary bearing in mind the absence of toxicity observed in this study.				
Toxicity to mammals	Bromadiolone	Rat	LD_{50} 1.31 mg/kg bw	Bromadiolone should be classified as Very Toxic (T+) and labelled with the risk phrases R 28 "Very toxic if swallowed" and R27 "Very toxic in contact with skin"	A6.1.1
	Acceptability (Y/N): Y		**Method:** OECD TG 401		**GLP (Y/N):** Y
	Comments: The corresponding acute rat LD50 from the other applicant LiphaTech S.A.S was slightly lower, 0.56-0.84 mg/kg bw/d.				
Acute toxicity to birds	Bromadiolone	Bobwhite quail	LD_{50} = 134 mg/kg bw	n/a	A 7.5.3.1.1-03
	Acceptability (Y/N): Y		**Method:** OPPTS 850.2100		**GLP (Y/N):** Y
	Comments:				
Long-term toxicity to birds	Bromadiolone	Bobwhite quail	5-day LC_{50} = 62 mg/kg food	n/a	A 7.5.3.1.1-03

	Acceptability (Y/N): Y		**Method:** OPPTS 850.2100		**GLP (Y/N):** Y
	Comments:				
Reproductive toxicity to birds	Bromadiolone	Japanese quail	NOEC = 0.039 mg/kg bw/day 0.26 mg/L drinking water	n/a	A 7.5.3.1.3
	Acceptability (Y/N): Y		**Method:** OECD TG 206		**GLP (Y/N):** Y
	Comments:				

3.3.5.3. Conclusion

Aquatic:
Bromadiolone is toxic to fish, aquatic invertebrates and algae under the Classification criteria as set out Directive 99/45 (DPD). Another active substance applicant's data indicated Bromadiolone was very toxic to aquatic organisms based on the results of an acute algae study. Bromadiolone is classified Aquatic Acute 1; H400 and Aquatic Chronic 1; H410 using the Classification criteria of the CLP regulation 1272/2008.

The most sensitive organism in the aquatic tests was green alga with a nominal ErC50 of 1.14 mg/L. This gives a **PNECwater** of 1.14/1000 (acute studies available only)/3 (uncertainties due to photolytic degradation) **= 3.8 x 10^{-4} mg/L**.

The test with micro-organisms in activated sludge showed that concentrations that cause inhibition of these micro-organisms are high indicating that it is not likely that Bromadiolone will have a negative impact on the microbial processes in a sewage treatment plant. This gives a **PNECSTP** of 132.8/100 (No NOEC or EC10 was available) **= 1.33 mg/L.** There was a study conducted on aquatic plants and it indicated no toxicity however the study was not considered useful for the risk assessment/characterisation process.

There justifiably were no studies on sediment dwelling organisms. The PNEC for sediment dwelling organisms was calculated using the equilibrium partitioning method. In order to obtain a value that could be used in the equation, an average value of 14770 ml/g was calculated from four of the five soils available. The **PNECsediment = 0.83 mg/kg w/w**

Terrestrial:
Exposure of soil organisms to Bromadiolone by direct contamination of soil may occur following use in and around buildings and waste dumps. It is also possible that soil may become exposed following the spreading of sewage sludge from a sewage treatment plant that has been exposed to Bromadiolone used in sewers.

No effects of Bromadiolone were found on earthworms in any of the concentrations. The PNECsoil of 918 mg/kg ww (1331 mg/kg/day adjusted for soil humidity)/1000 = 0.918 mg/kg ww. Tests with soil micro-organisms and terrestrial plants were not considered necessary bearing in mind the absence of toxicity observed in the earthworm study. Additionally, Bromadiolone is not expected to be toxic to soil micro-organisms or terrestrial plants on the basis of the mode of action.

When one terrestrial study is only available the PNEC should also be calculated from the aquatic toxicity data using equilibrium partitioning calculations giving a result of **PNECsoil =** (443/1700) x 3.8 x10^{-4} x 1000 **= 9.9 x 10^{-2} mg/kg.** Due to the uncertainties associated with using the **PNECsoil** determined by the two active substance applicants the value determined using the equilibrium partitioning calculations was used.

Bromadiolone is very toxic to birds. Effects were found in birds in acute, short-term and long term tests. Consumption of bait on a single occasion led to a body concentration of Bromadiolone of 96-188 mg/kg bw and a lethal effect. A single dose of 62.5 mg/kg bw caused sublethal effects, since cowering was observed at this dose. If 79µg Bromadiolone per kg bw and day is consumed during a 42 day exposure period effects can be observed that might lead to effects on the population level. The long-term PNEC for birds was determined by using the NOEC values calculated from the bird reproduction study. The **$PNEC_{oral}$** in birds is 0.039 mg/kg bw/day/30 **= 0.0013mg/kg bw/day.** Bromadiolone is also very toxic to mammals. According to the mammalian toxicity data, Bromadiolone should be classified as Very Toxic (T+) and labelled with the risk phrases R 28 "Very toxic if swallowed" and R27 "Very toxic in contact with skin". Due to lack of inhalation data presented in this dossier a classification proposal for acute inhalation toxicity cannot be made. However, the RMS is aware of other data indicating that classification with T+; R26 is appropriate. The **$PNEC_{oral}$** in mammals **= 0.0000056 mg/kg bw/day.** These $PNEC_{oral}$ values were used in risk characterisation of primary and secondary poisoning.

Bioaccumulation:
The quality of the bioaccumulation study (A 7.4.3.3.1) was not acceptable; however the results indicated long term toxicity at a concentration as low as 0.14µg/L. These effect concentrations are several orders of magnitude lower than the concentrations found to cause acute toxicity. Two bioconcentration studies have been conducted in the tissues of fish under artificial conditions in the laboratory. In a study with bluegill sunfish the maximum bioconcentration factor for Bromadiolone was 460 for whole fish. In non-edible tissues the maximum BCF was 1,658 and in edible tissues 161. In a second study with channel catfish, the bioconcentration factors in whole fish ranged from 24 (day 1) to 74 (day 14). In edible and non-edible tissues the maximum bioconcentration factors were 59 and 641, respectively. Two fish bioconcentration studies were performed by the Task Force, but both failed. Taking all the results together, the fish studies are of low reliability, and therefore BCF was derived by calculation from log K_{ow}, resulting in BCF values of 339 to 575. It is concluded that Bromadiolone has the potential to bioaccumulate.

Data requirements not addressed: None

3.3.5.4. Environmental hazard of the biocidal product

The products in the EU- review program for inclusion of the active substance in Annex I of Directive 98/8/EC were bait blocks (solid wax block bait formulation) and coral grain containing Bromadiolone. There were no aquatic or terrestrial (earthworm, other invertebrate, avian toxicity or mammals) data generated on bait blocks or cereal grain containing Bromadiolone. The aquatic, terrestrial, avian and mammalian toxicity data used for the assessment of the biocidal product was based on data determined in the Bromadiolone active substance studies.

No new ecotoxicology studies were performed for the biocidal product being assessed.

Summary of environmental and eco-toxicological data for the biocidal product containing Bromadiolone:

Parameter	Test material	Species	Result	Classification	Ref.
No tests conducted using biocidal product	n/a	n/a	n/a	n/a	n/a
	Acceptability (Y/N): n/a		**Method:** n/a		**GLP (Y/N):** n/a
	Comments: n/a				

Conclusion:
The most sensitive organism in the aquatic tests was green alga with a nominal ErC50 of 1.14 mg/L.

The test with micro-organisms in activated sludge showed that concentrations that cause inhibition of these micro-organisms are high indicating that it is not likely that Bromadiolone will have a negative impact on the microbial processes in a sewage treatment plant.

There justifiably were no studies on sediment dwelling organisms.

No effects of Bromadiolone were found on earthworms in any of the concentrations.

Effects were found in birds in acute, short-term and long term tests. Consumption of bait on a single occasion led to a body concentration of Bromadiolone of 96-188 mg/kg bw and a lethal effect. A single dose of 62.5 mg/kg bw caused sublethal effects, since cowering was observed at this dose. If 79µg Bromadiolone per kg bw and day is consumed during 42 days effects can be observed that might lead to effects on the population level.

According to the mammalian toxicity data, Bromadiolone should be classified as Very Toxic (T+) and labelled with the risk phrases R 28 "Very toxic if swallowed" and R27 "Very toxic in contact with skin". Due to lack of inhalation data presented in this dossier a classification proposal for acute inhalation toxicity cannot be made. However, the CA is aware of other data indicating that classification with T+; R26 is appropriate.

No further studies were identified as necessary.

Data requirements not addressed: None

[redacted]

None of the co-formulants are substances of concern for the environment. The Bromadiolone stock contains 2.5% active substance and 0.5% of a bittering agent which classifies R52/53. This stock is used to prepare the product. As the preparation contains less than 0.25% content of the product w/w

it does not exceed the threshold value of 0.25% w/w of substances meaning it does not classify as Aquatic Chronic 1-4 H410-413 (R50/53).

3.3.6. Exposure Assessment for the Environment

An overview of the environmental exposure assessment for the biocidal product is presented in this section. The environmental exposure assessed during the review process and the current intended use is similar. Detailed calculations are provided in Annex VI which accompanies this Product Authorisation Report (PAR).

The rodenticide product is used by professional and amateur users. The product is intended for indoors use, in and around buildings and for outdoors uses in non-agricultural open areas and waste dumps. It is not supported for use in sewers; however the applicant has included this scenario in their application as a worst case scenario.

It is always used in the same manner for all these purposes. Bait points are placed throughout the infested areas with 10 to 30 g per bait point for mice and 25 to 100 g per bait point for rats. Application sites are located 2-5 m apart for mice and 5-10 m apart for rats. Shorter distance is used in severe infestations. The number of baits and the distances should be adapted to the infestation level. Bait points are inspected frequently and replenished when bait has been eaten.

Bait points are protected to help prevent access to non-target animals. In situations where bait boxes cannot be used, the bait is covered / protected such that non-target organisms cannot reach it. Dead rodents are removed for disposal in order to prevent them being eaten by non-target animals and birds. When no more bait is eaten and rodent activity stops, the remains of all baits are removed for disposal.

Based on the environmental fate and behaviour of Bromadiolone, as outlined in Annex VI of this Product Authorisation Report, the environmental exposure assessment was conducted.

3.3.6.1. Aquatic compartment

As mentioned previously the product is not supported for use in sewers but the scenario has been included as part of the risk assessment for the other scenarios. Therefore exposure to the aquatic compartment has been assessed through the STP route also. Based on worst case ESD assumptions the maximum predicted environmental concentration (PEC) of the active substance for microorganisms in the STP is 4.44×10^{-5} mg/L. The corresponding amount in surface water is 4.37×10^{-6} mg/L. The maximum permissible concentration by directive 80/778/EEC (amended by 98/83/EC) of 0.1 µg/L is not exceeded in surface waters. 9.90×10^{-4} mg/kg wet weight is predicted to occur in sediment during an emission episode. Full details of the calculations are contained in Annex VI.

3.3.6.2. Atmospheric compartment

Bromadiolone has a low vapour pressure (< 5×10^{-5} Pa) and Henry's Law constant (4.25×10^{-4} $Pa.m^3mol^{-1}$). Release to air via water is expected to be negligible.

This is also supported by calculations using the TGD on risk assessment for percent release to air from a sewage treatment plant where no release to air is predicted. Releases to air from use of bait within covered/protected bait points or bait boxes are considered to be negligible.

Therefore, it can be considered that there are no releases to air of Bromadiolone from use or disposal phases.

3.3.6.3. Terrestrial compartment

Exposures of soil to the active substance occurs via direct (spillages) and disperse release (deposition by urine and faeces) after the use of the product in and around buildings, open areas and waste dumps. As mentioned previously the product is not supported for use in sewers however exposure to agricultural soil via spreading of sludge from an STP has been included as part of the worst case risk assessment.

Using ESD worst-case assumptions of the typical usage patterns and release mechanisms, the maximum concentration in agricultural soil (averaged over 30 d) after 10 years of sludge application from STP is 1.62×10^{-4} mg/kg wwt.

The highest concentration of Bromadiolone in soil following use in and around buildings is 0.0468 mg/kg wwt under ESD realistic worst case conditions (see table below). This scenario assumes the bait stations are filled 5 times during the campaign. The ESD estimates that given more realistic usage patterns only 2.6 fills of the bait are required. This, in conjunction with the 100 g per bait point recommended by the applicant, lowers the estimated soil concentration to 0.0097 mg/kg wwt.

For the open areas scenario ESD realistic worst-case conditions assume one application site is treated twice with the product. The fraction released during use and application is 0.25. The exposed soil area is assumed to be the lower half of the burrow wall surrounding an 8 cm diameter tunnel, with a soil mixing depth of 10 cm and up to 30 cm from the entrance hole. The amount of product used at each refilling in the control operation is not specified by the ESD. However, the Reviewer notes the ESD states " A typical initial dose for a rat hole in the Nordic countries is 100-200 g grain.hole^{-1}. However, in e.g. France a typical dose for a rat hole is about 50-100 g product." The applicant supports a dosage of 100 g bait per refill and this has been used in the exposure assessment. The local concentration arising in soil after a campaign is predicted to be 0.173 mg/kg wwt.

The default area for a waste dump defined in the ESD is 1 ha. If bait points are placed at distances of 5 m apart in a grid covering the entire dump this would yield a total of 441 points (21 x 21). 100 g in each bait point corresponds to a total loading of 44.1 kg of bait. This is higher than the default value considered in the ESD under realistic worst-case conditions (40 kg). Consequently the applicant's exposure calculation is not sufficient to support this use. The Reviewer generated new exposure calculations for this use. The local concentration arising in soil after such a campaign is predicted to be 0.00817 mg/kg wwt. A more realistic campaign would use a total of 11 kg of bait resulting in a local concentration of 0.00204 mg/kg wwt.

In and around buildings	Open areas	Waste dumps
Amount of product used in control operation for each bait box: 0.25 kg (ESD), 0.1 kg (applicant). Realistic worst-case: 21 day campaign Bait stations: 10 No. of replenishments: 5 (2.6 realistic) Bait stations are 5 m apart. Fraction released due to spillage: 0.01 Fraction ingested: 0.99 Spillage area: 0.09 m^2 (0.1 m around station) Frequented area: 550 m^2 (10 m	Amount of product used at each refilling in the control operation: 100 g Realistic worst-case: 6 day campaign Bait stations: 1 No. of replenishments: 2 Fraction of product released to soil during application: 0.05 Fraction of product released to soil during use: 0.2	Area of waste dump: 1 ha Amount of product per station: 100 g Spacing between blocks: 5 m (worst case), 10 m (realistic) Total mass of product used: 21 x 21 x 100 g = 44.1 kg (worst case) 11 x 10 x 100 g = 11 kg (realistic) No. of replenishments: 7 Fraction of active ingredient released to soil through urine, faeces and dead animals: 0.9.

around building)		

3.3.6.4. Groundwater

Exposure of groundwater may occur as a result of soil exposure which occurs via residues present in sewage sludge after using the product in sewers and via direct (spillages) and disperse release (urine and faeces) after the use of the product in the scenarios in and around buildings, open areas and waste dumps. As an indication for potential groundwater levels, the concentration in soil porewater in the various scenarios was examined. It should be noted that this is a worst-case assumption, neglecting transformation and dilution in deeper soil layers. A summary of the PECs obtained are presented in the table below. The calculated value for the open areas scenario exceeds the EU trigger value of 0.1 µg/L. However this figure is derived from a soil concentration value in a small localised area in the immediate vicinity of the baiting point. When taken in the context of a larger area (field, park, etc.) this figure would be several orders of magnitude lower. The same argument applies to the figure calculated for the in and around buildings scenario which is driven principally by direct release in the vicinity of the baiting point. In addition it must be noted that these two scenarios give a value for groundwater under industrial soil – not agricultural soil as specified by the ESD.

Scenario	**In and around buildings**		**Open area**	**Waste dumps**		**Sewer system**
	Worst case	**Realistic**		**Worst case**	**Realistic**	
PEC groundwater (mg/l)	2.55E-04	5.30E-05	9.43E-04	4.45E-05	1.11E-05	4.09E-07

3.3.6.5. Primary & Secondary poisoning

Detailed explanations and calculations for primary and secondary poisoning are found in Annex VI of this PAR.

The PNEC values are determined from the results presented in the Bromadiolone CAR and are also represented in the hazard assessment section in this section of the PAR.

$PNEC_{oral}$ values for birds and mammals exposed to Bromadiolone

Organism group	**Species / test**	**Results[1]**	**Assessment factor**	**PNEC (concentration in food, mg/kg)[3]**	**PNEC (dose, mg/kg b.w./d)[3]**
Acute					
Birds	Partridge, short-term toxicity study (10 days)	LC_{50}= 28.9 mg/kg food	3 000	0.00963	0.00120
Mammals	Rats, 28 days repeated dose test	NOAEL[2] = 2.5 *10^{-3} mg/kg b.w./d	300	1.67*10^{-4}	8.33*10^{-6}
Long-term					
Birds	Japanese quail Reproduction test 42 days	NOEC = 0.039 mg/kg b.w./day	30	0.0104	0.0013
Mammals	Rabbit 90 days	NOAEL = 5*10^{-4} mg/kg b.w./day	90	0.000186	0.0000056

The empirical risk assumes direct or indirect consumption of the deployed baits. A summary of the main exposure calculation results are presented next:

Primary poisoning:
For primary poisoning the initial PEC_{oral} values assume that there is no bait avoidance by the non-target animals and that they obtain 100% of their diet in the treated area and have access to the product.
For the acute tier 1 assessment the PECoral is 50 mg/kg (Bromadiolone present at 0.005% w/w in the product) and is used in quantitative risk assessment for the acute and long-term situation.

For the acute tier 2 assessment the body weights, daily food intakes and estimates of Bromadiolone ingestion, based on sufficient bait being accessible to satisfy a day's food intake requirement, are presented below for representative non-target mammals.

Tier 2 Calculations of ETE for non-target animals consuming baits treated with 0.005% Bromadiolone

Non-target animals	Typical body weight (g)[a]	Daily mean food intake (g dry weight/day)	Concentration of Bromadiolone in bait (mg/kg)	ETE, concentration of Bromadiolone after one meal (one day) (mg/ kg b.w.)	
				Step 1	Step 2
Tree sparrow	22	7.6[a]	50	17.3	12.4
Chaffinch	21.4	6.42[a]	50	15.0	10.8
Wood pigeon	490	53.1[a]	50	5.42	3.90
Pheasant	953	102.7[a]	50	5.39	3.88
Dog	10 000	456[b]	50	2.28	1.64
Pig	80 000	600[c]	50	0.375	0.270
Pig, young	25 000	600[c]	50	1.20	0.864

In Tier 2, Step 1 (worst case) AV, PT and PD are all set to 1, whilst in the realistic worst case (Step 2) these AV and PT are refined to 0.9 and 0.8, respectively.

In the second tier assessment long-term exposure, also has to be taken into account in the evaluation of primary poisoning of rodenticides. The EC (expected concentration of active substance in the animal) after metabolism and other elimination is calculated.

Expected concentration of Bromadiolone in the animal after one meal followed by a 24-hour elimination period

Species	Estimated daily uptake of a compound (ETE) (mg/kg b.w./d)		Fraction of daily uptake eliminated (number between 0 and 1) (EI)	Expected concentration of active substance in the animal (EC) (mg/kg b.w./d)	
	Step 1	Step 2		Step 1	Step 2
Tree sparrow	17.3	12.4	0.3	12.1	8.68
Chaffinch	15.0	10.8	0.3	10.5	7.56
Wood pigeon	5.42	3.90	0.3	3.79	2.73
Pheasant	5.39	3.88	0.3	3.77	2.72
Dog	2.28	1.64	0.3	1.60	1.15
Pig	0.375	0.270	0.3	0.263	0.189
Pig, young	1.20	0.864	0.3	0.840	0.605

According to the guidance agreed at the 23rd Biocides CA meeting, EC_5 values are used for quantitative risk assessment of primary poisoning in the long-term situation. Calculations of the expected concentrations (EC) for 5-days exposure considering elimination are calculated.

EC_{oral} for different relevant species

Days	EC_{oral} (mg/kg b.w./d)

Species	Tree sparrow	Chaffinch	Wood pigeon	Pheasant	Dog	Pig	Young pig
Day 1 after first meal	17.3	15.0	5.42	5.39	2.28	0.375	1.20
Day 2 before new meal	12.1	10.5	3.79	3.77	1.60	0.266	0.840
Day 3 before new meal	20.6	17.9	6.45	6.41	2.72	0.449	1.43
Day 4 before new meal	26.5	23.0	8.31	8.26	3.50	0.577	1.84
Day 5 before new meal	30.7	26.6	9.61	9.56	4.05	0.666	2.13

The previously presented PNEC values for each representative animal are compared with the ETE values to provide an indication of the risk to non-target animals ingesting a daily dose of bait containing Bromadiolone.

Secondary poisoning:

A summary of the calculations for the exposure assessment for the active substance for secondary poisoning are presented next.

In the terrestrial food chain, secondary poisoning is possible via contaminated soil invertebrates and rodents, and the latter animals are the most likely source of Bromadiolone residues in raptorial birds and predatory mammals. Here the food chain is as follows: rodenticide (bait) $\rightarrow$ rodent $\rightarrow$ rodent-eating mammal or rodent-eating bird.

For the first tier assessment of secondary poisoning, the maximum residue levels in target rodents that arise on day-5 after the last meal ($ETE_{oral\ predator}$) are compared to the PNEC values for concentration in food.

Accordingly, the residues of Bromadiolone in a target rodent in mg a.s./kg b.w. at different times during a control operation (concentration of active substance in rodenticide bait 0.005%) are calculated firstly:

	Residues of rodenticide in target animal, mg a.s./kg b.w. with bait consumption expressed as PD		
	0.2	**0.5**	**1**
A normal non-resistant target rodent stops eating on day 5			
Day 1 after the first meal*	1.00	2.50	5.00
Day 2 before new meal**	0.70	1.75	3.50
Day 5 before new meal	1.77	4.43	8.87
Day 5 after the last meal	2.77	6.93	13.9
Day 6**	1.94	4.85	9.71
Day 7 (mean time to death)**	1.36	3.40	6.79
A target rodent continues eating due to resistance			
Day 14 after the meal	3.31	8.28	16.6

* Equation for ETE is used for calculation of rodenticide in target animal on Day 1 immediately after first meal.
**Equation for EC (primary poisoning) is used for calculating the value for Day 2 before new meal.

A refined tier 2 risk assessment was also required and considered exposure of relevant species of predators, based on their bodyweights and food intakes. Food intake of non-target animals can vary significantly, depending on the metabolic rates of species, the nature of their food, weather conditions, time of year, etc. Several bird and mammal species are chosen to refine the risk assessment including **for birds**: barn owl, kestrel, little owl and tawny owl, and **for Mammals**: fox, polecat, stoat and weasel.

The expected concentrations of active substance in non-target animals (predators / carnivores) due to secondary poisoning after a single day of exposure (concentration of active substance in rodenticide bait 0.005%) with the following conditions: Rodents feed 100% on rodenticide, and predators / carnivores feed 50% on poisoned rodents, is as follows:

				Normal susceptible rodents caught on day 5, before their last meal.		Normal susceptible rodents caught on day 5 just after their last meal		Resistant rodents caught on day 14 just after their last meal	
Species		**Body weight *)**	**Daily mean food intake*)**	**Amount a.s. consumed by the non-target animal****	**Concentration in non-target animal**	**Amount a.s. consumed by the non-target animal*****	**Concentration in non-target animal**	**Amount a.s. consumed by the non-target animals********	**Concentration in non-target animal**
		(g)	**(g)**	**(mg)**	**(mg a.s./kg b.w.)**	**(mg)**	**(mg a.s./kg b.w.)**	**(mg)**	**(mg a.s./kg b.w.)**
Barn Owl	*Tyto alba*	294	72.9	0.32	1.10	0.51	1.72	0.61	2.06
Kestrel	*Falco tinnunculi.*	209	78.7	0.35	1.68	0.55	2.62	0.65	3.13
Little owl	*Athene noctua*	164	46.4	0.21	1.26	0.32	1.97	0.39	2.35
Tawny Owl	*Strix aluco*	426	97.1	0.43	1.01	0.67	1.58	0.81	1.89
Fox	*Vulpes vulpes*	5 700	520.2	2.31	0.41	3.62	0.63	4.32	0.76
Polecat	*Mustela putorius*	689	130.9	0.58	0.85	0.91	1.32	1.09	1.58
Stoat	*Mustela erminea*	205	55.7	0.25	1.21	0.39	1.89	0.46	2.26
Weasel	*Mustela nivalis*	63	24.7	0.11	1.74	0.17	2.72	0.21	3.25

3.3.6.6. Overall Summary of exposure assessment

The biocidal product is a ready-to-use bait containing 0.005% Bromadiolone as the active substance. Bromadiolone is a second-generation single-dose anticoagulant rodenticide. It is used against rat at the maximal rate of 100g of product equivalent to 5 mg a.s. per baiting post and against mouse at 30g product equivalent to 1.5 mg a.s. by baiting post. This formulation is intended for indoor and outdoor uses.

PECs were calculated in accordance with the ESD for PT14. These calculations are outlined in the previous section. Based on environmental fate and behaviour of Bromadiolone the following PEC values were determined:

Scenario	**In and around buildings**		**Open area**	**Waste dumps**		**Sewer system**
	Worst case	**Realistic**		**Worst case**	**Realistic**	
PEC soil (mg/kg wwt)	4.68E-02	9.36E-03	1.73E-01	7.41E-03	2.04E-03	
PEC groundwater (mg/l)	2.55E-04	5.10E-05	9.43E-04	4.04E-05	1.11E-05	
PEC microorganisms (mg/l)						4.44E-05
PEC surface water (mg/l)						4.37E-06
PEC agricultural soil (mg/kg						1.62E-04

wwt)						
PEC sediment (mg/kg wwt)						9.90E-04
PEC groundwater (ag) (mg/l)						4.09E-07

No new data related to the environment fate and behaviour or the ecotoxicology of the active substance or the biocidal product has been submitted by the applicant.
PNECs were calculated based on the studies submitted for the EU approval of the active substance.
PECS for assessment of primary and secondary poisoning were determined based on the ESD for PT14 and the TGD (2003).

3.3.7. Risk Characterisation for the Environment

Bromadiolone products are non-selective and can pose a risk of primary and secondary poisoning to non-target animals.

Product containing Bromadiolone are placed at secured bait points. To maximise exposure of the target rodents and minimise unintended exposure of other non-target vertebrates, the products are placed where they are most likely to be encountered by the target organisms (e.g. on habitual rat-runs).

The type of secured bait point suitable for a given situation is determined on a case-by-case basis, taking into account such factors as shielding from sunlight and moisture necessary to maintain bait integrity and the level of security required to prevent access to and/or interference by non-target animals etc.

The risks posed by products containing 50 mg Bromadiolone/kg are characterised for the following scenarios:

1. Sewers, where only bait blocks are applicable;
2. In and around buildings (houses, animal houses, commercial and industrial sites), both blocks and grains;
3. Open areas, both blocks and grains;
4. Waste dumps, both blocks and grains.

3.3.7.1. Aquatic compartment

A contamination of surface water with Bromadiolone from the placing of product in and around buildings, in open areas and on waste dumps is highly unlikely. A lack of exposure to surface water is also stated in the EUBEES 2 emission scenario document. Contamination of surface waters is however expected to arise following use of bait blocks in sewers.

The most sensitive organism in the aquatic tests was green alga with a nominal ErC50 of 1.14 mg/L. This **PNECwater** of 1.14/1000 (acute studies available only)/3 (uncertainties due to photolytic degradation) **= 3.8 x 10^{-4} mg/L**.

The test with micro-organisms in activated sludge showed that concentrations that cause inhibition of these micro-organisms are high indicating that it is not likely that Bromadiolone will have a negative impact on the microbial processes in a sewage treatment plant. This gives a **PNECSTP** of 132.8/100 (No NOEC or EC10 was available) **= 1.33 mg/L.**

The PNEC for sediment dwelling organisms was calculated using the equilibrium partitioning method. In order to obtain a value that could be used in the equation, an average value of 14770 ml/g was calculated from four of the five soils available. The **PNECsediment = 0.83 mg/kg w/w**

The risk characterisation for the aquatic compartment is presented in the following table applying the relevant PEC values as indicated in the table in the overall summary of the exposure assessment **section 3.3.6.6** above.

Aquatic PEC/PNEC ratios using the realistic worst case scenario

Exposed compartment	Endpoint	PNEC	PEC	Risk quotient PEC/PNEC
Surface water	Green algae ErC50 of 1.14 mg/L	**3.8 x 10^{-4} mg/L**.	4.37E-06 mg/l	≤ 1
Sediment	Equilibrium partitioning method	**0.83 mg/kg w/w**	9.90E-04 (mg/kg w/w)	≤ 1

	14770 ml/g			
STP	Micro-organisms in activated sludge EC_{50} = 132.8 mg/L (nominal)	**1.33 mg/L**	4.44E-05 mg/l	≤ 1

The PEC/PNEC risk quotient in all compartments are below the trigger value of 1 indicating Bromadiolone following the recommended use of the product does not cause an unacceptable risk to aquatic organisms, sediment dwelling organisms or biological processes at the sewage treatment plant.

Bromadiolone is not readily biodegradable under environmentally relevant conditions or during sewage treatment processes. Accordingly, the degradation of Bromadiolone in sediment is also anticipated to be low. However, it has limited exposure to the aquatic compartment and this is confirmed by the PEC calculations. The PEC/PNEC ratio is below the level that leads to an unacceptable risk, thus the risk for unacceptable accumulation in sediment can be regarded as low.

No risk is identified to either groundwater/porewater or surface water used for drinking as in both cases the maximum permissible concentration as indicated by directive 80/778/EEC (amended by 98/83/EC) of 0.1 µg/l is not exceeded in the ESD realistic worst case scenarios for uses in sewer, in and around buildings, open areas and waste dumps.

3.3.7.2. Atmospheric compartment

There are no releases to air of Bromadiolone from use or disposal phases. No risk is identified

3.3.7.3. Terrestrial compartment

Contamination of soil following the use of product in sewers is highly unlikely during application and use. However, soil may contain low concentrations of Bromadiolone from the spreading of sludge on land derived from waste water treatment works receiving water after the baiting of sewer systems.

Exposure of the terrestrial compartment (soil) will also occur when product is deployed outdoors. Exposure is assumed to arise through a combination of transfer (direct release) and deposition via urine and faeces (disperse release) onto soil.

Bromadiolone products are applied in open areas by inserting them inside the openings of the tunnels of the target rodents and soil exposure is assumed to occur to the burrow floor.

One terrestrial study is only available, accordingly the PNEC should also be calculated from the aquatic toxicity data using equilibrium partitioning calculations giving a result of **PNECsoil** = (443/1700) x 3.8 $x10^{-4}$ x 1000 = **9.9×10^{-2} mg/kg**. Due to the uncertainties associated with using the PNECsoil determined by the two active substance applicants the value determined using the equilibrium partitioning calculations was used.

Aquatic PEC/PNEC ratios using the realistic worst case scenario

Exposed compartment	Endpoint	PNEC	PEC	Risk quotient PEC/PNEC
In and around buildings	Equilibrium partitioning calculations	9.9 x 10^{-2} mg/kg	4.68E-02 mg/kg w/w	≤ 1
Open areas	Equilibrium partitioning calculations	9.9 x 10^{-2} mg/kg	1.73E-01 mg/kg w/w	1.74
Waste dump	Equilibrium	9.9 x 10^{-2} mg/kg	7.41E-03 mg/kg	≤ 1

	partitioning calculations		w/w	
Sewer application of sewage sludge	Equilibrium partitioning calculations	9.9 x 10^{-2} mg/kg	1.62E-04 mg/kg w/w	≤ 1

The PEC/PNEC ratios were less than 1 when used in and around buildings, waste dumps and for sewer applications indicating that Bromadiolone, following recommended use of the product, does not cause unacceptable risk to organisms in any of these terrestrial compartments assessed.

The PEC/PNEC ratio was greater than 1 when used in open areas indicating that Bromadiolone, following recommended use of the product, causes an unacceptable risk to organisms in this terrestrial compartment. However, the PEC/PNEC ratio based on the open area PEC **represents only a localised hotspot** of contamination near the entrance of each baited tunnel.

3.3.7.4. Primary poisoning

The risk for primary and secondary poisoning via the aquatic food chain, e.g. of predatory fish, is not considered further, since the exposure to the aquatic environment is limited and since available data on fish suggests that Bromadiolone does not have a high potential for bioaccumulation in fish tissues.

Acute exposure:
Non-target mammals and birds are unlikely to enter sewers and feed on product in sewage systems. Therefore, there will be no significant exposure following the use of product in sewers. Rats that live underground in sewers are also unlikely to take bait and deposit significant quantities in accessible places above ground, thus preventing exposure to non-target animals living above sewers. In conclusion, the risks to non-target mammals and birds following the use of bait blocks containing Bromadiolone in sewers are considered to be very low.

The empirical risk assumes direct or indirect consumption of the deployed baits in and around buildings, in open areas and waste dumps. For primary poisoning the initial PEC_{oral} values assume that there is no bait avoidance by the non-target animals and that they obtain 100% of their diet in the treated area and have access to the product.

Tier I risk assessment: $PEC_{oral}/PNEC_{oral}$ ratio for birds and mammals exposed to Bromadiolone

	PEC_{oral} (concentration in food, mg/kg)	**$PNEC_{oral}$ (concentration in food, mg/kg)**	**Risk quotient PEC / PNEC**
Acute			
Bird	50	0.00963	5192
Mammal	50	1.67*10^{-4}	299401
Long-term			
Bird	50	0.0104	4808
Mammal	50	0.000186	268817

The ratios PEC/PNEC are above 1 indicating a potential risk. Therefore, a refined tier 2 assessment is set out below, based on representative species.

The refined tier 2 risk assessment considers exposure of relevant species of predators, based on their bodyweights and food intakes. Food intake of non-target animals can vary significantly, depending on the metabolic rates of species, the nature of their food, weather conditions, time of year, etc.

Tier 2 acute risk assessment: $PEC_{oral}/PNEC_{oral}$ for non-target animals accidentally exposed to bait containing Bromadiolone after one meal

Non-target animals	ETE, concentration of Bromadiolone after one meal (one day) (mg/kg b.w.)		$PNEC_{oral}$ (dose, mg/kg b.w./d)	PEC/PNEC	
	Step 1	Step 2		Step 1	Step 2
Tree sparrow	17.3	12.4	0.00120	14 417	10 333
Chaffinch	15.0	10.8	0.00120	12 500	9 000
Wood pigeon	5.42	3.90	0.00120	4 517	3 250
Pheasant	5.39	3.88	0.00120	4 492	3 233
Dog	2.28	1.64	$8.33*10^{-6}$	273 709	196 879
Pig	0.375	0.270	$8.33*10^{-6}$	45 018	32 413
Pig, young	1.20	0.864	$8.33*10^{-6}$	144 058	103 721

In Tier 2, Step 1 (worst case) AV, PT and PD are all set to 1, whilst in the realistic worst case (Step 2) these AV and PT are refined to 0.9 and 0.8, respectively.

The ratios PEC/PNEC are above 1 indicating a potential risk even after refinement.

Long -term exposure:
Tier 2 long-term risk assessment: $EC_{oral}/PNEC_{oral}$ ratio after 5-day elimination of Bromadiolone

Species	EC_{oral} after 5 days (mg/kg b.w./d)	$PNEC_{oral}$ (mg/kg b.w./d)	Risk quotient $EC_{oral}/PNEC_{oral}$
Tree sparrow	30.7	0.0013	$2.36*10^{4}$
Chaffinch	26.6	0.0013	$2.05*10^{4}$
Wood pigeon	9.61	0.0013	$0.739*10^{4}$
Pheasant	9.56	0.0013	$0.735*10^{4}$
Dog	4.05	0.0000056	$7.23*10^{5}$
Pig	0.666	0.0000056	$1.19*10^{5}$
Pig, young	2.13	0.0000056	$3.80*10^{5}$

According to the guidance agreed at the 23rd Biocides CA meeting, EC_5 values are used for quantitative risk assessment of primary poisoning in the long-term situation.

3.3.7.5. Secondary poisoning

It is unlikely that target rodents that have ingested bait blocks containing Bromadiolone will leave the sewer system and be exposed, in significant numbers, to predators or scavengers. Therefore, the secondary poisoning risks from the use of bait blocks in sewers are considered to be very low.

For the first tier assessment of secondary poisoning in and around buildings, in open areas and waste dumps, the maximum residue levels in target rodents that arise on day-5 after the last meal ($ETE_{oral\ predator}$) are compared to the PNEC values for concentration in food. The first tier assessment also assumes the following three levels of Bromadiolone bait consumption: 20%, 50% and 100% of the daily food intake of the target rodents. For long-term exposure, it is assumed that the rodents have fed entirely on rodenticide and that the non-target animals consume 50% of their daily intake on poisoned rodents.

Tier 1 risk assessment of secondary poisoning at day 5 (non-resistant rodents)

Organism group	$PNEC_{oral}$ (mg a.s./kg b.w.)	$ETE_{oral, predator}$ (mg a.s./kg b.w.)			$PEC_{oral}/PNEC_{oral}$ – day 5		
PD values	-	0.2	0.5	1.0	0.2	0.5	1.0
Acute							
Birds	0.00120	2.77	6.93	13.9	2 308	5 775	11 583
Mammals	$8.33*10^{-6}$				$3.33*10^{5}$	$8.32*10^{5}$	$1.67*10^{6}$
Long-term							
Birds	0.0013	1.39	3.47	6.95	1 069	2 669	5 346
Mammals	0.0000056				$2.48*10^{5}$	$6.20*10^{5}$	$1.24*10^{6}$

Table VI.1.8-3: Tier 1 risk assessment of secondary poisoning at day 14 (resistant rodents)

Organism group	$PNEC_{oral}$ (mg a.s./kg b.w.)	$ETE_{oral, predator}$ (mg a.s./kg b.w.)			$PEC_{oral}/PNEC_{oral}$ – day 14		
PD values	-	0.2	0.5	1.0	0.2	0.5	1.0
Acute							
Birds	0.00120	3.31	8.28	16.6	2 758	6 900	13 833
Mammals	$8.33*10^{-6}$				$3.97*10^{5}$	$9.94*10^{5}$	$1.99*10^{6}$
Long-term							
Birds	0.0013	1.66	4.14	8.30	1 277	3 185	6 385
Mammals	0.000 0056				$2.96*10^{5}$	$7.39*10^{5}$	$1.48*10^{6}$

According to the tier 1 assessment the risk for secondary poisoning of non-target predator birds and mammals during acute and long-term exposure via rodents poisoned with Bromadiolone is very high. Therefore, a refined tier 2 assessment is set out below, based on representative species.

