Product Assessment Report

RATONEX BLOQUE

July 2013

Internal registration/file no:	
Authorisation/Registration no:	ES/AA-2013-14-00094
Granting date/entry into force of authorisation/ registration:	12 july 2013
Expiry date of authorisation/ registration:	31 march 2015
Active ingredient:	Difenacoum
Product type:	14

Biocidal product assessment report related to product authorisation under Directive 98/8/EC

5 de julio

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1 General information about the product application

1.1 Applicant

Company Name:	WILL KILL, S.A.
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City:	Palma de Mallorca
Postal Code:	07011
Country:	Spain
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1.1.1 Person authorised for communication on behalf of the applicant

Name:	Onofre Sureda Juan
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1.2 Current authorisation holder[1]

Company Name:	WILL KILL, S.A.
Address:	C/. 4 de noviembre, 6
City:	Palma de Mallorca
Postal Code:	07011
Country:	Spain
Telephone:	971203013
Fax:	971759434
E-mail address:	laboratorio@willkill.com
Letter of appointment for the applicant to represent the authorisation holder provided (yes/no):	yes

[1] Applies only to existing authorisations

1.3 Proposed authorisation holder

Company Name:	WILL KILL, S.A.
Address:	C/. 4 de noviembre, 6
City:	Palma de Mallorca
Postal Code:	07011
Country:	Spain
Telephone:	971203013
Fax:	971759434
E-mail address:	laboratorio@willkill.com
Letter of appointment for the applicant to represent the authorisation holder provided (yes/no):	yes

1.4 Information about the product application

Application received:	9 april 2010
Application reported complete:	-
Type of application:	authorisation
Further information:	ES has RATONEX BLOQUE currently authorised under national legislation for use as a rodenticide (PT14). The current application is for PT14 use and that will be assessed and authorised under 98/8/EC.

1.5 Information about the biocidal product

1.5.1 General information

Trade name:	RATONEX BLOQUE
Manufacturer's development code number(s), if appropriate:	-
Product type:	14
Composition of the product (identity and content of active substance(s) and substances of concern; full composition see confidential annex):	Difenacoum
Formulation type:	Wax Block
Ready to use product (yes/no):	Yes
Is the product the very same (identity and content) to another product already authorised under the regime of directive 98/8/EC (yes/no); If yes: authorisation/registration no. and	No

product name: **or** **Has the product the same identity and composition like the product evaluated in connection with the approval for listing of active substance(s) on to Annex I to directive 98/8/EC (yes/no):**	

1.5.2 Information on the intended use(s)

Overall use pattern (manner and area of use):	The product is intended for the control of rats and mice, by: • Trained professional users: Indoors (inside private, public and farm buildings), in and around (private, public and farm buildings) and outdoors (waste dumps and open areas). • Non-trained professional users: Indoors and around (maximum: 0.5 m) farm buildings • Non-professional users: Indoors (only inside private houses and outbuildings) and around (maximum: 0.5 m) private building premises and private gardens.
Target organisms:	Rodents (rats and mice)
Category of users:	Professional (trained and non-trained) and non-professional users
Directions for use including minimum and maximum application rates, application rates per time unit (e.g. number of treatments per day), typical size of application area:	For the control of rats, baits of 200g should be placed each 3 to 5 m. For the control of mice, baits of 40-50g should be placed each 3 to 5 m. Baiting points are inspected frequently and replenished when bait has been eaten. 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 bait are removed for disposal. Bait points should be removed, in a typical campaign, 6 weeks after initial placement.
Potential for release into the environment (yes/no):	Yes
Potential for contamination of food/feedingstuff (yes/no)	No
Proposed Label:	See the authorisation
Use Restrictions:	See the authorisation

1.5.3 Information on active substance(s)[2]

Active substance chemical name:	Difenacoum	3-(3-biphenyl-4-yl-1,2,3,4-tetrahydro-1-naphthyl)-4-hydroxycoumarin
CAS No:	56073-07-5	
EC No:	259-978-4	
Purity (minimum, g/kg or g/l):	≥ 960 g/kg	
Inclusion directive:	Directive 2008/81/EC	
Date of inclusion:	1 April 2010	
Is the active substance equivalent to the active substance listed in Annex I to 98/8/EC (yes/no):	yes	
Manufacturer of active substance(s) used in the biocidal product:	Activa s.r.l.	
Company Name:	*Activa s.r.l.*	
Address:	Via Tre Ponti	
City:	Maria de Zevio	
Postal Code:	37050 S	
Country:	Italy	
Telephone:	+39 0456069004	
Fax:	+39 0456069118	
E-mail address:	activa@activa.it	

1.5.4 Information on the substance(s) of concern[3]

The biocidal product does not contain any substance of concern according to the Technical Notes for Guidance on data requirements.

1.6 Documentation

1.6.1 Data submitted in relation to product application

The applicant has sent new data about the active substance. Regarding analytical methods, in order to support the product authorisation, the manufacture of the active substance (Activa S.r.l. as a member of the Activa/Pelgar Difenacoum and Brodifacoum Task Force) has sent studies on difenacoum regarding identity of impurities and additives concerning, validate analytical methods in water, in animal matrices and in sediments.

The biocidal product is a solid ready to use and it does not contain any substance of concern according to the Technical Notes for Guidance on data requirements.

Ecotoxicology data

[2] Please insert additional columns as necessary
[3] Please insert additional columns as necessary

The applicant has not provided any ecotoxicological study with the biocidal product. The environmental risk assessment for RATONEX BLOQUE has been done using the Competent Authority Report on the active substance difenacoum supported by the Task Force Activa/Pelgar.

1.6.2 Access to documentation

The applicant has submitted a letter of access from Activa source (notifier for Annex I inclusion and having on all the data included in the dossier for difenacoum presented by The Activa/Pelgar Brodifacoum and Difenacoum Task Force).

The safety data sheets of all substances are included in the dossier.

2 Summary of the product assessment

2.1 Identity related issues

The active substance was included in the Annex I of Directive 98/8/EC (Commission Directive 2008/81/EC of 28 July 2008). The letter of access is from Activa source.

Data on the active substance were required at the product authorization stage as stated in the AR about the active substance and were provided by Activa:

- Analytical data to prove the isomeric composition and impurity profile of the active substance

The assessment of the technical equivalence of the source of difenacoum from Activa versus the reference source of Pelgar used for annex I inclusion has been performed by France. The conclusion is that the source of Activa is technically equivalent to the source of Pelgar assessed for annex I inclusion. The confidential document is attached to this PAR.

The co-formulants are not substances of concern. The formulation includes bittering agent, preservative, dye, binder, flavouring and adyuvants. Information on the full composition of the product and assessment are detailed in additional confidential annex of this document.