The refined tier 2 risk assessment considers exposure of relevant species of predators, based on their bodyweights and food intakes. Food intake of non-target animals can vary significantly, depending on the metabolic rates of species, the nature of their food, weather conditions, time of year, etc.

Tier 2 risk assessment of secondary poisoning (non resistant and resistant rodents)

Species	Exposure	$ETE_{oral\ predators}$ (mg a.s./kg/d)	$PNEC_{oral}$ (mg a.s./kg/d)	Ratio $ETE_{oral\ predators}$ / $PNEC_{oral}$
Barn owl	Day 5 before the last meal	1.10	0.0013	846
	Day 5 after the last meal	1.72		1 323
	Day 14 after the last meal	2.06		1 585
Kestrel	Day 5 before the last meal	1.68	0.0013	1 292
	Day 5 after the last meal	2.62		2 015
	Day 14 after the last meal	3.13		2 408
Little owl	Day 5 before the last meal	1.26	0.0013	969
	Day 5 after the last meal	1.97		1 515
	Day 14 after the last meal	2.35		1 808
Tawny owl	Day 5 before the last meal	1.01	0.0013	777
	Day 5 after the last meal	1.58		1 215
	Day 14 after the last meal	1.89		1 454
Fox	Day 5 before the last meal	0.41	0.0000056	$7.32*10^{4}$
	Day 5 after the last meal	0.63		$1.13*10^{5}$

Species	Exposure	ETE $_{oral\ predators}$ (mg a.s./kg/d)	PNEC$_{oral}$ (mg a.s./kg/d)	Ratio ETE $_{oral\ predators}$ / PNEC$_{oral}$
	Day 14 after the last meal	0.76		$1.36*10^5$
Polecat	Day 5 before the last meal	0.85	0.0000056	$1.52*10^5$
	Day 5 after the last meal	1.32		$2.36*10^5$
	Day 14 after the last meal	1.58		$2.82*10^5$
Stoat	Day 5 before the last meal	1.21	0.0000056	$2.16*10^5$
	Day 5 after the last meal	1.89		$3.38*10^5$
	Day 14 after the last meal	2.26		$4.04*10^5$
Weasel	Day 5 before the last meal	1.74	0.0000056	$3.11*10^5$
	Day 5 after the last meal	2.72		$4.86*10^5$
	Day 14 after the last meal	3.25		$5.80*10^5$

The ratios PEC/PNEC are above 1 indicating a potential risk even after refinement.

3.3.7.6. Overall Summary

Based on toxicity data Bromadiolone presents a hazard to birds and non-target mammals. Non-target vertebrate animals may be exposed to product containing Bromadiolone, either directly by ingestion of exposed product (primary poisoning) or indirectly by ingestion of the carcasses of target rodents that contain Bromadiolone residues (secondary poisoning). Bromadiolone products are non-selective and can pose a risk of primary and secondary poisoning to non-target animals. There are many uncertainties associated with quantification of the risk associated with the use of Bromadiolone products. Overall, because of the toxic nature of rodenticides and the over-riding public health requirement it is more appropriate to develop and validate risk management measures than to refine the risk assessment procedures further. It is noted that the product contains a bittering agent and this may deter some non-target animals. It is also noted that the attractiveness of the product may be impacted by the use of dye.

Primary poisoning:
Overall, all acute and long-term PECoral/PNECoral ratios are above the trigger value of 1 indicating acute and long-term unacceptable risks. Even when avoidance and elimination are taken into account the empirical exposure levels result in unacceptable risks to birds and mammals.

Secondary poisoning:
All ratios $ETE_{oral\ predators}$ / $PNEC_{oral}$ are above the trigger value of 1 indicating an unacceptable risk of secondary poisoning. Even when avoidance and elimination are taken into account the empirical exposure levels result in unacceptable risks to birds and mammals.

Conclusion for primary and secondary poisoning:
Due to the risk assessment results for primary and secondary poisoning and the uncertainty associated with quantification of this risk, risk mitigation measures must be taken into account to lead to an acceptable use of the rodenticide product.

The following risk mitigation measures are proposed to mitigate the primary and secondary poisoning risk to non-target mammals and lead to an acceptable use of this rodenticide:
- Use of an integrated management strategy and precautionary systems
- Unless under the supervision of a pest control operator use or other competent person do not use anticoagulants as permanent baits
- There should be proper and secure placing of baits so as to minimise the risk of consumption by other animals or children. Where possible secure baits so they cannot be dragged away.

- Users should select tamper-resistant bait boxes, secured bait boxes, covered applications or burrow baiting (placing of bait in appropriate containers or under a curved tile or in a piece of tube) to minimize exposure of non-target animals
- Monitor and replenish bait stations as appropriate
- Frequent visits to bait stations to ensure that any bait that is split or dragged out of bait stations is removed
- Unconsumed baits must be collected after termination of the control campaign and dispose of them in accordance with local requirements
- Remove dead and moribund rodents at frequent intervals, at least as often as baits are checked or replenished during a baiting campaign
- Baits should be deployed in accordance with the product labelling
- Baits should be deployed in accordance with other approved guidance on good practice.
- Restrict the use of the product to treatment campaigns of limited duration
- To minimise the likelihood of target rodents developing resistance to second-generation anticoagulant rodenticides, long-term deployment of baits as a preventative control measure is not recommended
- The resistance status of the population should be taken into account when considering the choice of rodenticide to be used.
- When the product is being used in public areas, the areas treated must be marked during the treatment period and a notice explaining the risk of primary and secondary poisoning by the anticoagulant as well as indicating the first measure to be taken in case of poisoning must be made available alongside the baits

3.4. Measures to protect man, animals and the environment

The information submitted covering the requirements as described in the TNsG on Data Requirements, common core data for the product, section 8, points 8.1 to 8.8 is provided below.

3.4.1. Methods and precautions concerning handling, use, storage, transport or fire

Methods and precautions concerning handling and use:

- Always read the label before use and follow the instructions provided.
- Do not decant product into unlabelled containers.
- Avoid all unnecessary exposure, in particular avoid ingestion.
- Keep away from food, drink and animal feeding stuffs.
- Do not smoke eat or drink while handling this product.
- Baits must be secured in tamper resistant bait boxes to minimise the risk of consumption and poisoning to children, companion animals and other non-target animals.
- Bait boxes must be placed in areas inaccessible to children, companion animals and non-target animals.
- Bait boxes must always be clearly labelled “Do Not Touch” and warn of the contents.
- In public areas (such as business premises, schools, hospitals etc) it must be clearly signed that rodenticide control is in operation. Signage must provide information on the risks of interfering with the product and dead rodents.
- Dead rodent bodies must be collected during all control operations to minimise the risk of consumption and poisoning to children, companion animals and other non-target animals.
- It is illegal to use this product for the intentional poisoning of non-target, beneficial and protected animals.
- Wash hands and face after application and use of the product, and before eating, drinking or smoking.

Methods and precautions concerning storage:

- Store in a cool, dry, well-ventilated place
- Store locked up in the original container
- Store original container tightly closed
- Keep/store out of reach of children and companion animals
- Keep/store away from food, drink and animal feedstuffs.

Methods and precautions concerning transport:

Not classified as dangerous for transport.

Methods and precautions concerning fire:

Suitable Extinguishing Media:

Keep fire exposed containers cool by spraying with water if exposed to fire. Carbon dioxide (CO2), alcohol-resistant foam, dry powder, water spray mist or foam.

Extinguishing media which must not be used for safety reasons:

Avoid the use of water jets to prevent dispersion.

Specific hazards:

Not applicable

Special protective equipment for fire-fighters:

In the event of fire, wear self contained breathing apparatus, suitable gloves and boots

Residues:

Dispose of residues to certified waste disposal operator for incineration and licensed waste disposal site.

3.4.2. Specific precautions and treatment in case of an accident

Personal precautions

Wear suitable protective clothing, gloves and eye/face protection, if applicable and where appropriate.

- Respiratory Protection: No special respiratory protection equipment is recommended under normal conditions of use with adequate ventilation.
- Hand protection: Wear gloves.
- Skin protection: No special clothing/skin protection equipment is recommended under normal conditions of use.
- Eye protection: Not required.
- Ingestion: When using this product, do not eat, drink or smoke

Personal treatment

- General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible and report the authorisation number).
- Skin contact: May cause skin irritation. Remove contaminated clothing Wash off immediately with soap and plenty of water. If irritation persists obtain medical attention Contaminated clothing should be washed and dried before re-use.
- Eye contact: May cause eye irritation. Rinse immediately with plenty of water and seek medical advice.
- Inhalation: Unlikely to present an inhalation hazard unless excessive dust is present. Move to fresh air. Obtain medical advice immediately.
- Ingestion: If swallowed, seek medical advice immediately.

ADVICE FOR DOCTORS:

Bromadiolone is an indirect anti-coagulant. Phytomenadione, Vitamin K1, is antidotal. Determine prothrombin times not less than 18 hours after consumption. If elevated, administer Vitamin K1 until prothrombin time normalises. Continue determination of prothrombin time for two weeks after withdrawal of antidote and resume treatment if elevation occurs in that time.

Report all incidents of poisonings to the relevant national poisons centre; include information on the product authorisation number, product trade name and active substance. In Ireland, this is the National Poisons Information Centre, Beaumont Hospital, Dublin (01-8092166)

Environmental precautions

- Prevent accidental exposure of the product to the environment.
- Keep un-used bait locked-up and in secure storage containers
- Bait must be secured in tamper resistant bait boxes in areas away from drains, water courses and non-target organisms.

Environmental treatment

- Clean up accidental spillages promptly by sweeping or vacuum.
- If the product gets into water or soil, it should be removed mechanically.
- Transfer to a suitably labelled container and dispose of to a certified waste disposal operator for incineration and licensed waste disposal site.
- Subsequently, wash the contaminated area with water, taking care to prevent the washings entering sewers or drains.
- For further instructions, see section 3.4.6 below.

3.4.3. Procedures for cleaning application equipment

No application equipment is needed, therefore, no specific cleaning for equipment is required

If necessary, following use, bait boxes should be washed with detergent and water. The bait box should be washed out 3 times (triple rinsed).

3.4.4. Identity of relevant combustion products in cases of fire

Not applicable.

3.4.5. Procedures for waste management of the biocidal product and its packaging

Dispose of packaging, remains of unused product and dead rodents to a certified waste disposal operator for incineration and licensed waste disposal site.

3.4.6. Possibility of destruction or decontamination following accidental release

Air:
Bromadiolone has a very low vapour pressure, and decomposes at around 220°C and therefore does not boil. The formulated product is a wax block. The risk of release of the active ingredient or the product to the atmosphere is negligible.

Water (including drinking water):
The octanol-water partition coefficient of bromadiolone is high, and hence the active ingredient will remain in the product. The product is know not to inhibit activate sludge respiration, and the rapid partitioning to the solid phase and very low water solubility, would suggest that product exposure by use in sewer systems, would not result in contamination of water, but would contaminate the sludge.

Directions for use of the product, require users **not** to place bait points where water could become contaminated (excepting sewers), so there will be no direct exposure to surface or drinking water.

Indirect exposure by leaching is very unlikely, as the very low water solubility of the active ingredient, and its affinity for soil means that any release into an environmental aquatic compartment will result in rapid partitioning to the solid phase, usually soil.

Soil:
Sources for release to the soil compartment include: sludge spreading, transport of bait by rodents, degradation of dead rodent remains hidden in burrows and excretion of the active ingredient by poisoned rodents. Bioremediation will probably prove the most effective method of decontamination, as 30% biodegradation in a 28 day ready biodegradation study suggests.

In the event of spillage of an appreciable amount of product, this material should be collected for incineration.

3.4.7. Undesirable or unintended side-effects

Toxic to mammalian and avian species, including domesticated animals, wildlife and humans. Therefore the risk to these non-target species should be considered when using bait.

3.4.8. Poison control measures

The wax blocks are dyed (e.g. red or blue) to make them unattractive to wildlife, and birds in particular. In addition, in case of accidental ingestion, the presence of a dye may help to confirm that there has been ingestion and thus facilitate antidote treatment.

The product contains a human taste deterrent (adversive agent – Bitrex).

To report human poisoning incidents call the relevant national poison information centre. Include information on the product authorisation number, product trade name and active substance. Where possible provide a copy of the label or safety data sheet (SDS).

In Ireland to report a poisoning incident, call: 01 (8092566 / 8379964) The Poisons Information Centre of Ireland, Beaumont Hospital, Beaumont Road, Dublin 9.

ADVICE FOR DOCTORS:

Bromadiolone is an indirect anti-coagulant. Phytomenadione, Vitamin K1, is antidotal. Determine prothrombin times not less than 18 hours after consumption. If elevated, administer Vitamin K1 until prothrombin time normalises. Continue determination of prothrombin time for two weeks after withdrawal of antidote and resume treatment if elevation occurs in that time.

Report all incidents of poisonings to the relevant national poisons centre (include information on the product authorisation number, product trade name and active substance)

4. Proposal for Decision

The assessment presented in this report has shown that the ready-to-use product, Jade Paste, formulated by Lodi S.A. with the active substance Bromadiolone, at a level of 0.005% w/w, may be authorised for use as a rodenticide (product-type 14) for the control of rodents (rats and mice).

Physical-Chemical Properties:
Jade Paste has been shown not to present a physical-chemical hazard to end users and does not classify as highly flammable, oxidising or explosive. The Paste bait is stable when stored at 54^{o}C for two weeks and at ambient temperatures (20^{o}C) for 1 year, therefore a shelf life of two years is proposed. There is a suitable method of analysis for the determination of Bromadiolone in the Paste bait.

The source of active substance used in the biocidal product Jade Paste is not the same source of active substance that is listed in Annex I of 98/8/EC. Poland carried out an equivalence check on the PelGar International Ltd. source of Bromadiolone and found it to be equivalent to the Annex I source (Activa). The RefMS accepted Poland's assessment.

Efficacy:
Effectiveness data has confirmed that Jade Paste is attractive, palatable and efficacious against the intended target organisms, in the proposed areas of use at the proposed dose rates. Furthermore, accelerated ageing did not adversely affect the palatability or reduce its effectiveness.

Human Health:
The calculations presented have been made with the assumptions of rat control, and there are no separate calculations to assess exposure for mice control in which smaller bait sizes are used.

Using both the MOE and AEL approaches for risk assessment indicates that there is a satisfactory margin between the predicted exposure and the NOAEL (LOAEL) as well as exposures below the threshold value for the AEL for all intended uses by trained professionals with PPE, untrained professionals and amateurs (with and without PPE). The product is deemed suitable for authorisation and appropriate personal protective equipment is advised.

Secondary exposure from transient mouthing of the product exceeds the AEL reference value (0.0023µg/kg/day), both with the assumption of 0.01 g and 5 g of product ingested by infants. This is of concern. There is no margin of safety using the existing data and models. There is no safe scenario for indirect exposure if estimated according to TNsG and User Guidance. Mitigation and protection measures such as the inclusion of bittering agents and the enclosure of product in sealed packs and tamper resistant bait boxes are essential to reducing the risk of secondary exposure. Baits should not be placed where food, feeding stuffs or drinking water could be contaminated.

Environment:
The applicant did not submit any new environmental fate and behaviour studies with this product.

Therefore the conclusions made at the Annex I inclusion stage for the active substance stand. The uses of this product were assessed here under the TGD and the PT14 ESD and all PEC/PNEC ratios were <1 (with one exception deemed insignificant over a larger area). However there is a risk for primary and secondary poisoning for non-target vertebrates. These identified risks are mitigated by applying all appropriate and available risk mitigation measures.

Conclusion:
During the active substance review of Bromadiolone by Sweden, primary and secondary poisoning risks were identified for non-target organisms and for potential accidental poisoning incidents involving

children. The assessment of those EU identified risks during the product authorisation evaluation of Bromadiolone have also indicated a potential risk of primary and secondary poisoning to non-target animals and the potential for the accidental primary poisoning of children. Due to these findings risk mitigation measures are applied to product authorisation.

Additionally, as the target rodents are vermin and are both direct transmitters of disease (such as through biting or contamination of food/feed by urine or faeces) or indirect carriers of disease (such as disease vectors, where fleas move from rat to humans) to humans and other animals. Transmitted diseases can include leptospirosis (or Weil's disease), trichinosis and salmonella. Authorisation of this product is considered necessary on the basis of public health grounds, since rodent populations are considered to constitute a danger to public health through the transmission of disease. However, risk mitigation measures and restrictions are required to prevent the possibility of the identified risks to non-target animals, companion animals and children.

Conditions of authorisation

Two authorisations should be issued. The first authorisation covers professional and trained professional use product. The second authorisation covers amateur use product.

This authorisation of Jade Paste is for a period of 5-years with an annual renewal.

The concentration of the active substance, bromadiolone, in Jade Paste shall **not** exceed 0.05 g/kg (0.005% w/w).

Only ready-to-use Jade Paste product is authorised.

As a poison control measure, the authorisation requires that the product shall contain an aversive, bittering agent.

The authorisation requires that the product be dyed with a colour to make them unattractive to wildlife, and birds in particular.

This product shall **not** be used as a tracking poison.

The product is authorised only for use against rats and mice (for example brown rats, house rats and house mice). Authorisation of this product does **not** allow use against non-target organisms.

The authorisation of this product for professionals and trained professionals only allows for use indoors and outdoors in the following areas: Indoors, including areas such as houses, warehouses, outbuildings and commercial premises. Outdoors uses include areas such as in-and-around buildings, waste dumps and open areas (i.e. rat holes). The product can also be utilised in sewers. Bromadiolone baits must not be placed where food, feeding stuffs or drinking water can become contaminated.

The authorisation of this product for amateurs allows for use of this product indoors and outdoors around buildings in the following areas: Indoors, including only privates houses and outbuildings. Outdoors uses, including only around private building premises and private gardens. Bromadiolone baits should not be placed where food, feeding stuffs or drinking water can become contaminated.

The product should be used for rodent control in tamper resistant, secured bait stations or other secure coverings. However, for use in sewers where there is no risk to children, companion animals and non-target species blocks should be secured to available structures by wire to ensure the block is not washed away.

Bait stations should be clearly marked to show that they contain rodenticides and that they should not be disturbed.

Wax blocks shall be secured to the bait station(s) so that rodents cannot remove bait from the bait box.
For amateur use products placed on the market in Ireland packaging restrictions are to be limited to pre-baited bait stations and refill packs with a maximum pack-size of 500g. Refill packs for amateurs must contain bait that is wrapped. Loose baits or grain (without wrapping) shall not be packaged for amateurs.

All product placed on the Irish market after the date of authorisation must be in compliance with the conditions of this authorisation and shall carry the approved label with the IE/BPA authorisation number and be packaged in the approved packaging.

Prior to any amendment relating to this authorised product, such as specification, use, labelling or administrative changes, application must be made to this Authority to do so

Upon annual renewal of the biocidal product, the authorisation holder shall provide statistics to PRCD on the import and export from Ireland and also manufacture statistics where appropriate for the product for the given full annual period or part thereof.

Authorisation of the biocidal product may be subject to review, following a detailed assessment of the risks involved, in accordance with the European Communities (Authorisation, Placing on the Market, Use and Control of Biocidal Products) Regulations, 2001, as amended. This review may lead to changes in or revocation of this authorisation.

ANNEXES to Initial PAR - September 2012

ANNEXES

Annex:

1. Confidential Information and Data
2. Summary of the Product Characteristics (SPC)
3. Study Summaries of Studies Reviewed
4. List of Studies Reviewed
5. Toxicology Calculations
6. Environmental Calculations
7. Residue Calculations

ANNEX I: Confidential Information and Data

Manufacturing site(s) of the active substance(s)[21]

Manufacturer of the active substance(s):	
Company Name:	**Pelgar International Ltd.**
Address:	Unit 13, Newman Lane, Alton. Hants. GU34 2QR, England.
Tel:	[redacted]
E-mail:	[redacted]
Contact:	[redacted]

Manufacturing plant for the active substance(s):	
Company Name:	**Pelgar International Ltd.**
Address:	Prazska 54, 280 02 Kolin, Czech Republic.
Tel:	[redacted]
[redacted]	[redacted]
Contact:	[redacted]

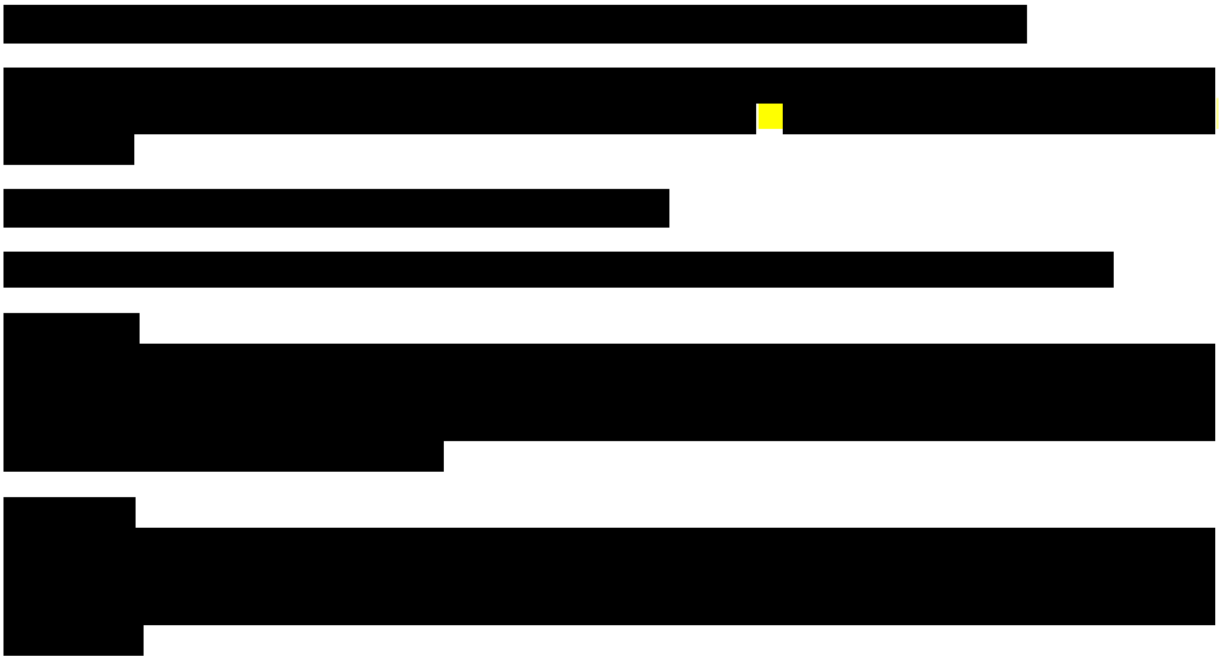
Manufacturing site(s) of the biocidal product[3]

Manufacturer and manufacturing site of the biocidal product:	
Company Name:	**CGB (Compagnie Générale des Biocides)**
Address:	Parc d'Activités des 4 Routes, F-35390 Grand Fougeray, France.
Tel:	[redacted]
E-mail:	[redacted]
Contact:	[redacted]

21 All sites involved in the manufacturing process of each active substance and of the product must be listed.

Assessment of equivalence of the PelGar source of Bromadiolone and the source that was included in Annex I:

Poland carried out an assessment on the technical equivalence of the PelGar International Ltd. Bromadiolone source with the Annex I source of Bromadiolone (reference source). The report has been sent to the Commission and it is available on CIRCA in the TM section, in the folder containing documents concerning the active substance Bromadiolone. Ireland accepts the Polish evaluation. The PelGar source of Bromadiolone is equivalent to the source that is listed in Annex I of 98/8/EC.

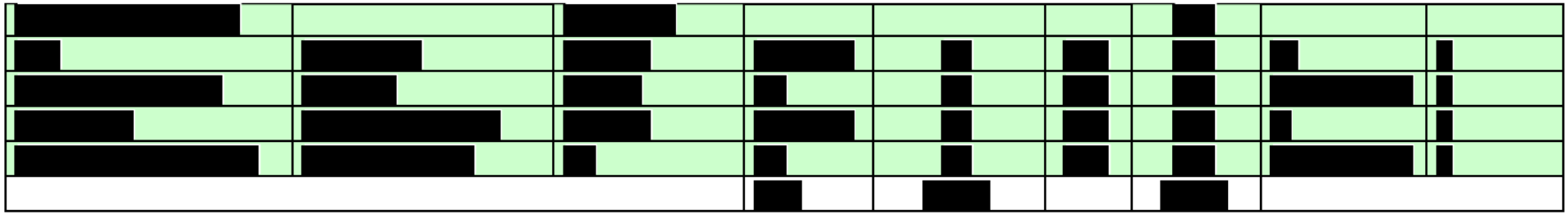


Product trade name: Jade Paste

Qualitative and quantitative information on the composition/specification of the biocidal product Jade Paste (PT 14)

Active substance(s)				Contents				
Common name	IUPAC name	CAS No.	EINECS No.	Concentration	Unit[22]	w/w (%)	Min purity (% w/w)	Same source as for Annex I inclusion (Y/N)
Bromadiolone	3-[3-(4'-bromobiphenyl-4-yl)-3-hydroxy-1-phenylpropyl]-4-hydroxycoumarin	28772-56-7	249-205-9	0.05	g/kg	0.005	[redacted]	[redacted]
Co-formulants				Contents				
Common name	Function	CAS No.	EC No.	Concentration	Unit	w/w (%)	Classification	Substance of concern (Y/N)
[redacted]								
[redacted]								
[redacted]								
[redacted]								
[redacted]								

22 g/l, g/kg, other. For biological products, the concentration should state the number of activity units/units of potency (as appropriate) per defined unit of formulation (e.g. per gram or per litre).



Annex II: Summary of the Products Characteristics (SPC)

Please see separate SPC accompanying the PAR and authorisation certificate that have uploaded to the R4BP2.

Annex III: Study Summaries of Studies Reviewed

Insert study summaries with expert evaluation in data point order.

Study summaries of new data[23] submitted in support of the evaluation of the active substance (IIIA)

Physical Chemical Characteristics

No new data were submitted in support of the active substance.

Methods of Analysis

No new data were submitted in support of the active substance.

Efficacy

No new data were submitted in support of the active substance.

Toxicology

No new data were submitted in support of the active substance.

Environment (including Eco-Toxicology)

No new data was submitted in support of the active substance.

Confidential Section:

See confidential section (Annex I).

23 Data which have not been already submitted for the purpose of the Annex I inclusion.

Study summaries of new data submitted in support of the evaluation of the biocidal product (IIIB)

Physical Chemical Characteristics of Jade Paste

Section B3	Physical and Chemical Properties of Biocidal Product							
Subsection (Annex Point/TNsG)	**Method**	**Purity/ Specification**	**Results**	**Remarks/ Justification**	**GLP (Y/N)**	**Reliability**	**Reference**	**Official use only**
3.1 Appearance (IIB3.1/Pt. I-B3.1)								
3.1.1 Physical state and nature	OECD method OPPTS 830.6303	Bromadiolone 50 ppm	Crisp paste *Less soft after 2 weeks at 54°C*		Y	1	Study report "LODI.06/2011", C.Magnier, 2011, Lodi	
3.1.2 Colour	OECD method OPPTS 830.6302	Bromadiolone 50 ppm	Green Munsell 10GY 7/4 *No change after 2 weeks at 54°C*		Y	1	Study report "LODI.06/2011", C.Magnier, 2011, Lodi	
3.1.3 Odour	OECD method OPPTS 830.6304	Bromadiolone 50 ppm	Slightly flour *No change after 2 weeks at 54°C*		Y	1	Study report "LODI.06/2011", C.Magnier, 2011, Lodi	
3.2 Explosive properties (IIB3.2/Pt. I-B3.2)	OECD method EC A.14	Bromadiolone 50 ppm	Examination of components: the components do not contain any chemical group which have explosive properties. Bromadiolone Paste Bait is		Y	1	Study report "LODI.39/2011", S.Richerioux, 2011, Lodi	

Section B3	Physical and Chemical Properties of Biocidal Product							
Subsection (Annex Point/TNsG)	**Method**	**Purity/ Specification**	**Results**	**Remarks/ Justification**	**GLP (Y/N)**	**Reliability**	**Reference**	**Official use only**
			considered as not having explosive properties.					
3.3 Oxidising properties (IIB3.3/Pt. I-B3.3)	OECD method EC A.17	Bromadiolone 50 ppm	Examination of components: the components do not contain any chemical group that might act as an oxidizing agent. Bromadiolone Paste Bait is considered as not having oxidizing properties.		Y	1	Study report "LODI.07/2011", C.Magnier, 2011, Lodi	
3.4 Flash-point and other indications of flammability or spontaneous ignition (IIB3.4/Pt. I-B3.4)								
Flammability (solid)	OECD method EC A.10	Bromadiolone 50 ppm	Preliminary test: no propagation of combustion along 200 mm length of the pile within 4 minutes is observed. According to the guideline, the main test is not		Y	1	Study report "LODI.08/2011", C.Magnier, 2011, Lodi	

Section B3	Physical and Chemical Properties of Biocidal Product							
Subsection (Annex Point/TNsG)	**Method**	**Purity/ Specification**	**Results**	**Remarks/ Justification**	**GLP (Y/N)**	**Reliability**	**Reference**	**Official use only**
			required. Based on the results of preliminary test, Bromadiolone Paste Bait is considered as not highly flammable.					
Auto-flammability				Not required as the product is not flammable.				
3.5 Acidity/Alkalinity (IIB3.5/Pt. I-B3.5)								
pH values	Method CIPAC MT 75.3	Bromadiolone 50 ppm	pH of a 1% (m/v) aqueous dilution of Test Item: 5.87 at 20.2°C		Y	1	Study report "LODI.10/2011", C.Magnier, 2011, Lodi	
Acidity/Alkalinity	Method CIPAC MT 191	Bromadiolone 50 ppm	Determination not required	Determination is not required because pH of a 1% (m/v) aqueous dilution of test item is higher than 4 and lower than 10 (FAO guideline).	Y	1	Study report "LODI.10/2011", C.Magnier, 2011, Lodi	

Section B3	Physical and Chemical Properties of Biocidal Product							
Subsection (Annex Point/TNsG)	**Method**	**Purity/ Specification**	**Results**	**Remarks/ Justification**	**GLP (Y/N)**	**Reliability**	**Reference**	**Official use only**
3.6 Relative density/bulk density (IIB3.6/Pt. I-B3.6)	OECD method 109 NF T20-053	Bromadiolone 50 ppm	1.151	This relative density is determined with a pycnometer.	Y	1	Study report "LODI.09/2011", C.Magnier, 2011, Lodi	
3.7 Storage stability - stability and shelf life (IIB3.7/Pt. I-B3.7)								
Stability at 0 ± 2°C				Not required for solid (paste).				
Accelerated storage procedure for 2 weeks at 54 ± 2°C	GIFAP Monograph No.17 CIPAC MT 46	Bromadiolone 50 ppm	After the accelerated storage procedure, no significant change was observed, concerning the characteristics of the test item except the aspect, which become less soft, but it doesn't influence the stability of the Bromadiolone content in the paste.	Study on compatibility with packaging will start on week 28, 2011.	Y	1	Study report "LODI.03/2010", E.Meriadec, 2010, Lodi	
Analytical quantification of the active substance before and after accelerated storage	An analytical method validation of bromadiolone	Bromadiolone 50 ppm	Relative deviation of Bromadiolone between the mesured content in the paste before the storage procedure		Y	1	Study report "LODI.03/2010", E.Meriadec, 2010, Lodi	

Section B3	Physical and Chemical Properties of Biocidal Product							
Subsection (Annex Point/TNsG)	**Method**	**Purity/ Specification**	**Results**	**Remarks/ Justification**	**GLP (Y/N)**	**Reliability**	**Reference**	**Official use only**
	in Jade Paste is presented in Doc III - Section B4		(T0) and after storage procedure (T14) is -20.61 % (< 25%). The test item is considered as stable after the accelerated storage procedure of 14 days at 54°C.					
Dilution stability				Not applicable. The product is ready-to-use. It is not intended to be mixed with any other product.				
Shelf life: storage procedure for 2 years and 3 years at 20 ± 2°C	GIFAP Monograph No.17	Bromadiolone 50 ppm	Storage for 2 years: study on-going, started on week 21, 2011.		Y	1	Study plan “LODI.44/2011”, S. Richerioux, 2011, Lodi	
			Storage for 3 years: study on-going, started on week 21, 2011.		Y	1	Study plan “LODI.45/2011”, S. Richerioux, 2011, Lodi	

Section B3	Physical and Chemical Properties of Biocidal Product							
Subsection (Annex Point/TNsG)	**Method**	**Purity/ Specification**	**Results**	**Remarks/ Justification**	**GLP (Y/N)**	**Reliability**	**Reference**	**Official use only**
3.8 Technical characteristics (IIB3.8/Pt. I-B3.8)				Not applicable as the product is a paste.				
3.9 Compatibility with other products (IIB3.9/Pt. I-B3.9)				Not applicable. The product is ready-to-use. It is not intended to be mixed with any other product.				
3.10 Surface tension (Pt. I-B3.10)				Not applicable as the product is a paste.				
3.11 Viscosity (Pt. I-B3.10)				Not applicable as the product is a paste.				
3.12 Particle size distribution (Pt. I-B3.11)				Not applicable as the product is a paste.				

Conclusions:
The biocidal product Jade Paste is not explosive, oxidising or highly flammable and does not classify from a physical/chemical point of view. The test item is stable after storage for two weeks at 54^{o}C. The test item is stable for 1 year at ambient temperatures. The packaging material is stable after storage at

ambient temperatures (20^{o}C ± 2^{o}C) for 1 year with all deviations in packaging and sample weights being below 5%. There were no significant changes of characteristics of the test item or packaging observed after 1 year storage. The Bromadiolone paste bait is considered compatible with all the packaging tested. The test item is a ready-to-use paste bait and is not intended to be added or mixed with any other product.

Data requirements:

1. Information on the reactivity of the paste bait towards the container material for the 2 year time point has been requested and will be provided when complete *(the approximate date of submission is week 29, 2013).*
2. The results of the 2-year storage stability study at ambient temperatures has been requested and will be submitted when complete *(the approximate date of submission is week 29, 2013)*.

Methods of Analysis

Section A4.1 **Annex Point IIA4.1 & IIIA-IV.1**	**Analytical Methods for Detection and Identification**	
	1 Reference	**Official use only**
1.1 Reference	Richerioux S., 2011, Analytical validation for determination of Bromadiolone in Paste Bait, Lodi, Version date: 2011-06-24	
1.2 Data protection	Yes	
1.2.1 Data owner	LODI	
1.2.2 Criteria for data protection	Data on existing biocidal product to maintain of a biocidal product's authorisation	
	2 MATERIALS AND METHODS	

Section A4.1 **Annex Point IIA4.1 & IIIA-IV.1**	**Analytical Methods for Detection and Identification**	
2.1 Preliminary treatment		
2.1.1 Enrichment	/	
2.1.2 Cleanup	/	
2.2 Detection	Bromadiolone was quantified by liquid chromatography using a reverse phase column and an UV detector.	X
2.2.1 Separation method	Instruments: HPLC system with Azur	
2.2.2 Detector	UV detector	
2.2.3 Analytical Standard(s)	Reference item: Name: Analytical standard of Bromadiolor Supplier: SIGMA-ALDRICH Batch number: 6061X Expiry date: March 2nd, 2011	
2.2.4 Interfering substance(s)	No substance may interfere with Bromadiolone.	
2.3 Linearity		
2.3.1 Calibration range	The linearity is given on a given interval of concentration. The interval extends from 20% in lower part from the awaited concentration minimum and 20% with the top of the awaited maximum concentration. The operator prepared 5 solutions containing 80%, 90%, 110%, 120% of the concentration in Test Item.	
2.3.2 Number of measurements	Three measures per concentration level.	
2.3.3 Linearity	The coefficient of line correlation (r2) obtained is equal to 0.9946 showing a good linearity (> 0.99).	
2.4 Specificity: interfering substances	To define the specificity of the analytical method, the following items were analyzed: - Placebo - Stressed paste bait by adding 5 ml of acetic acid If a peak appears, the resolution (Rs) must be higher than 2:	

Section A4.1 **Annex Point IIA4.1 & IIIA-IV.1**	**Analytical Methods for Detection and Identification**	
	$Rs = 2 \times \frac{t_2 - t_1}{w_1 - w_2}$. with: - ti = retention time - wi = width with semi height Results are: - placebo : no peak - stressed grain bait: Rs > 2 The specificity permits to make sure that no interference causes false-positive, or do not come to disturb the quantitative measurement of the Test Item.	
2.5 Recovery rates at different levels	The accuracy (precision) translates the narrowness between the found value and the value of reference. The operator spiked a placebo with 50, 100 and 150% of the theoretical concentration of Test Item. He carried out 3 injections per solution. MR (Mean Recovery) is calculated for each solution: $90\% < MR = \frac{Concentration\ found}{Theoritical\ concentration} \times 100 < 110\%$ The recoveries of Bromadiolone are given in the following table:	
2.5.1 Relative standard deviation	Relative Standard Deviation (RSD) for:	

Paste Bait	**50% spiked placebo**	**100% spiked placebo**	**150% spiked placebo**	**Average of MR**
MR values	103.09%	106.18%	103.88%	104.38%

The recovery rates are included in the range 90% - 110%. The accuracy (precision) of the method is validated.

Section A4.1 **Annex Point IIA4.1 & IIIA-IV.1**	**Analytical Methods for Detection and Identification**	
	- intermediate fidelity 1.062% - intralaboratory fidelity 0.999%	
2.6 Limit of determination	Limit of detection: The operator injected a solution containing 10 ppm of Test Item, and calculated the ratio S / N, with: - S = Signal (intensity of peak) - N = Noise (intensity of the background noise). The operator divided by 10 then by 2 the concentration of Test Item until obtaining a ratio S / N lower than 3. He retained last concentration before S / N is lower than 3. The limit of detection is 0.05 ppm (S / N = 4.33).	
	Limit of quantification: The operator injected a solution containing 50 ppm of Test Item, and calculated the ratio S / N, with: - S = Signal (intensity of peak) - N = Noise (intensity of the background noise). The operator divided by 10 then by 2 the concentration of the element of test until obtaining a ratio S / N lower than 10. He retained last concentration before S / N is lower than 10. The limit of quantification is 0.25 ppm (S / N = 13.33).	
2.7 Precision		
2.7.1 Repeatability	The fidelity (selectivity) translates the narrowness between series of measure and the average of the found values. It provides an indication on the randomly which had errors. The relative standard deviation is the criterion of acceptability of the test according to the formula. The operator prepared 3 solutions of a concentration (C) of the product to be proportioned. He carried out 3 injections per solution. RSD (Relative Standard Deviation) is calculated for each solution: $RSD < 2^{(1-0.5\log C)} \times 0.67$	

Section A4.1 **Annex Point IIA4.1 & IIIA-IV.1**	**Analytical Methods for Detection and Identification**	
	The results are: Intermediary fidelity (table: 1st injection / 2nd injection / 3rd injection / Date of preparation of sample / Opérateur) Solution a: 2.18 / 2.15 / 2.13 / 2009/10/03 / CM Solution b: 2.12 / 2.12 / 2.15 / 2009/10/03 / CM Solution c: 2.15 / 2.15 / 2.19 / 2009/10/03 / CM **RSD %= 1.062** Intralaboratory fidelity (table: 1st injection / 2nd injection / 3rd injection / Date of preparation of sample / Opérateur) Solution a: 2.18 / 2.15 / 2.13 / 2009/10/03 / CM Solution b: 2.20 / 2.17 / 2.15 / 2009/10/03 / CM Solution c: 2.15 / 2.15 / 2.19 / 2009/10/03 / CM **RSD %= 0.999** In both cases, the fidelity (selectivity) of the method is validated.	
2.7.2 Independent laboratory validation	Not available.	
	3 Applicant's Summary and conclusion	
3.1 Materials and methods	Test Item was quantified by High Performance Liquid Chromatography (HPLC) using a reverse phase column and an UV detector.	
3.2 Conclusion	In compliance with Guideline for quality in analytical chemistry (CITAC / EURACHEM), the analytical method for the determination of Bromadiolone in Grain Bait was validated during the study by definition of the linearity, the specificity, the accuracy (precision with recovery rates), the limit of detection and the limit of quantification, and the precision (with fidelity/selectivity) of the method. Linearity The response of the detector during the analysis of Bromadiolone was linear (r2 = 0.9946). Specificity The specificity permits to make sure that no interference causes false-positive, or do not come to disturb the quantitative measurement of Bromadiolone. Accuracy (recovery rates)	

Section A4.1 **Annex Point IIA4.1 & IIIA-IV.1**	**Analytical Methods for Detection and Identification**	
	The accuracy results of Bromadiolone were in conformity with the range 90% - 110%. Indeed, the recovery results were experimentally between 103.09% and 106.18%, with an average at 104.38%. Limit of determination The limit of detection is 0.05 ppm. The limit of quantification is 0.25 ppm. Precision (fidelity/selectivity) Intermediate and intralaboratory fidelity are measured. In both cases, RSD are correct and the fidelity (selectivity) of the method is validated.	
3.2.1 Reliability	3	
3.2.2 Deficiencies	No deviation was requested.	
	Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	

<table>
<tr><td>Section A4.1
Annex Point IIA4.1 & IIIA-IV.1</td><td>Analytical Methods for Detection and Identification</td></tr>
<tr><td></td><td>EVALUATION BY REFERENCE MEMBER STATE (IRELAND)</td></tr>
<tr><td>Date</td><td>3.4.2012</td></tr>
<tr><td>Materials and methods</td><td>X: UV detector at 310 nm.
The method of analysis presented above was validated in terms of its linearity, precision, accuracy and specificity.</td></tr>
<tr><td>Results and discussion</td><td>Accept the results of the Notifier.</td></tr>
<tr><td>Conclusion</td><td>Accept the results of the Notifier.</td></tr>
<tr><td>Reliability</td><td>1</td></tr>
<tr><td>Acceptability</td><td>Acceptable</td></tr>
<tr><td>Remarks</td><td>The individual recoveries were requested and are given in the table below:
<table>
<tr><th></th><th>50% doped placebo</th><th>100% doped placebo</th><th>150% doped placebo</th><th>Average of MR</th></tr>
<tr><td>Recoveries</td><td>105.28, 102.06, 101.88</td><td>93.40, 102.37, 96.74</td><td>102.86, 104.11, 104.64</td><td rowspan="2">101.49</td></tr>
<tr><td>Mean recovery (MR)</td><td>103.09</td><td>97.50</td><td>103.88</td></tr>
</table></td></tr>
</table>

Section A4 (4.2) **Annex Point IIA4.2 & IIIA-IV.1**	**Analytical Methods in Soil, Air, Water, Animal and human body fluids and tissues and treated food or feedingstuffs**	
	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [X]	Technically not feasible [ ] Scientifically unjustified [ ]	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	Validated methods for the determination of Bromadiolone in several matrices (water, soil and in food or feedstuffs) are available. No method is considered needed for analysis in air due to the low vapour pressure of Bromadiolone and as it is not used in spray applications. Please refer to the Letter of Access from Pelgar.	
Undertaking of intended data submission [ ]	–	
	Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
	EVALUATION BY REFERENCE MEMBER STATE (IRELAND)	
Date	March 2012	
Materials and method	Not applicable.	
Conclusion	Suitable analytical methods for the determination of Bromadiolone in Soil, Water, Animal and human body fluids and tissues and treated food or feedingstuffs are available in the CAR. A waiver was accepted for Air.	
Reliability	Not applicable.	
Acceptability	Not applicable.	
Remarks	None.	

Efficacy

Section B5 Effectiveness against target organisms and intended uses

Subsection (Annex Point)			Official use only
5.1	**Product type(s) and field(s) of use envisaged (IIB5.1)**		
5.1.1	**Product type(s)**		
	MG03: Pest control	Product type PT14: rodenticide VIII.4.1 Paste VIII.4.1.1 Ready-for-use (sachets and other)	
5.1.2	**Overall use pattern**	Jade Paste is presented as a ready-to-use paste bait for the control of Norway rats, Black rats, House mice and Field mice in and around buildings, in non-agricultural open areas and in waste dumps, for amateur and professional users	
5.2	**Method of application including description of system used (IIB5.2)**	Method of application VI.2: covered application VI.2.1: covered application in bait stations. VI.2.2: other covering Rodenticide paste baits containing 50 ppm Bromadiolone as the active substance is for use in and around buildings, in open areas and in waste dumps. It is used as a response to an infestation. The number of baits depends on the site type and the infestation level. The ready-to-use baits are available as paste of 10 g easy to place where the rodents are active, near rodent burrows, against walls, along travel routes (runways) and preferably between the rodents' place of shelter and their food supply. Baits should be placed in a safe manner to prevent access to children and non-target animals. They should be placed in suitable bait boxes or appropriate containers or under a curved tile or in a piece of tube. Preferentially, they should be placed into tamper resistant and securely closed bait boxes to increase the safety and reduce the primary poisoning hazards	

		of non-target animals. Bait points are placed where there are signs of activity. Since the product is formulated as a ready-to-use bait, no dilution or other preparation are necessary. Use of gloves when handling the baits and hands wash after use are advised on the label. Bait points are checked regularly. Any bait eaten or damaged has to be replaced. The baiting campaign stops with the end of bait consumption. Residual baits are removed and disposed of safely at the end of the campaign. The rodents' bodies all along the treatment should be disposed according to local/national regulation.
5.3	**Application rate and if appropriate, the final concentration of the biocidal product and active substance in the system in which the preparation is to be used, *e.g.* cooling water, surface water, water used for heating purposes (IIB5.3)**	Bait points are placed manually in dry locations and in appropriate positions. Baits should be placed where they are inaccessible to children and non-target organisms and kept away from food, drink and animal feeding stuffs Bait points are placed throughout the infested areas with 20 to 30 g per bait point for mice and 60 to 100 g per bait point for rats. Application sites are located 2-5 m apart for mice and 5-10 m apart for rats. The number of baits and the distances has to be adapted to the infestation level. The shortest distance is to be used in severe infestations.

Section B5 Effectiveness against target organisms and intended uses

5.4	**Number and timing of applications, and where relevant, any particular information relating to geographical variations, climatic variations, or necessary waiting periods to protect man and animals (IIB5.4)**	The quantity of bait used depends on the level of infestation and has to be adapted to local conditions. After the end of the baiting period, surveillance should continue and baiting must be re-started at signs of re-infestation.
5.5	**Function (IIB5.5)**	Rodenticide
5.6	**Pest organism(s) to be controlled and products, organisms or objects to be protected (IIB5.6)**	
5.6.1	**Pest organism(s) to be controlled**	<u>Target organisms to be controlled</u> I.1.1.1 Brown rat: *Rattus norvegicus* I.1.1.2 Roof rat, House rat: *Rattus rattus* I.1.1.3 House mouse: *Mus musculus* I.1.1.4 Other murids: Other *Muridae* <u>Developmental stages of target organisms to be controlled</u> II.1 Juveniles II.2 Adults
5.6.2	**Products, organisms or objects to be protected**	<u>Application aim</u> VII.1 Stored product protection / food protection VII.2 Health protection VII.3 Material protection (historical buildings, technical objects) Infestation treatment prevents rodent infestation that can

		spread diseases, posing a serious risk to public health. Rodent-borne diseases can be transferred directly to humans through bite wounds or consumption of contaminated food and/or water, or indirectly by way of ticks, mites, and fleas that transmit the infection to humans after feeding on infected rodents. Rodents can also cause significant damage to property and food supplies.
5.7	**Effects on target organisms (IIB5.7)**	Anticoagulant rodenticide acts by inhibiting hepatic vitamin K metabolism, disturbing Phytomenadione (Vitamin K1) cycle. Signs of poisoning in rodents and other mammals are those associated with an increased tendency to bleed, leading ultimately to profuse hemorrhage. After feeding on bait containing the active substance for 2 – 3 days the animal becomes lethargic and slow moving. Signs of bleeding are often noticeable and blood may be seen around the nose and anus. As symptoms develop, the animal will lose its appetite and will remain in its burrow or nest for increasingly long periods of time. Death will usually occur within 4-10 days of ingesting a lethal dose and animals often die out of sight in their nest or burrow. Effectiveness of Bromadiolone depends on exposure (*i.e.* consumption of the bait by the target organism).
5.8	**Mode of action (including time delay) in so far as not covered by section A5.4 (IIB5.8)**	<u>Function / Mode of action</u> III.2 long term action III.2.1 anticoagulant III.2.1.1 ingestion toxin III.2.1.1.1 ingestion by eating Bromadiolone is a second-generation single-dose anticoagulant rodenticide. It disrupts the normal blood clotting mechanisms resulting in increased bleeding tendency and, eventually, profuse haemorrhage and death. Please refer to the active substance dossier (Section A5.4 and Doc. IIA).
5.9	**User: industrial, professsional, general public (non-professional) (IIB5.9)**	<u>Field of use</u> IV.1 indoor use IV.1.1 potential for contamination outdoors IV.1.1.1 yes

		IV.1.2 Potential for contamination of food IV.1.2.2 no IV.2: outdoor use User category V.1 non professional/ general public V.2 professional V.3 specialised professional
	1. Industrial	Not appropriate
	2. Professional	Pest control operators and non-trained professionals
	3. General public	Homeowners
5.10	**Efficacy data: The proposed label claims for the product and efficacy data to support these claims, including any available standard protocols used, laboratory tests, or field trials, where appropriate (IIB5.10)**	
5.10.1	**Proposed label claims for the product**	Labels for amateurs and professional are provided in section B9.
5.10.2	**Efficacy data**	Please refer to Document B5.10_effectiveness
5.11	**Any other known limitations on efficacy including resistance (IIB5.10)**	

Section B5 Effectiveness against target organisms and intended uses

5.11.1	**Use-related restrictions**	The proposed labels contain detailed instructions for use. The population size of the target rodent should be evaluated before a control campaign. The number of baits and the timing of the control campaign has to be in proportion to the infestation level. Baits must be placed in a safe manner inaccessible to children and non-target species and not be applied to areas where food/feed, food utensils or food processing surfaces may come into contact with, or be contaminated by the product. Bait consumption should be regularly checked and consumed or spoilt bait replaced until consumption has stopped. The remaining baits and material must be removed and disposed of safely at the end of the treatment according to local/national wastes disposal regulation. Water must not be contaminated with the product and its container The rodents' bodies all along the treatment must be disposed of according to local/national regulation.
5.11.2	**Prevention of the development of resistance**	The resistance status of the rodent population to Bromadiolone should be taken into account when considering the choice of rodenticide to be used. Where resistance to Bromadiolone is suspected or has been shown, resistant management strategies should be employed and Bromadiolone products must not be used. Use another rodenticidal product containing a different anticoagulant active ingredient or call a pest control operator. Moreover, the following measures from Codes of Good Practice in Rodent control are recommended and usually respected by the applicators: - The population size of the target rodent should be evaluated before a control campaign. The number of baits and the timing of the control campaign is in proportion to the infestation level. - A complete elimination of rodents in the infested area should be achieved. - Site inspections are made regularly during baiting campaigns to search for carcasses of target rodents that must be collected and properly disposed. - Baits are properly disposed of and all uneaten baits are

Section B5	Effectiveness against target organisms and intended uses	
	collected. - Where individual infestations are found to be resistant or contain resistant individuals, other alternative treatments should be used (alternative baits or alternative control techniques).	
5.11.3 Concomittant use with other (biocidal) products	The use of the product with other biocidal products is not recommended.	

Table B5-1: Summary table of data on the method of application including description of system used

Serial number	Product type	Substance(s) used for dilution	Concentration of dilutant(s)	Other substance(s) added	Application technique	Remarks
(1)	PT14 - Rodenticide	None	Not relevant	No other active substance. The product contains a bittering agent to reduce accidental ingestion	The ready-to-use product is applied manually by placing product in a safe manner to prevent access by children and non targeted animals. The product is to be used in and around buildings, in open areas and waste dumps.	The product is not intended to be used with any other product.

Table B5-2: Summary table of data on the number and timing of applications, and where relevant, any particular information relating to geographical variations, climatic variations, or necessary waiting periods to protect man and animals

Serial number	Product type	Application type	Number and timing of application	Waiting periods	Information on recommended variations of the application rate in different locations	Remarks
(1)	PT14 - Rodenticide	Ready-to-use bait against mice and rats For general public and for professionals For use in and around buildings, in open areas and waste dumps Application codes: I.1.1.1, I.1.1.2, I.1.1.3, and I.1.1.4, II.1 and II.2, III.2.1.1.1., IV.1 (IV.1.1.1 and IV.1.2.2) and IV.2, V.1, V.2 and V.3, 2, VI 2.1 and VI.2.2, VII.1, VII.1, VII.2 and VII.3, VIII.4.1.1	The number and timing of application depends on the infestation level.	Not applicable	The application is similar in all parts of the Community	Rodenticide use is closely related to the level of infestation. It is necessary to explore carefully the site before treatment.

Evaluation by Competent Authorities		
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	September 2012	
Materials and Methods	N/A	
Results and discussion	N/A	
Conclusion	N/A	
Reliability	N/A	
Acceptability	N/A	
Remarks	N/A	
	COMMENTS FROM ... *(specify)*	
Date	*Give date of the comments submitted*	
Materials and Methods	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*	
Results and discussion	*Discuss if deviating from view of rapporteur member state*	
Conclusion	*Discuss if deviating from view of rapporteur member state*	
Reliability	*Discuss if deviating from view of rapporteur member state*	
Acceptability	*Discuss if deviating from view of rapporteur member state*	

Section B5.10.1 **Efficacy Data**
Efficacy on mice, choice feeding test, fresh product

		Official use only
	1 Reference	
1.1 Reference	Ivo Rovetto, 2010, Efficacy assessment of Bromadiolone Fresh Paste bait (T_0), containing 50 mg/kg Bromadiolone, using CD-1 albino House mice, SAGEA/SynTech Research, Report VPU/10/019 (unpublished), 05 July 2010.	
1.2 Data protection	Yes	
1.2.1 Data owner	Lodi (see LoA)	
1.2.2 Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its authorisation.	
1.3 Guideline study	The study was conducted according to the guidance document on efficacy evaluations of rodenticides (Product Type 14) from the European Commission (European Commission, 2008).	
1.4 Deviations	None	
	2. Method	

Section B5.10.1	**Efficacy Data** Efficacy on mice, choice feeding test, fresh product
2.1 Test Substance (Biocidal Product)	Bromadiolone
2.1.1 Trade name/ proposed trade name	French name: Jade Paste Belgium name: Control Pasta
2.1.2 Composition of Product tested	Paste bait containing 50 mg/kg of Bromadiolone, freshly manufactured Batch number 20100126.
2.1.3 Physical state and nature	Ready to use paste bait (RB)
2.1.4 Monitoring of active substance concentration	Not applicable
2.1.5 Method of analysis	Not applicable
2.2 Reference substance	Standard mouse diet
2.2.1 Method of analysis for reference substance	Not relevant. The challenge diet was a non-poisoned product.
2.3 Testing procedure	
2.3.1 Test population / inoculum / test organism	10 animals (5 males, 5 females). House mouse (*Mus musculus*). See details in Table 1.2
2.3.2 Test system	Laboratory test. The animals were individually caged in purpose-built stainless steel cages measuring 38 cm * 28 cm * 22 cm. The cages were held in a rack over a plastic tray with an absorbent liner so that spillage could be collected. The test is a choice test in which the rodents have unrestricted access to the test bait and to palatable and familiar alternative food (challenge diet) during a 4-day test period. During the conditioning period the animals were fed with standard EPA meal. The animals were supplied with water *ad libitum* (see Table 1.3)
2.3.3 Application of Test Substance	Mice received the test item from two symmetrically-placed food bowls at the front of each cage, one filled with the test product, the other with the challenge diet. The positions of the bowls were alternated daily. The contents of the food bowls were made up daily to provide an excess of the animals' daily requirement from each bowl (*i.e.* > 50 g) (see Table 1.4).
2.3.4 Test conditions	Ambient conditions in animal rooms were maintained in accordance with normal laboratory requirements; with a

temperature range of 18 - 24°C, a relative humidity range of 30% to 80%, with between 10 and 25 air changes per hour, and with a 12-hour light-dark cycle. Animals were housed in single cages that were equipped to provide food and water provided *ad libitum* during the pre-tested period and the post-treatment and in excess during the 4-day test period (see Table 1.5).

Section B5.10.1	Efficacy Data Efficacy on mice, choice feeding test, fresh product	
2.3.5 Duration of the test / Exposure time	The maximum duration of the test was 22 days, comprising four days of acclimatization (conditioning period), a 4-day test period (period of exposure to the test item) followed by a 14-day observation period.	
2.3.6 Number of replicates performed	No replicate performed.	
2.3.7 Controls	No, not required in EPPO guidelines and in "TNsG Chapter 7 TP14" for choice tests. They are not required by the EU in order to reduce the number of test animals.	
2.4 Examination		
2.4.1 Effect investigated	Palatability of the product in the presence of a competing alternative food (standard diet).	X
2.4.2 Method for recording / scoring of the effect	The daily intakes of challenge diet and test bait were measured and recorded. Product acceptance (amount of product eaten expressed as a percentage of total consumption), any unusual or significant observations were recorded on data entry forms, including excessive bait spillage, signs of toxicity and death, were recorded. The weight of each animal was recorded immediately before the start of the conditioning period and immediately on completion of the observation period, or at death if this occurred earlier.	
2.4.3 Intervals of examination	Daily.	
2.4.4 Statistics	The product acceptance (amount of product eaten expressed as a percentage of total [product + challenge diet] consumption) calculated for each individual, for the group, and for the different sexes of mice. The percentage of mortality	
2.4.5 Post monitoring of the test organism	Yes, 14-day post treatment observation period.	
	3 Results	
3.1 Efficacy		
3.1.1 Dose/Efficacy curve	Not applicable	
3.1.2 Begin and duration of effects	Four animals were killed as they showed signs of toxicity that exceeded the severity limit, as specified for that procedure in the Home Office Project Licence of the testing facility. The mean day of death was 4.3 days (range 3 to 5 days).	

3.1.3 Observed effects in the post monitoring phase 90% mortality was observed. One male survived.

3.2Effects against organisms or objects to be protected Not applicable.

3.3Other effects Not applicable.

3.4 Efficacy of the reference substance Not applicable.

3.5 Tabular and/or graphical presentation of the summarised results

	Initial weight of the animals (g)	Final weight of the animals (g)	Day of death	Mean intake (mg a.s./kg b.w.)	Mean quantity consumed by each animal during the 4-day test period		% acceptance
					Treated	Control	
Average	25.0	23.3	4.3	10.72	5.4	7.9	47.0
SD				4.21			20.1

3.6 Efficacy limiting factors

3.6.1 Occurrences of resistances Not applicable

3.6.2 Other limiting factors Not applicable

4 Relevance of the results compared to field conditions

4.1 Reasons for laboratory testing	This laboratory test is designed to determine the palatability of fresh product. Either the amount of bait consumed, in which the active substance is incorporated, or the mortality of the rodents is a measure for the palatability of the fresh bait in controlled and recognised conditions.
4.2 Intended actual scale of biocide application	Not applicable
4.3 Relevance compared to field conditions	
4.3.1 Application method	Mice had the choice between bait and alternative food. This is intended to represent field conditions in which the animals have unrestricted access to food in competition with treated bait.
4.3.2 Test organism	House mice, the intended target organisms, are used both for laboratory and field tests.
4.3.3 Observed effect	Bromadiolone paste bait was sufficiently attractive to mice to divert them from feeding only on the familiar diet. The observed effects of high consumption of the test item by rodents and the 90% mortality of the test group are both relevant to field conditions.
4.4 Relevance for read-across	Yes and field data are available as well.

Section B5.10.1 **Efficacy Data**
Efficacy on mice, choice feeding test, fresh product

5 Applicant's Summary and conclusion

5.1 Materials and methods

The study was conducted according to TNsG on Product evaluation, Chapter 7.

The test material is a paste bait freshly manufactured (T_0) containing 50 mg/kg Bromadiolone.

The test was a laboratory choice feeding test. It consisted in 4-day acclimatisation (conditioning period) then 4-day test period, followed by a 14-day observation period.

The test group consisted of 5 males and 5 females of CD-1 House mouse. The weight of each animal was recorded to the nearest 1 g immediately before the start of the conditioning period and immediately on completion of the observation period, or at death if this occurred earlier. The animals were individually caged and were provided with an unrestricted supply of tap water and the prescribed food(s) at all times.

The treated bait and control bait were placed in 2 food bowls and the quantity in each pot exceeded the normal daily requirement for each animal. The positions of the test item and of the challenge diet bowls were alternated daily.

Amount of product consumed, any unusual or significant observation including excessive bait spillage, signs of toxicity and death were recorded daily for each animals

5.2 Reliability

5.3 Assessment of efficacy, data analysis and interpretation

The mean initial weight of the test animals was 25.0 g. All test animals fed consistently from the feeding bowls during the 4-day conditioning period and there was no obvious sign of a preference among the animals for one feeding bowl or another. All animals, therefore, continued into the test period.

Acceptance of the Bromadiolone paste bait was very good. The mean quantity of the test item consumed by each animal during the 4-day test period was 5.4 g. A mean of 7.9 g of the challenge diet was consumed by each animal during the same period. The mean acceptance of the test item was 47.0% (S.D. 20.1%), showing that the Bromadiolone paste bait is a palatable formulation.

Mortality occurred in 90% of the test group, with a mean day to death of 4.3 days (range 3 to 5 days). One male animal survived the test after consuming 0.3 g of formulation, which is equivalent to an active ingredient intake of 0.6 mg/kg (assuming a nominal

formulation strength of 50 mg/kg). The mean final weight of the animals was 23.3 g.

5.4 Conclusion

The study showed that, when freshly manufactured, Bromadiolone paste bait is palatable to CD-1 House mice, with a mean palatability against ground laboratory diet of 47.0% (S.D. 20.1%). The test item also resulted in 90% mortality after a 4-day choice between this formulation and challenge diet.
According to the European Commission document (European Commission, 2008), Section 4.1 “Norms and Criteria”:
“In the bait choice feeding test the percentage of ingested bait containing the product should be normally ≥20%. When the test results in ≥90% mortality, a lower level than 20% of the total food consumption is acceptable.”
The results obtained in the choice test with the test item Bromadiolone paste baits, freshly manufactured meet the required criteria.
The results of this test reflect field conditions as animals have unrestricted access to a well-known food.
It can be concluded that the tested Bromadiolone paste bait is palatable in the presence of a competing alternative food (standard diet).

5.5 Proposed efficacy specification

The efficacy of the test item is very good to excellent (90% mortality in 5 days).

Section B5.10.1	**Efficacy Data**
Annex Point IIB5.10	Efficacy on mice, choice feeding test, fresh product
TNsG: Pt. I-B5.10, Pt. III-Ch. 6	

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	September 2012.
Materials and Methods	**2.4.1** Effect observed included palatability and mortality.
Results and discussion	The mean acceptance of the test item was 47.0% (S.D. 20.1%), showing that the Bromadiolone paste bait is a palatable formulation. 90% mortality was observed. One male survived.
Conclusion	Adopt applicant's version.
Reliability	1
Acceptability	Acceptable.
Remarks	None.
	COMMENTS FROM ...
Date	*Give date of comments submitted*
Materials and Methods	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Results and discussion	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B5.10.1 **Efficacy Data**

Annex Point IIB5.10 Efficacy on mice, choice feeding test, fresh product

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.2 Test organism

Criteria	Details
Species	House mice (*Mus musculus*)
Strain	CD-1
Source	Charles River Laboratories UK Ltd.
Laboratory culture	Yes
Stage of life cycle and stage of stadia	Healthy non-pregnant adults
Mixed age population	No
Other specification	Body weight range of 15 to 35 g. Average initial weight of 25.0 g.
Number of organisms tested	10 animals, 5 males and 5 females
Method of cultivation	Animals were weighed and kept individually in cages with a temperature range of 18 - 24°C, a relative humidity range of 30% to 80%, with between 10 and 25 air changes per hour, and with a 12-hour light-dark cycle. They were fed with standard meal (prepared in the laboratory from cornmeal made from whole yellow ground corn (65%); ground rolled oat groats (25%); confectionary sugar (5%) and corn oil (9%), and manufactured according to the Guidelines of the US EPA (1982)) and supplied with water *ad libitum*.
Pre-treatment of test organisms before exposure	The animals were acclimatised to test conditions for 4 days.
Initial density/number of test organisms in the test system	10 animals. Each animal was individually caged

1.3 Test system

Criteria		Details
1.7.3	**Culturing apparatus / test chamber**	Mice were individually caged in purpose-built stainless steel cages measuring 38 cm * 28 cm * 22 cm. The cages were held in a rack over a plastic tray with an absorbent liner so that spillage could be collected.
1.7.4	**Number of vessels / concentration**	Two symmetrically-placed food bowls at the front of each cage.
1.7.5	**Test culture media and/or carrier material**	The test bait is a paste bait containing 50 mg/kg Bromadiolone, provided by the sponsor. The challenge diet, RM3 ground laboratory diet, was manufactured by Special Diets Services Ltd., Witham, Essex, CM8 3AD, UK.
1.7.6	**Nutrient supply**	Not applicable
1.7.7	**Measuring equipment**	Weighing scale (Fisherbrand DP600)

Section B5.10.1 **Efficacy Data**

Annex Point IIB5.10 Efficacy on mice, choice feeding test, fresh product

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.4 Application of test substance

Criteria	Details
Application procedure	During the 4-day conditioning period, the animals had access to Standard EPA Meal from two symmetrically-placed food bowls at the front of each cage. The positions of the two food bowls were alternated daily. The amount of food consumed by each animal was determined daily to the nearest 1 g by the difference method, taking care first to recover spillage and discard contaminants as far as possible. On each day, both food bowls were weighed, replenished and re-weighed. Following any corrections for spillage, spoilage and contamination, the bowl weights were recorded on data entry forms. If a food was fouled by urine or faeces, both foods were replaced with fresh. If food, especially spillage, was damp, it was dried before weighing. During the 4-day test period the animals had access to the test item and the challenge diet and the positions of the bowls containing the two diets were alternated daily. Bowl markings indicated whether contents are a Test (T) or Control (C) diet. The procedures for provisioning and weighing the food bowls were the same as in the conditioning period. At the end of the test period the animals were maintained on laboratory diet and the amount eaten was measured during the 14-day observation period.
Delivery method	The challenge diet and test bait were placed in 2 food bowls.
Dosage rate	The contents of the food bowls were made up daily to provide an excess of the animals' daily requirement from each bowl (*i.e.* > 50 g).
Carrier	Not applicable
Concentration of liquid carrier	Not applicable
Liquid carrier control	Not applicable

Other procedures	No other relevant details.

Section B5.10.1 **Efficacy Data**

Annex Point IIB5.10 Efficacy on mice, choice feeding test, fresh product

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.5 Test conditions

Criteria	Details
Substrate	Not applicable
Incubation temperature	Ambient temperature was 18-24°C
Moisture	Relative humidity range of 30 to 80%
Aeration	10 to 25 air changes per hour
Method of exposure	Oral exposure
Aging of samples	Fresh test bait
Other conditions	12h light-dark cycle

Section B5.10.2
Annex Point IIB5.10
TNsG: Pt. I-B5.10, Pt. III-Ch. 6

Efficacy Data
Efficacy on mice, choice feeding test, aged product

Official use only

1 Reference

1.1 Reference	Ivo Rovetto, 2010, Efficacy assessment of Bromadiolone fresh paste bait ($T_{2\ weeks\ accelerated}$), containing 50 mg/kg Bromadiolone, using CD-1 albino House Mice, SAGEA/SynTech Research, Report VPU/10/020 (unpublished), 05 July 2010.
1.2 Data protection	Yes
1.2.1 Data owner	Lodi (see LoA)
1.2.2 Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its authorisation.
1.3 Guideline study	The study was conducted according to the guidance document on efficacy evaluations of rodenticides (Product Type 14) from the European Commission (European Commission, 2008).
1.4 Deviations	None

Section B5.10.2 **Annex Point IIB5.10** **TNsG: Pt. I-B5.10, Pt. III-Ch. 6**	**Efficacy Data** Efficacy on mice, choice feeding test, aged product

	2 Method
2.1 Test Substance (Biocidal Product)	Bromadiolone
2.1.1Trade name/ proposed trade name	French name: Jade Paste Belgium name: Control Pasta
2.1.2 Composition of Product tested	Paste bait containing 50 mg/kg of Bromadiolone stored at 54°C for a period of 2 weeks. Batch number 20100126
2.1.3 Physical state and nature	Ready to use paste bait (RB)
2.1.4 Monitoring of active substance concentration	Not applicable
2.1.5 Method of analysis	Not applicable
2.2 Reference substance	Standard mouse diet
2.2.1 Method of analysis for reference substance	Not relevant. The challenge diet was a non-poisoned product.
2.3 Testing procedure	
2.3.1 Test population / inoculum / test organism	10 animals (5 males, 5 females). House mouse (*Mus musculus*). See Table 1.2
2.3.2 Test system	Laboratory test. The animals were individually caged in purpose-built stainless steel cages measuring 38 cm * 28 cm * 22 cm. The cages were held in a rack over a plastic tray with an absorbent liner so that spillage could be collected. The test is a choice test in which the rodents have unrestricted access to the test bait and to palatable and familiar alternative food (challenge diet) during a 4-day test period. During the conditioning period the animals were fed with standard EPA meal. The animals were supplied with water *ad libitum* (see Table 1.3)
2.3.3 Application of Test Substance	Mice received the test item from two symmetrically-placed food bowls at the front of each cage, one filled with the test product, the other with the challenge diet. The positions of the bowls were alternated daily. The contents of the food bowls were made up daily to provide an excess of the animals' daily requirement from each bowl *(i.e.* > 10 g) (see Table 1.4).
2.3.4 Test conditions	Ambient conditions in animal rooms were maintained in

accordance with normal laboratory requirements; with a temperature range of 18 - 24°C, a relative humidity range of 30% to 80%, with between 10 and 25 air changes per hour, and with a 12-hour light-dark cycle. Animals were housed in single cages that were equipped to provide food and water provided *ad libitum* during the pre-tested period and the post-treatment and in excess during the 4-day test period (see Table 1.5).

Section B5.10.2 **Annex Point IIB5.10** **TNsG: Pt. I-B5.10,** **Pt. III-Ch. 6**	**Efficacy Data** Efficacy on mice, choice feeding test, aged product

2.3.5 Duration of the test / Exposure time	The maximum duration of the test was 22 days, comprising four days of acclimatization (conditioning period), a 4-day test period (period of exposure to the test item) followed by a 14-day observation period.	
2.3.6 Number of replicates performed	No replicate performed.	
2.3.7 Controls	No, not required in EPPO guidelines and in "TNsG Chapter 7 TP14" for choice tests. They are not required by the EU in order to reduce the number of test animals.	
2.4 Examination		
2.4.1 Effect investigated	Palatability of the aged product in the presence of a competing alternative food (standard diet).	X
2.4.2 Method for recording / scoring of the effect	The daily intakes of challenge diet and test bait were measured and recorded. Product acceptance (amount of product eaten expressed as a percentage of total consumption), any unusual or significant observations were recorded on data entry forms, including excessive bait spillage, signs of toxicity and death, were recorded. The weight of each animal was recorded immediately before the start of the conditioning period and immediately on completion of the observation period, or at death if this occurred earlier.	
2.4.3 Intervals of examination	Daily.	
2.4.4 Statistics	The product acceptance (amount of product eaten expressed as a percentage of total [product + challenge diet] consumption) calculated for each individual, for the group, and for the different sexes of mice. The percentage of mortality	
2.4.5 Post monitoring of the test organism	Yes, 14-day post treatment observation period.	
	3 Results	
3.1 Efficacy		
3.1.1 Dose/Efficacy curve	Not applicable	
3.1.2 Begin and duration of effects	Eight animals were killed as they showed signs of toxicity that exceeded the severity limit, as specified for that procedure in the Home Office Project Licence of the testing facility. The mean day of death was 4.6 days (range 3 to 5 days).	
3.1.3 Observed effects in the post monitoring phase	100% mortality was observed in both males and females.	

3.2 Effects against organisms or objects to be protected Not applicable.

3.3 Other effects Not applicable.

3.4 Efficacy of the reference substance Not applicable.

3.5 Tabular and/or graphical presentation of the summarised results

	Initial weight of the animals (g)	Final weight of the animals (g)	Day of death	Mean intake (mg a.s./kg b.w.)	Mean quantity consumed by each animal during the 4-day test period		% acceptance
					Treated	Control	
Average	25.4	23.7	4.6	12.70	6.3	9.2	44.5
SD				4.48			17.2

3.6 Efficacy limiting factors

3.6.1 Occurrences of resistances Not applicable

3.6.2 Other limiting factors Not applicable

4 Relevance of the results compared to field conditions

Section B5.10.2 **Annex Point IIB5.10** **TNsG: Pt. I-B5.10,** **Pt. III-Ch. 6**	**Efficacy Data** Efficacy on mice, choice feeding test, aged product

4.1 Reasons for laboratory testing	This laboratory test is designed to determine the palatability of aged product. Either the amount of bait consumed, in which the active substance is incorporated, or the mortality of the rodents is a measure for the palatability of the aged bait in controlled and recognised conditions.
4.2 Intended actual scale of biocide application	Not applicable
4.3 Relevance compared to field conditions	
4.3.1 Application method	Mice had the choice between bait and alternative feed. This represents natural conditions in which the animals have unrestricted access to food in competition with treated bait.
4.3.2 Test organism	House mice, the intended target organisms, are used for both laboratory and field tests.
4.3.3 Observed effect	It is apparent that the Bromadiolone paste bait was sufficiently attractive to mice to divert them from feeding only on the familiar diet. The observed effects of high consumption of the test item by rodents and the total mortality of the test group are both relevant to field conditions.
4.4 Relevance for read-across	Yes and field data are available as well.

5 Applicant's Summary and conclusion

Section B5.10.2 **Efficacy Data**
Annex Point IIB5.10 Efficacy on mice, choice feeding test, aged product
TNsG: Pt. I-B5.10, Pt. III-Ch. 6

5.1 Materials and methods

The study was conducted according to TNsG on Product evaluation, Chapter 7.

The test material is a paste bait aged for 2 weeks at 54°C, containing 50 mg/kg Bromadiolone.

The test was a laboratory choice feeding test. It consisted in 4-day acclimatisation (conditioning period) then 4-day test period, followed by a 14-day observation period.

The test group consisted of 5 males and 5 females of CD-1 House mouse. The weight of each animal was recorded to the nearest 1 g immediately before the start of the conditioning period and immediately on completion of the observation period, or at death if this occurred earlier. The animals were individually caged and were provided with an unrestricted supply of tap water and the prescribed food(s) at all times.

The treated bait and control bait were placed in 2 food bowls and the quantity in each pot exceeded the normal daily requirement for each animal. The position of the test item and the challenge diet bowls were alternated daily.

Amount of product consumed, any unusual or significant observation including excessive bait spillage, signs of toxicity and death were recorded daily for each animal.

5.2 Reliability

1

5.3 Assessment of efficacy, data analysis and interpretation

The mean initial weight of the test animals was 25.4 g. All test animals fed consistently from the feeding bowls during the 4-day conditioning period and there was no obvious sign of a preference among the animals for one feeding bowl or another. All animals, therefore, continued into the test period.

Acceptance of the Bromadiolone paste bait was very good. The mean quantity of the test item consumed by each animal during the 4-day test period was 6.3 g. A mean of 9.2 g of the challenge diet was consumed by each animal during the same period. The mean acceptance of the test item was 44.5% (S.D. 17.2%) showing that the Bromadiolone paste bait is a palatable formulation.

Mortality was complete (100%) in the test group, with a mean day to death of 4.6 days (range 3 to 5 days). The mean final weight of the animals was 23.7 g.

5.4 Conclusion

The study showed that, after a storage period of 2 weeks at 54°C, Bromadiolone paste bait is palatable to CD-1 House mice, with a mean palatability against ground laboratory diet of 44.5% (S.D. 17.2%). The test item also resulted in 100% mortality after a 4-day choice between this formulation and challenge diet.