2.2 Classification, labelling and packaging

On basis of the submitted data and the Annex VI to Regulation No 1272/2008 on classification, labelling and packaging of dangerous substances, we suggest the following classification:

According to Directive 1999/45/EC:

Class of danger	No classification
R-phrases	Any risk phrase is considered necessary
S-phrases	S2: Keep out of the reach of children S13: Keep away from food, drink and animal feedingstuffs S37: Wear gloves S46: If swallowed, seek medical advice immediately and show this container or label

2.2.1 Harmonised classification and labelling of the biocidal product

Until 1 June 2015, mixtures shall be classified, labelled and packaged in accordance with Directive 1999/45/EC. Nevertheless, the biocidal product, according to Regulation 1272/2008, does not require classification and the Precautionary statements are:

P102: Keep out of reach of children.
P103: Read label before use.
P280: Wear protective gloves
P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

2.2.2 Packaging of the biocidal product

For **trained professional users**, the product is placed on the market as solid loose blocks of 6, 10 or 15g inside containers of 1, 2.5, 3, 9, 10, 20 and 25kg.

For non-trained professional and **non-professional users**, the product is placed on the market as solid loose blocks of 6, 8, 10 and 15g inside boxes of 25, 50, 100, 180, 250 and 500g and 1kg.

The blocks will always be placed in a bait station.

2.3 Physico/chemical properties and analytical methods

No new studies have been submitted about the physical/chemical properties for the active substance. Regarding analytical methods, in order to support the product authorisation, the manufacturer of the active substance (Activa S.r.l. as a member of the Activa/Pelgar Difenacoum and Brodifacoum Task Force) has sent studies on difenacoum regarding identity of impurities and additives concerning, validate analytical methods in water, in animal matrices and in sediments.

2.3.1 Physico-chemical properties

Regarding the active substance, difenacoum, the table has not been filled in because a letter of access has been submitted. Regarding the biocidal product, these are the physico-chemical properties:

Table 1: Physico-chemical properties of the biocidal product:

	Method	Purity/Specification	Results	Reference
Physical state and nature	visual		solid	B3.1
Colour			blue	B3.1
Odour			Wheat & paraffin smell	B3.1
Explosive properties	Directive 92/69/EC		Any component is considered explosive	B3.2
Oxidizing properties	Directive 92/69 EC		Any component is considered oxidizing	B3.3
Flash point			Only applicable to liquids	B3.4
Autoflammability				B3.4
Other indications of flammability				
Acidity / Alkalinity			No relevant	B3.5
Relative density / bulk density	pycnometer		1,1651 g/ml	B3.6
Storage stability – stability and shelf life	CIPAC MT 46.3 PNT ATC0100 LC-UV/DAD		Stable Stable	B3.7
Effects of temperature				
Effects of light				
Reactivity towards container material			Any component presents reactivity towards container material	
Technical characteristics in dependence of the formulation type			n.a The product is a solid ready-to-use	B3.8
Compatibility with other products			Not applicable. It is a product of direct application: the application is made directly without being in combination with other products / biocides	B3.9

	Method	Purity/Specification	Results	Reference
Surface tension			Not applicable. Since the product is a ready-to-use solid and is not expected to be dissolved in water	B3.10
Viscosity			Not applicable. It is a solid product	B3.10
Particle size distribution			n.a. It is a solid block without free particles	B3.11

2.3.2 Analytical methods

	Principle of method
Technical active substance as manufactured:	Difenacoum quantified in technical grade material by HPLC with UV detection at 254 nm using an internal standard.
Impurities in technical active substance:	Impurities in technical grade material quantified by HPLC with UV detection using either an internal or external standard.
Active substance in the formulation:	Difenacoum determination was made by Liquid Chromatography with Mass detector. The determination method is in the dilution of the sample with methanol at acidic pH and the subsequent injection in the liquid chromatograph. The method is described in the internal procedure AGQ PE-827.
Analytical methods for residues	
Soil (principle of method and LOQ)	After extraction of the soil samples by chloroform acetone, concentrated extracts are purified with a Florisil –sodium sulphate column. Quantification is done by HPLC–DAD detector. The method has been acceptably validated for samples of soil containing difenacoum at levels of 0.016, 0.063 and 0.158 mg/Kg. LOQ is 0.0214 mg/Kg
Air (principle of method and LOQ)	Not relevant, due to the low vapour pressure of difenacoum
Water (principle of method and LOQ)	The test method for determination of difenacoum in drinking, ground and surface waters is based on extraction by dichloromethane. Quantification is done by LC-MS/MS (both SIM and SMR mode). LOQ is 0.05 µg/L for drinking water and groundwater and 0.5 µg/L for surface water.
Food/feed of plant origin (principle of method and LOQ for methods for monitoring purposes)	Method of residue analysis for cucumber, wheat and lemon has been validated acceptably. The purified extracts are analysed for residues of difenacoum by LC-MS. LOQ is 0.01 mg/kg

Data on the active substance difenacoum were required at the product authorization stage as stated in the AR of the active substance and were provided by Activa:
- Analytical data to prove the isomeric composition and impurity profile of the active substance,
- A validated method for the analysis of difenacoum in animal and human tissues,
- Validation data for the determination of residues of difenacoum in meat and oil-seed rape (food/feeding stuffs),
- Validation data for the determination of difenacoum in sediment.

Results of the assessment of the analytical methods provided by Activa on the active substance as required in the CAR:

- Analytical data to prove the isomeric composition and impurity profile of the active substance,

Results of the assessment:

→ The method provided doesn't allow to identify and quantify separately the two diastereoisomers. Nevertheless FR CA considers that the provided data allow the determination of the isomeric composition.

→ The submitted data allow to determine the impurity profile.

See table below and the confidential appendix "Technical equivalence Difenacoum Activa" for detailed information.

- A validated method for the analysis of difenacoum in animal and human tissues

Results of the assessment: The method is validated and is acceptable.

- Validation data for the analytical method for determination of residues of difenacoum in meat and oil-seed rape (food/feeding stuffs)

Results of the assessment: The data provided were not validation data based on the analysis method already provided in the dossier, as requested. The submitted study report provided a new method with validation data. This new method is validated and is acceptable.

- Validation data for analytical method for determination of difenacoum in sediment (based on the analysis method for difenacoum in soil)

Results of the assessment: The data provided were not validation data based on the analysis method for difenacoum in soil, as requested. The submitted study report provided a new method with validation data. This new method is validated and is acceptable.

2.4 Risk assessment for Physico-chemical properties

No new data on physico-chemical properties of the active substance have been submitted. The active substance Difenacoum is stable with the temperature. Difenacoum is not highly flammable, doesn't release gas in dangerous amount in the contact with the water, neither is oxidizing. The a.i. is not explosive.