According to the European Commission document (European Commission, 2008), Section 4.1 “Norms and Criteria”:

“In the bait choice feeding test the percentage of ingested bait containing the product should be normally ≥20%. When the test results in ≥90% mortality, a lower level than 20% of the total food consumption is acceptable.”

The results obtained in the choice test with the test item

Section B5.10.2 **Annex Point IIB5.10** **TNsG: Pt. I-B5.10, Pt. III-Ch. 6**	**Efficacy Data** Efficacy on mice, choice feeding test, aged product

	Bromadiolone paste bait, aged for 2 weeks meet the required criteria. The results of this test reflect field conditions as animals have unrestricted access to a well-known food. It can be concluded that the tested Bromadiolone paste baits is palatable in the presence of a competing alternative food (standard diet)
5.5 Proposed efficacy specification	The efficacy of the test item is very good to excellent (100% mortality in 5 days).

Section B5.10.2	**Efficacy Data**
Annex Point IIB5.10	**Efficacy on mice, choice feeding test, aged product**
TNsG: Pt. I-B5.10,	
Pt. III-Ch. 6	

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	September 2012.
Materials and Methods	**2.4.1** Effect observed included palatability and mortality.
Results and discussion	The mean acceptance of the test item was 44.5% (S.D. 17.2%) showing that the Bromadiolone paste bait is a palatable formulation to *mus musculus*. Mortality was total (100%) in the test group, with a mean day to death of 4.6 days (range 3 to 5 days).
Conclusion	Adopt applicant's version.
Reliability	1
Acceptability	Acceptable.
Remarks	None.
	COMMENTS FROM ...
Date	*Give date of comments submitted*
Materials and Methods	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Results and discussion	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B5.10.2 **Efficacy Data**

Annex Point IIB5.10 Efficacy on mice, choice feeding test, aged product

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.2 Test organism

Criteria	Details
Species	House mice (*Mus musculus*)
Strain	CD-1
Source	Charles River Laboratories UK Ltd.
Laboratory culture	Yes
Stage of life cycle and stage of stadia	Healthy non-pregnant adults.
Mixed age population	No
Other specification	Body weight range of 15 to 35 g. Average initial weight of 25.4 g.
Number of organisms tested	10 animals, 5 males and 5 females
Method of cultivation	Animals were weighed and kept individually in cages with a temperature range of 18 - 24°C, a relative humidity range of 30% to 80%, with between 10 and 25 air changes per hour, and with a 12-hour light-dark cycle. They were fed with standard meal (prepared in the laboratory from cornmeal made from whole yellow ground corn (65%); ground rolled oat groats (25%); confectionary sugar (5%) and corn oil (9%), and manufactured according to the Guidelines of the US EPA (1982)) and supplied with water *ad libitum*.
Pre-treatment of test organisms before exposure	The animals were acclimatised to test conditions for 4 days.
Initial density/number of test organisms in the test system	10 animals. Each animal was individually caged

1.3 Test system

Criteria	Details
Culturing apparatus / test chamber	Mice were individually caged in purpose-built stainless steel cages measuring 38 cm * 28 cm * 22 cm. The cages were held in a rack over a plastic tray with an absorbent liner so that spillage could be collected.
Number of vessels / concentration	Two symmetrically-placed food bowls at the front of each cage
Test culture media and/or carrier material	The test bait is a paste bait containing 50 mg/kg Bromadiolone, aged for 2 weeks at 54°C, provided by the sponsor. The challenge diet, RM3 ground laboratory diet, was manufactured by Special Diets Services Ltd., Witham, Essex, CM8 3AD, UK.
Nutrient supply	Not applicable
Measuring equipment	Weighing scale (Fisherbrand DP600)

Section B5.10.2 **Efficacy Data**

Annex Point IIB5.10 Efficacy on mice, choice feeding test, aged product

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.4 Application of test substance

Criteria	Details
Application procedure	During the 4-day conditioning period, the animals had access to Standard EPA Meal from two symmetrically-placed food bowls at the front of each cage. The positions of the two food bowls were alternated daily. The amount of food consumed by each animal was determined daily to the nearest 1 g by the difference method, taking care first to recover spillage and discard contaminants as far as possible. On each day, both food bowls were weighed, replenished and re-weighed. Following any corrections for spillage, spoilage and contamination, the bowl weights were recorded on data entry forms. If a food was fouled by urine or faeces, both foods were replaced with fresh. If food, especially spillage, was damp, it was dried before weighing. During the 4-day test period the animals had access to the test item and the challenge diet and the positions of the bowls containing the two diets were alternated daily. Bowl markings indicated whether contents are a Test (T) or Control (C) diet. The procedures for provisioning and weighing the food bowls were the same as in the conditioning period. At the end of the test period the animals were maintained on laboratory diet and the amount eaten was measured during the 14-day observation period.
Delivery method	The challenge diet and test bait were placed in 2 food bowls.
Dosage rate	The contents of the food bowls were made up daily to provide an excess of the animals' daily requirement from each bowl (*i.e.* > 10g).
Carrier	Not applicable
Concentration of liquid carrier	Not applicable
Liquid carrier control	Not applicable

Other procedures	No other relevant details.

Section B5.10.2 **Efficacy Data**

Annex Point IIB5.10 Efficacy on mice, choice feeding test, aged product

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.5 Test conditions

Criteria	Details
Substrate	Not applicable
Incubation temperature	Ambient temperature was 18-24°C
Moisture	Relative humidity range of 30 to 80%
Aeration	10 to 25 air changes per hour
Method of exposure	Oral exposure
Aging of samples	Aged test bait (54°C, 2 weeks)
Other conditions	12h light-dark cycle

Section B5.10.3	**Efficacy Data**
Annex Point IIB5.10	Efficacy on rats, choice feeding test, fresh product
TNsG: Pt. I-B5.10, Pt. III-Ch. 6	

		Official use only
	1 REFERENCE	
1.1 Reference	Ivo Rovetto, 2010, Efficacy assessment of Bromadiolone Fresh Paste bait (T_0), containing 50 mg/kg Bromadiolone, using CD albino Norway rat, SAGEA/SynTech Research, Report VPU/10/017 (unpublished), 05 July 2010.	
1.2 Data protection	Yes	
1.2.1 Data owner	Lodi (see LoA)	
1.2.2 Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its authorisation.	
1.3 Guideline study	The study was conducted according to the guidance document on efficacy evaluations of rodenticides (Product Type 14) from the European Commission (European Commission, 2008).	
1.4 Deviations	None	
	2 METHOD	
2.1 Test Substance (Biocidal Product)	Bromadiolone	
2.1.1 Trade name/ proposed trade name	French name: Jade Paste Belgium name: Control Pasta	
2.1.2 Composition of Product tested	Paste bait containing 50 mg/kg of Bromadiolone, freshly manufactured. Batch number 20100126.	

Section B5.10.3	**Efficacy Data**
Annex Point IIB5.10	Efficacy on rats, choice feeding test, fresh product
TNsG: Pt. I-B5.10, Pt. III-Ch. 6	

2.1.3	**Physical state and nature**	Ready to use paste bait (RB)
2.1.4	**Monitoring of active substance concentration**	Not applicable
2.1.5	**Method of analysis**	Not applicable
2.2 Reference substance		Standard rat diet
2.2.1	**Method of analysis for reference substance**	Not relevant. The challenge diet was a non-poisoned product.
2.3 Testing procedure		
2.3.1	**Test population / inoculum / test organism**	10 animals (5 males, 5 females). CD Norway rat (*Rattus norvegicus*). See Table 1.2
2.3.2	**Test system**	Laboratory test. The animals were individually caged in purpose-built stainless steel cages measuring 38 cm * 28 cm * 22 cm. The cages were held in a rack over a plastic tray with an absorbent liner so that spillage could be collected. The test is a choice test in which the rodents have unrestricted access to the test bait and to palatable and familiar alternative food (challenge diet) during a 4-day test period. During the conditioning period the animals were fed with standard EPA meal. The animals were supplied with water *ad libitum* (see Table 1.3)
2.3.3	**Application of Test Substance**	Rats received the test item from two symmetrically-placed food bowls at the front of each cage, one filled with the test product,

		the other with the challenge diet. The positions of the bowls were alternated daily. The contents of the food bowls were made up daily to provide an excess of the animals' daily requirement from each bowl (*i.e.* > 50 g) (see Table 1.4).	
2.3.4	**Test conditions**	Ambient conditions in animal rooms were maintained in accordance with normal laboratory requirements; with a temperature range of 18 - 24°C, a relative humidity range of 30% to 80%, with between 10 and 25 air changes per hour, and with a 12-hour light-dark cycle. Animals were housed in single cages that were equipped to provide food and water provided ad libitum during the pre-tested period and the post-treatment and in excess during the 4-day test period (see Table 1.5).	
2.3.5	**Duration of the test / Exposure time**	The maximum duration of the test was 22 days, comprising four days of acclimatization (conditioning period), a 4-day test period (period of exposure to the test item) followed by a 14-day observation period.	
2.3.6	**Number of replicates performed**	No replicate performed.	
2.3.7	**Controls**	No, not required in EPPO guidelines and in "TNsG Chapter 7 TP14" for choice tests. They are not required by the EU in order to reduce the number of test animals.	
2.4 Examination			
2.4.1	**Effect investigated**	Palatability of the product in the presence of a competing alternative food (standard diet).	X
2.4.2	**Method for recording / scoring of the effect**	The daily intakes of challenge diet and test bait were measured and recorded. Product acceptance (amount of product eaten expressed as a percentage of total consumption), any unusual or significant observations were recorded on data entry forms,	

		including excessive bait spillage, signs of toxicity and death, were recorded. The weight of each animal was recorded immediately before the start of the conditioning period and immediately on completion of the observation period, or at death if this occurred earlier.
2.4.3	**Intervals of examination**	Daily.
2.4.4	**Statistics**	The product acceptance (amount of product eaten expressed as a percentage of total [product + challenge diet] consumption) calculated for each individual, for the group, and for the different sexes of rats. The percentage of mortality
2.4.5	**Post monitoring of the test organism**	Yes, 14-day post treatment observation period.
	3 RESULTS	
3.1 Efficacy		
3.1.1	**Dose/Efficacy curve**	Not applicable
3.1.2	**Begin and duration of effects**	Nine animals were killed as they showed signs of toxicity that exceeded the severity limit, as specified for that procedure in the Home Office Project Licence of the testing facility. The mean day of death was 4.0 days (range 2 to 5 days).
3.1.3	**Observed effects in the post monitoring phase**	100% mortality was observed in both males and females.
3.2	**Effects against**	Not applicable.

organisms or objects to be protected

3.3 Other effects Not applicable.

3.4 Efficacy of the reference substance Not applicable.

3.5 Tabular and/or graphical presentation of the summarised results

	Initial weight of the animals (g)	Final weight of the animals (g)	Day of death	Mean intake (mg a.s./kg b.w.)	Mean quantity consumed by each animal during the 4-day test period		% acceptance
					Treated	Control	
Average	174.1	187.6	4.0	6.55	22.5	42.9	34.6
SD				2.10			9.7

3.6 Efficacy limiting factors

3.6.1 Occurrences of resistances Not applicable

3.6.2 Other limiting factors Not applicable

4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS

4.1 Reasons for laboratory testing This laboratory test is designed to determine the palatability of aged product. Either the amount of bait consumed, in which the active substance is incorporated, or the mortality of the rodents is

		a measure for the palatability of the aged bait in controlled and recognised conditions.
4.2	**Intended actual scale of biocide application**	Not applicable
4.3	**Relevance compared to field conditions**	
4.3.1	**Application method**	Rats had the choice between bait and alternative food. This is intended to represent field conditions in which the animals have unrestricted access to food in competition with treated bait.
4.3.2	**Test organism**	Norway rats, the intended target organisms, are used for both laboratory and field tests.
4.3.3	**Observed effect**	It is apparent that the Bromadiolone paste bait was sufficiently attractive to rats to divert them from feeding only on the familiar diet. The observed effects of high consumption of the test item by rodents and the total mortality of the test group are both relevant to field conditions.
4.4	**Relevance for read-across**	Yes and field data are available as well.

5 APPLICANT'S SUMMARY AND CONCLUSION

5.1	**Materials and methods**	The study was conducted according to TNsG on Product evaluation, Chapter 7. The test material is a paste bait freshly manufactured (T0) containing 50 mg/kg Bromadiolone. The test was a laboratory choice feeding test. It consisted in 4-day acclimatisation (conditioning period) then 4-day test period, followed by a 14-day observation period. The test group consisted of 5 males and 5 females of CD Norway rat (*Rattus norvegicus*). The weight of each animal was recorded

to the nearest 1 g immediately before the start of the conditioning period and immediately on completion of the observation period, or at death if this occurred earlier. The animals were individually caged and were provided with an unrestricted supply of tap water and the prescribed food(s) at all times.

The treated bait and control bait were placed in 2 food bowls and the quantity in each pot exceeded the normal daily requirement for each animal. The position of the test item and the challenge diet bowls were alternated daily.

Amount of product consumed, any unusual or significant observation including excessive bait spillage, signs of toxicity and death were recorded daily for each animal.

5.2 Reliability

1

5.3 Assessment of efficacy, data analysis and interpretation

The mean initial weight of the test animals was 174.16 g. All test animals fed consistently from the feeding bowls during the 4-day conditioning period and there was no obvious sign of a preference among the animals for one feeding bowl or another. All animals, therefore, continued into the test period.

Acceptance of the Bromadiolone paste bait was good. The mean quantity of the test item consumed by each animal during the 4-day test period was 22.5 g. A mean of 42.9 g of the challenge diet was consumed by each animal during the same period. The mean acceptance of the test item was 34.6% (S.D. 9.7%), showing that the Bromadiolone paste bait is a palatable formulation.

Mortality was total (100%) in the test group, with a mean day to death of 4.0 days (range 2 to 5 days). The mean final weight of the animals was 187.6 g.

5.4 Conclusion

The study showed that, when freshly manufactured, Bromadiolone paste bait is palatable to CD Norway rats, with a mean palatability against ground laboratory diet of 34.6% (S.D. 9.7%). The test item also resulted in 100% mortality after a 4-day

	choice between this formulation and challenge diet. According to the European Commission document (European Commission, 2008), Section 4.1 “Norms and Criteria”: “In the bait choice feeding test the percentage of ingested bait containing the product should be normally ≥20%. When the test results in ≥90% mortality, a lower level than 20% of the total food consumption is acceptable.” The results obtained in the choice test with the test item Bromadiolone paste bait, freshly manufactured, meet the required criteria. The results of this test reflect field conditions as animals have unrestricted access to a well-known food. It can be conclude that the test item Bromadiolone paste baits is palatable in the presence of a competing alternative food (standard diet)	
5.5 Proposed efficacy specification	The efficacy of the test item is very good to excellent (100% mortality in 5 days).	

Section B5.10.3 **Efficacy Data**

Annex Point IIB5.10 Efficacy on rats, choice feeding test, fresh product

TNsG: Pt. I-B5.10, Pt. III-Ch. 6

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	September 2012.
Materials and Methods	**2.4.1** Effect observed included palatability and mortality.
Results and discussion	The study showed that, when freshly manufactured, Bromadiolone paste bait is palatable to Norway rats, with a mean palatability against ground laboratory diet of 34.6%. 100% mortality was observed after a 4-day choice between this formulation and challenge diet.
Conclusion	Adopt applicant's version.
Reliability	1
Acceptability	Acceptable.
Remarks	None.
	COMMENTS FROM ...
Date	*Give date of comments submitted*
Materials and Methods	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion. Discuss if deviating from view of rapporteur member state*
Results and discussion	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B5.10.3 **Efficacy Data**

Annex Point IIB5.10 Efficacy on rats, choice feeding test, fresh product

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.2 Test organism

Criteria	Details
Species	Norway rats (*Rattus norvegicus*)
Strain	CD Norway rat
Source	Charles River UK Ltd.
Laboratory culture	Yes
Stage of life cycle and stage of stadia	Healthy non-pregnant adults
Mixed age population	No
Other specification	Body weight range of 120 to 300 g. Average initial weight of 174.1 g.
Number of organisms tested	10 animals, 5 males and 5 females
Method of cultivation	Animals were weighed and kept individually in cages with a temperature range of 18 - 24°C, a relative humidity range of 30% to 80%, with between 10 and 25 air changes per hour, and with a 12-hour light-dark cycle. They were fed with standard meal (prepared in the laboratory from cornmeal made from whole yellow ground corn (65%); ground rolled oat groats (25%); confectionary sugar (5%) and corn oil (9%), and manufactured according to the Guidelines of the US EPA (1982)) and supplied with water *ad libitum*.
Pre-treatment of test organisms before exposure	The animals were acclimatised to test conditions for 4 days.
Initial density/number of test organisms in the test system	10 animals. Each animal was individually caged.

1.3 Test system

Criteria	Details
Culturing apparatus / test chamber	Rats were individually caged in purpose-built stainless steel cages measuring 38 cm * 28 cm * 22 cm. The cages were held in a rack over a plastic tray with an absorbent liner so that spillage could be collected.

Number of vessels / concentration	Two symmetrically-placed food bowls at the front of each cage.
Test culture media and/or carrier material	The test bait is paste bait containing 50 mg/kg Bromadiolone, provided by the sponsor. The challenge diet, RM3 ground laboratory diet, was manufactured by Special Diets Services Ltd., Witham, Essex, CM8 3AD, UK.
Nutrient supply	Not applicable
Measuring equipment	Weighing scale (Fisherbrand DP600)

Section B5.10.3	**Efficacy Data**
Annex Point IIB5.10	Efficacy on rats, choice feeding test, fresh product
TNsG: Pt. I-B5.10,	
Pt. III-Ch. 6	

1.4 Application of test substance

Criteria	Details
Application procedure	During the 4-day conditioning period, the animals had access to Standard EPA Meal from two symmetrically-placed food bowls at the front of each cage. The positions of the two food bowls were alternated daily. The amount of food consumed by each animal was determined daily to the nearest 1 g by the difference method, taking care first to recover spillage and discard contaminants as far as possible. On each day, both food bowls were weighed, replenished and re-weighed. Following any corrections for spillage, spoilage and contamination, the bowl weights were recorded on data entry forms. If a food was fouled by urine or faeces, both foods were replaced with fresh. If food, especially spillage, was damp, it was dried before weighing. During the 4-day test period the animals had access to the test item and the challenge diet and the positions of the bowls containing the two diets were alternated daily. Bowl markings indicated whether contents are a Test (T) or Control (C) diet. The procedures for provisioning and weighing the food bowls were the same as in the conditioning period. At the end of the test period the animals were maintained on laboratory diet and the amount eaten was measured during the 14-day observation period.
Delivery method	The challenge diet and test bait were placed in 2 food bowls.
Dosage rate	The contents of the food bowls were made up daily to provide an excess of the animals' daily requirement from each bowl (*i.e.* > 50 g).
Carrier	Not applicable
Concentration of liquid carrier	Not applicable
Liquid carrier control	Not applicable

Other procedures	No other relevant details.

Section B5.10.3 **Efficacy Data**

Annex Point IIB5.10 Efficacy on rats, choice feeding test, fresh product

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.5 Test conditions

Criteria	Details
Substrate	Not applicable
Incubation temperature	Ambient temperature was 18-24°C
Moisture	Relative humidity range of 30 to 80%
Aeration	10 to 25 air changes per hour
Method of exposure	Oral exposure
Aging of samples	Fresh test bait
Other conditions	12h light-dark cycle

Section B5.10.4	**Efficacy Data**
Annex Point IIB5.10	Efficacy on rats, choice feeding test, aged product
TNsG: Pt. I-B5.10, Pt. III-Ch. 6	

Official use only

1 Reference

1.1 Reference

Ivo Rovetto, 2010, Efficacy assessment of Bromadiolone Paste bait ($T_{2\ weeks\ accelerated}$), containing 50 mg/kg Bromadiolone, using CD albino Norway rat, SAGEA/SynTech Research, Report VPU/10/018 (unpublished), 01 July 2010.

1.2 Data protection Yes

1.2.1 Data owner Lodi (see LoA)

1.2.2 Criteria for data protection Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its authorisation.

1.3 Guideline study The study was conducted according to the guidance document on efficacy evaluations of rodenticides (Product Type 14) from the European Commission (European Commission, 2008).

1.4 Deviations None

2 Method

Section B5.10.4 **Annex Point IIB5.10** **TNsG: Pt. I-B5.10,** **Pt. III-Ch. 6**	**Efficacy Data** Efficacy on rats, choice feeding test, aged product

2.1 Test Substance (Biocidal Product) **2.1.1 Trade name/ proposed trade name**	Bromadiolone French name: Jade Paste Belgium name: Control Pasta
2.1.2 Composition of Product tested	Paste bait containing 50 mg/kg of Bromadiolone stored at 54°C for a period of 2 weeks. Batch number 20100126
2.1.3 Physical state and nature	Ready to use paste bait (RB)
2.1.4 Monitoring of active substance concentration	Not applicable
2.1.5 Method of analysis	Not applicable
2.2 Reference substance	Standard rat diet
2.2.1 Method of analysis for reference substance	Not relevant. The challenge diet was a non-poisoned product.
2.3 Testing procedure	
2.3.1 Test population / inoculum /test organism	10 animals (5 males, 5 females). CD Norway rat (*Rattus norvegicus*). See Table 1.2
2.3.2 Test system	Laboratory test. The animals were individually caged in purpose-built stainless steel cages measuring 38 cm * 28 cm * 22 cm. The cages were held in a rack over a plastic tray with an absorbent liner so that spillage could be collected. The test is a choice test in which the rodents have unrestricted access to the test bait and to palatable and familiar alternative food (challenge diet) during a 4-day test period. During the conditioning period the animals were fed with standard EPA meal. The animals were supplied with water *ad libitum* (see Table 1.3).
2.3.3 Application of Test Substance	Rats received the test item from two symmetrically-placed food bowls at the front of each cage, one filled with the test product, the other with the challenge diet. The positions of the bowls were alternated daily. The contents of the food bowls were made up daily to provide an excess of the animals' daily requirement from each bowl (*i.e.* > 50 g) (see Table 1.4).
2.3.4 Test conditions	Ambient conditions in animal rooms were maintained in accordance with normal laboratory requirements; with a temperature range of 18 - 24°C, a relative humidity range of 30% to 80%, with between 10 and 25 air changes per hour, and with a 12-hour light-dark cycle. Animals were housed in single cages that were equipped to provide food and water provided *ad libitum*

during the pre-tested period and the post-treatment and in excess during the 4-day test period (see Table 1.5).

Section B5.10.4 **Annex Point IIB5.10** **TNsG: Pt. I-B5.10,** **Pt. III-Ch. 6**	**Efficacy Data** Efficacy on rats, choice feeding test, aged product

2.3.5 Duration of the test / Exposure time	The maximum duration of the test was 22 days, comprising four days of acclimatization (conditioning period), a 4-day test period (period of exposure to the test item) followed by a 14-day observation period.	
2.3.6 Number of replicates performed	No replicate performed.	
2.3.7 Controls	No, not required in EPPO guidelines and in "TNsG Chapter 7 TP14" for choice tests. They are not required by the EU in order to reduce the number of test animals.	
2.4 Examination		
2.4.1Effect investigated	Palatability of the product in the presence of a competing alternative food (standard diet).	X
2.4.2 Method for recording / scoring of the effect	The daily intakes of challenge diet and test bait were measured and recorded. Product acceptance (amount of product eaten expressed as a percentage of total consumption), any unusual or significant observations were recorded on data entry forms, including excessive bait spillage, signs of toxicity and death, were recorded. The weight of each animal was recorded immediately before the start of the conditioning period and immediately on completion of the observation period, or at death if this occurred earlier.	
2.4.3 Intervals of examination	Daily.	
2.4.4 Statistics	The product acceptance (amount of product eaten expressed as a percentage of total [product + challenge diet] consumption) calculated for each individual, for the group, and for the different sexes of rats. The percentage of mortality.	
2.4.5 Post monitoring of the test organism	Yes, 14-day post treatment observation period.	
	3 Results	
3.1 Efficacy		
3.1.1 Dose/Efficacy curve	Not applicable	
3.1.2 Begin and duration of effects	Nine animals were killed as they showed signs of toxicity that exceeded the severity limit, as specified for that procedure in the Home Office Project Licence of the testing facility. The mean day of death was 3.7 days (range 3 to 5 days).	

Section B5.10.4 **Efficacy Data**
Annex Point IIB5.10 Efficacy on rats, choice feeding test, aged product
TNsG: Pt. I-B5.10, Pt. III-Ch. 6

3.1.3 Observed effects in the post monitoring phase Total mortality was observed in both male and female rats.

3.2 Effects against organisms or objects to be protected Not applicable.

3.3 Other effects Not applicable.

3.4 Efficacy of the reference substance Not applicable.

3.5 Tabular and/or graphical presentation of the summarised results

	Initial weight of the animals (g)	Final weight of the animals (g)	Day of death	Mean intake (mg a.s./kg b.w.)	Mean quantity consumed by each animal during the 4-day test period		% acceptance
					Treated	Control	
Average	173.1	185.2	3.7	8.68	30.0	32.2	48.9
SD				2.09			12.0

3.6 Efficacy limiting factors

3.6.1 Occurrences of resistances Not applicable

3.6.2 Other limiting factors Not applicable

4 Relevance of the results compared to field conditions

Section B5.10.4 **Annex Point IIB5.10** **TNsG: Pt. I-B5.10,** **Pt. III-Ch. 6**	**Efficacy Data** Efficacy on rats, choice feeding test, aged product

4.1 Reasons for laboratorytesting	This laboratory test is designed to determine the palatability of aged product. Either the amount of bait consumed, in which the active substance is incorporated, or the mortality of the rodents is a measure for the palatability of the aged bait in controlled and recognised conditions.
4.2 Intended actual scale of biocide application	Not applicable
4.3 Relevance compared to field conditions	
4.3.1 Application method	Rats had the choice between the bait and alternative food. This is intended to represent field conditions in which the animals have unrestricted access to food in competition with treated bait.
4.3.2 Test organism	Norway rats, the intended target organisms, are used for both laboratory and field tests.
4.3.3 Observed effect	Bromadiolone paste bait was sufficiently attractive to rats to divert them from feeding only on the familiar diet. The observed effects of high consumption of the test item by rodents and the total mortality of the test group are both relevant to field conditions.
4.4 Relevance for read-across	Yes and field data are available as well.

5 Applicant's Summary and conclusion

Section B5.10.4 **Annex Point IIB5.10** **TNsG: Pt. I-B5.10, Pt. III-Ch. 6**	**Efficacy Data** Efficacy on rats, choice feeding test, aged product

5.1 Materials and methods

The study was conducted according to TNsG on Product evaluation, Chapter 7.

The test material is paste bait aged for 2 weeks at 54°C, containing 50 mg/kg Bromadiolone.

The test was a laboratory choice feeding test. It consisted in 4-day acclimatisation (conditioning period) then 4-day test period, followed by a 14-day observation period.

The test group consisted of 5 males and 5 females of CD Norway rat (*Rattus norvegicus*). The weight of each animal was recorded to the nearest 1 g immediately before the start of the conditioning period and immediately on completion of the observation period, or at death if this occurred earlier. The animals were individually caged and were provided with an unrestricted supply of tap water and the prescribed food(s) at all times.

The treated bait and control bait were placed in 2 food bowls and the quantity in each pot exceeded the normal daily requirement for each animal. The position of the test item and the challenge diet bowls were alternated daily.

Amount of product consumed, any unusual or significant observation including excessive bait spillage, signs of toxicity and death were recorded daily for each animal.

5.2 Reliability

1

5.3 Assessment of efficacy, data analysis and interpretation

The mean initial weight of the test animals was 173.1 g. All test animals fed consistently from the feeding bowls during the 4-day conditioning period and there was no obvious sign of a preference among the animals for one feeding bowl or another. All animals, therefore, continued into the test period.

Acceptance of the Bromadiolone paste bait was good. The mean quantity of the test item consumed by each animal during the 4-day test period was 30.0 g. A mean of 32.2 g of the challenge diet was consumed by each animal during the same period. The mean acceptance of the test item was 48.9% (S.D. 12.0%), showing that the Bromadiolone paste bait is a palatable formulation.

Mortality was total (100%) in the test group, with a mean day to death of 3.7 days (range 3 to 5 days). The mean final weight of the animals was 185.2 g.

5.4 Conclusion

The study showed that, after a storage period of 2 weeks at 54°C, Bromadiolone paste bait is palatable to CD Norway rats, with a mean palatability against ground laboratory diet of 48.9% (S.D. 12.0%). The test item also resulted in 100% mortality after a 4-day choice between this formulation and challenge diet.

According to the European Commission document (European Commission, 2008), Section 4.1 “Norms and Criteria”:

“In the bait choice feeding test the percentage of ingested bait containing the product should be normally ≥20%. When the test results in ≥90% mortality, a lower level than 20% of the total food consumption is acceptable.”

The results obtained in the choice test with the test item Bromadiolone paste bait, aged for 2 weeks, meet the required criteria.

Section B5.10.4 **Annex Point IIB5.10** **TNsG: Pt. I-B5.10, Pt. III-Ch. 6**	**Efficacy Data** Efficacy on rats, choice feeding test, aged product

The results of this test reflect field conditions as animals have unrestricted access to a well-known food.
It can be conclude that the test item Bromadiolone paste baits is palatable in the presence of a competing alternative food (standard diet)

5.5 Proposed efficacy specification

The efficacy of the test item is very good to excellent (100% mortality in 5 days).

Section B5.10.4	**Efficacy Data**
Annex Point IIB5.10	Efficacy on rats, choice feeding test, aged product
TNsG: Pt. I-B5.10, Pt. III-Ch. 6	

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	September 2012.
Materials and Methods	**2.4.1** Effect observed included palatability and mortality.
Results and discussion	The study showed that, after a storage period of 2 weeks at 54°C, Bromadiolone paste bait is palatable to Norway rats, with a mean palatability against ground laboratory diet of 48.9%. 100% mortality was observed after a 4-day choice between this formulation and challenge diet.
Conclusion	Adopt applicant's version.
Reliability	1
Acceptability	Acceptable.
Remarks	None.
	COMMENTS FROM ...
Date	*Give date of comments submitted*
Materials and Methods	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Results and discussion	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B5.10.4 **Efficacy Data**

Annex Point IIB5.10 Efficacy on rats, choice feeding test, aged product

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.2 Test organism

Criteria	Details
Species	Norway rats (*Rattus norvegicus*)
Strain	CD Norway rat
Source	Charles River UK Ltd.
Laboratory culture	Yes
Stage of life cycle and stage of stadia	Healthy non-pregnant adults
Mixed age population	No
Other specification	Body weight range of 120 to 300 g. Average initial weight of 171.6 g.
Number of organisms tested	10 animals, 5 males and 5 females
Method of cultivation	Animals were weighed and kept individually in cages with a temperature range of 18 - 24°C, a relative humidity range of 30% to 80%, with between 10 and 25 air changes per hour, and with a 12-hour light-dark cycle. They were fed with standard meal (prepared in the laboratory from cornmeal made from whole yellow ground corn (65%); ground rolled oat groats (25%); confectionary sugar (5%) and corn oil (9%), and manufactured according to the Guidelines of the US EPA (1982)) and supplied with water *ad libitum*.
Pre-treatment of test organisms before exposure	The animals were acclimatised to test conditions for 4 days.
Initial density/number of test organisms in the test system	10 animals. Each animal was individually caged

1.3 Test system

Criteria	Details
Culturing apparatus / test chamber	Rats were individually caged in purpose-built stainless steel cages measuring 38 cm * 28 cm * 22 cm. The cages were held in a rack over a plastic tray with an absorbent liner so that spillage could be collected.
Number of vessels / concentration	Two symmetrically-placed food bowls at the front of each cage
Test culture media and/or carrier material	The test bait is a paste bait containing 50 mg/kg Bromadiolone, aged for 2 weeks at 54°C, provided by the sponsor. The challenge diet, RM3 ground laboratory diet, was manufactured by Special Diets Services Ltd., Witham, Essex, CM8 3AD, UK.
Nutrient supply	Not applicable
Measuring equipment	Weighing scale (Fisherbrand DP600)

Section B5.10.4 **Efficacy Data**

Annex Point IIB5.10 Efficacy on rats, choice feeding test, aged product

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.4 Application of test substance

Criteria	Details
Application procedure	During the 4-day conditioning period, the animals had access to Standard EPA Meal from two symmetrically-placed food bowls at the front of each cage. The positions of the two food bowls were alternated daily. The amount of food consumed by each animal was determined daily to the nearest 1 g by the difference method, taking care first to recover spillage and discard contaminants as far as possible. On each day, both food bowls were weighed, replenished and re-weighed. Following any corrections for spillage, spoilage and contamination, the bowl weights were recorded on data entry forms. If a food was fouled by urine or faeces, both foods were replaced with fresh. If food, especially spillage, was damp, it was dried before weighing. During the 4-day test period the animals had access to the test item and the challenge diet and the positions of the bowls containing the two diets were alternated daily. Bowl markings indicated whether contents are a Test (T) or Control (C) diet. The procedures for provisioning and weighing the food bowls were the same as in the conditioning period. At the end of the test period the animals were maintained on laboratory diet and the amount eaten was measured during the 14-day observation period.
Delivery method	The challenge diet and test bait were placed in 2 food bowls.
Dosage rate	The contents of the food bowls were made up daily to provide an excess of the animals' daily requirement from each bowl (*i.e.* > 50 g).
Carrier	Not applicable
Concentration of liquid carrier	Not applicable
Liquid carrier control	Not applicable

Other procedures	No other relevant details.

Section B5.10.4 **Efficacy Data**

Annex Point IIB5.10 Efficacy on rats, choice feeding test, aged product

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.5 Test conditions

Criteria	Details
Substrate	Not applicable
Incubation temperature	Ambient temperature was 18-24°C
Moisture	Relative humidity range of 30 to 80%
Aeration	10 to 25 air changes per hour
Method of exposure	Oral exposure
Aging of samples	Aged test bait (54°C, 2 weeks)
Other conditions	12h light-dark cycle

Section B5.10.5 **Annex Point IIB5.10** **TNsG: Pt. I-B5.10, Pt. III-Ch. 6**	**Efficacy Data** Efficacy on mice, field test

		Official use only
	1 Reference	
1.1 Reference	Biannic M.-L., 2009, Efficacy assessment of rodenticides in natural conditions, LODI (unpublished), assay code PATE_BROMADIOLONE_50ppm_Souris, 12 May 2009	
1.2 Data protection	Yes	
1.2.1 Data owner	Lodi (see LoA)	
1.2.2 Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its authorisation.	
1.3 Guideline study	CEB Method No.002: Méthode d'essai d'efficacité pratique de raticides. J. Giban EPPO Guidelines PP 1/114(2): Efficacy evaluation of rodenticides. Field tests against synanthropic rodents	
1.4 Deviations	Yes The test was conducted regarding the CEB census baiting method which was validated for rats but not mice. Anyhow, this method can be considered suitable for any rodents.Regarding EPPO, no replicates were tested but the assessment was made in an entire building on 32 bait stations.	X
	2 Method	

Section B5.10.5 **Annex Point IIB5.10** **TNsG: Pt. I-B5.10,** **Pt. III-Ch. 6**	**Efficacy Data** Efficacy on mice, field test

2.1 Test Substance (Biocidal Product)	Bromadiolone
2.1.1 Trade name/ proposed trade name	French name: Jade Paste Belgium name: Control Pasta
2.1.2 Composition of Product tested	Paste bait containing 50 mg/kg of Bromadiolone
2.1.3 Physical state and nature	Ready to use paste bait (RB)
2.1.4 Monitoring of active substance concentration	*Not applicable*
2.1.5Method of analysis	Not applicable.
2.2 Reference substance	None
2.2.1 Method of analysis for reference substance	Not applicable
2.3 Testing procedure	
2.3.1 Test population / inoculum /test organism	Wild house mouse (*Mus musculus*). See Table 1.2
2.3.2 Test system	The test was carried out on a farm raising cows infested with *Mus musculus* (see Table 1.3).
2.3.3 Application of Test Substance	See table 1.4 When the pre-baiting consumption reached the plateau (day 25), the non-poisoned baits were replaced by the product to be tested (day 26). After the baiting period, the residual consumption was determined to be compared with the initial consumption. During the baiting period, bait stations received 300 g baits (50 mg/kg of Bromadiolone). Baits were replaced daily.
2.3.4 Test conditions	Natural conditions (see table 1.5).
2.3.5 Duration of the test / Exposure time	Duration of the whole test: 35 days The practical efficacy trial included three consecutive periods: - 1st period: determination of the consumption plateau of the initial population to measure initial daily consumption (25 days). - 2nd period: rodenticide application (6 days). - 3rd period: establishment of the consumption plateau of the surviving

population to measure residual consumption (4 days).
The comparison of the two consumption plateaus obtained experimentally before and after the rodenticide treatment enables the calculation, as a relative value, of the treatment efficacy.

2.3.6 Number of replicates performed

None (field test).

2.3.7 Controls

No control as the test is a field efficacy trial.

2.4 Examination

2.4.1 Effect investigated

Percentage of bait consumed after the control operation compared to the amount of bait consumed before the control operation as an index of population size.

2.4.2 Method for recording / scoring of the effect

Bait consumption was recorded on a daily basis and for each bait point. The bait stations were emptied of their content every day, around the same hour, and then refilled with the initial quantity of bait. Remaining uneaten baits were collected in separate bags and weighted with a laboratory balance at the laboratory.

2.4.3 Intervals of examination

Daily.

2.4.4 Statistics

The treatment efficacy, as a relative value, was calculated as follows:

$$E = \left[\frac{C_i - C_r}{C_i} \right] * 100$$

Where:

E = efficacy;

C_i = initial consumption, average consumption before the treatment (when the plateau is reached);

C_r = residual consumption, average consumption after the treatment (when the plateau is reached).

A graph showing the variation of total daily consumption (consumption in all the bait stations of the experimental site) was completed every day.