The biocide RATONEX BLOQUE presents such a stability that can cover two years of shelf life to the product, in the different climates zones.

No hazardous risk is expected for users and bystanders, with regard to the physical and chemical properties of this formulation. It is not recommended to be used with other products.

Its technical properties indicate that no particular problems are to be expected when it is handled, stored or applied as recommended.

2.5 Effectiveness against target organisms

2.5.1 Function

The product will be used as a rodenticide for the control of rats and mice by both professionals and amateur users. The product is intended for use in and around buildings, open areas and waste dumps. Product type (PT) 14.

2.5.2 Organisms to be controlled, products, organisms or objects to be protected

RATONEX BLOQUE will be used as a rodenticide for the control of rats and mice by both professionals and amateur users. The product is intended for use in and around buildings, open areas and waste dumps. Due to its wax content it can be used in wet and humid places as well. It is used to protect human food and animal feedstuffs and for general hygiene purposes.

Please find the specific species in the following table:

Codes*	Specific names*	Common English Terms*
I.1.1.1	*Rattus norvegicus*	Brown rats
I.1.1.3	*Mus musculus*	House mouse

*Application codes for encoding Rodenticides (PT14), edited the 16 January 2009 on website Ex-ECB.

2.5.3 Effects on target organisms and efficacy

To support the effectiveness of RATONEX BLOQUE only one field study with rats *(Rattus norvegicus)* has been conducted following the guidelines for field trial for rodenticides Annex 3 of "TNG on Product Evaluation, Appendices to Chapter 7 Product Type 14, Efficacy Evaluation of Rodenticidal Biocidal Products".

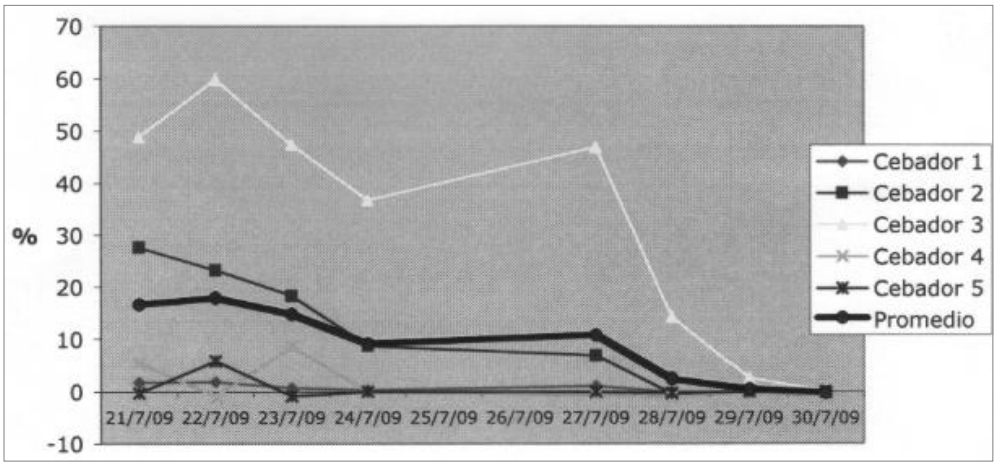
Single-Caged test was made on *Rattus norvegicus*. The results are summarised in the tables below

Tabla 2.5.3-1 Percentage of daily RATONEX BOLQUE consumption in each bait point

Fecha	21-07-09	22-07-09	23-07-09	24-07-09
Cebador 1	1,78	1,90	0,66	0,35
Cebador 2	27,60	23,26	18,38	8,74
Cebador 3	48,85	59,88	47,44	36,73
Cebador 4	5,41	-1,01	8,57	0,00
Cebador 5	-0,29	5,82	-0,89	0,00

Fecha	27-07-09	28-07-09	29-07-09	30-07-09
Cebador 1	1,07	-0,07	0,00	0,00
Cebador 2	6,84	-0,36	0,00	0,00
Cebador 3	46,99	14,31	2,69	0,22
Cebador 4	-0,70	-1,06	0,00	-1,02
Cebador 5	0,01	-0,27	0,00	-0,10

The uncertainty: 2.1%



Day

The decrease in the percentage of consumption of bait until the 0% value is associated with the disappearance of the rodent population (100% mortality).

These data show a good efficacy of the product RATONEX BLOQUE with 0.005% of difenacoum against the target organism *Rattus norvegicus*.The proposed uses by the applicant for RATONEX BLOQUE are also based on four studies conducted by Activa S.r.l. (supplier of the active substance) with ROBAN wax block, similar to RATONEX BLOQUE covered by the letter of access granted to Activa S.r.l. These studies are choice studies conducted according to OEPP/EPPO (1982) and US EPA (1982) guidance. Two studies were conducted on house mouse, one with fresh bait and one with two years aged bait. Two other studies were done on the brown rat and in one of them aged bait was used. The studies are summarized in **Table 2.5.3-2.** Efficacy of the wax block formulation has not been studied in the black rat.

The studies show that ROBAN is palatable to the house mouse and the brown rat according to the criteria given in TNsG on Product Evaluation. The bait intake was more than 20% of the total food consumption in all the studies. The two years storage time in the ambient conditions did not reduce the palatability. The product is concluded to be effective against brown rats as all test animals died within 8-14 days after start of the exposure. The product was also effective against the house mouse with all test animals dying within 7 – 11 days of exposure for fresh bait and 90% of mice dying within 4 – 21 days of exposure for the aged bait. The one surviving individual hardly ate the bait. Its bait intake was less than 3% of the total food intake.

Field studies have also been completed that showed an efficacy of 98.0% to 100% for the rat (*Rattus norvegicus*) and an efficacy of 96.5% to 100% for the mouse (*Mus musculus*). The use of bait for a prolonged period of treatment demonstrated that can be successfully applied without the development of rejection to the bait. The product showed a high level of continuous control of infestations in both house mice and brown rats. These studies are also summarized in **Table 2.5.4-2.**

Table 2.5.3-2 Efficacy of ROBAN wax block containing 50 mg/kg difenacoum.

Test organism	**Test system/ Test conditions**	**Results**	**Reference**
House mouse *(Mus musculus)*	Choice test with aged bait. 4 d exposure + 20 d post monitoring. 5 males + 5 females	Mean bait intake 43.9% of the total food consumption. The mean consumption of the test product and the reference meal were 10.0 g and 12.2 g, respectively. 90% mortality 4-21 d after the start of exposure.	**Svoboda T. (2001)** *Palatability and Efficacy of Aged Roban Wax Block Bait Formulation in Laboratory Mice.* Biopharm, Report No. 51/A/2001.