2.4.5 Post monitoring of the test organism

Post-baiting residual consumption was determined for 4 days

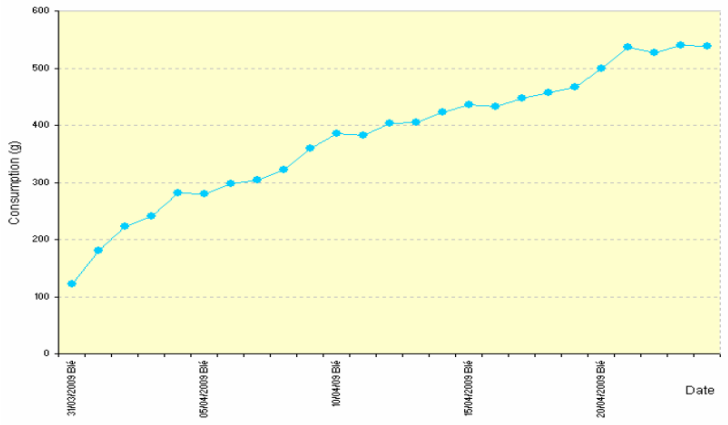
3 Results

3.1 Efficacy

Both initial consumption and residual consumption were calculated by averaging the consumption of the last three consecutive days (on the plateau). The efficacy measured was 92.99%.

Section B5.10.5	**Efficacy Data**
Annex Point IIB5.10	Efficacy on mice, field test
TNsG: Pt. I-B5.10, Pt. III-Ch. 6	

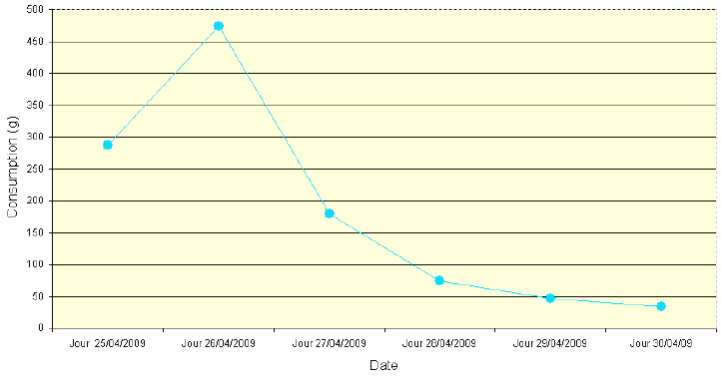
3.1.1 Dose/Efficacy curve	Not applicable
3.1.2 Begin and duration of effects	Once the total daily consumption is considered to be stabilized, as a plateau is reached for three consecutive days during the pre-baiting period, the non-poisoned baits were replaced by the product to be tested. The graph of the total daily bait consumption is given in section 3.5.
3.1.3 Observed effects in the post monitoring phase	Total daily consumption was measured for 4 days after the baiting period to assess the level of the survival rodent population, with the same methods than those employed to measure pre-treatment activity. The consumption reached a plateau (about 38 g/day) and was lower than during the pre-baiting period (about 535 g/day).
3.2 Effects against organisms or objects to be protected	No adverse effects were reported.
3.3 Other effects	Not applicable.
3.4 Efficacy of the reference substance	Not applicable.
3.5 Tabular and/or graphical presentation of the summarised results	Daily consumption during the prebaiting period (g/day):



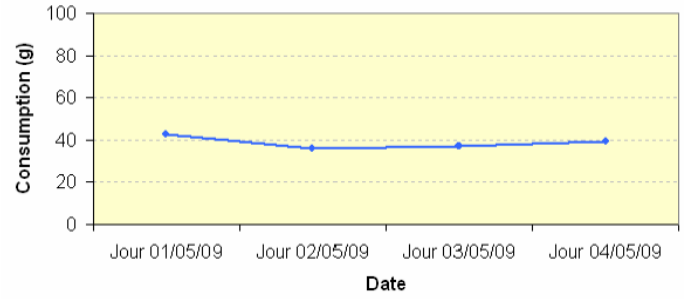
Daily consumption during the baiting phase (g/day):

Section B5.10.5
Annex Point IIB5.10
TNsG: Pt. I-B5.10, Pt. III-Ch. 6

Efficacy Data
Efficacy on mice, field test



Daily consumption during the post-baiting period (g/day):



3.6 Efficacy limiting factors

3.6.1 Occurrences of resistances Not applicable

3.6.2 Other limiting factors Not applicable

4 Relevance of the results compared to field conditions

Section B5.10.5 **Annex Point IIB5.10** **TNsG: Pt. I-B5.10,** **Pt. III-Ch. 6**	**Efficacy Data** Efficacy on mice, field test

4.1 Reasons for laboratory testing	Not applicable.
4.2 Intended actual scale of biocide application	
4.3 Relevance compared to field conditions	
4.3.1 Application method	
4.3.2 Test organism	
4.3.3 Observed effect	
4.4 Relevance for read-across	

5 Applicant's Summary and conclusion

5.1 Materials and methods	The field assay, appropriate to the geographic regions in which the product will be used, was conducted in an experimentation station infested with wild *Mus musculus* to assess under actual in-use conditions the palatability of the bait and the mortality it causes. A pre-baiting period (25 days) allowed to place bait points correctly and to determine a plateau of food consumption by the wild mice population. Rodent activity on the site before and after treatment was determined. During the baiting period, 32 bait points were used with 300 g of bait (50 mg/kg of Bromadiolone) replaced daily for 6 days. The location of the bait points and the amount of bait consumed each day were recorded. During the post-baiting period (4 days), the food consumption was recorded up to reach a plateau. The total amount of census bait consumed give an index of the population size. The level of control is expressed as a percentage reduction in the pre-treatment index.
5.2 Reliability	1
5.3 Assessment of efficacy, data analysis and interpretation	The percentage of bait consumed after the control operation compared to the amount of bait consumed before the control operation was ≤10%, satisfying the criteria proposed for a good rodenticide efficacy in the field trials
5.4 Conclusion	With an efficacy of 92.99% the field assay showed an excellent efficacy with a fast decrease of the population.
5.5 Proposed efficacy specification	Efficacy of more than 92%

Section B5.10.5	**Efficacy Data**
Annex Point IIB5.10	Efficacy on mice, field test
TNsG: Pt. I-B5.10,	
Pt. III-Ch. 6	

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	September 2012.
Materials and Methods	**1.4** Acceptable deviation.
Results and discussion	92.99% efficacy calculated from census baiting demonstrating a highly palatable and effective bait formulation effective in controlling a sizeable wild population of house mice.
Conclusion	Adopt applicant's version.
Reliability	1
Acceptability	Acceptable.
Remarks	None.
	COMMENTS FROM ...
Date	*Give date of comments submitted*
Materials and Methods	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Results and discussion	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B5.10.5 **Efficacy Data**

Annex Point IIB5.10 Efficacy on mice, field test

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.2 Test organism

Criteria	Details
Species	*Mus musculus*
Strain	Wild
Source	Not applicable
Laboratory culture	Not applicable
Stage of life cycle and stage of stadia	Not applicable
Mixed age population	Yes
Other specification	None
Number of organisms tested	About 152, estimated by pre-treatment bait census
Method of cultivation	Not applicable
Pre-treatment of test organisms before exposure	The rodents were fed with grain baits (non-poisoned cereals) with negligible variations of weight due to the desiccation or hygrometry. Bait were placed in bait stations from which uneaten bait can be collected. The map of the site indicating the location of bait points is provided. Baits were placed where mice are regularly seen by the owner of the farm, where the owner of the farm use to put rodenticides and where these products are consumed, where mice have been recently seen, where mice are liable to walk away. Baits are also placed between the nests and their food location, as near as possible to the nests. At Day 9, some bait points were removed if the consumption was two weak. On the contrary, the bait points showing a too high consumption have been duplicated.
Initial density/number of test organisms in the test system	The initial consumption calculated as the average of the consumption of the last three days of the pre-baiting period is 535.2 g/day.

	The average consumption per mice is estimated to be 3.5 g/day (ESD for biocides used as rodenticides). Therefore, the number of mice with a continuous supply of non-poisoned baits could be estimated ≥ 152 mice.

Section B5.10.5 **Efficacy Data**

Annex Point IIB5.10 Efficacy on mice, field test

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.3 Test system

Criteria	Details
Culturing apparatus / test chamber	The test was carried out in a farm raising cows in France (La Boutratais, F-35390 Grand Fougeray). The station map and the locations of the bait points on the plan are provided. The owner of the farm told that the last treatment dated from the summer 2008.
Number of vessels / concentration	Not applicable
Test culture media and/or carrier material	The Bromadiolone-based paste baits are ready-to-use. Paste baits were placed in bait stations.
Nutrient supply	During the baiting period, the non-poisoned baits were replaced by the rodenticide. The bait stations were refilled with a quantity of rodenticide equal to the bait quantity initially placed into the bait stations.
Measuring equipment	The uneaten baits were collected in separate bags and the weighing was carried out at the laboratory, using a laboratory balance.

Section B5.10.5 **Efficacy Data**

Annex Point IIB5.10 Efficacy on mice, field test

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.4 Application of test substance

Criteria	Details
Application procedure	During the baiting period, bait stations were refilled with a quantity of rodenticide equal to the non-poisoned bait quantity placed during the pre-baiting period. In the same way as during the pre-baiting period, the bait stations were emptied of their contents every day, around the same hour (± 1h), then refilled with the initial quantity of rodenticide. The uneaten rodenticides of each bait station were collected in separate bags. The weighing was carried out at the laboratory. The baiting period lasted for 6 days.
Delivery method	During the baiting period, 300 g of bait (50 mg/kg of Bromadiolone)
Dosage rate	The bait stations received 300 g of bait each and are emptied then refilled every day.
Carrier	None (ready-to-use product)
Concentration of liquid carrier	Not applicable
Liquid carrier control	Not applicable
Other procedures	Not relevant.

Section B5.10.5 **Efficacy Data**

Annex Point IIB5.10 Efficacy on mice, field test

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.5 Test conditions

Criteria	Details
Substrate	Not applicable
Incubation temperature	Not applicable
Moisture	Natural conditions
Aeration	Natural conditions
Method of exposure	The baits are placed in feeding trays (bait stations).
Aging of samples	No
Other conditions	Natural conditions

Section B5.10.6	**Efficacy Data**
Annex Point IIB5.10	Efficacy on rats, field test
TNsG: Pt. I-B5.10,	
Pt. III-Ch. 6	

			Official use only
	3	**1Reference**	
1.1 Reference	Biannic M.-L., 2009, Efficacy assessment of rodenticides in natural conditions, LODI (unpublished), assay code PATE_BROMADIOLONE_50ppm_RAT, 19 April 2009		
1.2 Data protection	Yes		
1.2.1 Data owner	Lodi (see LoA)		
1.2.2 Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its authorisation.		
1.3 Guideline study	CEB Method No.002: Méthode d'essai d'efficacité pratique de raticides. J. Giban EPPO Guidelines PP 1/114(2): Efficacy evaluation of rodenticides. Field tests against synanthropic rodents		
1.4 Deviations	Yes The test was conducted regarding the CEB census baiting method. The initial consumption plateau is lower than the recommended 5 000 g/day and the initial quantity of bait by bait point is lower than 500 g.		X
	4	**2Method**	

Section B5.10.6	**Efficacy Data**
Annex Point IIB5.10	Efficacy on rats, field test
TNsG: Pt. I-B5.10,	
Pt. III-Ch. 6	

2.1 Test Substance (Biocidal Product)	Bromadiolone
2.1.1 Trade name/ proposed trade name	French name: Jade Paste Belgium name: Control Pasta
2.1.2 Composition of Product tested	Paste bait containing 50 mg/kg of Bromadiolone
2.1.3 Physical state and nature	Ready to use paste bait (RB)
2.1.4 Monitoring of active substance concentration	Not applicable
2.1.5 Method of analysis	Not applicable.
2.2 Reference substance	None
2.2.1 Method of analysis for reference substance	Not applicable
2.3 Testing procedure	
2.3.1 Test population / inoculum / test organism	Wild Norway Rats (*Rattus norvegicus*). See Table 1.2
2.3.2 Test system	The test was carried out on a farm raising cows infested with *Rattus norvegicus*(see Table 1.3).
2.3.3 Application of Test Substance	See table 1.4 When the pre-baiting consumption reached the plateau (day 18), the non-poisoned baits were replaced by the product to be tested (day 19). After the baiting period, the residual consumption was determined to be compared with the initial consumption. During the baiting period, bait stations received 300 g baits (50 mg/kg of Bromadiolone). Baits were replaced daily.

Section B5.10.6	**Efficacy Data**
Annex Point IIB5.10	Efficacy on rats, field test
TNsG: Pt. I-B5.10,	
Pt. III-Ch. 6	

2.3.4 Test conditions	Natural conditions (see table 1.5).
2.3.5 Duration of the test / Exposure time	Duration of the whole test: 28 days The practical efficacy trial included three consecutive periods: - 1st period: determination of the consumption plateau of the initial population to measure initial daily consumption (18 days). - 2nd period: rodenticide application (5 days). - 3rd period: establishment of the consumption plateau of the surviving population to measure residual consumption (5 days). The comparison of the two consumption plateaus obtained experimentally before and after the rodenticide treatment enables the calculation, as a relative value, of the treatment efficacy.
2.3.6 Number of replicates performed	None (field test).
2.3.7 Controls	No control as the test is a field efficacy trial.
2.4 Examination	
2.4.1 Effect investigated	Percentage of bait consumed after the control operation compared to the amount of bait consumed before the control operation as an index of population size.
2.4.2 Method for recording / scoring of the effect	Bait consumption was recorded on daily basis and for each bait point. The bait stations were emptied of their content every day, around the same hour, and then refilled with the initial quantity of bait. Remaining uneaten baits were collected in separate bags and weighted with a laboratory balance at the laboratory.
2.4.3 Intervals of examination	Daily.
2.4.4 Statistics	The treatment efficacy, as a relative value, was calculated as follows: $E = \left[\frac{C_i - C_r}{C_i} \right] * 100$ Where: E = efficacy;

Section B5.10.6	**Efficacy Data**
Annex Point IIB5.10	Efficacy on rats, field test
TNsG: Pt. I-B5.10,	
Pt. III-Ch. 6	

	C_i = initial consumption, average consumption before the treatment (when the plateau is reached); C_r = residual consumption, average consumption after the treatment (when the plateau is reached). A graph showing the variation of total daily consumption (consumption in all the bait stations of the experimental site) was completed every day.
2.4.5 Post monitoring of the test organism	Post-baiting residual consumption was determined for 5 days
	5 3Results
3.1 Efficacy	Both initial consumption and residual consumption were calculated by averaging the consumption of the last three consecutive days (on the plateau). The efficacy measured was 93.2%.
3.1.1 Dose/Efficacy curve	Not applicable
3.1.2 Begin and duration of effects	Once the total daily consumption is considered to be stabilized, as a plateau is reached for three consecutive days during the pre-baiting period, the non-poisoned baits were replaced by the product to be tested. The graph of the total daily bait consumption is given in section 3.5.
3.1.3 Observed effects in the post monitoring phase	Total daily consumption was measured for 5 days after the baiting period to assess the level of the survival rodent population, with the same methods than those employed to measure pre-treatment activity. The consumption reached a plateau (about 97 g/day) and was lower than during the pre-baiting period (about 1 428 g/day).
3.2 Effects against organisms or objects to be protected	No adverse effects were reported.
3.3 Other effects	Not applicable.
3.4 Efficacy of the reference substance	Not applicable.

Section B5.10.6

Annex Point IIB5.10

TNsG: Pt. I-B5.10,

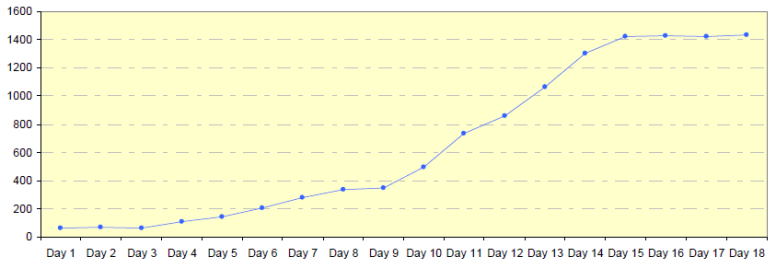
Pt. III-Ch. 6

Efficacy Data

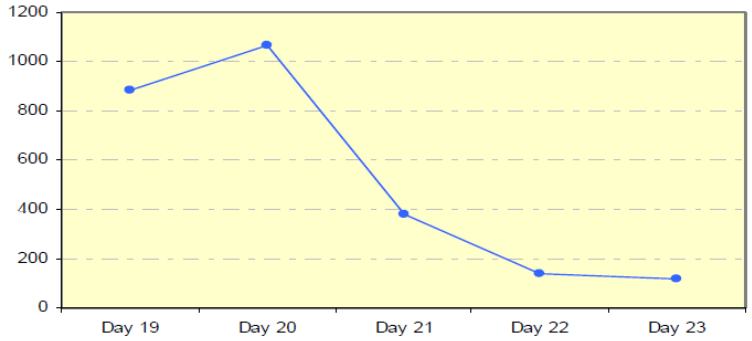
Efficacy on rats, field test

3.5 Tabular and/or graphical presentation of the summarised results

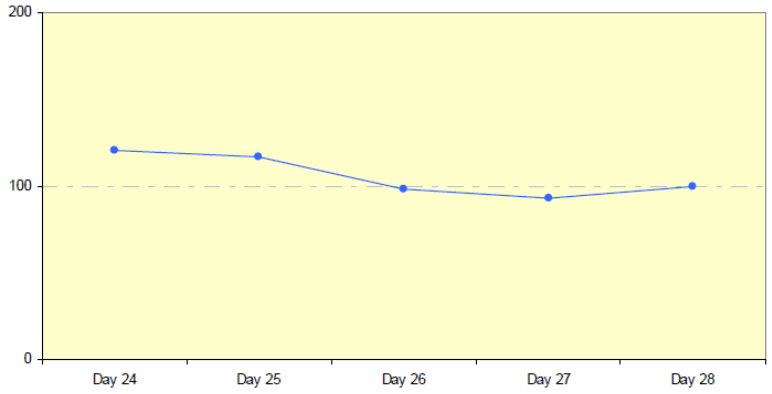
Daily consumption during the prebaiting period (g/day):



Daily consumption during the baiting phase (g/day):



Daily consumption during the post-baiting period (g/day):



3.6 Efficacy limiting factors

3.6.1 Occurrences of resistances

Not applicable

3.6.2 Other limiting factors

Not applicable

Section B5.10.6	**Efficacy Data**
Annex Point IIB5.10	Efficacy on rats, field test
TNsG: Pt. I-B5.10,	
Pt. III-Ch. 6	

4 Relevance of the results compared to field conditions

4.1 Reasons for laboratory testing	Not applicable.
4.2 Intended actual scale of biocide application	
4.3 Relevance compared to field conditions	
4.3.1 Application method	
4.3.2 Test organism	
4.3.3 Observed effect	
4.4 Relevance for read-across	

5 Applicant's Summary and conclusion

Section B5.10.6	**Efficacy Data**
Annex Point IIB5.10	Efficacy on rats, field test
TNsG: Pt. I-B5.10,	
Pt. III-Ch. 6	

5.1 Materials and methods	The field assay, appropriate to the geographic regions in which the product will be used, was conducted in an experimentation station infested with wild *Rattus norvegicus* to assess under actual in-use conditions the palatability of the bait and the mortality it causes. A pre-baiting period (18 days) allowed to place bait points correctly and to determine a plateau of food consumption by the wild mice population. During the baiting period, 21 bait points were used with 300 g of bait (50 mg/kg of Bromadiolone) replaced daily for 5 days. The location of the bait points and the amount of bait consumed each day were recorded. During the post-baiting period (5 days), the food consumption was recorded up to reach a plateau. The total amount of census bait consumed give an index of the population size. The level of control is expressed as a percentage reduction in the pre-treatment index.
5.2 Reliability	1
5.3 Assessment of efficacy, data analysis and interpretation	The percentage of bait consumed after the control operation compared to the amount of bait consumed before the control operation was ≤10%, satisfying the criteria proposed for a good rodenticide efficacy in the field trials
5.4 Conclusion	With an efficacy of 93.2% the field assay showed an excellent efficacy with a fast decrease of the population.
5.5 Proposed efficacy specification	Efficacy of more than 93%

Section B5.10.6 **Efficacy Data**

Annex Point IIB5.10 Efficacy on rats, field test

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	September 2012.
Materials and Methods	**1.4** Acceptable deviation
Results and discussion	93.2% reduction in wild *Rattus norvegicus* population confirming the paste formulation as being both a palatable and effective bait under field conditions.
Conclusion	Adopt applicant's version.
Reliability	1
Acceptability	Acceptable.
Remarks	None.
	COMMENTS FROM ...
Date	*Give date of comments submitted*
Materials and Methods	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Results and discussion	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B5.10.6 **Efficacy Data**

Annex Point IIB5.10 Efficacy on rats, field test

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.2 Test organism

Criteria	Details
Species	*Rattus norvegicus*
Strain	Wild
Source	Not applicable
Laboratory culture	Not applicable
Stage of life cycle and stage of stadia	Not applicable
Mixed age population	Yes
Other specification	None
Number of organisms tested	About 57, estimated by pre-treatment bait census
Method of cultivation	Not applicable
Pre-treatment of test organisms before exposure	The rodents were fed with grain baits (non-poisoned cereals) with negligible variations of weight due to the desiccation or hygrometry. Baits were placed in bait stations from which uneaten bait can be collected. The map of the site indicating the location of bait points is provided. Baits were placed where rats are regularly seen by the owner of the farm, where the owner of the farm use to put rodenticides and where these products are consumed, where rats have been recently seen, where rats are liable to walk away. Baits are also placed between the nests and their food location, as near as possible to the nests.
Initial density/number of test organisms in the test system	The initial consumption calculated as the average of the consumption of the last three days of the pre-baiting period is 1427.8 g/day. The average consumption per rat is estimated to be 25 g/day (ESD for biocides used as rodenticides). Therefore, the number of rats with a continuous supply of non-poisoned baits could

	be estimated ≥ 57 rats.

Section B5.10.6 **Efficacy Data**

Annex Point IIB5.10 Efficacy on rats, field test

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.3 Test system

Criteria	Details
Culturing apparatus / test chamber	The test was carried out in a farm raising cows in France (la Dère, F-35390 Grand Fougeray). The station map and the locations of the bait points are provided. The owner of the farm told that the last treatment dated from the summer 2008.
Number of vessels / concentration	Not applicable
Test culture media and/or carrier material	The Bromadiolone-based paste baits are ready-to-used. Paste baits were placed in bait stations.
Nutrient supply	During the baiting period, the non-poisoned baits were replaced by the rodenticide. The bait stations were refilled with a quantity of rodenticide equal to the bait quantity initially placed into the bait stations.
Measuring equipment	The uneaten baits were collected in separate bags and the weighing was carried out at the laboratory, using a laboratory balance.

Section B5.10.6 **Efficacy Data**

Annex Point IIB5.10 Efficacy on rats, field test

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.4 Application of test substance

Criteria	Details
Application procedure	During the baiting period, bait stations were refilled with a quantity of rodenticide equal to the non-poisoned bait quantity placed during the pre-baiting period. In the same way as during the pre-baiting period, the bait stations were emptied of their contents every day, around the same hour (± 1h), then refilled with the initial quantity of rodenticide. The uneaten rodenticides of each bait station were collected in separate bags. The weighing was carried out at the laboratory. The baiting period lasted for 5 days.
Delivery method	During the baiting period, 300 g of bait (50 mg/kg of Bromadiolone) were placed into receptacles (bait stations).
Dosage rate	The bait stations received 300 g of bait each and were emptied and then refilled every day.
Carrier	Not applicable
Concentration of liquid carrier	Not applicable
Liquid carrier control	Not applicable
Other procedures	No other relevant details.

Section B5.10.6 **Efficacy Data**

Annex Point IIB5.10 Efficacy on rats, field test

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.5 Test conditions

Criteria	Details
Substrate	Not applicable
Incubation temperature	Not applicable
Moisture	Natural conditions
Aeration	Natural conditions
Method of exposure	The baits are placed in feeding trays (bait stations)
Aging of samples	No
Other conditions	Natural conditions

Section B5.10.7 **Efficacy Data**
Annex Point IIB5.10 Efficacy on black rats, field test
TNsG: Pt. I-B5.10, Pt. III-Ch. 6

		Official use only
	1 REFERENCE	
1.1 Reference	Feys J.L., 2012, Efficacy assessment of Bromadiolone paste baits "CONTROL PASTA" against *Rattus rattus* (unpublished), Study BROMA002, 10/07/2012.	
1.2 Data protection	Yes	
1.2.1 Data owner	Belgagri	
1.2.2 Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its authorisation.	
1.3 Guideline study	TNsG on Product Evaluation, Appendices to Chapter 7, Product Type 14, Efficacy Evaluation of Rodenticidal Biocidal Products. February 2009.	
1.4 Deviations	No.	
	2 METHOD	
2.1 Test Substance (Biocidal Product)	Bromadiolone	
2.1.1 Trade name/ proposed trade name	French name: Jade Paste Belgium name: Control Pasta	
2.1.2 Composition of Product tested	Paste bait containing 0.005% (w/w) of Bromadiolone (50 mg/kg). Batch number: BRM0412, production date: April 2012, expiration date: April 2014.	
2.1.3 Physical state and nature	Ready-to-use green paste bait.	

Section B5.10.7	**Efficacy Data**
Annex Point IIB5.10	Efficacy on black rats, field test
TNsG: Pt. I-B5.10, Pt. III-Ch. 6	

2.1.4 Monitoring of active substance concentration	No.
2.1.5 Method of analysis	Not applicable.
2.2 Reference substance	None.
2.2.1 Method of analysis for reference substance	Not applicable.
2.3 Testing procedure	
2.3.1 Test population / inoculum /test organism	Wild black rats or roof rats (*Rattus rattus*). See Table 1.2.
2.3.2 Test system	The test was carried out in a pig stable in a farm newly infested with *Rattus rattus.* The test included four consecutive periods: - a pre-baiting period, with non-treated placebo paste bait in the bait points. - a baiting period, with the test product Control Pasta in the bait points. - a lag period, with non-treated placebo paste bait - a post-baiting period, with non-treated placebo bait The pre- and post-baiting periods lasted for one week. The baiting period lasted for two weeks, followed by a 7 days lag period with placebo, to let the rat population stabilize without any further poisoning. During the whole test period, the baits were weighted daily. See Table 1.3.

Section B5.10.7	**Efficacy Data**
Annex Point IIB5.10	Efficacy on black rats, field test
TNsG: Pt. I-B5.10, Pt. III-Ch. 6	

2.3.3 Application of Test Substance	After 7 days of pre-baiting, the placebo baits were replaced by the test product Control Pasta. For each bait station, 9 to 10 sachets of 10-11 g each were weighted and attached together by a steel wire (to avoid moving by the rats). Translucent jars were put in the roof insulation, at the side and in the neighbourhood of the windows. The bait was placed in these jars and can easily be monitored, visually and by weight. Ten bait points were chosen, in boxes were rat activity was noticeable. The baits were renewed each time the paste was almost all eaten or too dirty. See Table 1.4.
2.3.4 Test conditions	Natural conditions. See Table 1.5.
2.3.5 Duration of the test / Exposure time	Duration of the whole test: 35 days / Exposure time: 14 days.
2.3.6 Number of replicates performed	Baits were placed in 10 bait points in the stable.
2.3.7 Controls	No control as the test is a field efficacy trial.
2.4 Examination	
2.4.1 Effect investigated	Daily uptake of bait during the different periods of the test. The comparison of the consumption of bait before and after the baiting period is an index of the reduction of the population. Dead rats discovered were also counted.
2.4.2 Method for recording / scoring of the effect	Bait consumption was recorded daily and for each bait point. The bait stations were refilled when necessary (paste almost all eaten or too dirty). This occurred once during the pre-baiting period and twice during the baiting period.
2.4.3 Intervals of examination	Daily.

2.4.4 Statistics

The treatment efficacy, as a relative value, was calculated as follows:

$$E = \left[\frac{C_i - C_f}{C_i} \right] * 100$$

where:
E = efficacy
Ci = consumption before treatment (total for 10 bait points and 7 days)
Cf = consumption after treatment (total for 10 bait points and 7 days)

2.4.5 Post monitoring of the test organism

None.

3 RESULTS

3.1 Efficacy

During the pre-baiting period, the total consumption was 1 313 g of bait. During the post-baiting period, the total consumption was 79 g. The calculated efficacy was thus 93.98%.

During the pre-baiting period, the total daily uptake was comprised between 161 and 215 g. During the first week of the beating period, it remained similar, between 164 and 224 g. It then decreased during the second week of baiting to 33 g on the last day. During the lag period, the total daily uptake varied between 6 and 21 g, and it was comprised between 6 and 16 g during the post-baiting period.

The first dead rat was discovered on the 7th day of the baiting period. A total of 9 dead rats were discovered during the trial (baiting period and lag period).

3.1.1 Dose/Efficacy curve

Not applicable.

Section B5.10.7	**Efficacy Data**
Annex Point IIB5.10	Efficacy on black rats, field test
TNsG: Pt. I-B5.10, Pt. III-Ch. 6	

3.1.2 Begin and duration of effects

The first dead rat was found on the 7th day of the baiting period and the consumption of the test product began to decrease on the 10th day. One can expect that the effect of the treated bait began about one week after application.

3.1.3 Observed effects in the post monitoring phase

Not applicable.

3.2 Effects against organisms or objects to be protected

No adverse effects were reported.

3.3 Other effects

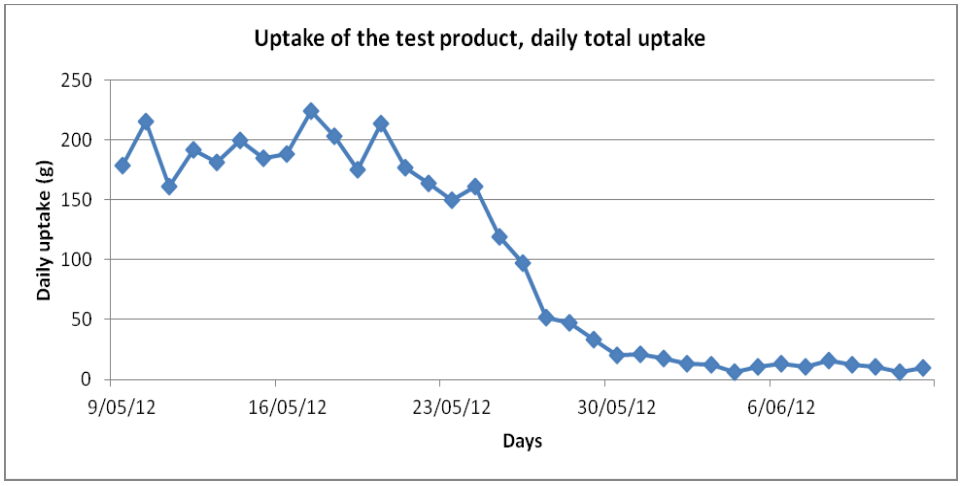
Not applicable.

3.4 Efficacy of the reference substance

Not applicable.

3.5 Tabular and/or graphical presentation of the summarised results

Evolution of the daily total uptake of bait during the whole trial period (10 baits). Placebo during one week, then 2 weeks of Control Pasta and in the end 2 weeks of placebo.



3.6 Efficacy limiting factors

Section B5.10.7	**Efficacy Data**
Annex Point IIB5.10	Efficacy on black rats, field test
TNsG: Pt. I-B5.10,	
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3.6.1 Occurrences of resistances	Not applicable
3.6.2 Other limiting factors	Not applicable

4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS

4.1 Reasons for laboratory testing	Not applicable.
4.2 Intended actual scale of biocide application	
4.3 Relevance compared to field conditions	
4.3.1 Application method	
4.3.2 Test organism	
4.3.3 Observed effect	
4.4 Relevance for read-across	

5 APPLICANT'S SUMMARY AND CONCLUSION

5.1 Materials and methods	The field test was conducted in natural conditions, in a pig stable of a farm with newly installed roof rats (*Rattus rattus).* It was conducted to assess the uptake of Control Pasta and its effect on the population under actual in-use conditions. Baits were placed in translucent jars put in the roof insulation, at

	the side and in the neighbourhood of the windows, for a total of 10 bait points. Each bait station received 9 to 10 sachets of 10 - 11 g each, attached together by a steel wire. During the concerned periods, around 100 g of placebo bait were placed in each bait station. The daily uptake was recorded during the 4 periods of the test (pre-baiting with placebo, baiting with test product, lag and post-baiting with placebo). Baits were renewed when necessary. Efficacy was expressed as the percentage of reduction of the consumption of placebo bait, before and after the Control Paste application.
5.2 Reliability	1.
5.3 Assessment of efficacy, data analysis and interpretation	During the pre-baiting period, the total consumption was 1 313 g of bait. During the post-baiting period, the total consumption was 79 g. The calculated efficacy was thus 93.98%. There were some rats remaining, as there was still some bait consumption at the end of the post-baiting period.
5.4 Conclusion	The conclusion is that Control Pasta is well taken by *Rattus rattus* (black rats or roof rats) and a significant part of the population was exterminated after the two weeks treatment. According to the TNsG (TNsG on Product Evaluation, Appendices to Chapter 7, Product Type 14, Efficacy Evaluation of Rodenticidal Biocidal Products), rodenticides are considered to be efficacious if they satisfy 3 criteria, among which "In the 'field' trial or the 'semi-field' trial the percentage of bait consumed after the control operation compared to the amount of bait consumed before the control operation should normally be ≤10%". This criterion is fulfilled.
5.5 Proposed efficacy specification	According to the result obtained, it can be considered that the efficacy of the product Control Pasta is excellent.

Section B5.10.7	**Efficacy Data**
Annex Point IIB5.10	Efficacy on black rats, field test
TNsG: Pt. I-B5.10,	
Pt. III-Ch. 6	

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	September 2012.
Materials and Methods	Applicant's version ecceptable.
Results and discussion	The calculated efficacy was 93.98% based on census consumption levels indicating a highly palatable and effective bait formulation.
Conclusion	Adopt applicant's version.
Reliability	1
Acceptability	Acceptable.
Remarks	None.
	COMMENTS FROM ...
Date	*Give date of comments submitted*
Materials and Methods	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Results and discussion	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B5.10.7 **Efficacy Data**

Annex Point IIB5.10 Efficacy on black rats, field test

TNsG: Pt. I-B5.10,

Pt. III-Ch. 6

1.2 Test organism

Criteria	Details
Species	*Rattus rattus* (black rat or roof rat)
Strain	Wild
Source	Not applicable
Laboratory culture	Not applicable
Stage of life cycle and stage of stadia	Not applicable
Mixed age population	Yes
Other specification	None
Number of organisms tested	Not applicable. The presence of rats was confirmed by observation at night of roof rats coming out of the gaps between the outer and inner wall which have openings at each window and are connected with the roof insulation.
Method of cultivation	Not applicable
Pre-treatment of test organisms before exposure	Before exposure to the Bromadiolone containing baits, placebo baits were proposed to the rats. Placebo baits are non-treated paste. About 100 g were put in each jar, and renewed when necessary (once during the 7 days period).
Initial density/number of test organisms in the test system	Not evaluated

1.3 Test system

Criteria	Details
Culturing apparatus / test chamber	The test was carried out in a farm raising pigs in Belgium (B 1360, Perwez). The station map and the location of the bait points are provided. This was clearly a new attack. The farmer had never have a problem before with roof rats and he had tried some rodenticides, but only in very small quantity and applied on the wrong places. None of these products were taken or even touched by the roof rats, so one can state the problem had no antecedents.
Number of vessels / concentration	Not applicable
Test culture media and/or carrier material	The Bromadiolone-based paste baits were ready-to-use. They were placed in translucent jars as bait stations.
Nutrient supply	During the baiting period, the placebo baits were replaced by the Bromadiolone-based past baits. The bait stations were refilled with a quantity of paste equal to the initial placebo bait quantity.
Measuring equipment	Weighing scale

Section B5.10.7 **Efficacy Data**

Annex Point IIB5.10 Efficacy on black rats, field test

TNsG: Pt. I-B5.10,

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1.4 Application of test substance

Criteria	Details
Application procedure	At the beginning of the baiting period (2012/05/15), each bait point received about 100 g of Control Pasta (9 to 10 sachets of 10 - 11 g each). The baits were renewed twice in the 10 bait stations (2012/05/12 and 2012/05/22.
Delivery method	Nine to 10 sachets of Control Pasta, of 10 - 11 g each, were put in each translucent jar.
Dosage rate	Each bait points received about 100 g of bait at the beginning of the baiting period, but they were not refilled every day.
Carrier	None (ready-to-use product)
Concentration of liquid carrier	Not applicable
Liquid carrier control	Not applicable
Other procedures	No other relevant details

1.5 Test conditions

Criteria	Details
Substrate	Not applicable
Incubation temperature	Not applicable
Moisture	Natural conditions
Aeration	Natural conditions
Method of exposure	The baits were placed in translucent jars (bait stations).
Aging of samples	No
Other conditions	Natural conditions

Toxicology

Section B6.1.1	**Acute Toxicity**
Annex Point IIIB 6.1	Acute oral toxicity in the rat
	Limit test

1 Reference

1.1 Reference	[redacted] 2011a, Bromadiolone Paste Bait, Evaluation of acute oral toxicity in rats, Acute toxic class method, [redacted] Study No.TAO423-PH-11/0018.
1.2 Data protection	Yes
1.2.1 Data owner	BIO6 SA
1.2.2 Letter of access	Yes
1.2.3 Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its authorisation.