Test organism	**Test system/ Test conditions**	**Results**	**Reference**
Brown rat *(Rattus norvegicus)*	Choice test with aged bait. 4 d exposure + 20 d post monitoring. 5 males + 5 females	Mean bait intake 37.9% of the total food consumption. The mean consumption of the test product and the reference meal were 39.4 g and 64.5 g, respectively. 100% mortality 9-11 d after the start of exposure.	**Struhar V. (2004)** *Palatability and Efficacy of Aged Roban Wax Block Bait Formulation in Laboratory Rats.* BioTest, s.r.o., Report No. 03/2004.
House mouse *(Mus musculus)*	Choice test. 4 d exposure + 20 d post monitoring. 5 males + 5 females	Mean bait intake 39.4% of the total food consumption. The mean consumption of the test product and the reference meal were 3.6 g and 5.6 g, respectively. 100% mortality 7-11 d after the start of exposure.	**Struhar V. (2004)** *Palatability and Efficacy of Fresh Roban Wax Block Bait Formulation in Laboratory Mice.* BioTest, s.r.o., Report No. 62/2003.
Brown rat (*Rattus norvegicus*)	Choice test. 4 d exposure + 20 d post monitoring. 5 males + 5 females	Mean bait intake 43.8% of the total food consumption. The mean consumption of the test product and the reference meal were 41.4 g and 52.8 g, respectively. 100% mortality 8-14 d after the start of exposure.	**Struhar V. (2003)** *Palatability and Efficacy of Roban Wax Block Bait Formulation in Laboratory Rats.* BioTest, s.r.o., Report No. 59/2003.
Brown rat *(Rattus norvegicus)*	Field trial	Efficacy based on total census bait take = 98.0% Efficacy based on maximum track score = 98.0%	**Capel-Williams G (2003)** *Field trial report to determine the efficacy of Roban Wax Block Bait, containing 0.005% w/w Difenacoum for the control of an Infestation of Brown rats (Rattus norvegicus) in and around Farm Buildings at an Equestrian Centre (Home Farm, Pirbright, Surrey, UK)* PelGar International Ltd., Report No. PEL/007/03.
Brown rat *(Rattus norvegicus)*	Field trial	Efficacy based on total census bait take = 99.9% Efficacy based on maximum track score = 100%	**Capel-Williams G (2003)** *Field trial report to determine the efficacy of Roban Wax Block Bait, containing 0.005% w/w Difenacoum for the control of an Infestation of Brown rats (Rattus norvegicus) in the Gardens of Neighbouring Private Dwellings (Heathside Road/Headside Gardens, Woking, Surrey, UK).* PelGar International Ltd., Report No. PEL/008/03.
House mouse *(Mus musculus)*	Field trial	Efficacy based on total census bait take = 98.2% Efficacy based on maximum track score = 96.5%	**Capel-Williams G (2003)** *Field trial report to determine the efficacy of Roban Wax Block Bait, containing 0.005% w/w Difenacoum for the control of an Infestation of*

Test organism	**Test system/ Test conditions**	**Results**	**Reference**
			House mice (Mus musculus) in a barn at Hawthorn Cottage, Knaphill, Surrey, UK. PelGar International Ltd., Report No. PEL/005/03.
House mouse *(Mus musculus)*	Field trial	Efficacy based on total census bait take = 100% Efficacy based on maximum track score = 100%	**Capel-Williams G (2003)** *Field trial report to determine the efficacy of Roban Wax Block Bait, containing 0.005% w/w Difenacoum for the control of an Infestation of House mice (Mus musculus) in a stable block on a smallholding (Hawthorn Cottage, Knaphill, Surrey, UK)* PelGar International Ltd., Report No. PEL/006/03.

It has also been made a field study with ROBAN Excel against mice. This trial demonstrated efficacy of the product of 92.6%-94.0%. The product showed a high level of infestation control mice. This study is summarized in **Table 2.5.3-3.**

Table 2.5.3-3 Efficacy of ROBAN extruded block bait containing 50 mg/kg difenacoum.

Test organism	**Test system/ Test conditions**	**Results**	**Reference**
House mouse *(Mus musculus)*	Field trial	Efficacy based on total census bait take = 94.0% Efficacy based on maximum track score = 92.6%	**Havers SJ (2009)** *Field trial report to determine the efficacy of Roban Extruded Block Bait, containing 0.005% w/w Difenacoum for the control of an Infestation of House mice (Mus musculus) on an agricultural holding (Folly Farm, North Waltham, Basingstoke, Hampshire, UK).* PelGar International Ltd., Report No. PEL/001/09.

The applicant has claimed that the product is also effective against strains of rodent resistant to first generation anticoagulants such as warfarin, however there is no information on the resistance status of the animals tested in the laboratory or field studies, therefore, it is considered that the claims of efficacy against resistant rodents are not supported.

The performance of bait stored in sewer conditions was not studied for the block bait. The product can be concluded not to be suitable for baiting in damp or wet conditions (i.e. sewers).

2.5.4 Dose / mode of action / known limitations / resistance

RATONEX BLOQUE is an anticoagulant rodenticide that causes internal bleeding, killing slowly and avoiding rejection by other rodents.

To control rats will be used bait stations containing up to 200g of bait and it should be placed at intervals of 3-5 meters. To control mice, the bait stations contain up to 40-50g of bait placed at intervals of 3-5 meters away.

The mode of action is determined by the active substance difenacoum. Difenacoum is a second generantion anticoagulant which prevents blood clotting in the target organisms by inihibiting regeneration of the active form of vitamin K1.

The main site of its 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. Difenacoum accumulates and is stored in the liver until broken down. The plasma prothrombin (pro-coagulant factor II) concentration provides a suitable guide to the severity of acute intoxication and to the effectiveness and required duration of the antidotal therapy (vitamin K1).

When an animal ingests a lethal dose, death occurs a few days after (due to time spent active clotting factors in blood before ingestion of the poison). This delay prevents the rejection of baits by the rat population.

The effects are reversible with the administration of vitamin K1 antidote which stimulates regeneration of coagulation factors.

2.6 Exposure assessment

2.6.1 Description of the intended use(s)

The product is intended for the control of rats and mice, by:

- Trained professional users: Indoors (inside private, public and farm buildings), in and around (private, public and farm buildings) and outdoors (waste dumps and open areas).
- Non-trained professional users: Indoors and around (maximum: 0.5 m) farm buildings
- Non-professional users: Indoors (only inside private houses and outbuildings) and around (maximum: 0.5 m) private building premises and private gardens.

Baits of 200g for rats should be placed each 3 to 5 m.
Baits of 40-50g for mice should be placed each 3 to 5 m.