2 Guidelines and Quality Assurance

2.1 Guideline study	Yes, the following guidelines were used: OECD No.423 (2001) Test method B.1tris Council Regulation No.440/2008.
2.2 GLP	Yes
2.3 Deviations	No

3 MATERIALS AND MethodS

Section B6.1.1	**Acute Toxicity**
Annex Point IIIB 6.1	Acute oral toxicity in the rat Limit test
3.1 Test material	Bromadiolone paste bait
3.1.1Lot/Batch number	RB201101 broma
3.1.2 Specification	Refer to Document IIIB.3
3.1.3 Description	Green paste
3.1.4 Purity	52.67 mg/kg
3.1.5 Stability	This product is stable after storage for 2 weeks at 54°C, so is supposed to be stable in the test conditions.
3.2 Test Animals	
3.2.1 Species	Rat
3.2.2 Strain	Sprague-Dawley (SPF Caw)
3.2.3 Source	[redacted]
3.2.4 Sex	Female
3.2.5 Age/weight at study initiation	8-week old in weight range of 180 to 208 g
3.2.6 Number of animals per group	Group treated: 3 female rats (step 1) 3 female rats (step 2)
3.2.7 Control animals	No
3.3 Administration/ Exposure	Oral/using a suitable syringe graduated fitted with an oesophageal metal canula

Section B6.1.1	**Acute Toxicity**
Annex Point IIIB 6.1	Acute oral toxicity in the rat
	Limit test
3.3.1 Post exposure period	14 days
3.3.2 Type	Gavage
3.3.3 Concentration	2 000 mg/kg b.w.
3.3.4 Vehicle	Distilled water
3.3.5 Concentration in vehicle	-
3.3.6 Total volume applied	10 mL/kg b.w.
3.3.7 Controls	Every day for 14 days for symptoms and mortality and on day D0, D2, D7 and D14 for the body weight.
3.4 Examinations	Mortality, clinical observations, body weight evolution and macroscopical examinations (necropsy).
3.5 Method of determination of LD_{50}	LD_{50} was not determined as only one dose level was investigated (limit test).
3.6 Further remarks	None

4 Results and Discussion

Section B6.1.1	**Acute Toxicity**
Annex Point IIIB 6.1	Acute oral toxicity in the rat Limit test
4.1 Clinical signs	No mortality occurred during the study. No clinical signs related to the administration of the test item were observed. The body weight evolution of the animals remained normal throughout the study.
4.2 Pathology	The macroscopical examination of the animals at the end of the study did not reveal treatment-related changes.
4.3 Other	-
4.4 LD_{50}	No mortality occurred during the study. The LD_{50} was not determined. However under the conditions of the study, the LD_{50} was estimated to be higher than 2 000 mg/kg body weight by oral route for females.

5 Applicant's Summary and conclusion

5.1 Materials and methods	The test item Bromadiolone Paste Bait was administered to a group of 6 female Sprague Dawley rats at the single dose of 2 000 mg/kg body weight. The experimental protocol was established on the basis of the official method as defined in the O.E.C.D. guideline No.423 (2001) and the test method B.1tris of the Council Regulation No.440/2008.
5.2 Results and discussion	No mortality occurred during the study. No clinical signs related to the administration of the test item were observed. The body weight evolution of the animals remained normal throughout the study. The macroscopical examination of the animals at the end of the study did not reveal treatment-related changes.
5.3 Conclusion	In conclusion, the LD_{50} of the test item Bromadiolone Paste Bait

Section B6.1.1	**Acute Toxicity**
Annex Point IIIB 6.1	Acute oral toxicity in the rat Limit test
	is higher than 2 000 mg/kg body weight by oral route in the rat. In accordance with the OECD guideline No.423, the LD_{50} cut-off of the test item may be considered as 5 000 mg/kg body weight by oral route in the rat. According to the criteria for classification, packaging and labelling of dangerous substances and preparations in accordance with the European Directives 67/548/EEC, 1999/45/EC and 2001/59/EC the test item Bromadiolone Paste Bait must not be classified. No symbol or risk phrase is required. In accordance with the Globally Harmonized System (Regulation (EC) No.1272/2008), the test item must not be classified. No signal word or hazard statement is required.
5.3.1 Reliability	1
5.3.2 Deficiencies	No

Evaluation by Competent Authorities
Use separate "evaluation boxes" to provide transparency as to the comments and views submitted

Section B6.1.1	**Acute Toxicity**
Annex Point IIIB 6.1	Acute oral toxicity in the rat
	Limit test

	Evaluation by Rapporteur Member State
Date	20 September 2012
Materials and Methods	Applicants version is acceptable.
Results and discussion	Adopt applicant's version.
Conclusion	Other conclusions: None
Reliability	1
Acceptability	Acceptable
Remarks	

	Comments from ...
Date	*Give date of comments submitted*
Materials and Methods	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Results and discussion	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B6.1.2	**Acute Toxicity**
Annex Point IIIB 6.1	Acute dermal toxicity in the rat Limit test

	1 Reference
1.1 Reference	[redacted] 2011b, Bromadiolone Paste Bait, Evaluation of acute dermal toxicity in rats, [redacted] Study No.TAD-PH-11/0018.
1.2 Data protection	Yes
1.2.1 Data owner	BIO6 SA
1.2.2 Letter of access	Yes
1.2.3 Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its authorisation.
	2 Guidelines and Quality Assurance
2.1 Guideline study	Yes, the following guidelines were used: OECD No.402 (1987) Test method B.3 Council Regulation No.440/2008
2.2 GLP	Yes
2.3 Deviations	No
	3 MATERIALS AND MethodS

Section B6.1.2	**Acute Toxicity**
Annex Point IIIB 6.1	Acute dermal toxicity in the rat Limit test
3.1 Test material	Bromadiolone Paste Bait
3.1.1 Lot/Batch number	RB201101 broma
3.1.2 Specification	Refer to Document IIIB.3
3.1.3 Description	Green block
3.1.4 Purity	52.67 mg/kg
3.1.5 Stability	This product is stable after storage for 2 weeks at 54°C, so is supposed to be stable in the test conditions.
3.2 Test Animals	
3.2.1 Species	Rat
3.2.2 Strain	Sprague Dawley (SPF Caw)
3.2.3 Source	[redacted]
3.2.4 Sex	Male and female
3.2.5 Age/weight at study initiation	Males: 7-week old in weight range of 235 to 244 g Females: 8-week old in weight range of 206 to 222 g
3.2.6 Number of animals per group	Group treated: 5 male rats and 5 female rats
3.2.7 Control animals	No
3.3 Administration/ Exposure	Dermal / Approximately 24 hours before the treatment, fur was removed from the dorsal area of the trunk of the test animals by clipping.
3.3.1 Post exposure period	14 days
3.3.2 Area covered	10% of body surface
3.3.3 Occlusion	Topical application under porous gauze dressing
3.3.4 Vehicle	Distilled water
3.3.5 Concentration in vehicle	-

Section B6.1.2	**Acute Toxicity**
Annex Point IIIB 6.1	Acute dermal toxicity in the rat Limit test
3.3.6 Total volume applied	10 mL/kg b.w.
3.3.7 Duration of exposure	24 h
3.3.8 Removal of test substance	Rinsed with distilled water
3.3.9 Controls	Every day for 14 days for symptoms and mortality and on day D0, D2, D7 and D14 for the body weight.
3.4 Examinations	Mortality, clinical observations, body weight evolution and macroscopical examinations (necropsy).
3.5 Method of determination of LD_{50}	LD_{50} was not determined as only one dose level was investigated (limit test).
3.6 Further remarks	None

Section B6.1.2	**Acute Toxicity**
Annex Point IIIB 6.1	Acute dermal toxicity in the rat
	Limit test

4 Results and Discussion

4.1 Clinical signs	No mortality occurred during the study. Neither cutaneous reactions nor systemic clinical signs related to the administration of the test item were observed. A green coloration was observed on the treated areas in all animals (10/10), 24 hours after the test item application. The body weight evolution of the animals remained normal throughout the study.
4.2 Pathology	The macroscopical examination of the animals at the end of the study did not reveal treatment-related changes.
4.3 Other	-
4.4 LD_{50}	No mortality occurred during the study. The LD_{50} was not determined. However under the conditions of the study, the LD_{50} males and females was estimated to be higher than 2 000 mg/kg body weight by dermal route.

2.1 5 Applicant's Summary and conclusion

5.1 Materials and methods	The test item Bromadiolone Paste Bait was applied onto the intact skin of 10 Sprague Dawley rats (5 males and 5 females) at the single dose of 2 000 mg/kg body weight. The experimental protocol was established on the basis of the official method as defined in the O.E.C.D. guideline No.402 (1987) and the test method B.3 of the Council Regulation No.440/2008.
5.2 Results and discussion	No mortality occurred during the study. Neither cutaneous reactions nor systemic clinical signs related to the administration of the test item were observed. A green coloration was observed on the treated areas in all animals (10/10), 24 hours after the test item application. The body weight evolution of the animals remained normal throughout the study. The macroscopical examination of the animals at the end of the study did not reveal treatment-related changes.
5.3 Conclusion	In conclusion, the LD_{50} of the test item Bromadiolone Paste Bait is higher than 2 000 mg/kg body weight by dermal route in the rat. According to the criteria for classification, packaging and labelling of dangerous substances and preparations in accordance with the European Directives 67/548/EEC, 1999/45/EC and 2001/59/EC, the test item Bromadiolone Paste Bait must not be classified. No symbol or risk phrase is required. In accordance with the Globally Harmonized System (Regulation (EC) No.1272/2008), the test item must not be classified. No

Section B6.1.2	**Acute Toxicity**
Annex Point IIIB 6.1	Acute dermal toxicity in the rat
	Limit test
	signal word or hazard statement is required.
5.3.1 Reliability	1
5.3.2 Deficiencies	No

Section B6.1.2	**Acute Toxicity**
Annex Point IIIB 6.1	Acute dermal toxicity in the rat Limit test

Evaluation by Competent Authorities
Use separate "evaluation boxes" to provide transparency as to the comments and views submitted

Section B6.1.2	**Acute Toxicity**
Annex Point IIIB 6.1	Acute dermal toxicity in the rat Limit test

	Evaluation by Rapporteur Member State
Date	20 September 2012
Materials and Methods	Applicants version is acceptable.
Results and discussion	Adopt applicant's version.
Conclusion	Other conclusions: None
Reliability	1
Acceptability	Acceptable
Remarks	

	Comments from ...
Date	*Give date of comments submitted*
Materials and Methods	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Results and discussion	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*

Section B6.1.2	**Acute Toxicity**
Annex Point IIIB 6.1	Acute dermal toxicity in the rat
	Limit test

Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B6.1.3
Annex point IIIB 6.3 **Acute inhalation**

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ] **Limited exposure [X]**	**Technically not feasible [ ]** **Scientifically unjustified [X]** **Other justification [ ]**	
Detailed justification:	Considering TNsG recommendations, for studies 6.1.1 to 6.1.3 biocidal products other than gases shall be administered *via* at least two routes, one of which should be the oral route. The choice of the second route will depend upon the nature of the product and the likely route of human exposure. The preparation is neither a gas, nor a powder. The application method does not generate aerosol, particles or droplets in an inhalable size range (MMAD < 50 µm). The active substance bromadiolone have a low vapour pressure ($2.13*10^{-8}$ Pa at 25°C). Therefore, it can be considered that inhalatory exposure is not a relevant route of human exposure. Moreover this complies with Council Directive 86/609/EEC, in order to avoid inacceptable use of vertebrates.	
Undertaking of intended data submission [ ]	–	
	Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	*Give date of action*	
Evaluation of applicant's justification	*Discuss applicant's justification and, if applicable, deviating view*	
Conclusion	*Indicate whether applicant's justification is acceptable or not. If unacceptable because of the reasons discussed above, indicate which action will be required, e.g. submission of specific test/study data*	
Remarks		
	COMMENTS FROM OTHER MEMBER STATE *(specify)*	
Date	*Give date of comments submitted*	

Section B6.1.3
Annex point IIIB 6.3 **Acute inhalation**

Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B6.1.4
Annex point IIB VI 6.4

For biocidal products that are intended to be authorised for use with other biocidal products, the mixture of products, where possible, shall be tested for acute dermal toxicity and skin and eye irritation, as appropriate

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ] **Limited exposure [...]**	**Technically not feasible [ ]** **Scientifically unjustified [...]** **Other justification [X]**	
Detailed justification:	The product is not intended to be used mixed with other biocidal products. Therefore, no study was conducted on a mixture.	
Undertaking of intended data submission [ ]	–	
	Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	*Give date of action*	
Evaluation of applicant's justification	*Discuss applicant's justification and, if applicable, deviating view*	
Conclusion	*Indicate whether applicant's justification is acceptable or not. If unacceptable because of the reasons discussed above, indicate which action will be required, e.g. submission of specific test/study data*	
Remarks		
	COMMENTS FROM OTHER MEMBER STATE *(specify)*	
Date	*Give date of comments submitted*	
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*	
Conclusion	*Discuss if deviating from view of rapporteur member state*	
Remarks		

Section B6.2 **Acute Dermal Irritation**
Annex Point IIIB6.2

		Official use only
	1 Reference	
1.1 Reference	[redacted] 2011c, Bromadiolone Paste Bait, Assessment of acute dermal irritation, [redacted] Study No.IC-OCDE-PH-11/0018.	
1.2 Data protection	Yes	
1.2.1 Data owner	BIO6 SA	
1.2.2 Letter of access	Yes	
1.2.3 Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its authorisation.	
	2 Guidelines and Quality Assurance	
2.1 Guideline study	Yes, the following guidelines were used: OECD No.404 (2002) Test method B.4 Council Regulation No.440/2008.	
2.2 GLP	Yes	
2.3 Deviations	No	
	3 MATERIALS AND MethodS	

Section B6.2 **Acute Dermal Irritation**
Annex Point IIIB6.2

3.1 Test material	Bromadiolone Paste Bait
3.1.1 Lot/Batch number	RB201101 broma
3.1.2 Specification	Refer to Document IIIB.3
3.2.2.1 Description	Green paste
3.2.2.2 Purity	52.67 mg/kg
3.2.2.3 Stability	This product is stable after storage for 2 weeks at 54°C, so is supposed to be stable in the test conditions.
3.2 Test Animals	
3.2.1 Species	Rabbit
3.2.2 Strain	Albino New Zealand
3.2.3 Source	[redacted]
3.2.4 Sex	Female
3.2.5 Age/weight at study initiation	11 or 12 weeks old in weight range of 2.37 to 2.88 kg.
3.2.6 Number of animals per group	Three
3.2.7 Control animals	No, but the other flank of the animal was served as a control.
3.3 Administration/ Exposure	Dermal
3.3.1 Application	
Preparation of test substance	The test item was applied as supplied.
3.3.2 Test site and Preparation of Test Site	Approximately 24 hours before the test, the rabbit's back and flanks were shorn using electric clippers equipped with a fine comb, so as to expose an area of skin about 6 cm^2 per patch.

3.3.2 Occlusion	Semi-occlusive dressing
3.3.3 Vehicle	None
3.3.4 Concentration in vehicle	/
3.3.5 Total volume applied	0.5 g
3.3.6 Removal of test substance	Rinsed with distilled water
3.3.7 Duration of exposure	4 h
3.3.8 Post-exposure period	14 days if necessary
3.3.9 Controls	Untreated area
3.4 Examinations	
3.4.1 Clinical signs	No
3.4.2 Dermal examination	Yes, this examination consisted in assessing the irritant reactions in the treated zone, compared to a control area.
3.4.2.1 Scoring system	Grading scales: Erythema and Eschar formation **- 0:** No erythema **- 1:** Very slight erythema (barely perceptible) **- 2:** Well defined erythema **- 3:** Moderate to severe erythema **- 4:** Severe erythema (beef redness) with eschars formation preventing grading of erythema Oedema **- 0:** No oedema **- 1:** Very slight oedema (barely perceptible) **- 2:** Slight oedema (contour clearly defined) **- 3:** Moderate oedema (raised approx. 1mm) **- 4:** Severe oedema (raised more than 1mm, and extending beyond area of exposure)
3.4.2.2 Examination time points	1h, 24h, 48h, 72h after removal of the patch. As no reaction was observed 72 hours after the treatment, the study was terminated.
3.4.3 Other examinations	/

3.5 Further remarks /

4 Results and Discussion

4.1 Average score No cutaneous reaction (erythema and oedema) were observed whatever the examination time (1, 24, 48 and 72 hours).

4.1.1 Erythema For the three animals, the average score (24, 48 and 72h) was 0.0.

4.1.2 Oedema For the three animals, the average score (24, 48 and 72h) was 0.0.

4.2 Reversibility Not concerned

4.3 Other examinations /

4.4 Overall result Under the conditions of the study, the test item is considered to be not irritating to rabbit skin.
Overall result is given in Table B4.4-1 below:

Table B4.4-1: Table for skin irritation study

	Individual indice (after removal of the patch)							
	Erythema				Œdema			
Animals	**24 h**	**48 h**	**72 h**	**Mean**	**24 h**	**48 h**	**72 h**	**Mean**
1	0	0	0	**0.0**	0	0	0	**0.0**
2	0	0	0	**0.0**	0	0	0	**0.0**
3	0	0	0	**0.0**	0	0	0	**0.0**

5 Applicant's Summary and conclusion

5.1 Materials and methods

The test item Bromadiolone Paste Bait was applied, as supplied, at a dose of 0.5 g, under semi-occlusive dressing during 4 hours on an undamaged skin area of 3 female rabbits. The experimental protocol was established from the OECD guideline No.404 (2002) and the test method B.4 of the Council Regulation No.440/2008.

5.2 Results and discussion

No cutaneous reaction (erythema and oedema) were observed whatever the examination time (1, 24, 48 and 72 hours).

5.3 Conclusion

The results obtained, under these experimental conditions, enable to conclude that the test item **Bromadiolone Paste Bait must not be classified,** according to the criteria for classification, packaging and labelling of dangerous substances and preparations in compliance with the European Directives 1967/548/EEC, 1999/45/EC and 2001/59/EC. No symbol or risk phrase is required.

In accordance with the Globally Harmonized System (Regulation (EC) No.1272/2008), the test item **must not be classified**. No signal word or hazard statement is required.

5.3.1 Reliability

1

5.3.2 Deficiencies

No

Section B6.2 **Acute Dermal Irritation**

Annex Point IIIB6.2

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted

Section B6.2 **Acute Dermal Irritation**

Annex Point IIIB6.2

	Evaluation by Rapporteur Member State
Date	20 September 2012
Materials and Methods	Applicants version is acceptable.
Results and discussion	Adopt applicant's version.
Conclusion	Other conclusions: None
Reliability	1
Acceptability	Acceptable
Remarks	

	Comments from ...
Date	*Give date of comments submitted*
Materials and Methods	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Results and discussion	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*

Section B6.2 **Acute Dermal Irritation**

Annex Point IIIB6.2

Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section 6.2 **Acute Eye Irritation**

Annex Point IIIB6.2

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1 Reference

1.1 Reference	[redacted] 2011d, Bromadiolone Paste Bait, Assessment of acute eye irritation, [redacted] Study No.IO-OCDE-PH-11/0018.
1.2 Data protection	Yes
1.2.1 Data owner	BIO6 SA
1.2.2 Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its authorisation.

2 Guidelines and Quality Assurance

Section 6.2 **Acute Eye Irritation**

Annex Point IIIB6.2

2.1	***Guideline study***	Yes, the following guidelines were used: OECD No.405 (2002) Test method B.5 Council regulation No.440/2008
2.2	***GLP***	Yes
2.3	***Deviations***	No

3 MATERIALS AND MethodS

3.1 Test material	Bromadiolone Paste Bait
3.1.1 Lot/Batch number	RB201101 broma
3.1.2 Specification	Refer to Document III-B.3
3.1.2.1 Description	Green block
3.1.2.2 Purity	52.67 mg/kg
3.1.2.3 Stability	This product is stable after storage for 2 weeks at 54°C, so is supposed to be stable in the test conditions.
3.2 Test Animals	
3.2.1 Species	Rabbit
3.2.2 Strain	Albino New Zealand
3.2.3 Source	[redacted]
3.2.4 Sex	Female
3.2.5 Age/weight at study initiation	11 or 12 weeks old in weight range of 2.24 to 2.59 kg during the test.
3.2.6 Number of animals per group	Three
3.2.7 Control animals	No, but the other eye of the animal was served as a control.
3.3 Administration/ Exposure	Ocular instillation

Section 6.2 **Acute Eye Irritation**

Annex Point IIIB6.2

3.3.1 Preparation of test substance	The test item was applied as supplied.
3.3.2 Amount of active substance instilled	0.1 g
3.3.3 Exposure period	0.1 g of the test item was instilled, as supplied, into the conjunctival sac of one eye after gently pulling the lower lid away from the eyeball. The lids were then gently held together for about one second in order to prevent loss of the test item. The other eye remained untreated serving as control.
3.3.4 Post-exposure period	21 days if necessary
3.4 Examinations	
3.4.1 Ophthalmoscopic examination	Ocular examinations were performed on both right and left eyes 1 hour, 24, 48 and 72 hours following treatment, according to the scoring system below. As persistent reactions were observed 72 hours after instillation, additional observations have been carried out from D4 in order to determine the reversible character of the lesions observed.

3.4.1.1 Scoring system

Eye examinations are carried out using the scale of lesion scores in the following order:

CHEMOSIS (A)
- **0:** No swelling
- **1:** Slight swelling, including the nictitating membrane
- **2:** Swelling with eversion of the eyelid
- **3:** Swelling with eyelid half-closed
- **4:** Swelling with eyelid more than half-closed

DISCHARGE (B)
- **0:** No discharge
- **1:** Slight discharge (normal slight secretions in the inner corner not to be taken into account)
- **2:** Discharge with moistening of the eyelids and neighbouring hairs
- **3:** Discharge with moistening of the eyelids and large areas around the eye

REDNESS (C)
- **0:** Blood vessels normal
- **1:** Vessels significantly more prominent than normal

Vessels individually distinguishable with difficulty:
- **2:** Generalised red coloration
- **3:** Generalised deep red coloration

IRIS (D)
- **0:** Normal
- **1:** Iris significantly more wrinkled than normal, congestion, swelling of the iris which continues to react to light, even slowly
- **2:** No reaction to light, haemorrhage, significant damage (any or all of these characteristics)

CORNEA: DEGREE OF OPACITY (E)
- **0:** No modification visible either directly or after instillation of fluorescein (no loss of glint or polish)
- **1:** Translucent areas (diffuse or disseminated), iris details clearly visible
- **2:** Easily identifiable translucent area, iris details slightly obscured
- **3:** Opalescent area, no iris details visible, pupil outline scarcely distinguishable
- **4:** Total corneal opacity, completely obscuring the iris and pupil

CORNEA: EXTENT OF OPACITY (F)
- **1:** Opaque area present but covering one quarter or less
- **2:** Between one quarter and half
- **3:** Between half and three quarters
- **4:** Between three quarters and the entire surface

3.4.1.2 Examination time points

1h, 24h, 48h, 72h, Day 4

3.4.2 Other investigations

/

3.5 Further remarks

4 Results and Discussion

4.1 Clinical signs

The ocular conjunctivae reactions observed during the study have been slight to moderate and totally reversible: a slight to moderate redness noted 1 hour after the test item instillation and totally reversible between days 2 and 4, associated with a slight to moderate chemosis noted 1 hour after the test item instillation and totally reversible between days 1 and 3.

4.2 Average score

4.2.1 Cornea

For the three animals, the average score (24, 48 and 72h) was 0.0.

4.2.2 Iris

For the three animals, the average score (24, 48 and 72h) was 0.0.

4.2.3 Conjunctivae

4.2.3.1 Redness

For one animal, the average score (24, 48 and 72h) was 0.3.
For one animal, the average score (24, 48 and 72h) was 1.3.
For one animal, the average score (24, 48 and 72h) was 1.0.

4.2.3.2 Chemosis

For two animals, the average score (24, 48 and 72h) was 0.0.
For one animal, the average score (24, 48 and 72h) was 1.0.

4.3 Reversibility

The ocular reactions observed during the study have been totally reversible.

4.4 Other

/

4.5 Overall result

Under the condition of the study, the test item is considered to be not irritating to rabbit eyes.
Overall result is given in Table B4.5-1 below:

Section 6.2 **Acute Eye Irritation**

Annex Point IIIB6.2

Table B4.5-1: Results of eye irritation study

	Cornea			Iris			Conjunctivae					
							Redness			Chemosis		
Time/Animal	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
24 hours	0	0	0	0	0	0	1	2	2	0	2	0
48 hours	0	0	0	0	0	0	0	1	1	0	1	0
72 hours	0	0	0	0	0	0	0	1	0	0	0	0
Mean individual scores 24, 48 and 72 h	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.3**	**1.3**	**1.0**	**0.0**	**1.0**	**0.0**

Section 6.2 **Acute Eye Irritation**

Annex Point IIIB6.2

5 Applicant's Summary and conclusion

5.1	***Materials and methods***	The test item Bromadiolone Paste Bait was instilled, as supplied, into the eye of 3 New Zealand rabbits at the dose of 0.1 g. The experimental protocol was established on the basis of the official method as defined in the OECD guideline No.405 (2002) and the test method B.5 of the Council Regulation No.440/2008.
5.2	***Results and discussion***	The ocular conjunctivae reactions observed during the study have been slight to moderate and totally reversible: a slight to moderate redness noted 1 hour after the test item instillation and totally reversible between days 2 and 4, associated with a slight to moderate chemosis noted 1 hour after the test item instillation and totally reversible between days 1 and 3.
5.3	***Conclusion***	In conclusion, the results obtained, under these experimental conditions, enable to conclude that the test item **Bromadiolone Paste Bait must not be classified,** according to the criteria for the classification, packaging and labelling of dangerous substances in compliance with the European Directives 67/548/EEC, 1999/45/EC and 2001/59/EC. No symbol or risk phrase is required. In accordance with the Globally Harmonized System (Regulation (EC) No.1272/2008), the test item **must not be classified**. No signal word or hazard statement is required.
5.3.1	**Reliability**	1
5.3.2	**Deficiencies**	No

Section 6.2 **Acute Eye Irritation**

Annex Point IIIB6.2

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted

	Evaluation by Rapporteur Member State
Date	20 September 2012
Materials and Methods	Applicants version is acceptable.
Results and discussion	Adopt applicant's version.
Conclusion	Other conclusions: None
Reliability	1
Acceptability	Acceptable
Remarks	

	Comments from ...
Date	*Give date of comments submitted*
Materials and Methods	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Results and discussion	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B6.3	**Skin sensitisation**
Annex Point IIIB6.3	Magnusson and Kligman (M&K)

		Reference
1.1	***Reference***	[redacted] Bromadiolone Paste Bait Assessment of Sensitising properties on albino guinea pigs, Maximisation test according to Magnusson and Kligman, [redacted] Study No.SMK-PH-11/0018
1.2	***Data protection***	Yes
1.2.1	**Data owner**	BIO6 SA
1.2.2	**Letter of access**	Yes
1.2.3	**Criteria for data protection**	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its authorisation.
		2 Guidelines and Quality Assurance
2.1	***Guideline study***	Yes, the following guidelines were used: OECD No.406 (1992) Test Method B.6 Council Regulation No.440/2008
2.2	***GLP***	Yes
2.3	***Deviations***	No
		3 MATERIALS AND MethodS

Section B6.3	**Skin sensitisation**
Annex Point IIIB6.3	Magnusson and Kligman (M&K)

	Bromadiolone Paste Bait
3.1 Test material	
	RB201101 broma
3.1.1 Lot/Batch number	
	Refer to Document IIIB.3
3.1.2 Specification	
Description	Green paste
Purity	52.67 mg/kg
Stability	This product is stable after storage for 2 weeks at 54°C, so is supposed to be stable in the test conditions.
Preparation of test substance for application	The test item was used as supplied in the study: no correction factor taken into account the purity was used for the preparations.
Pretest performed on irritant effects	- Maximum Non Necrotizing Concentration (M.N.N.C.) determination: injection of 0.1 mL of the test item by intradermal route to 2 animals at 7 concentrations, 100% and diluted at 50%, 25%, 12.5%, 6.25%, 3.125% and 1.56% in isotonic sodium chloride. - Pre-Maximum Non Irritant Concentration (Pre -M.N.I.C.) determination: application of the test item under an occlusive dressing during 24 hours to 2 female guinea pigs, at 4 concentrations, diluted at 80%, 40%, 20% and 10% in distilled water. - Maximum Non Irritant Concentration (M.N.I.C.) determination: 3 animals are treated according to the same treatment as animals from Group 1 (negative control) for the induction phase (i.e. isotonic sodium chloride and distilled water). During the challenge phase, the animals were treated with the test item for a period of 24 hours at 4 concentrations, diluted at 80%, 40%, 20% and 10% in distilled water.
3.2 Test Animals	
	Albino guinea pigs
3.2.1 Species	

3.2.2 Strain	Dunkin-Hartley
3.2.3 Source	[redacted]
3.2.4 Sex	Female
3.2.5 Age/weight at study initiation	4-week old in weight range of 236 to 278 g
3.2.6 Number of animals per group	7 animals in preliminary studies 5 animals in negative control group (Group 1) 11 animals in treated group (Group 2)
3.2.7 Control animals	Yes
3.3 Administration/ Exposure	Intradermal/Topical
3.3.1 Induction schedule	Day 0: first intradermal induction Day 6: second topical induction Day 7: topical application under occlusive dressing Day 9: occlusive dressing removal
3.3.2 Way of Induction	Intra-dermal and topical with occlusion
3.3.3 Concentrations used for induction	Test item at 50% in isotonic sodium chloride for indradermal injection (D0) Test item at 80% for topical application (D7)
3.3.4 Concentration Freunds Complete Adjuvant (FCA)	50% in isotonic sodium chloride
3.3.5 Challenge schedule	Day 20
3.3.6 Concentrations used for challenge	The test item has been used diluted at 80% and at 40% in distilled water.
3.3.7 Rechallenge	No

3.3.8 Scoring schedule	The sensitization level of the test item was determined according to the following scale (readings at 24 and 48 hours): Erythema **- 0 :** No visible modification - **1 :** Slight or patches of erythema **- 2 :** Moderate confluent erythema **- 3 :** Internal erythema and swelling Oedema **- 0 :** No visible modification **- 1 :** Slight oedema - **2 :** Moderate oedema - **3 :** Important oedema
3.3.9 Removal of the test substance	Occlusive dressing removal and rinse with distilled water.
3.3.10 Positive control substance	α-hexylcinnamaldehyde The results of routine positive control study with α-hexylcinnamaldehyde are shown in Appendix 2 of the study report.
3.4 Examinations	Prior to the test, the animals were kept for a minimum acclimatization period of 5 days, under stabling and nutritional conditions identical to those of the test. Before the experimentation process, they were identified individually by marking with picric acid and a tattoo placed on their ear. The animals were weighed at the beginning and at the end of the study.
3.4.1 Pilot study	Yes
3.5 Further remarks	

4 Results and Discussion

4.1 Results of pilot studies

Three preliminary studies were conducted:

- Maximal Non Necrotizing Concentration (MNNC) determination: Slight necrosis was observed in one animal (1/2) at the concentration of 100%. Moderate erythema was noted in one animal at 100% (1/2) and in the two animals at 50% (2/2). The first induction of the Group 2 has been carried out by intradermal injection at the same concentration of 50%.

- Pre-Maximal Non Irritant Concentration (Pre MNIC) determination: 24 hours after the removal of the occlusive dressings, no cutaneous reaction was noted, whatever the concentration administered. In view of these results, the concentration selected was 80% for the second induction of the treated group (Group 2) and the MNIC determination began at the concentration of 80%.

- Maximal Non Irritant Concentration (MNIC) determination: 24 hours after the removal of the occlusive dressings, no cutaneous reaction was noted, whatever the concentration administered. In view of these results, the concentrations selected were 80% and 40% for the challenge phase.

4.2 Results of test

4.2.1 Induction phase

No cutaneous reaction was recorded after the first (D0) and the second (D7) induction phases in groups 1 and 2.

It was noted a dryness in four animals (4/11, Group 2) and two animals (2/5, Group 1), 24 hours after the removal of the occlusive dressing during the 2nd induction phase and a green coloration of the treatment site in height animals (8/11, Group 2).

4.2.2 phase	***Challenge***	No macroscopic cutaneous reactions were recorded during the examination following the removal of the occlusive dressing (challenge phase) from the animal of the treated group with the test item at 80% or 40%. Only a depilation was noted in two animals treated at 80% at 24 hours after the removal of the occlusive dressing. No cutaneous intolerance reaction was recorded in animals from the negative control group after the challenge phase, on the treated area with the test item at 80% or 40%.
4.2.3 evolution	***Weight***	No abnormality was recorded in the body weight gain of both groups.
4.2.4	***Mortality***	No mortality was registered during the main test.
4.3 result	***Overall***	In view of these results, under these experimental conditions, the test item Bromadiolone Paste Bait is not considered as a skin sensitizer.

Section B6.3	**Skin sensitisation**
Annex Point IIIB6.3	Magnusson and Kligman (M&K)

5 Applicant's Summary and conclusion

5.1Results and discussion

The aim of the study was to evaluate the possible allergenic activity of the test item after intradermal and topical administration in guinea pigs.
After induction (intradermic injection at 50% and topical application at 80%) of 11 Guinea Pigs of treated group with the test item Bromadiolone Paste Bait and a 10-day rest phase, the challenge phase, under occlusive dressing for 24 hours, consisted to a single topical application of the test item diluted at 80% and at 40% in distilled water. The experimental protocol was established according the OECD guideline No.406 (1992) and the test method B.6 of the Council Regulation No.440/2008.
No macroscopic cutaneous reactions was recorded during the examination following the removal of the occlusive dressing (challenge phase) from the animal of the treated group with the test item at 80% or 40%. Only a depilation was noted in two animals treated at 80% at 24 hours after the removal of the occlusive dressing.
No cutaneous intolerance reaction was recorded in animals from the negative control group after the challenge phase, on the treated area with the test item at 80% or 40%.

5.2 Conclusion

In conclusion, in view of these results, under these experimental conditions, the test item **Bromadiolone Paste Bait must not be classified as a skin sensitizer**, in accordance with the criteria for classification, packaging and labelling of dangerous substances and preparations of the EuropeanDirectives 67/548/EEC, 1999/45/EC, 2001/59/EC. No symbol or warning label is required.
In accordance with the Globally Harmonized System (Regulation (EC) No.1272/2008), the test item **must not be classified in category 1**. No signal word or hazard statement is required.

5.2.1 Reliability

1

5.2.2 Deficiencies

No

Section B6.3	**Skin sensitisation**
Annex Point IIIB6.3	Magnusson and Kligman (M&K)

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted

	Evaluation by Rapporteur Member State
Date	20 September 2012
Materials and Methods	Applicants version is acceptable.
Results and discussion	Adopt applicant's version.
Conclusion	Other conclusions: None
Reliability	1
Acceptability	Acceptable
Remarks	

	Comments from ...
Date	*Give date of comments submitted*
Materials and Methods	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Results and discussion	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B6.4 **Percutaneous absorption**
Annex Point IIIB6.4

5

JUSTIFICATION FOR NON-SUBMISSION OF DATA

Other existing data [X] **Limited exposure [ ]**	**Technically not feasible [ ] Scientifically unjustified [ ]** **Other justification [ ]**	
Detailed justification:	No dermal absorption study was performed with Jade Paste. Based on an *in vitro* study of formulated active (bait: saline incorporated bromadiolone 0.00255 w/w) and a representative wax block formulation (0.005% w/w), a value of 0.36% was obtained by the Bromadiolone Task Force (see List of endpoints in the Assessment Report of the Bromadiolone Task Force (May 2008, revised December 2010) and Letter of Access from Pelgar). This value can be extrapolated to Jade Paste (lard formulation) as it is a greasy formulation like the representative formulation and is used for the risk assessment.	
Undertaking of intended data submission [ ]	–	

Section B6.4 **Percutaneous absorption**

Annex Point IIIB6.4

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted

	Evaluation by Rapporteur Member State
Date	20 September 2012
Materials and Methods	Applicants version is acceptable.
Results and discussion	Adopt applicant's version.
Conclusion	Other conclusions: None
Reliability	Not Applicable
Acceptability	Acceptable
Remarks	

	Comments from ...
Date	*Give date of comments submitted*
Materials and Methods	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Results and discussion	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B6.5 **Annex Point IIB VI 6.5**	**Available toxicological data relating to toxicologically relevant non-active substances (i.e. substances of concern)** Denatonium Benzoate

1 Acute toxicity

Section B6.5 **Annex Point IIB VI 6.5**	**Available toxicological data relating to toxicologically relevant non-active substances (i.e. substances of concern)** Denatonium Benzoate

1.1 Type of test	Acute oral toxicity test on rat
1.1.1 Reference	SDS Bitrex in propylene glycol 25%, Macfarlan, January 2010
1.1.2 Summary and conclusion	LD_{50} (oral, rat) = 749 mg/kg b.w.
1.2 Type of test	Acute oral toxicity test on rat
1.2.1 Reference	DAR_Vol1_public_Denatonium benzoate, List of endpoints, August 2008
1.2.2 Summary and conclusion	LD_{50} (oral, rat) = 648 mg/kg b.w. (female), 841 mg/kg b.w. (male)
1.3 Type of test	Acute dermal toxicity test on rat
1.3.1 Reference	SDS Bitrex in propylene glycol 25%, Macfarlan, January 2010 DAR_Vol1_public_Denatonium benzoate, List of endpoints, August 2008
1.3.2 Summary and conclusion	LD_{50} (oral, rat) > 2000 mg/kg b.w.
1.4 Type of test	Acute inhalation test on rat
1.4.1 Reference	SDS Bitrex in propylene glycol 25%, Macfarlan, January 2010 DAR_Vol1_public_Denatonium benzoate, List of endpoints, August 2008
1.4.2 Summary and conclusion	LC_{50} (4h, inhalation, rat) = 0.2 mg/L
1.5 Type of test	Acute irritation test on rabbit skin
1.5.1 Reference	SDS Bitrex in propylene glycol 25%, Macfarlan, January 2010

Section B6.5
Annex Point IIB VI 6.5

Available toxicological data relating to toxicologically relevant non-active substances (i.e. substances of concern)
Denatonium Benzoate

1.5.2 Summary and conclusion	Corrosive
	2 Skin sensitisation in animal and/or human skin
2.1 Type of test	Sensitization test on Guinea pig
2.1.1 Reference	SDS Bitrex in propylene glycol 25%, Macfarlan, January 2010 DAR_Vol1_public_Denatonium benzoate, List of endpoints, August 2008
2.1.2 Summary and conclusion	Not sensitizing
	3 Dermal absorption
3.1 Type of test	No data available
3.1.1 Reference	-
3.1.2 Summary and conclusion	-
	4 Genotoxicity

Section B6.5 **Annex Point IIB VI 6.5**	**Available toxicological data relating to toxicologically relevant non-active substances (i.e. substances of concern)** Denatonium Benzoate

4.1 Type of test	No details available on the type of test.
4.1.1 Reference	DAR_Vol1_public_Denatonium benzoate, List of endpoints, August 2008
4.1.2 Summary and conclusion	Apparently not genotoxic

5 Short term repeated dose toxicity

5.1 Type of test	No data available
5.1.1 Reference	-
5.1.2 Summary and conclusion	-

6 Long term repeated dose toxicity incl. carcinogenicity

6.1 Type of test	No details available on the type of test.
6.1.1 Reference	SDS Bitrex in propylene glycol 25%, Macfarlan, January 2010 DAR_Vol1_public_Denatonium benzoate, August 2008
6.1.2 Summary and conclusion	Apparently not carcinogenic

7 Reproduction toxicity

7.1 Type of test	No details available on the type of test.
7.1.1 Reference	SDS Bitrex in propylene glycol 25%, Macfarlan, January 2010
7.1.2 Summary and conclusion	May cause adverse reproductive effects

8 Human medical data and epidemiological data

Section B6.5 **Annex Point IIB VI 6.5**	**Available toxicological data relating to toxicologically relevant non-active substances (i.e. substances of concern)** Denatonium Benzoate

8.1 Type of data	Medical data
8.1.1 Reference	DAR_Vol1_public_Denatonium benzoate, List of endpoints, August 2008
8.1.2 Summary and conclusion	Some slight effects in the skin of subjects tested at concentration lower than the recommended dose for the use of the product.

9 Other relevant toxicity data

9.1 Type of test	No data available
9.1.1 Reference	
9.1.2 Summary and conclusion	

Evaluation by Competent Authorities
Use separate "evaluation boxes" to provide transparency as to the comments and views submitted

Section B6.5	**Available toxicological data relating to toxicologically relevant non-active substances (i.e. substances of concern)**
Annex Point IIB VI 6.5	Denatonium Benzoate

	Evaluation by Rapporteur Member State
Date	*30/08/2012*
Comments on applicant's data	*Acceptable*
Conclusion	Applicants version accepted.
Acceptability	Information acceptable
Remarks	*N/A*
	Comments from ...
Date	*Give date of comments submitted*
Comments on applicant's data	*For additional comments referring to the (sub)heading numbers. Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B6.5

Annex Point IIB VI 6.5

Available toxicological data relating to toxicologically relevant non-active substances (i.e. substances of concern)

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	**Official use only**
Other existing data [...] **Limited exposure [ ]**	**Technically not feasible [ ] Scientifically unjustified [ ]** **Other justification [X]**	
Detailed justification:	In the formulated product, Jade Paste, containing 0.005% bromadiolone, there is no co-formulant of toxicological concern. The formulants with a toxicological classification are: 1- Benzoate denatonium (CAS No.3734-33-6) which data are provided in Document IIIB6.5.1. 2- Sorbic acid (CAS 110-44-1) which has the following classification: - Xi, irritant - R 36/37: Irritating to eyes and respiratory system 3- BHT or 2,6-di-tert-butyl-p-cresol (CAS 128-37-0) which has the following classification: - Xn: harmful - R 22: harmful if swallowed. - Xi, irritant - R 36/38: Irritating to eyes and skin Due to their very low concentrations (respectively 0.02% for sorbic acid and 0.15% for BHT), it can be concluded that these formulants have no influence on the toxicity of the formulated product what is confirmed by the toxicological properties assessed in the acute toxicological studies with the Jade Paste formulation (Doc III-B6.1 to IIIB6.3). No further study was deemed necessary.	

Undertaking of intended data submission	**[ ]**

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	Evaluation by Rapporteur Member State
Date	*30/08/2012*
Comments on applicant's data	*Acceptable*
Conclusion	Accept applicants version
Acceptability	Information acceptable
Remarks	*N/A*
	Comments from ...
Date	*Give date of comments submitted*
Comments on applicant's data	*For additional comments referring to the (sub)heading numbers. Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B6.6 **Information related to the exposure of the biocidal product**

Annex Point IIB VI.6.6

JUSTIFICATION FOR NON-SUBMISSION OF DATA

Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [ ]**	
Limited exposure [ ]	**Other justification [X]**	
Detailed justification:	No study is available for the exposure of Jade Paste. Therefore, the default data from the TNsG on Human exposure will be used in the risk assessments for Human exposure.	
Undertaking of intended data submission [ ]	–	

Section B6.6 **Information related to the exposure of the biocidal product**

Annex Point IIB VI.6.6

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted

Section B6.6 **Information related to the exposure of the biocidal product**

Annex Point IIB VI.6.6

	Evaluation by Rapporteur Member State
Date	*30/08/12*
Materials and Methods	*N/A*
Results and discussion	*N/A*
Conclusion	*Adopt applicant's version*
Reliability	*N/A*
Acceptability	acceptable
Remarks	*N/A*

	Comments from ...
Date	*Give date of comments submitted*
Materials and Methods	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Results and discussion	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*

Section B6.6 **Information related to the exposure of the biocidal product**

Annex Point IIB VI.6.6

Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B6.7 **Further human health related studies**

Annex Point IIB VI.6.7

6.7.1 Food and feeding stuff studies

6.7.1.1 If residues of the biocidal product remain on feedingstuffs for a significant period of time, then feeding and metabolism studies in livestock shall be required to permit evaluation of residues in food of animal origin

JUSTIFICATION FOR NON-SUBMISSION OF DATA

Other existing data [ ]	**Technically not feasible [ ]**	**Scientifically unjustified [ ]**
Limited exposure [X]	**Other justification [X]**	

Section B6.7 **Further human health related studies**

Annex Point IIB VI.6.7

Detailed justification:	The product is not intended to be used on feedingstuff. Therefore, no additional study was conducted.	
Undertaking of intended data submission [ ]	–	

Section B6.7 **Further human health related studies**

Annex Point IIB VI.6.7

6.7.1.2 Effects of industrial processing and/or domestic preparation on the nature and magnitude of residues of the biocidal product

JUSTIFICATION FOR NON-SUBMISSION OF DATA

Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [ ]**	
Limited exposure [X]	**Other justification [X]**	
Detailed justification:	No industrial processing or domestic preparations are intended with this product. Therefore, no residue study was conducted.	
Undertaking of intended data submission [ ]	–	

Section B6.7 **Further human health related studies**

Annex Point IIB VI.6.7

6.7.2 "Other test(s) related to the exposure to humans
Suitable test(s) and a reasoned case will be required for the biocidal product"

JUSTIFICATION FOR NON-SUBMISSION OF DATA

Other existing data [ ] **Technically not feasible [ ]** **Scientifically unjustified [ ]** **Limited exposure […]** **Other justification [X]**		
Detailed justification:	No further data available.	
Undertaking of intended data submission [ ]	**–**	

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	Evaluation by Rapporteur Member State
Date	*30/08/12*
Materials and Methods	*N/A*
Results and discussion	*N/A*
Conclusion	*Adopt applicant's version*
Reliability	*N/A*
Acceptability	acceptable
Remarks	*N/A*
	Comments from ...
Date	
Materials and Methods	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

Environment (including Eco-Toxicology)

Section B.7	**ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT**

B7 .1 **Annex IIB, VII 7.1**	**Foreseeable routes of entry into the environment on the basis of the use envisaged**	**Official use only**
	The bloc bait is intended for use in and around buildings, for outdoor uses and sewerage use. The foreseeable routes of entry in the environment are estimatedon the basis of the use envisaged and the physico-chemical properties of the active substance: Air justification Bromadiolone is a large aromatic organic compound of low volatility. It is not expected to partition to the atmosphere to any significant extent due to its low vapour pressure ($2.13*10^{-8}$ Pa at 25 °C) and Henry's Law constant ($8.99*10^{-7}$ $Pa.m^3/mol$). It has a rapid photolysis rate in the air (half-life of about two hours). Then Bromadiolone is not expected to volatilise to or persist in air in significant quantities. Thus, the risk of contamination of the air can be considered as negligible when using the product. Water justification Bromadiolone has a strong tendency to adsorb to sediment combined with a high degree of photo-instability. This means that Bromadiolone is unlikely to remain in the water column of surface waters. Groundwater justification Bromadiolone is strongly adsorbed to soil and K_{OC} values range	X

Section B.7 **ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT**

B7 .1 **Annex IIB, VII 7.1**	**Foreseeable routes of entry into the environment on the basis of the use envisaged**

between 1563 and 41600 mL/g, which correspond to ‘slightly mobile’ to “non-mobile” according to the SSLRC classification index. It means that the risk of contamination of groundwater is low.

Soil justification

The product is ready-to-use and placed generally in a tamper resistant and secured bait box. It should be noted that due to its mode of application the release of Bromadiolone is only local. Thus the risk of contamination of soil can be considered as negligible and this foreseeable route of entry is not of concern.

The environmental exposure assessment is presented in Doc. II-B. The risk assessment is presented in Doc. II-C.

Section B.7 **ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT**

B7 .1 **Annex IIB, VII 7.1**	**Foreseeable routes of entry into the environment on the basis of the use envisaged**

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	20-09-2012
Evaluation of applicant's justification	Agree with applicant's justification with the following correction: The opening sentence should be corrected to refer to the 'Jade paste' rather than the 'bloc bait'. Also this product is not intended for sewerage use.
Conclusion	Applicant's justification is acceptable. However this justification is subject to the more rigorous risk and hazard assessments submitted in docs II-B and II-C and presented in the PAR document.
Remarks	n/a
	COMMENTS FROM OTHER MEMBER STATE *(specify)*
Date	*Give date of comments submitted*
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section B.7 **ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT**

B7 .2 **Annex IIB, VII 7.2**	**Information on the ecotoxicology of the active substance in the product, where this cannot be extrapolated from the information on the active substance itself**	Official use only
	The data on the active substance are presented below (see Bromadiolone Task Force, Document I (public), Appendix I, List of endpoints, First draft June 2009 and LOA from Pelgar).	
7.2.1 Toxicity for aquatic species		
Fish	LC_{50} (96 h) *Oncorhynchus mykiss* = 2.86 mg/L	
Invertebrates	LC_{50} (48 h) *Daphnia magna* = 5.79 mg/L	
Algae	E_rC_{50} (72 h) *Selenastrum capricornutum* = 1.14 mg/L NOE_bC = 0.13 mg/L	
Microbial activity Inhibition	EC_{50} Activated sludge = 132.8 mg/L	
Other aquatic organism	ErC_{50} *Lemna minor* (7 d) ≥ 0.47 mg/L	
7.2.2 Toxicity for terrestrial species		
Earthworm	LD_{50} (13 d) *Eisenia foetida* = 918 mg/kg wet weight	
Mammals	LD_{50} rat = 1.31 mg/kg b.w.	
Birds	Acute toxicity: LD_{50} Japanese quail = 134 mg/kg b.w. Dietary toxicity: LC_{50} (5 d) Bobwhite quail = 62 mg/kg food Dietary toxicity: LC_{50} (10 d) Japanese quail = 28.9 mg/kg food Reproductive toxicity: NOEC Japanese quail = 0.039 mg/kg bw/day and 0.26 mg/kg drinking water	
7.2.3 Secondary poisoning		

Section B.7 **ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT**

B7 .2 **Annex IIB, VII 7.2**	**Information on the ecotoxicology of the active substance in the product, where this cannot be extrapolated from the information on the active substance itself**
Bioaccumulation	BCF = 339 (calculated)
Metabolites in target organisms	No data available.

Section B.7	ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT

B7 .2 Annex IIB, VII 7.2	Information on the ecotoxicology of the active substance in the product, where this cannot be extrapolated from the information on the active substance itself

JUSTIFICATION FOR NON-SUBMISSION OF DATA

Other existing data [X] **Limited exposure [X]**	**Technically not feasible [ ]** **Scientifically unjustified [ ]** **Other justification [ ]**	
Detailed justification:	The product is generally placed in a tamper resistant and secured bait box. Even in the case where there is no bait box, the exposure of the aquatic or terrestrial organisms is limited due to the application mode. Thus in this case, the risk of environmental contamination is very low and can occur only accidentally. Moreover, the concentration of Bromadiolone in the product is very low (0.005%), thus it can be estimated by calculation that the product will not be toxic for aquatic and terrestrial organisms (see Doc. III B9, Classification). The risk of long term toxicity for birds should be limited by the use of secured bait boxes and good practice of the operator (baits placed in a safe manner in order to prevent access to non-target animals) as recommended on the label and in the Technical Data Sheet (see Doc. III B9). Finally as tests are available on the active substance, there is no need to conduct tests on vertebrate animals in accordance with Council Directive 86/609/EEC.	
Undertaking of intended data submission [ ]	–	
	Evaluation by Competent Authorities	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	13.09.2012	
Evaluation of applicant's justification	The reviewer agrees with the applicants justification	
Conclusion	The applicants justification is agreeable	
Remarks	None	

	COMMENTS FROM OTHER MEMBER STATE *(specify)*
Date	
Evaluation of applicant's justification	
Conclusion	
Remarks	

Section B.7 **ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT**

Section B7.3
Annex II B- VII 7.3

Available ecotoxicological information relating to ecotoxicological relevant non-active substances (*i.e.* substances of concern)

One component has an environmental classification: the Bitrex classified R52/53. The ecotoxicological data are extracted from the following documents:
SDS Bitrex in propylene glycol 25%, Macfarlan, January 2010
DAR_Vol1_public_Denatonium benzoate, August 2008

1 Aquatic toxicity

1.1 Type of test Acute toxicity to fish

1.1.1 Reference SDS and DAR

1.1.2 Summary and conclusion LC_{50}(96h) > 1 000 mg/L

1.2 Type of test *Acute toxicity to* Daphnia magna

1.2.1 Reference *SDS*

1.2.2 Summary and conclusion *EC_{50}(48h) = 13 mg/L*

1.3 Type of test *Chronic toxicity to* Daphnia magna

1.3.1 Reference *SDS*

Section B.7 **ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT**

Section B7.3 **Annex II B- VII 7.3**	Available ecotoxicological information relating to ecotoxicological relevant non-active substances (*i.e.* substances of concern)
1.3.2 Summary and conclusion	*NOEC(21d) = 5 mg/L*
1.4 Type of test	*Acute toxicity to algae*
1.4.1 Reference	*DAR*
1.4.2 Summary and conclusion	*EbC_{50}(70.5h) = 5-10 mg/L*
	2 Terrestrial toxicity
2.1 Type of test	Acute toxicity to bird
2.1.1 Reference	DAR
2.1.2 Summary and conclusion	LD_{50} = 196 mg/kg b.w.
2.2 Type of test	Short term toxicity to bird
2.2.1 Reference	DAR
2.2.2 Summary and conclusion	LC_{50} > 5 200 ppm

JUSTIFICATION FOR NON-SUBMISSION OF DATA

Other existing data [X] **Limited exposure [X]**	**Technically not feasible [ ]** **Scientifically unjustified [ ]** **Other justification [ ]**	
Detailed justification:	The other formulants of the product are not classified for the environment (see Confidential document C3 with the SDS of the formulants) and thus are not considered as substances of concern for the environment. Therefore, no additional data are submitted. A proposal of classification has been made on the basis of the provisions of and the guidance for the Council Directive 1999/45/EC (DPD) and the guidance for the Council Regulation (EC) No.1272/2008 (GHS). According to these classifications, the product is not classified for the environment (refer to proposition of classification and labelling, Doc. B9).	
Undertaking of intended data submission [ ]	–	
	Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	*13.09.2012*	
Evaluation of applicant's justification	The reviewer agrees with the applicants justification	
Conclusion	The applicants justification is agreeable	
Remarks	None	
	COMMENTS FROM OTHER MEMBER STATE *(specify)*	
Date	*Give date of comments submitted*	
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*	
Conclusion	*Discuss if deviating from view of rapporteur member state*	
Remarks		

Section B.7 ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT

Section B7.4 Annex IIB, VII 7.4	Where relevant all the information required in accordance with paragraph A7.1 and A7.2 data set for the active substance	
7.4.1.1 Acute toxicity to fish Type of test Reference Summary and conclusion		Official use only
7.4.1.2 Acute toxicity to invertebrates Type of test Reference Summary and conclusion		
7.4.1.3 Growth inhibition test on algae Type of test Reference Summary and conclusion		
	JUSTIFICATION FOR NON-SUBMISSION OF DATA	
Other existing data [X] Limited exposure [X]	Technically not feasible [ ] Scientifically unjustified [ ] Other justification [ ]	
Detailed justification:	The risk of contamination of the aquatic compartment is very low (see Point 7.1 of this document) and several data are available on the active substance, therefore no study on aquatic species was conducted with the product.	
Undertaking of intended data submission [ ]		
	Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
Date	EVALUATION BY RAPPORTEUR MEMBER STATE ***13.09.2013***	

Section B.7 **ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT**

Section B7.4 Annex IIB, VII 7.4	Where relevant all the information required in accordance with paragraph A7.1 and A7.2 data set for the active substance
Evaluation of applicant's justification	*The reviewer agrees with the applicants justification*
Conclusion	*The applicants justification is agreeable*
Remarks	*None*
	COMMENTS FROM OTHER MEMBER STATE ***(specify)***
Date	Give date of comments submitted
Evaluation of applicant's justification	Discuss if deviating from view of rapporteur member state
Conclusion	Discuss if deviating from view of rapporteur member state
Remarks	

Section B.7 **ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT**

Section B7.5 **Testing for distribution and dissipation in soil, water and air**

Annex IIB, VII 7.5

Applicable only to ecotoxicological relevant component of the biocidal product

Official use only

The only ecotoxicologically relevant component of the biocidal product is Bromadiolone as the other formulants are not classified or in concentrations below the limits of classification.
A fugacity model is used to estimate distribution in soil, water and air. The model is Level III fugacity model (in EPI Suite v4.10):
The data on Bromadiolone used for the simulation are issued from the CAR (see Document I - public version- First draft June 2009 – List of endpoints):

Molecular Mass: 527.4 g/Mol
Water Solubility: 2.48 mg/L at pH=7, 20°C
Vapour pressure: $2.13*10^{-8}$ Pa at 25°C (extrapolated)
Henry's law constant: $4.25*10^{-4}$ $Pa.m^3/mol$ at 20°C
Log Kow: 3.8 at pH 7, 20 °C
Melting Point: 172.4 – 201.7 °C
DT_{50} air: ca 2 h (EPIWIN)
DT_{50} water/photolysis: 2.98 min (summer) to 30.4 min (winter)
DT_{50} soil = 4-53 d = 96-1272 h
The results are presented below:

7.5.1	Soil	37.5%
7.5.2	Water	4.31%
7.5.3	Sediment	58.1%
7.5.4	Air	0.0246%

Section B.7	ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT
Section B7.5 Annex IIB, VII 7.5	Testing for distribution and dissipation in soil, water and air Applicable only to ecotoxicological relevant component of the biocidal product

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	28-08-2012
Evaluation of applicant's justification	Agree with applicant's justification
Conclusion	Applicant's justification is acceptable. However this justification is subject to the more rigourous risk and hazard assessments submitted in docs II-B and II-C and presented in the PAR document.
Remarks	n/a
	COMMENTS FROM OTHER MEMBER STATE ***(specify)***
Date	Give date of comments submitted
Evaluation of applicant's justification	Discuss if deviating from view of rapporteur member state
Conclusion	Discuss if deviating from view of rapporteur member state
Remarks	

Section B.7	ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT
Section B7.6 Annex IIIB, XIII.1	Effects on birds

JUSTIFICATION FOR NON-SUBMISSION OF DATA

Other existing data [X] Limited exposure [X]	Technically not feasible [ ] Scientifically unjustified [ ] Other justification [ ]	
Detailed justification:	Several data on birds are available on the active substance (see Point 7.2 of this document and List of studies in the Assessment Report). Bromadiolone is toxic to birds. However, in order to prevent exposure of non-target organisms to primary and secondary poisonings, baits have to be placed in bait boxes or hidden under curved tile or in a piece of tube. It is also recommended that remaining uneaten baits and dead rodents are removed. Therefore, no additional study with the product was done in order to avoid inacceptable use of vertebrates in accordance with Council Directive 86/609/EEC. A risk assessment is presented in Doc. IIB for primary and secondary poisoning.	
Undertaking of intended data submission [ ]		
	Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	*13.09.2012*	
Evaluation of applicant's justification	*The reviewer agrees with the applicants justification*	
Conclusion	*The applicants justification is agreeable*	
Remarks	*None*	
	COMMENTS FROM OTHER MEMBER STATE ***(specify)***	
Date	Give date of comments submitted	

Section B.7 ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT

Evaluation of applicant's justification	Discuss if deviating from view of rapporteur member state
Conclusion	Discuss if deviating from view of rapporteur member state
Remarks	

Section B.7	ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT
Section B7.7 Annex IIIB, XIII.2	Effects on aquatic organisms

JUSTIFICATION FOR NON-SUBMISSION OF DATA

Other existing data [X] Limited exposure [X]	Technically not feasible [ ] Scientifically unjustified [ ] Other justification [ ]	
Detailed justification:	Data on the active substance are available on several aquatic species (see Point 7.2 of this document). Bromadiolone is toxic to fish, aquatic invertebrates and algae. Due to the application mode it can be considered that there will be only limited exposure of the organisms in the aquatic compartment. Therefore the risk of contamination of aquatic systems is very low and no additional study with the product has been conducted. A risk assessment for the aquatic compartment is presented in Doc. IIB.	
Undertaking of intended data submission [ ]		
	Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	*13.09.2012*	
Evaluation of applicant's justification	*The reviewer agrees with the applicants justification*	
Conclusion	*The applicants justification is agreeable*	
Remarks	*None*	
	COMMENTS FROM OTHER MEMBER STATE ***(specify)***	
Date	Give date of comments submitted	
Evaluation of applicant's justification	Discuss if deviating from view of rapporteur member state	
Conclusion	Discuss if deviating from view of rapporteur member state	
Remarks		

Section B.7	ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT
Section B7.8 Annex IIIB, XIII.3	Effects on other non target organisms

JUSTIFICATION FOR NON-SUBMISSION OF DATA

Other existing data [X] Limited exposure [X]	Technically not feasible [ ] Scientifically unjustified [ ] Other justification [ ]	
Detailed justification:	Bromadiolone has a low toxicity to earthworms (see Point 7.2 of this document). It can be considered that the formulants used in the product do not have an impact on the terrestrial toxicity. In addition the application of the product is local and the use of bait boxes is recommended. Therefore the toxicity of the product to terrestrial compartment can be considered as very low. Thus no additional study was conducted with the product. A risk assessment for the terrestrial compartment is presented in Doc. IIB.	
Undertaking of intended data submission [ ]		
	Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	*13.09.2012*	
Evaluation of applicant's justification	*The reviewer agrees with the applicant's justification. Additionally, Bromadiolone is toxic to mammals.*	
Conclusion	*The applicants justification is agreeable*	
Remarks	*None*	
	COMMENTS FROM OTHER MEMBER STATE ***(specify)***	
Date	Give date of comments submitted	
Evaluation of applicant's justification	Discuss if deviating from view of rapporteur member state	
Conclusion	Discuss if deviating from view of rapporteur member state	
Remarks		

Section B.7	**ECOTOXICOLOGICAL DATA FOR THE BIOCIDAL PRODUCT**
Section B7.9 **Annex IIIB, XIII.4**	**Summary and evaluation of ecotoxicological data**

JUSTIFICATION FOR NON-SUBMISSION OF DATA

Other existing data [...] Limited exposure [...]	Technically not feasible [ ] Scientifically unjustified [ ] Other justification [X]	
Detailed justification:	Bromadiolone is toxic to fish and aquatic invertebrates and very toxic to algae. It does not inhibit growth or respiration of aquatic microorganisms. It causes no toxic effects in the acute earthworm test. Bromadiolone is toxic to birds. Considering that the risk of contamination of the different environmental compartments is very low during product use, no additional study with the product has been conducted. The product is not classified for the environment according to calculations (see Doc. III B9). The summary and evaluation of ecotoxicological data are detailed in documents IIA and IIB.	
Undertaking of intended data submission [ ]		
	Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	*13.09.2012*	
Evaluation of applicant's justification	*The reviewer agrees with the applicant's justification. Bromadiolone is toxic to mammals.*	
Conclusion	*The applicants justification is agreeable*	
Remarks	*None*	
	COMMENTS FROM OTHER MEMBER STATE ***(specify)***	
Date	Give date of comments submitted	
Evaluation of applicant's justification	Discuss if deviating from view of rapporteur member state	
Conclusion	Discuss if deviating from view of rapporteur member state	
Remarks		

Annex IV: List of studies reviewed

List of new data[24] submitted in support of the evaluation of the active substance (IIIA)

Not applicable.

24 Data which have not been already submitted for the purpose of the Annex I inclusion.

List of new data submitted in support of the evaluation of the biocidal product (IIIB)

Section No in IUCLID/ IIIB / Non key study / Published	Author(s)	Year	Title/testing company	Report No	GLP study (Y/N)	Published (Y/N)	Data protection claimed (Y/N)	Data Owner
Doc IIIB 3.1	C.Magnier	2011	Determination of physical properties of Bromadiolone Paste Bait	LODI.06/2011	Y	N	Y	LODI
Doc IIIB 3.2	S.Richerioux	2011	Explosive properties of Bromadiolone Paste Bait	LODI.39/2011	Y	N	Y	LODI
Doc IIIB 3.3	C.Magnier	2011	Oxidizing properties of Bromadiolone Paste Bait	LODI.07/2011	Y	N	Y	LODI
Doc IIIB 3.4	C.Magnier	2011	Flammability of Bromadiolone Paste Bait	LODI.08/2011	Y	N	Y	LODI
Doc IIIB 3.5	C.Magnier	2011	Acidity-Alkalinity of Bromadiolone Paste Bait	LODI.10/2011	Y	N	Y	LODI
Doc IIIB 3.6	C.Magnier	2011	Relative density of Bromadiolone Paste Bait	LODI.09/2011	Y	N	Y	LODI
Doc IIIB 3.7	E.Meriadec	2010	Chemical stability after accelerated storage of Bromadiolon	LODI.03/2010	Y	N	Y	LODI

Section No in IUCLID/ IIIB / Non key study / Published	Author(s)	Year	Title/testing company	Report No	GLP study (Y/N)	Published (Y/N)	Data protection claimed (Y/N)	Data Owner
			e fresh Paste Baits 0.005%					
Doc IIIB 3.7	S. Richerioux	2011	Chemical stability of Bromadiolone Paste Bait stored for 2 years under 20°C conditions	LODI.44/2011	Y	N	Y	LODI
Doc IIIB 3.7	S. Richerioux	2011	Chemical stability of Bromadiolone Paste Bait stored for 3 years under 20°C conditions	LODI.45/2010	Y	N	Y	LODI
Doc IIIB 4	S.Richerioux	2011	Analytical validation for determination of Bromadiolone in Paste Bait	Version Date: 2011-06-24	N	N	Y	LODI
Doc IIIB 5.10.1	Rovetto I.	2010a	Efficacy assessment of Bromadiolone Fresh Paste Bait (T_0),	Report VPU/10/019, 05 July 2010	N	N	Y	LODI

Section No in IUCLID/ IIIB / Non key study / Published	Author(s)	Year	Title/testing company	Report No	GLP study (Y/N)	Published (Y/N)	Data protection claimed (Y/N)	Data Owner
			containing 50 mg/kg bromadiolone, using CD-1 albino House mice, SAGEA/Syn Tech Research					
Doc IIIB 5.10.2	Rovetto I.	2010b	Efficacy assessment of Bromadiolone Fresh Paste Bait ($T_{2\ weeks\ accelerated}$), containing 50 mg/kg bromadiolone, using CD-1 albino House Mice, SAGEA/Syn Tech Research	Report VPU/10/020, 05 July 2010	N	N	Y	LODI
Doc IIIB 5.10.3	Rovetto I.	2010c	Efficacy assessment of Bromadiolone Fresh Paste Bait	Report VPU/10/017, 05 July 2010.	N	N	Y	LODI

Section No in IUCLID/ IIIB / Non key study / Published	Author(s)	Year	Title/testing company	Report No	GLP study (Y/N)	Published (Y/N)	Data protection claimed (Y/N)	Data Owner
			(T_0), containing 50 mg/kg bromadiolone, using CD albino Norway rat, SAGEA/Syn Tech Research					
Doc IIIB 5.10.4	Rovetto I.	2010d	Efficacy assessment of Bromadiolone Paste Bait ($T_{2\ weeks\ accelerated}$), containing 50 mg/kg bromadiolone, using CD albino Norway rat, SAGEA/Syn Tech Research,	Report VPU/10/018, 01 July 2010	N	N	Y	LODI
Doc IIIB 5.10.5	Biannic M.-L.	2009a	Efficacy assessment of rodenticides in natural conditions,	Assay code PÂTE_BROMADIOLONE_50ppm_Souris, 12 May 2009	N	N	Y	LODI

Section No in IUCLID/ IIIB / Non key study / Published	Author(s)	Year	Title/testing company	Report No	GLP study (Y/N)	Published (Y/N)	Data protection claimed (Y/N)	Data Owner
			LODI					
Doc IIIB 5.10.6	Biannic M.-L.	2009b	Efficacy assessment of rodenticides in natural conditions, LODI	Assay code PÂTE_BROMADIOLONE_50ppm_RAT, 19 April 2009	N	N	Y	LODI
Doc IIIB 5.10.7	Feys J.L.	2011	Study plan, Efficacy assessment of bromadiolone paste baits “CONTROL PASTA” against Rattus rattus, Belgagri	Study plan BROMA002, 01 June 2011	N	N	Y	Belg agri
Doc IIIB 6.1.1	[redacted]	2011a	Bromadiolone Paste Bait, Evaluation of acute oral toxicity in rats, Acute toxic class method. [redacted]	Study No.TAO423-PH-11/0018	Y	N	Y	BIO6 SA
Doc IIIB 6.1.2	[redacted]	2011b	Bromadiolone Paste Bait,	Study No.TAD-PH-11/0018	Y	N	Y	BIO6 SA

Section No in IUCLID/ IIIB / Non key study / Published	Author(s)	Year	Title/testing company	Report No	GLP study (Y/N)	Published (Y/N)	Data protection claimed (Y/N)	Data Owner
			Evaluation of acute dermal toxicity in rats, [redacted]					
Doc IIIB 6.2.1	[redacted]	2011 c	Brom[redacted]diolone Paste Bait Assessment of acute dermal irritation. [redacted]	Study No.IC-OCDE-PH-11/0018	Y	N	Y	BIO6 SA
Doc IIIB 6.2.2	[redacted]	2011 d	Bromadiolone Paste Bait, Assessment of acute eye irritation, [redacted]	Study No.IO-OCDE-PH-11/0018	Y	N	Y	BIO6 SA
Doc IIIB 6.3	[redacted]	2011 e	Bromadiolone Paste Bait Assessment of Sensitising properties on albino guinea pigs, Maximisation	Study No.SMK-PH-11/0018	Y	N	Y	BIO6 SA

Section No in IUCLID/ IIIB / Non key study / Published	Author(s)	Year	Title/testing company	Report No	GLP study (Y/N)	Published (Y/N)	Data protection claimed (Y/N)	Data Owner
			test according to Magnusson and Kligman, [redacted]					

ANNEX V: Toxicology Calculations

Insert relevant exposure/effect calculations undertaken, if applicable.

ANNEX VI: Environmental Calculations

Environmental exposure assessment

The rodenticide products are used by professional and amateur users. The bait is intended for indoors use in and around buildings and for outdoors uses in non agricultural open areas and waste dumps. It is always used in the same manner for all these purposes. Bait points are placed throughout the infested areas with 10 to 30 g per bait point for mice and 25 to 100 g per bait point for rats. Application sites are located 2-5 m apart for mice and 5-10 m apart for rats. Shorter distance is used in severe infestations. The number of baits and the distances should be adapted to the infestation level. Bait points are inspected frequently and replenished when the bait has been eaten.

Bait points are protected to help prevent access by non-target animals. In situations where bait boxes cannot be used, the bait is covered / protected such that non-target organisms cannot reach it. Dead rodents are removed for disposal in order to prevent them being eaten by non-target animals and birds. When no more bait is eaten and rodent activity stops, the remains of all baits are removed for disposal.

Fate and distribution in the environment

For the assessment of the environmental fate and behaviour of the active substance contained in biocidal product, see the chapter on Environmental effects assessment in Doc. II-A (see Letter Of Access from Pelgar). A summary of the environmental behaviour of Bromadiolone is presented below (see Assessment Report – Bromadiolone- May 2008, revised December 2010):

Bromadiolone is not readily biodegradable under environmentally relevant conditions or during sewage treatment processes. It is also not inherently biodegradable. No hydrolysis was found at the investigated pHs 7 and 9, so hydrolysis of Bromadiolone is not expected to be a significant process in the environment. Photolysis of Bromadiolone in aqueous solution is rapid with a half-life of 12 hours or less.

Degradation studies in soil have not been performed by the Task Force and their justification stating that the release of Bromadiolone is only local has been accepted.

Bromadiolone is strongly adsorbed to soil and K_{OC} values range between 1563 and 41600 mL/g (mean value of 10393 ml/g from the seven presented figures). This corresponds to ‘slightly mobile’ to “non-mobile” according to the SSLRC classification index. It can be estimated that Bromadiolone, even if released indirectly to soil in small quantities, is unlikely to reach groundwater in significant quantities.

The rapid photolysis rate in air (t½ *ca* 2 hours), the low vapour pressure of Bromadiolone and the low Henry's law constant together show that the active substance is not expected to volatilise to or persist in air in significant quantities.

A strong tendency to adsorb to sediment combined with a high degree of photo-instability means that Bromadiolone is unlikely to remain in the water column of surface waters. BCF was derived by calculation from log Kow, resulting in BCF values of 339 to 575. It can be concluded that Bromadiolone has a slight potential to bioaccumulate.

Bromadiolone is very toxic to aquatic life including fish, daphnia and algae.

It is not classified as toxic to activated sludge microorganisms with an EC_{50} of 132.8 mg/L.

No effects of Bromadiolone were found on earthworms at 1331 mg/kg dry weight, the highest concentration tested. The NOEC is 918 mg/kg wet weight.

Bromadiolone is toxic to birds with an NOEC of 0.039 mg/kg bw/day and toxic to mammals with an acute oral rat LD_{50} of 1.31 mg/kg. The corresponding acute rat LD50 from the other notifier LiphaTech S.A.S was slightly lower, 0.56-0.84 mg/kg bw/d.

The following **PNECs** were determined (see AR Bromadiolone, May 2008, revised December 2010):

Compartment	Organisms/test	Results	AF	PNEC
Freshwater	Alga/ growth inhibition	ErC_{50} = 1.14 mg/L EbC_{50} = 0.17 mg/L	1000 * 3 1000 * 10	3.8 x 10^{-4} mg/L
STP microorganisms	Sewage sludge/ respiration inhibition	EC_{50} = 132.8 mg/L EC_{50} = 31.6 mg/L	100 100	1.33 mg/L
Sediment	Calculated/ EPM	-	-	0.83 mg/kg ww
Soil	Calculated/ EPM Earthworm acute toxicity	LC_{50} > 8.4 mg/kg soil	- 1000	0.099 mg/kg
Birds	Japanese quail (*Coturnix coturnix japonica*) reproduction test 42 days	NOEC = 0.039 mg/kg b.w./day 0.26 mg/L drinking water	30	0.0013 mg/kg b.w./day
Mammals	Rabbit 90 days	NOAEL = 5 * 10^{-4} mg/kg b.w./day	90	0.0000056 mg/kg b.w./day

Modelling in EUSES[25] v2.1 was used to estimate local PECs for the substance. In the EUSES model, default values (according to the TGD) were used, unless submitted data were available in the dossier.

Uses taken into account are:
14 Rodenticides / 14.2.1 Control around buildings, bait boxes
14 Rodenticides / 14.3.1 Control in open area, using impregnated grain
14 Rodenticides / 14.4 Waste dump and landfills
14 Rodenticides / 14.1 Control in sewer system (as a worst-case scenario)

PEC in air

Bromadiolone has a low vapour pressure (< 5x10^{-5} Pa) and Henry's Law constant (4.25x10^{-4} Pa.$m^3$$mol^{-1}$). Release to air *via* water is expected to be negligible. This is also supported by calculations using the TGD on risk assessment for percent release to air from a sewage treatment plant where no release to air is predicted. Releases to air from use of bait within covered/protected

25 A software tool used for risk assessment, in support of the TGD

bait points or bait boxes are considered to be negligible. Therefore, it can be considered that there are no releases to air of Bromadiolone from use or disposal phases.

PEC in soil

In and around buildings

On the basis of European data (see ESD for biocides used as Rodenticides[26]), a realistic average for a rodent infested farm would be 10 bait boxes placed around the farm buildings, with a large variation. A farm, which has a rat problem, represents a realistic worst-case example. In this case it is assumed that 10 tamper resistant bait stations are used, each filled with 250 g baits, inspected and replenished 5 times (day 1, 3, 7, 14, 21). It is assumed that all the baits have been eaten. There is a large variation of the duration of a rodenticide campaign and a 21-day period represents a realistic worst case.
Estimating to 1% the direct release to the environment during application and use, the total direct release is estimated to be:
Total direct release = 10 stations * 250 g bait * 5 refills * 0.01 / 21 = 5.95 g product/day, averaged over 21 days.