2.6.2 Assessment of exposure to humans and the environment

Regarding human exposure no studies have been submitted; therefore, the exposure assessment has been performed using the paper "HEEG opinion on a harmonised approach for the assessment of rodenticides (anticoagulants)" agreed at TMII 2011. This paper was based on an operator exposure study conducted by CEFIC/EBPF Rodenticides Data Development Group (Chambers *et al.* (2004)) and the number of manipulations agreed at TMII 2010.

For the environment, no new studies with the product have been presented. The estimated local environmental concentrations (C_{local}) have been calculated with the scenarios outlined in the 'Emission scenario document for biocides used as rodenticides' (Larsen, 2003, hereafter ESD) and TGD (Technical Guidance Document on Risk Assessment in support of Commission Directive 93/67/EEC on Risk Assessment for new notified substances, Commission Regulation (EC) No 1488/94) using default values.

2.7 Risk assessment for human health

2.7.1 Hazard potential

2.7.1.1 Toxicology of the active substance

The toxicology of the active substance was examined extensively according to standard requirements. The results of this toxicological assessment can be found in the CAR when the active substance difenacoum was included in the Annex I of the Directive 98/8/EC. The threshold limits and labelling regarding human health risks listed in Annex 4 "Toxicology and metabolism" must be taken into consideration.

2.7.1.2 Toxicology of the substance(s) of concern

The biocidal product does not contain any substances of concern according to the Technical Notes for Guidance on data requirements.

2.7.1.3 Toxicology of the biocidal product

The toxicology of the biocidal product RATONEX BLOQUE 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.

Acute oral, dermal and inhalation toxicity, skin and eye irritation and skin sensitisation studies have not been provided on the biocidal product, which have been assessed by the ES CA. No studies are available to evaluate the dermal absorption.

Dermal absorption

No studies are available to evaluate the dermal absorption. Therefore, the data on the representative products (wax block) from Annex I inclusion, resulting in an overall dermal absorption value of 0.047% will be used in the risk assessment for RATONEX BLOQUE.

Acute toxicity

It is proposed that information about acute toxicity concerning the biocidal product may be derived from existing data on the active substance difenacoum and the co-formulants in order to minimise animal testing. This means that the assessment of the hazards of the preparation has been carried out by using the appropriate calculation method.

The active substance difenacoum was classified by the Rapporteur Member State, on the basis of review of the submitted data and read-across of data from warfarin. Specific concentration limits were established by the Technical Committee on Classification and Labelling but they have not already been accorded by the Committee for Risk Assessment of the European Chemicals Agency. However, the biocidal product contains 0.005% difenacoum and, according to those specific concentration limits, the classification would be harmful by inhalation, in contact with skin and if swallowed and assigned the symbol Xn and R-phrases R20/21/22 but, as the specific concentration limits have not already been accorded, they cannot be applied.

On the other hand, some of the co-formulants of the product are classified as dangerous substances, but they exist in such small concentration that none of them contribute to the classification of the product (according to the Directive 1999/45/EC).

The vapour pressure of the active substance difenacoum (P (45°C) < 0.05 mPa = < 5 x 10^{-5} Pa) and the formulation type justifies the no classification as harmful by inhalation.

For these reasons, the biocidal product does not require classification about acute toxicity and any phrase is considered necessary.

Skin and eye irritation

It is proposed that information about skin and eye irritation concerning the biocidal product may be derived from existing data on the active substance and the co-formulants in order to minimise animal testing. This means that the assessment of the hazards of the preparation has been carried out by using the appropriate calculation method. Three co-formulant are classified as irritating to eyes and assigned the symbol Xi and the R-phrase R36. The biocidal product contains ≤ 20 % of these irritating substances. About irritation to skin, the biocidal product does not contain any substance with this characteristic. According to Directive 1999/45/EC, RATONEX BLOQUE does not trigger a particular classification.

Skin sensitisation

It is proposed that information about skin sensitisation concerning the biocidal product may be derived from existing data on the active substance and the co-formulants in order to minimise animal testing. This means that the assessment of the hazards of the preparation has been carried out by using the appropriate calculation method. The co-formulants are not considered sensitizer. On the other hand, according to the final CAR of difenacoum, the applicant submitted two sensitisation studies with a 2.5% liquid concentrate of difenacoum in solvents, one Magnusson & Kligman test and one Buehler test. These studies were negative; these mean that the active substance is not considered sensitizer and, for these reasons, the biocidal product does not require classification.

2.7.2 Exposure

Regarding human exposure no studies have been submitted; therefore, the exposure assessment has been performed using the paper "HEEG opinion on a harmonised approach for the assessment of rodenticides (anticoagulants)" agreed at TMII 2011. This paper was based on an operator exposure study conducted by CEFIC/EBPF Rodenticides Data Development Group (Chambers *et al.* (2004)) and the number of manipulations agreed at TMII 2010.

The most relevant routes of exposure are the following:

Exposure path	Industrial use	Professional use	General public	Via the environment
Inhalation	Not relevant	Not relevant	Not relevant	Not relevant
Dermal	Not relevant	Potentially significant	Potentially significant	Negligible
Oral	Not relevant	Negligible	Relevant	Negligible

Concerning dermal absorption, no study is submitted for this RATONEX BLOQUE. Therefore, the data on the representative PelGar products (wax block) from Annex I inclusion, resulting in an overall dermal absorption value of 0.047% will be used in the risk assessment for RATONEX BLOQUE.

2.7.2.1 Exposure of professional users

Trained professionals (Pest Control Operators)

Pest Control Operators are trained in the correct use of the block bait, i.e. placement, number of bait boxes required based on the infestation rate area, the amount of block bait per bait box and safe handling procedures. They handle the product on a daily basis and they will be exposed during loading of bait boxes, application of the bait and clean-up. The exposure will be via the dermal route, with the inhalation exposure being negligible, due to the fact that the product is a wax block and that difenacoum is non-volatile. Gloves are worn when loading bait boxes and disposing of remaining bait and carcasses.

During use, professional pest control operators will be exposed through the loading of bait boxes and application of the bait. Exposure will be via the dermal route and to the hands only. During disposal, professional pest control operators will be exposed through the disposal of old bait and carcasses. Exposure will be via the dermal route and to the hands only.

The following points have been taken into consideration for the assessment of the potential exposure of professional users of RATONEX BLOQUE:

1. RATONEX BLOQUE is supplied loose for use by professional users. Therefore, the assessment is made for product not in sachets.