= 5.95 * 0.005% = 0.30 mg a.s./day

In a typical campaign (normal use), each station contains about 100 g of bait. It would be applied on day 1, replenished 100% on day 3, on day 7 there would be 25-50% replenishment, on day 14, 10%, on day 21 0%. Roughly the equivalent of 1.6 x 100% replenishments corresponding to a total direct release of:
Total direct release (normal) = 10 * 100 * (1+1.6) * 0.01 / 21 = 1.23 g product/day, averaged over 21 days

= 1.23 * 0.005% = 0.062 mg a.s./day

Soil exposure

The equation for the local direct release in the realistic worst-case farm scenario based on bait in bait boxes would be:

*ElocalsoilDcampaign = Qprod * Fcprod * Nsites * Nrefil * Frelease,soil*

where:

[26] Supplement to the methodology for risk evaluation of biocides, Emission scenario document for biocides used as rodenticides, J. Larsen, EUBEES, May 2003

ElocalsoilDcampaign: Local direct emission rate of active substance to soil from a campaign (g)

Qprod: Amount of product used at each refilling in the control operation for each bait box (250 g)

Fcprod: Fraction of active substance in product (0.005%)

Nsites: Number of application sites (10)

Nrefil: Number of refilling times (5)

FreleaseD,soil: Fraction of product released directly to soil (0.01)

ElocalsoilDcampaign = 250 * 0.005% * 10 * 5 * 0.01 = 0.0063 g

The concentration in the soil around each bait box after direct release can be estimated by the equation:

*Clocalsoil-D = ElocalsoilDcampaign * 10^3 / (AREAexposed-D * DEPTHsoil * RHOsoil * Nsites)*

where:

Clocalsoil-D = Local emission to soil from a campaign (mg/kg)

AREAexposed-D = Area directly exposed to rodenticide (0.09 m²)

DEPTHsoil = Depth of exposed soil (0.1 m)

RHOsoil = Density of exposed soil (1700 kg/m^3)

Clocalsoil-D = 0.0063 * 10^3 / (0.09 * 0.1 * 1700 * 10) = 0.0408 mg/kg

The concentration in the soil around the bait box taking into account only disperse release of bromadiolone (*via* urine and faeces of rodents) can be estimated by the equation:

$$Clocalsoil\text{-}ID = \frac{[Qprod * Fcprod * Nsites * Nrefil * 10^3 * FreleaseIDsoil * (1 - FreleaseDsoil)]}{(AREAexposedID * DEPTHsoil * RHOsoil)}$$

where:

Clocalsoil-ID: Concentration in soil due to indirect (disperse) release after a campaign (mg/kg)

FreleaseIDsoil: Fraction released indirectly to soil (default: 0.9)

AREAexposed-ID: Area indirectly exposed to rodenticide (550 m²)

Clocalsoil-ID = 100 * 0.005% * 10 * 5 * 1000 * 0.9 * 0.01 / 550 * 0.1 * 1700

Clocalsoil-ID = 0.00596 mg/kg soil

then:

PEClocalsoil = Clocalsoil-D + Clocalsoil-ID = 0.0468 mg/kgsoil

The results for the worst-case scenario and the normal use scenario are presented in the following table:

Clocalsoil of bait in and around buildings

Parameters		Realistic worst case scenario (default values)	Normal case scenario + normal use + refined metabolism
INPUT			
Q_{prod}	Amount of product used in control operation for each bait box	250 g	100 g
$Fc_{product}$	Fraction of active substance in product	0.005%	0.005%
N_{sites}	Number of application sites	10	10
N_{refill}	Number of refilling times	5	1.6
$F_{release\text{-}D,\ soil}$	Fraction of product released directly to soil	0.01	0.01
$F_{release\text{-}\ D,\ soil}$	Fraction of non metabolised active ingredient released indirectly to soil	0.9	0.9
OUTPUT			
$Elocal_{soil\text{-}campaign,\ direct}$	Local direct emission of active substance to soil from a campaign	0.0063 g/camp	0.00125 g/camp
$Clocal_{soil\text{-}D}$	Local concentration in soil due to direct release after a campaign	0.041 mg/kg	0.0082 mg/kg
$Clocal_{soil\text{-}ID}$	Concentration in soil due to indirect release after a campaign	0.0059 mg/kg	0.00119 mg/kg
$Clocal_{soil}$ (= $Clocal_{soil\text{-}D}$ + $Clocal_{soil\text{-}ID}$)	Total concentration in soil	0.0468 mg/kg	0.0097 mg/kg

Open areas

There are different methods of applying rodenticides for control of voles in the open areas. Baits can be placed sub-surface, *i.e*. burrow baiting, and they are inaccessible to almost all non-target animals.
In open areas 100 g bait in one bait point (refilled twice) is used and product is not applied directly to the soil, because a feeding station is always used. According to the ESD, exposure is expected to be to the soil just around entrance of the rat hole *via* direct release during application and use. Indirect release is not considered in the scenario and it is not regarded relevant when the anticipated exposed area is quite limited. The default value for the fraction of product released to soil during application is used in the calculation, because the use of feeding stations inside the rat holes although recommended is not probable.

Elocalsoilcampaign =Qprod x Fcprod x Nsites x Nrefil x (Frelease,soil.appl + Frelease,soil,use)

ClocalsoilD = (Elocalsoilcampaign x 1000) / Vsoilexposed x RHOsoil
where:
Vsoilexposed = ($R^2 – r^2$) x π x l / 2 (= 0.0085 m^3)
with:
R = Radius of exposed soil around the hole (0.14 m)
r = Radius of hole (0.04 m)
l =Length of exposed hole = 0.3 m)
RHOsoil = 1700 kg/m^3 soil

Clocalsoil for use of bait in open areas:

Parameter		**Realistic worst-case scenario (default)**
INPUT		
Qprod	Amount of product used at each refilling in the control operation	100 g
Fcproduct	Fraction of active substance in product	0.005%
Nsites	Number of application sites	1
Nrefill	Number of refilling times	2
Frelease, soil, appl	Fraction of product released to soil during application	5%
Frelease, soil,, use	Fraction of product released to soil during use	20%
OUTPUT		
Elocalsoilcampaign	Local emission of active substance to soil from a campaign	0.0025 g/campaign
Clocalsoil	Local concentration in soil after a campaign: (mg/kg)	0.173

Landfill and waste dumps

The ESD suggests 40 kg as the total amount of bait to be used during a campaign. However it notes that there is enormous variation in this value. Normally at landfill sites, for rat control, bait trays with

100 g in each are placed at intervals of 10 meters apart. According to ESD the default exposure area is 1 ha. Therefore a maximum of 110 (10 x 11) bait trays could be laid within a 1 ha grid area during normal use, equivalent to 11 kg of product in total. However if bait points are placed at distances of 5 m apart (as supported by the notifier) in a grid covering the entire dump this would yield a total of 441 points (21 x 21). 100 g in each bait point corresponds to a total loading of 44.1 kg of bait.

According to the ESD scenario most of the bait is eaten and the soil is potentially exposed through urine, faeces and dead animals. It is also considered in the report that, as a worst case situation, there is no collection of dead animals. Also in the current assessment, metabolism of Bromadiolone by rats is not taken into account. Therefore the default release factor of 0.9 is used.

Elocalsoilcampaign = *Qprod* x *Fcprod* x *Napp* x *Frelease,soil*
Clocalsoil = (*Elocalsoilcampaign* x 10^6) /(*AREAexposed* x *DEPTHsoil* x *RHOsoil*)
where:
AREAexposed = 10 000 m²
DEPTHsoil = 0.1 m
RHOsoil = 1700 kg/m³ soil

Clocalsoil for use of bait in landfill and waste dump:

Parameter		Realistic worst case scenario (default)	Normal case scenario + refined metabolism + general use
INPUT			
Qprod	Amount of product used in control operation per application	44.1 kg	11 kg
Fcproduct	Fraction of active substance in product	0.005%	0.005%
Napp	Number of applications	7	7
Frelease,soil	Fraction of active ingredient released to soil through exreta and dead bodies	0.9	0.9
OUTPUT			
Elocalsoilcampaign	Local emission of active substance to soil from a campaign: (kg/camp)	0.0139	0.00347
Clocalsoil	Local concentration in soil after a Campaign (mg/kg)	0.0081	0.00204

PEC in surface water, ground water and sediment

In and around buildings

The concentration in groundwater resulting from local concentration in soil is calculated according to equation 67 in TGD on Risk Assessment – Part II:

*PEClocalsoil,porew = PEClocalsoil * RHOsoil / Ksoilwater * 1000*
where:
PEClocalsoil = predicted environmental concentration in soil (mg/kg)
Ksoilwater = soil-water partitioning coefficient (m^3/m^3) (312 from EUSES)
RHOsoil = bulk density of wet soil (kg/m^3)
PEClocalsoil,porew = Predicted Environmental Concentration in porewater (mg/L)

PEClocalsoil,porew (worst case) = 0.047 * 1700 / 312 * 1000 = **0.00026 mg/L**
PEClocalsoil,porew (normal case) = 0.0094 * 1700 / 312 * 1000 = **0.000051 mg/L**

Open areas

The concentration in groundwater resulting from local concentration in soil is calculated in the same manner as for the 'in and around buildings' scenario above:

PEClocalsoil,porew = 0.173 * 1700 / 312 * 1000 = **0.00094 mg/L**

Landfill and waste dumps

The concentration in groundwater resulting from local concentration in soil is calculated in the same manner as for the 'in and around buildings' scenario above:

PEClocalsoil,porew (worst case) = 0.0074 * 1700 / 312 * 1000 = **$4.453 * 10^{-5}$ mg/L**
PEClocalsoil,porew (normal case) = 0.000 0051 * 1700 / 312 * 1000 = **$1.111 * 10^{-5}$ mg/L**

Sewer system

The bait is not intended for used in sewers. However this scenario is considered as a worst case scenario. Therefore it is used for the risk assessment when using the bait in open areas or waste dumps. The release to sewage water for the realistic worst-case scenario (heavily infested areas) is

calculated using the following equations (see ESD for biocides used as rodenticides, EUBEES, May 2003):

$Elocal_{water} = [(Q_{prod} * Fc_{product}) / T_{emission}] * F_{released}$.

where:
Qprod = weight of bait * Napp
Freleased = 0.3 + (0.6 – Fmetab)

$$C_{influent} = Elocal_{water} / Vtot\ sewage$$

where:
Vtot sewage: total volume of sewage water per day = 2 000 000 L/d (related to standard STP scenario in TGD with 200 L / person / day and 10 000 inhabitants per STP).

Table 3.3.4-1: PEClocal for use of bait in sewage system

Parameters		Realistic worst case scenario (default values)
INPUT		
Q_{prod}	Amount of product used in control operation after one week	30 kg
$Fc_{product}$	Fraction of active substance in product	0.005%
$T_{emission}$	Number of emission days	7
$F_{metabolised}$	Fraction of active ingredient metabolised	0
$F_{release}$	Fraction of active ingredient released	0.9
OUTPUT		
$Elocal_{water}$	Mean local emission of active substance to waste water during episode:	0.193 g/d
Cinfl	Concentration in sewage water to local STP	$9.64 * 10^{-5}$ mg/L
Local concentrations in different compartments after elimination processes in STP according to the TGD (2003) calculated by EUSES 2.0.3.		
PEC_{stp}	PEC for micro-organisms in the STP	$4.44 * 10^{-5}$ mg/L
$PEClocal_{water}$	Local PEC in surface water during emission episode	$4.37 * 10^{-6}$ mg/L
$PEC_{sediment}$	Local PEC in fresh-water sediment during emission episode	$9.90 * 10^{-4}$ mg/kg
$PEClocal_{soil}$	Through application of sewage sludge and aerial deposition	$1.62 * 10^{-4}$ mg/kg

Parameters		Realistic worst case scenario (default values)
$PEClocal_{soil, porew}$	Concentration in porewater / groundwater of agricultural soil after application of sewage sludge	$4.09 * 10^{-7}$ mg/L

Summary of calculated PECs

Scenario	In and around buildings		Open area	Waste dumps		Sewer system
	Worst case	Realistic		Worst case	Realistic	
PEC soil (mg/kg wwt)	4.68E-02	9.73E-03	1.73E-01	8.17E-03	2.04E-03	
PEC groundwater (mg/l)	2.55E-04	5.31E-05	9.43E-04	4.45E-05	1.11E-05	
PEC microorganisms (mg/l)						4.44E-05
PEC surface water (mg/l)						4.37E-06
PEC agricultural soil (mg/kg wwt)						1.62E-04
PEC sediment (mg/kg wwt)						9.90E-04
PEC groundwater (ag) (mg/l)						4.09E-07

Non-compartmental-specific exposure relevant to the food chain (secondary poisoning)

The product is a ready-to-use bait containing 0.005% Bromadiolone as the active substance. Bromadiolone is a second-generation single-dose anticoagulant rodenticide. It is used against rat at the maximal rate of 100g of product equivalent to 5 mg a.s. per baiting post and against mouse at 30g product equivalent to 1.5 mg a.s. by baiting post. This formulation is intended for indoor and outdoor uses.

Exposure and Risk Assessment for Primary and Secondary Poisoning

Exposure scenarios for primary poisoning

The same physiological processes are responsible for maintaining life for warm-blooded animals i.e. birds and mammnals. Therefore, the use of anticoagulant rodenticide for killing selected pest mammals is also considered a general hazard for many species such as small non-target rodents and small, mostly granivorous, birds.

Non target animals are at risk through two means:

a. Primary poisoning
b. Secondary poisoning

Since the product is applied in and around building, avian and mammal species can be exposed to the treated baits. Birds eating cereal and weed seeds like sparrows, pigeons and pheasants or domestic hen seem reasonable to include in a worst-case scenario.

Dogs are more omnivorous than cats, so that dogs are more often victims of primary poisoning. Pigs are considered the most susceptible species among domestic animals. Therefore dog, pig and young pigs are chosen to assess the risk of primary poisoning.

Acute and long-term Tier 1 risk assessment for primary poisoning of a non-target organism

In the first tier scenario[27], the risk is characterized by the ratio between PEC_{oral} and $PNEC_{oral}$. PEC_{oral} is the concentration of the rodenticide in the food of a non-target organism. $PNEC_{oral}$ is the No Effect Concentration for oral intake.

This evaluation can be used for both short- and long-term exposure. According to the TGD (2003), the $PNEC_{oral}$ is based on; LC_{50bird}, $NOEC_{bird}$ or $NOEC_{mammal}$, which is divided by a specific assessment factor mentioned in the TGD Table 23.

The acute and long-term $PNEC_{oral}$ values for birds and mammals are calculated from toxicity data in the CAR of Bromadiolone and reported in Table 3.3.5.1-1.

[27]: EU course "Exposure scenarios in Risk Assessment of Wood Preservatives and Rodenticides", Dr. Marta A. Sobanska, 9 – 10 October 2003, ECB, Ispra (web site http://ihcp.jrc.ec.europa.eu/our_activities/health-env/risk_assessment_of_Biocides/doc/ESD/TRAINING_COURSE/PT14_RODENTICIDES > Exercise 3)

Table VI.1.7-1: $PNEC_{oral}$ values for birds and mammals exposed to Bromadiolone

Organism group	Species / test	Results[1]	Assessment factor	PNEC (concentration in food, mg/kg)[3]	PNEC (dose, mg/kg b.w./d)[3]
Acute					
Birds	Partridge, short-term toxicity study (10 days)	LC_{50}= 28.9 mg/kg food	3 000	0.00963	0.00120
Mammals	Rats, 28 days repeated dose test	NOAEL[2] = 2.5 *10^{-3} mg/kg b.w./d	300	1.67*10^{-4}	8.33*10^{-6}
Long-term					
Birds	Japanese quail Reproduction test 42 days	NOEC = 0.039 mg/kg b.w./day	30	0.0104	0.0013
Mammals	Rabbit 90 days	NOAEL = 5*10^{-4} mg/kg b.w./day	90	0.000186	0.0000056

[1] CAR Bromadiolone

[2] According to TGD, the $PNEC_{mammal}$ can be calculated from toxicity studies of 28 days, 90 days or chronic. Therefore, the acute $PNEC_{mammal}$ is based on NOAEL from 28-d toxicity study.

[3] Calculated using conversion factor from Table 22 in the TGD: 8 for birds, 20 for rats and 33.3 for rabbit.

The concentration in the final product is 0.005% for the active substance Bromadiolone. The Tier 1 assessment assumes that there is no bait avoidance by the non-target animals and that they obtain 100% of their diet in the treated area and has access to the Bromadiolone product. The PECoral is 50 mg/kg (Bromadiolone present at 0.005% w/w in the product) and is used in quantitative risk assessment for the acute and long-term situation.

Table VI.1.7-2: Tier I risk assessment: $PEC_{oral}/PNEC_{oral}$ ratio for birds and mammals exposed to Bromadiolone

	PEC_{oral} (concentration in food, mg/kg)	$PNEC_{oral}$ (concentration in food, mg/kg)	PEC / PNEC
Acute			
Bird	50	0.00963	5192
Mammal	50	1.67*10^{-4}	299401
Long-term			
Bird	50	0.0104	4808
Mammal	50	0.000186	268817

The ratios PEC/PNEC are above 1 indicating a potential risk, which must be refined.

Acute Tier 2 risk assessment for primary poisoning of a non-target organism

In the refined risk assessment the daily uptake (ETE) of Bromadiolone is compared to the PNEC for birds and mammals. Food intake of non-target animals can vary significantly, depending on the metabolic rates of species, the nature of their food, weather conditions, time of year, etc. The body weights, daily food intakes and estimates of Bromadiolone ingestion, based on sufficient bait being accessible to satisfy a day's food intake requirement, are presented below for a representative non-target mammal based on the equation:

ETE = (FIR/b.w.) * C * AV * PT * PD (mg Bromadiolone/kg b.w./day)
where:
ETE is the Estimated Theoretical Exposure to the active substance,
FIR is the non-target animal's daily food intake (fresh weight),
b.w. is bodyweight,
C is the concentration of active substance in the fresh diet (Bromadiolone bait),
AV is the avoidance factor (default 1.0 = no avoidance),
PT is the fraction of diet obtained in the treated area (default 1.0)
PD is the fraction of food type in the diet (default 1.0).
In Tier 2, Step 1 (worst case) AV, PT and PD are all set to 1, whilst in the realistic worst case (Step 2) these AV and PT are refined to 0.9 and 0.8, respectively.

Table VI.1.7-3 Calculations of ETE for non-target animals consuming baits treated with 0.005% Bromadiolone

Non-target animals	Typical body weight (g)[a]	Daily mean food intake (g dry weight/day)	Concentration of Bromadiolone in bait (mg/kg)	ETE, concentration of Bromadiolone after one meal (one day) (mg/ kg b.w.)	
				Step 1	Step 2
Tree sparrow	22	7.6[a]	50	17.3	12.4
Chaffinch	21.4	6.42[a]	50	15.0	10.8
Wood pigeon	490	53.1[a]	50	5.42	3.90
Pheasant	953	102.7[a]	50	5.39	3.88
Dog	10 000	456[b]	50	2.28	1.64
Pig	80 000	600[c]	50	0.375	0.270
Pig, young	25 000	600[c]	50	1.20	0.864

[a] From EUBEES 2, Section 3.2.1,Table 3.1,

[b] From EUBEES 2, Section 3.2.1, page 50: for mammals: log (FIR) = 0.822*log(BW)-0.629,

[c] From EUBEES 2, it seems reasonable to consider a portion of 600 g bait as the normal upper limit for what is available to non-target animals in several EU countries. The 600 g portion is the largest one permitted for use by non-professionals in several countries.

The PNEC values for each representative animal are compared with the ETE values to provide an indication of the risk to non-target animals ingesting a daily dose of bait containing Bromadiolone.

Table VI.1.7-4 Tier 2 acute risk assessment: $PEC_{oral}/PNEC_{oral}$ for non-target animals accidentally exposed to bait containing Bromadiolone after one meal

Non-target animals	ETE, concentration of Bromadiolone after one meal (one day) (mg/kg b.w.)		$PNEC_{oral}$ (dose, mg/kg b.w./d)	PEC/PNEC	
	Step 1	Step 2		Step 1	Step 2
Tree sparrow	17.3	12.4	0.00120	14 417	10 333
Chaffinch	15.0	10.8	0.00120	12 500	9 000
Wood pigeon	5.42	3.90	0.00120	4 517	3 250
Pheasant	5.39	3.88	0.00120	4 492	3 233
Dog	2.28	1.64	$8.33*10^{-6}$	273 709	196 879
Pig	0.375	0.270	$8.33*10^{-6}$	45 018	32 413
Pig, young	1.20	0.864	$8.33*10^{-6}$	144 058	103 721

The ratios PEC/PNEC are above 1 indicating a potential risk even after refinement.

Long-term Tier 2 risk assessment for primary poisoning of a non-target organism

In the second tier assessment, long-term exposure also has to be taken into account in the evaluation of primary poisoning of rodenticides. The EC (expected concentration of active substance in the animal) after metabolism and other elimination is calculated as follows:

$$EC = ETE \times (1 - El)$$

EC values are based on the calculations for ETE above but an elimination factor has to be taken into account. The default value for an elimination factor of (*El*) = 0.3 per day, stated in the EUBEES 2, has been used. This is a reasonable average default value for elimination, as anticoagulant rodenticides are eliminated from the body mainly through faeces.

Table VI.1.7-5: Expected concentration of Bromadiolone in the animal after one meal followed by a 24-hour elimination period

Species	Estimated daily	Fraction of daily	Expected concentration of

	uptake of a compound (ETE) (mg/kg b.w./d)		uptake eliminated (number between 0 and 1) (EI)	active substance in the animal (EC) (mg/kg b.w./d)	
	Step 1	Step 2		Step 1	Step 2
Tree sparrow	17.3	12.4	0.3	12.1	8.68
Chaffinch	15.0	10.8	0.3	10.5	7.56
Wood pigeon	5.42	3.90	0.3	3.79	2.73
Pheasant	5.39	3.88	0.3	3.77	2.72
Dog	2.28	1.64	0.3	1.60	1.15
Pig	0.375	0.270	0.3	0.263	0.189
Pig, young	1.20	0.864	0.3	0.840	0.605

Table VI.1.7-6: Tier 2 long-term risk assessment: $EC_{oral}/PNEC_{oral}$ ratio after 1-day elimination of Bromadiolone

Species	EC_{oral} (mg/kg b.w./d) after 1 day		$PNEC_{oral}$ (mg/kg b.w./d)	Ratio $PEC_{oral}/PNEC_{oral}$	
	Step 1	Step 2		Step 1	Step 2
Tree sparrow	12.1	8.68	0.0013	9 308	6 677
Chaffinch	10.5	7.56	0.0013	8 077	5 815
Wood pigeon	3.79	2.73	0.0013	2 915	2 100
Pheasant	3.77	2.72	0.0013	2 900	2 092
Dog	1.60	1.15	0.000 0056	$2.86*10^5$	$2.05*10^5$
Pig	0.263	0.189	0.000 0056	$4.70*10^4$	$3.38*10^4$
Pig, young	0.840	0.605	0.000 0056	$1.50*10^5$	$1.08*10^5$

The ratios PEC/PNEC are above 1 indicating a potential risk.

According to the guidance agreed at the 23rd Biocides CA meeting, EC_5 values are used for quantitative risk assessment of primary poisoning in the long-term situation. Calculations of the expected concentrations (EC) for 5-days exposure considering elimination are calculated.

The EC_n (expected concentration of active substance in the animal after n days) can be calculated by use of ESD equation 21:

$$EC_n = \sum_{n=1}^{n-1} ETE * (1 - EL)^n$$

All parameters AV, PT and PD are set to 1 as a worst-case scenario.

The principle in the calculations is for the first 5 days that the animal eats the same daily amount and eliminates 30% of its content of residues. EC_3 is the concentration of residues in the animal before a new meal on Day 3 and so forth. Therefore, the concentration of residues on Day 5 is calculated stepwise this way:

$EC_3 = (EC_2 + ETE) * (1 - 0.3)$

$EC_4 = (EC_3 + ETE) * (1 - 0.3)$

$EC_5 = (EC_4 + ETE) * (1 - 0.3)$

Table VI.1.7-7: EC_{oral} for different relevant species

Days	EC_{oral} (mg/kg b.w./d)						
Species	Tree sparrow	Chaffinch	Wood pigeon	Pheasant	Dog	Pig	Young pig
Day 1 after first meal	17.3	15.0	5.42	5.39	2.28	0.375	1.20

Day 2 before new meal	12.1	10.5	3.79	3.77	1.60	0.266	0.840
Day 3 before new meal	20.6	17.9	6.45	6.41	2.72	0.449	1.43
Day 4 before new meal	26.5	23.0	8.31	8.26	3.50	0.577	1.84
Day 5 before new meal	30.7	26.6	9.61	9.56	4.05	0.666	2.13

Table VI.1.7-8: Tier 2 long-term risk assessment: $EC_{oral}/PNEC_{oral}$ ratio after 5-day elimination of Bromadiolone

Species	**EC_{oral} after 5 days (mg/kg b.w./d)**	**$PNEC_{oral}$ (mg/kg b.w./d)**	**Ratio $EC_{oral}/PNEC_{oral}$**
Tree sparrow	30.7	0.0013	$2.36*10^4$
Chaffinch	26.6	0.0013	$2.05*10^4$
Wood pigeon	9.61	0.0013	$0.739*10^4$
Pheasant	9.56	0.0013	$0.735*10^4$
Dog	4.05	0.000 0056	$7.23*10^5$
Pig	0.666	0.000 0056	$1.19*10^5$
Pig, young	2.13	0.000 0056	$3.80*10^5$

The ratios PEC/PNEC are above 1 indicating a potential risk even after refinement.

Overall, all acute and long-term $PEC_{oral}/PNEC_{oral}$ ratios are still above the trigger value of 1 indicating acute and long-term unacceptable risks.

Exposure scenarios for secondary poisoning

Secondary poisoning assessment according to the TGD (2003) considers the oral intake of a chemical *via* fish or worms only (PECoral, fish and PECoral, worm) which is compared to a PNEC for fish- or worm-eating mammals or birds.

In the aquatic food chain (fish-eating birds and mammals), the risk for secondary poisoning is considered insignificant.

In the terrestrial food chain, secondary poisoning is possible via contaminated soil invertebrates and rodents, and the latter animals are the most likely source of Bromadiolone residues in raptorial birds and predatorian mammals. Here a food chain: rodenticide (bait) → rodent → rodent-eating mammal or rodent-eating bird is assessed.

The animals which can be affected are for instance: dogs, foxes, stoats, polecats, martens, weasels, birds of prey and scavenger birds such as crows or gulls.

The expected content in the target animals is calculated before an assessment of the expected effects and concentration of active substance in a predator or scavenger after having consumed one or more poisoned rodents.

The following assumption is followed: a rodent of a size occurring in EU countries consumes an average daily amount of food equivalent to about 10% of its body weight[28].

The equation for ETE (see primary poisoning) can be used for calculating the amount of active substance being consumed by the target rodent. A reasonable value for factor PD in the equation is necessary for the full scenario.

$$ETE = (FIR / b.w.) * C * AV * PT * PD \text{ (mg/kg b.w./d)}$$

where:

28 EU course “Exposure scenarios in Risk Assessment of Wood Preservatives and Rodenticides”, Dr. Marta A. Sobanska, 9 – 10 October 2003, ECB, Ispra, (web site http://ihcp.jrc.ec.europa.eu/our_activities/health-env/risk_assessment_of_Biocides/doc/ESD/TRAINING_COURSE/PT14_RODENTICIDES > Exercise 4)

FIR: Food intake rate of indicator species (fresh weight). The food intake rate divided with body weight is set to 10% as default value, *i.e.* FIR/b.w. = 0.1.
b.w.: Body weight
C or ($Fc_{product}$): Concentration of active compound in fresh diet (bait)
AV: Avoidance factor (1 = no avoidance, 0 = complete avoidance)
PT: Fraction of diet obtained in treated area (value between 0 and 1)
PD: Fraction of food type in diet (number between 0 and 1; one type or more types)
ETE: Estimated daily uptake of a compound

The realistic worst case, in order to elucidate a full-scale scenario, is to consider a PD = 1 (*i.e.* 100% of food items are poisoned bait). However, in the normal use, it seems very unlikely that an animal will not take the normal available food within its range, as the occurrence of its preferred food has been one of the factors determining its presence. Since poisonous bait is well accepted by the target rodent, it is considered that the target rodent will make up about 50% of the daily consumption: PD = 0.5. For registration of rodenticides it is required that the consumption of the rodenticide makes up at least 20% of the total daily consumption in choice tests: PD = 0.2[29]. Therefore, PD values of 0.2, 0.5 or 1 are included in the following calculations.

Anticoagulant rodenticides are eliminated from the body mainly through faeces. A worst-case scenario assumes that the target rodent will eat continuously during the whole period and that the elimination of active substance is 30% per day during the whole period. Therefore a default elimination factor of 0.3 is used.

A normal susceptible rodent may eat an anticoagulant rodenticide for some days before it stops eating. The feeding period has been set to a default value of 5-days, which corresponds to the feeding pattern observed in laboratory experiments. The mean time until death has been set to a default value of 7-days.

EC_3 is the concentration of residues in the animal before new meal on Day 3 and so forth. Therefore, the concentration of residues on Day 6 is calculated stepwise this way:
$EC_3 = (EC_2 + ETE) * (1 - 0.3)$
$EC_4 = (EC_3 + ETE) * (1 - 0.3)$
$EC_5 = (EC_4 + ETE) * (1 - 0.3)$
$EC_6 = (EC_5 + ETE) * (1 - 0.3)$

29 EU course “Exposure scenarios in Risk Assessment of Wood Preservatives and Rodenticides”, Dr. Marta A. Sobanska, 9 – 10 October 2003, ECB, Ispra, (web http://ihcp.jrc.ec.europa.eu/our_activities/health-env/risk_assessment_of_Biocides/doc/ESD/TRAINING_COURSE/PT14_RODENTICIDES > Exercise 4)

For considering the elements in a secondary poisoning scenario for resistant rodents, the concentration of active substance that may be present after a 14-day control operation has been included in the calculations. However, this is considered as a special type of a worst-case scenario, which should only be considered in cases of resistance problems.

For the resistant rodent the calculations have been continued until Day 14 after the meal.

The sum of the above-mentioned considerations is expressed in the following table regarding the content of active substance in the target rodent that may be available to raptors and scavengers.

Table VI.1.8-1: Residues of Bromadiolone in target rodent in mg a.s./kg b.w. at different times during a control operation (concentration of active substance in rodenticide bait 0.005%)

	Residues of rodenticide in target animal, mg a.s./kg b.w. with bait consumption expressed as PD		
	0.2	**0.5**	**1**
A normal non-resistant target rodent stops eating on day 5			
Day 1 after the first meal*	1.00	2.50	5.00
Day 2 before new meal**	0.70	1.75	3.50
Day 5 before new meal	1.77	4.43	8.87
Day 5 after the last meal	2.77	6.93	13.9
Day 6**	1.94	4.85	9.71
Day 7 (mean time to death)**	1.36	3.40	6.79
A target rodent continues eating due to resistance			
Day 14 after the meal	3.31	8.28	16.6

* Equation for ETE is used for calculation of rodenticide in target animal on Day 1 immediately after first meal.

**Equation for EC (primary poisoning) is used for calculating the value for Day 2 before new meal.

The assessments indicate an increased concentration in resistant rodents. The users should be aware of resistance problems and thereby avoid this risk by checking the resistance status of the rodent population in the area to be controlled and by considering the choice of the rodenticide to be used.

Regarding a control operation against normal susceptible rodents, it is seen that the highest concentration of active substance is found in rodents that have just taken their last meal on the fifth day before they are going to die. The realistic worst case is considered best described when the target rodent has consumed an amount of rodenticide making up 100% of its daily food intake.

Tier 1 risk assessment:

For the first tier assessment of secondary poisoning, the maximum residue levels in target rodents that arise on day-5 after the last meal ($ETE_{oral\ predator}$) are compared to the PNEC values for concentration in food. The Estimated Theoretical Exposure to an active substance in food of a rodent-eating predator is calculated as follows:

$$ETE_{oral,predator} = (EC_n + ETE_{rodent}) \times F_{rodent}$$

where:

$ETE_{oral,\ predator}$: Estimated Theoretical Exposure to an active substance in food of a predator per day

EC_n: Expected concentration of active substance in the rodent on day "n" before the last meal

ETE_{rodent}: Estimated uptake of active substance by rodent on day "n" (*i.e.* intake of rodenticide in the last meal, no elimination)

F_{rodent}: Fraction of poisoned rodents in predator's diet

The first tier assessment also assumes the following three levels of Bromadiolone bait consumption: 20%, 50% and 100% of the daily food intake of the target rodents. For long-term exposure, it is assumed that the rodents have fed entirely on rodenticide (*i.e.* 100%, PD = 1) and that the non-target animals consume 50% of their daily intake on poisoned rodents (F_{rodent} = 0.5).

Table VI.1.8-2: Tier 1 risk assessment of secondary poisoning at day 5 (non-resistant rodents)

Organism group	$PNEC_{oral}$ (mg a.s./kg b.w.)	$ETE_{oral,\ predator}$ (mg a.s./kg b.w.)			$PEC_{oral}/PNEC_{oral}$ – day 5		
PD values	-	0.2	0.5	1.0	0.2	0.5	1.0
Acute							
Birds	0.00120	2.77	6.93	13.9	2 308	5 775	11 583
Mammals	$8.33*10^{-6}$				$3.33*10^{5}$	$8.32*10^{5}$	$1.67*10^{6}$
Long-term							
Birds	0.0013	1.39	3.47	6.95	1 069	2 669	5 346
Mammals	0.0000056				$2.48*10^{5}$	$6.20*10^{5}$	$1.24*10^{6}$

Table VI.1.8-3: Tier 1 risk assessment of secondary poisoning at day 14 (resistant rodents)

Organism group	$PNEC_{oral}$ (mg a.s./kg	$ETE_{oral,\ predator}$ (mg a.s./kg b.w.)	$PEC_{oral}/PNEC_{oral}$ – day 14

	b.w.)						
PD values	-	0.2	0.5	1.0	0.2	0.5	1.0
Acute							
Birds	0.00120	3.31	8.28	16.6	2 758	6 900	13 833
Mammals	$8.33*10^{-6}$				$3.97*10^{5}$	$9.94*10^{5}$	$1.99*10^{6}$
Long-term							
Birds	0.0013	1.66	4.14	8.30	1 277	3 185	6 385
Mammals	0.000 0056				$2.96*10^{5}$	$7.39*10^{5}$	$1.48*10^{6}$

According to this assessment the risk for poisoning of non-target predator birds and mammals during acute and long-term exposure via rodents poisoned with Bromadiolone is very high. Therefore, a refined tier 2 assessment is set out below, based on representative species.

Tier 2 risk assessment:

The refined tier 2 risk assessment considers exposure of relevant species of predators, based on their bodyweights and food intakes. Food intake of non-target animals can vary significantly, depending on the metabolic rates of species, the nature of their food, weather conditions, time of year, etc. Several bird and mammal species are chosen to refine the risk assessment: Birds: barn owl, kestrel, little owl and tawny owl.
Mammals: fox, polecat, stoat and weasel.

The bodyweights and food intake are drawn from the EUBEES 2 guidance document and on documents referred to therein (SANCO/4145/2000).

In the following Table **VI.1.8-4**, the expected values for uptake of active substance by a bird of prey or a mammal predator are presented after a single day of exposure and the expected concentration in the non-target animals as a second tier exposure estimation of secondary poisoning.

Table VI.1.8-4: Expected concentrations of active substance in non-target animals (predators / carnivores) due to secondary poisoning after a single day of exposure (concentration of active substance in rodenticide bait 0.005%). Rodents feed 100% on rodenticide, and predators / carnivores feed 50% on poisoned rodents

	Normal susceptible rodents caught on day 5, before their last meal.	**Normal susceptible rodents caught on day 5 just after their last meal**	**Resistant rodents caught on day 14 just after their last meal**

Species		Body weight *) (g)	Daily mean food intake*) (g)	Amount a.s. consumed by the non-target animal** (mg)	Concentration in non-target animal (mg a.s./kg b.w.)	Amount a.s. consumed by the non-target animal*** (mg)	Concentration in non-target animal (mg a.s./kg b.w.)	Amount a.s. consumed by the non-target animals**** (mg)	Concentration in non-target animal (mg a.s./kg b.w.)
Barn Owl	*Tyto alba*	294	72.9	0.32	1.10	0.51	1.72	0.61	2.06
Kestrel	*Falco tinnuncul.*	209	78.7	0.35	1.68	0.55	2.62	0.65	3.13
Little owl	*Athene noctua*	164	46.4	0.21	1.26	0.32	1.97	0.39	2.35
Tawny Owl	*Strix aluco*	426	97.1	0.43	1.01	0.67	1.58	0.81	1.89
Fox	*Vulpes vulpes*	5 700	520.2	2.31	0.41	3.62	0.63	4.32	0.76
Polecat	*Mustela putorius*	689	130.9	0.58	0.85	0.91	1.32	1.09	1.58
Stoat	*Mustela erminea*	205	55.7	0.25	1.21	0.39	1.89	0.46	2.26
Weasel	*Mustela nivalis*	63	24.7	0.11	1.74	0.17	2.72	0.21	3.25

*) all values from EUBEES 2 ESD

) this is based on 8.87 mg a.s./kg b.w. rat (see calculation for Table **VI.1.8-1) and that the non-target carnivores fed 50% on poisoned rodents.

***) this is based on 13.9 mg a.s./kg b.w. rat (see calculation for Table **VI.1.8-1**) and that the non-target carnivores fed 50% on poisoned rodents.

****) this is based on 16.6 mg a.s./kg b.w. rat (see calculation for Table **VI.1.8-1**) and that the non-target carnivores fed 50% on poisoned rodents.

Like for the first tier risk assessment, the $ETE_{oral\ predator}$ is compared to the $PNEC_{oral}$.

Table 3.3.6.2-5: Tier 2 risk assessment of secondary poisoning (non resistant and resistant rodents)

Species	**Exposure**	**ETE $_{oral\ predators}$ (mg a.s./kg/d)**	**PNEC$_{oral}$ (mg a.s./kg/d)**	**Ratio ETE $_{oral\ predators}$ / PNEC$_{oral}$**
Barn owl	Day 5 before the last meal	1.10	0.0013	846
	Day 5 after the last meal	1.72		1 323
	Day 14 after the last meal	2.06		1 585
Kestrel	Day 5 before the last meal	1.68	0.0013	1 292
	Day 5 after the last meal	2.62		2 015
	Day 14 after the last meal	3.13		2 408
Little owl	Day 5 before the last meal	1.26	0.0013	969
	Day 5 after the last meal	1.97		1 515
	Day 14 after the last meal	2.35		1 808
Tawny owl	Day 5 before the last meal	1.01	0.0013	777
	Day 5 after the last meal	1.58		1 215
	Day 14 after the last meal	1.89		1 454
Fox	Day 5 before the last meal	0.41	0.0000056	$7.32*10^4$
	Day 5 after the last meal	0.63		$1.13*10^5$
	Day 14 after the last meal	0.76		$1.36*10^5$
Polecat	Day 5 before the last meal	0.85	0.0000056	$1.52*10^5$
	Day 5 after the last meal	1.32		$2.36*10^5$
	Day 14 after the last meal	1.58		$2.82*10^5$
Stoat	Day 5 before the last meal	1.21	0.0000056	$2.16*10^5$
	Day 5 after the last meal	1.89		$3.38*10^5$
	Day 14 after the last meal	2.26		$4.04*10^5$
Weasel	Day 5 before the last meal	1.74	0.0000056	$3.11*10^5$
	Day 5 after the last meal	2.72		$4.86*10^5$
	Day 14 after the last meal	3.25		$5.80*10^5$

All ratios ETE$_{oral\ predators}$ / PNEC$_{oral}$ are above the trigger value of 1 indicating an unacceptable risk of secondary poisoning.

ANNEX VII: Residue Calculations

No residue calculations are required as Jade Paste is a ready to use bait, which is used to kill rats and mice. Jade Paste will not come into contact with the human food chain. The bait may be used indoors, around buildings, away from buildings and around waste sites and sewers. The bait will be placed at protected bait points in dry locations, protected from the weather to help prevent access by non target animals.