2. As no human exposure studies have been submitted, the exposure assessment has been performed using the paper "HEEG opinion on a harmonised approach for the assessment of rodenticides (anticoagulants)" agreed at TMII 2011. This paper was based on an operator exposure study conducted by CEFIC/EBPF Rodenticides Data Development Group (Chambers et al. (2004)) and the number of manipulations agreed at TMII 2010.

3. The product is ready to use, then there is no decanting or mixing and loading task. The number of contacts is considered critical rather than the size of the bait. Therefore, as a worst-case, the total daily exposure frequency is assumed to be 75 manipulations, for the placing of 200g bait (maximum dose for rats) on 60 sites and the cleaning of 15 bait sites. It should be noted that the worst case of block weight is 6 g, therefore the placing of 33 blocks is equivalent to 200g bait. With these assumptions, placing of 33 blocks per bait site results in exposure of 183.41 mg of product, and clean-up of one bait site results in exposure of 5.75 mg of product

4. Although it could be assumed that professional users wear protective gloves when handling the products, an exposure scenario without personal protective equipment is also included as a worst case. Gloves are assumed to reduce the exposure of hands by 90%.

5. It is assumed that 100% of inhalation exposure is absorbed. Concerning dermal absorption, no study is submitted for this RATONEX BLOQUE. Therefore, the data on the representative product (wax block) from Annex I inclusion, resulting in an overall dermal absorption value of 0.047% will be used in the risk assessment.

6. Operator body weight is assumed to be 60 kg.

Dermal Exposure

Based on extrapolation from the operator exposure study, exposure to difenacoum of trained professional operators applying RATONEX BLOQUE is estimated to be 4.34 x 10^{-7} mg/kg bw/day. However, if as a worst case it is considered that operators do not use the personal protective equipment, the total systemic dose to difenacoum is estimated as 4.34 x 10^{-6} mg/kg bw/day.

The calculation is summarised in the table below.

Table 2.7.2.1-1: Exposure for pest control operators during the placing and cleaning of RATONEX BLOQUE

Dermal exposure		
Active substance content		0.005 %
Dermal absorption		0.047 %
Bodyweight		60 kg
Loading	Amount of exposure to product during loading (75th percentile for more than 4 manipulations)	27.79 mg b.p. / 5 contacts x 33 contacts = 183.41 mg b.p
	Nº of manipulations during loading	60
	Systemic dose (no gloves)	4.31 x 10^{-6} mg/kg bw/day
	Systemic dose (with gloves, 10% penetration)	4.31 x 10^{-7} mg/kg bw/day
Cleaning	Amount of exposure to product during loading (75th percentile for more than 4 manipulations)	5.7 mg b.p
	Nº of manipulations during cleaning	15
	Systemic dose (no gloves)	3.35 x 10^{-8} mg/kg bw/day
	Systemic dose (with gloves, 10% penetration)	3.35 x 10^{-9} mg/kg bw/day
Total	**Systemic dose (no gloves)**	**4.34 x 10^{-6} mg/kg bw/day**
	Systemic dose (with gloves, 10% penetration)	**4.34 x 10^{-7} mg/kg bw/day**

Inhalation Exposure

Due to the physical nature of the product, and due to the fact that difenacoum is non-volatile, the inhalation exposure is not considered relevant. Moreover, the HEEG paper indicates that according to a pilot study, the inhalation exposure during loading and cleaning of wax blocks was determined as negligible.

Oral Exposure

It is not likely that block baits reach the mouth of professionals if label instructions are followed and hands are washed after handling the bait. Therefore, oral exposure can be considered negligible.

Non-trained professionals

Dermal exposure

As a worst-case total daily exposure frequency, it is assumed that the non-trained professionals places the equivalent of 33 bait blocks (200 g block bait) per site on five bait sites and cleans five bait sites per day.

Based on extrapolation from the operator exposure study, exposure to difenacoum of trained professional operators applying RATONEX BLOQUE is estimated to be 3.70 x 10^{-8} mg/kg bw/day mg/kg bw/day. However, if as worse case it is considered that operators do not use the personal protective equipment, the total systemic dose to difenacoum is estimated as 3.70 x 10^{-7} mg/kg bw/day mg/kg bw/day.

Table 2.7.2.1-2: Exposure for non-trained professionals during placing and cleaning of RATONEX BLOQUE

Dermal exposure		
Active substance content		0.005%
Dermal absorption		0.047%
Bodyweight		60 kg
Loading	Amount of exposure to product during loading (75^{th} percentile for more than 4 manipulations)	27.79 mg b.p. / 5 contacts x 33 contacts = 183.41 mg b.p
	Nº of manipulations during loading	5
	Systemic dose (no gloves)	3.59×10^{-9} mg/kg bw/day
	Systemic dose (with gloves, 10% penetration)	3.59×10^{-8} mg/kg bw/day
Cleaning	Amount of exposure to product during loading (75^{th} percentile for more than 4 manipulations)	5.7
	Nº of manipulations during cleaning	5
	Systemic dose (no gloves)	1.12×10^{-8} mg/kg bw/day
	Systemic dose (with gloves, 10% penetration)	1.12×10^{-9} mg/kg bw/day
Total	**Systemic dose (no gloves)**	**3.70×10^{-7} mg/kg bw/day**
	Systemic dose (with gloves, 10% penetration)	**3.70×10^{-8} mg/kg bw/day**

2.7.2.2 Exposure of non-professional users and the general public

Exposure of Non-Professional Users

Non-professional users are untrained and cannot be expected to wear protective clothing. Use is occasional for a short time in a single day and unlikely to be repeated more than once a week. After use the product is likely to be collected and disposed of in a controlled way (as directed by product labels). The products are used by non-professionals in and around buildings against rats (*Rattus norvegicus*) and mice *(Mus musculus)* .

The potential exposure of non-professional users to RATONEX BLOQUE is assessed below. The following points have been taken into consideration:

1. RATONEX BLOQUE is supplied loose for use by non-professional users. Therefore, the assessment is made for product not in sachets.

2. As no human exposure studies have been submitted, the exposure assessment has been performed using the paper "HEEG opinion on a harmonised approach for the assessment of rodenticides (anticoagulants)" agreed at TMII 2011. This paper was based on an operator exposure study conducted by CEFIC/EBPF Rodenticides Data Development Group (Chambers et al. (2004)) and the number of manipulations agreed at TMII 2010.

3. The product is ready to use, then there is no decanting or mixing and loading task. The number of contacts is considered critical rather than the size of the bait. It should be noted that the worst case of block weight is 6 g, therefore the placing of 33 blocks is equivalent to 200g bait, resulting in exposure of 183.41 mg of product, while the clean-up of one bait site results in exposure of 5.75 mg of product.

4. Two scenario are proposed, the first scenario with no exposure during the application phase and the second scenario assuming that the bait boxes would have to be loaded by the user. It is proposed that non-professional users perform five manipulations per day without the decanting task

5. Non-professional users are assumed **not** to wear protective gloves (or other protective clothing) when handling the products.

6. It is assumed that 100% of inhalation exposure is absorbed. Concerning dermal absorption, no study is submitted for this RATONEX BLOQUE. Therefore, the data on the representative product (wax block) from Annex I inclusion, resulting in an overall dermal absorption value of 0.047% will be used in the risk assessment.

7. Body weight is assumed to be 60 kg.

Dermal Exposure

Total systemic exposure to difenacoum of non-professional operators applying RATONEX BLOQUE is estimated at 3.70×10^{-7} mg/kg bw/day when the product is used or 1.12×10^{-8} mg/kg bw/day when there is exposure only during cleaning the bait. The calculations are summarised in the tables below.

Table 2.7.2.2-1: Exposure for non-professionals during the cleaning of RATONEX BLOQUE

Dermal exposure		
Active substance content		0.005 %
Dermal absorption		0.047 %
Bodyweight		60 kg
Cleaning	Amount of exposure to product during loading (75^{th} percentile for more than 4 manipulations)	5.7 mg b.p
	Nº of manipulations during cleaning	5
	Systemic dose (no gloves)	**1.12×10^{-8} mg/kg bw/day**

Table 2.7.2.2-2: Exposure for non-professionals during the placing and cleaning of RATONEX BLOQUE

Dermal exposure		
Active substance content		0.005 %
Dermal absorption		0.047 %
Bodyweight		60 kg
Loading	Amount of exposure to product during loading (75^{th} percentile for more than 4 manipulations)	27.79 mg b.p. / 5 contacts x 33 contacts = 183.41 mg b.p
	Nº of manipulations during loading	5
	Systemic dose (no gloves)	3.59×10^{-7} mg/kg bw/day
Cleaning	Amount of exposure to product during loading (75^{th} percentile for more than 4 manipulations)	5.7
	Nº of manipulations during cleaning	5
	Systemic dose (no gloves)	1.12×10^{-8} mg/kg bw/day
Total	**Systemic dose (no gloves)**	**3.70×10^{-7} mg/kg bw/day**

Inhalation Exposure

Due to the physical nature of the product, and due to the fact that difenacoum is non-volatile, the inhalation exposure is not considered relevant. Moreover, the HEEG paper indicates that according to a pilot study, the inhalation exposure during loading and cleaning of wax blocks was determined as negligible.

Oral Exposure

It is not likely that block baits reach the mouth if label instructions are followed and hands are washed after handling the bait. Therefore, oral exposure can be considered negligible.

Indirect exposure as a result of use of the active substance in biocidal product

In order to minimise the risk of ingestion of the bait by humans the bait contains a bittering aversive agent. The bait boxes have been manufactured to prevent incidental poisoning to both non-target animals and man, i.e. children. They are hard plastic and are either locked or sealed shut to prevent access to the bait. If bait boxes are not used, the bait point should be covered or protected in such a way to prevent access to the bait.

However, indirect exposure, especially of children may happen. 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. For the latter, either 5g (User Guidance) or 10 mg (TNsG) of the product is assumed to be swallowed by an infant per poisoning event. The following systemic dose of difenacoum is then either 2.5×10^{-2} mg/kg bw or 5.0×10^{-5} mg/kg bw, respectively:

Table 2.7.2.2-3: Indirect exposure as a result of use of the active substance in biocidal product

Quantity ingested (g)	% ai	Systemic Exposure (mg)	bw (kg)	Systemic Exposure (mg/kg bw)
5	0.005%	2.5×10^{-1}	10	2.5×10^{-2}
0.01	0.005%	5×10^{-4}	10	5×10^{-5}

2.7.2.3 Exposure to residues in food

Exposure to residues in food is not assessed because no contamination of food or feedingstuff is foreseen.

2.7.3 Risk Characterisation

2.7.3.1 Risk for Professional Users

Acute risks were not considered for professional users in view of the moderate to low dermal exposure, and the anticipated negligible inhalation and oral exposure. Instead, the risk assessment was restricted to the more relevant repeated exposure. Exposure assessment is based on measurements in simulated use conditions and on daily exposure frequencies according to a questionnaire answered by selected pest control companies in 15 EU countries. The calculations have been made using assumptions related to rat control and the estimates are considered to represent reasonable worst case scenarios.

Trained professionals

The exposure assessment for professional pest control operators under reasonable worst case assumptions (60 loadings and 15 clean-ups/day), yielded a potential dermal exposure leading to a systemic dose of 4.34×10^{-6} mg/kg/day for an unprotected operator during bait handling operations. Comparison to the LOAEL of 0.001 mg/kg/day (based on a teratogenicity test in rabbits) shows that the use of rodenticide baits containing 0.005% difenacoum causes a potential health risk for pest control operators not wearing appropriate PPE (gloves), as indicated by the resulting margin of exposure (MOE = 78, see Table 2.7.3.1-1).

Nevertheless, since pest control operators are supposed to wear protective gloves during pest control operations, a refined assessment is conducted. The resulting margin of exposure (MOE = 783, see Table 2.7.3.1-1) indicates that the use of rodenticide baits containing 0.005% difenacoum does not cause a risk for pest control operators if gloves are worn.

Non-trained professionals

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 3.70 x 10^{-7} mg/kg/day for an unprotected person. Without PPE, the resulting margin of exposure (MOE = 918, see Table 2.7.3.1-1) indicates that use of rodenticide baits containing 0.005% difenacoum is at risk at the stated exposure frequency. A refined assessment was conducted since wearing of protective gloves is recommended in the instructions for use. The resulting margin of exposure (MOE = 9181, see Table 2.7.3.1-1) indicates a high protection level for non-trained professional users when gloves are worn.

Overall

The result of the risk assessment concerning use of difenacoum in RATONEX BLOQUE, indicates that the acceptable exposure level is not exceeded for trained professionals (pest control operators) with gloves and for non-trained professionals using the product with or without gloves. Even then, use of protective gloves is recommended in all cases for hygiene reasons and always expected for professional users. Exposure during manufacture of the active substance and formulation of products is beyond the scope of BPD and therefore has not been addressed.

Table 2.7.3.1-1. MOE value and comparison of AEL to exposure to RATONEX BLOQUE of professional users

User / Workplace operation	PPE	Exposure path	Total systemic dose (mg/kg/d)	Repeated dose Toxicity			
				Systemic NOAEL (mg/kg bw/day)	Systemic AEL (mg/kg bw/day)	MOE	%AEL
Trained professional Placing of bait (60 manipulations) and clean-up (15 manipulations)	None	Dermal, hands	4.34 x 10^{-6}	0.00034	0.0000011	78	395
	Gloves	Dermal, hands	4.34 x 10^{-7}	0.00034	0.0000011	783	39
Non-Trained professional Placing of bait (5 manipulations) and clean-up (5 manipulations)	None	Dermal, hands	3.70 x 10^{-7}	0.00034	0.0000011	918	34
	Gloves	Dermal, hands	3.70 x 10^{-8}	0.00034	0.0000011	9181	3

2.7.3.2 Risk for non-professional users and the general public

Non-professional users

RATONEX BLOQUE is supplied as loose blocks for use in refillable bait stations. Two scenarios for non-professional exposure have been assessed; the first assuming that the refillable bait stations would have to be loaded by the user, and the second taking into account only potential exposure from the cleaning task. As a worst-case, non-professionals were assumed to load five bait points and to clean five bait points per day, and to wear no gloves. The estimated daily systemic dose, 3.70 x 10^{-7} and 1.12 x 10^{-8} mg/kg/day, respectively, results in a MOE value of 3461 and 30459, respectively. This shows that that there is no risk for non-professional users.

Table 2.7.3.1-2. MOE value and comparison of AEL to exposure to RATONEX BLOQUE of non-professionals

User / Workplace operation	PPE	Exposure path	Total systemic dose (mg/kg/d)	Repeated dose Toxicity			
				Systemic NOAEL (mg/kg bw/day)	Systemic AEL (mg/kg bw/day)	MOE	%AEL
Non-professionals Placing of bait (5 manipulations) and clean-up (5 manipulations)	None	Dermal, hands	3.70 x 10^{-7}	0.00034	0.0000011	918	34
Non-professionals Clean-up (5 manipulations)	None	Dermal, hands	1.12 x 10^{-8}	0.00034	0.0000011	30459	1

General public

As a potential secondary exposure route, associated with the use of difenacoum in rodenticide products, ingestion of wax block bait by infants has been assessed. The potential exposure due to dermal contact with poisoned rodents is not included in the risk assessment, because the available scenarios are unrealistic. 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 0.01 or 6.8, respectively. Therefore, the secondary exposure scenario of accidental poisoning of infants is of concern.

2.7.3.3 Risk for consumers via residues

Based on the intended uses, no contamination of food or feeding stuff is foreseen. Therefore the risk for consumers via residues was not assessed.

2.8 Risk assessment for the environment

The risk assessment is performed for RATONEX BLOQUE, which contain 0.005 % of the a.i. difenacoum which equals 50 mg difenacoum/kg. The product is intended to be used in and around buildings, sewer systems, open areas and waste dumps. The risk characterisation is based on the product information from the applicant, the Technical Guidance Document II (TGD II, 2003) and the EUBEES 2 emission scenario document (ESD) for biocides used as rodenticides (Larsen, 2003). The risk characterisation is performed by comparing the predicted no effect concentration (PNEC), with the predicted environmental concentration (PEC). Values for PNEC and PEC have been derived through calculations presented in detail. Considering the different ingredients in the product, only the active ingredient difenacoum will cause risk for the environment and the risk characterisation is therefore only performed for difenacoum.

2.8.1 Fate and distribution in the environment

The environmental fate and behaviour of the active substance difenacoum has been fully evaluated during the assessment for Annex I inclusion. A summary of the fate and distribution of difenacoum is presented in Section 2.2.2.1 of the final Assessment Report (17 September 2009), and the relevant endpoints appear in the EU List of Endpoints.

The formulation of difenacoum as a fat bait block in RATONEX BLOQUE has no impact on the route or rate of degradation of the active substance difenacoum in the environment. No additional studies involving the formulated product are required.

2.8.2 Effects on environmental organisms

RATONEX BLOQUE does not contain substances of concern apart of difenacoum. Therefore, the ecotoxicological effects can be derived from the effect studies conducted with the active substance.

2.8.2.1 Aquatic compartment (including water, sediment and STP)

Toxicity values from Assessment Report are presented below for organisms of three trophic levels.

Difenacoum is very toxic to fish, aquatic invertebrates and algae. Fish is the most sensitive species. The toxicity in fish is based on the inhibition of blood clotting, whereas mode of action in the invertebrates and algae is unknown. The $PNEC_{water}$ is 0.06 µg/l based on the LC_{50} for the rainbow trout.

$PNEC_{sediment}$ was calculated using the equilibrium partitioning method. $PNEC_{sediment} = K_{susp\text{-}water}/RHO_{susp}$ x $PNEC_{water}$ x 1000 (TGD, eq. 70) = $4.51x10^{4}/1150$ x $6.4x10^{-5}$ x 1000 = 2.51 mg/kg wet weight.

Because all test concentrations on the activated sludge respiration inhibition exceeded the water solubility of difenacoum, the water solubility of 0.48 mg/l will be used as the $PNEC_{STP}$.

2.8.2.2 Atmosphere

No adverse effects of the product RATONEX BLOQUE are expected via atmospheric exposure due to low vapour pressure of the active substance and to the mode of use of the product.

2.8.2.3 Terrestrial compartment

Only one experimental test result is available (acute toxicity to earthworms, with a LC_{50} >994 mg/kg), and $PNEC_{soil}$ was calculated = 994 mg/kg /1000 = 0.994 mg/kg dry weight (0.877 mg/kg wet weight).

The $PNEC_{soil}$ is also derived with the equilibrium partitioning method from the aquatic PNEC. $PNEC_{soil} = K_{soil\text{-}water} / RHO_{soil}$ x $PNEC_{water}$ x 1000 (TGD, eq. 72) = $5.41x10^{4}/1700 * 6.4x10^{-5}$ x 1000 = 2.04 mg/kg wet weight.

Because the $PNEC_{soil}$ derived from the earthworm test is lower, it will be used for the risk characterization ($PNEC_{soil}$ = 0.877 mg/kg wet weight).

2.8.2.4 Non compartment specific effects relevant to the food chain

Due to poor quality of the reproduction test, the results from the dietary test (LC_{50} of 1.4 mg/kg food) will be used for the derivation of $PNEC_{oral\ for\ birds}$. The appropriate assessment factor according to the TGD is 3000. In order to transform the LC_{50} to LD_{50}, LC_{50} is multiplied with average food consumption (13.5 g) and divided by average body weight 71.3 g. The resulting LD_{50} is 0.3 mg/kg bw/d.

$PNEC_{oral\ for\ birds}$ = 1.4 mg/kg food/3000 = 0.5 µg/kg food

$PNEC_{oral\ for\ birds}$ = 0.3 mg/kg bw/d/3000 = 0.1 µg/kg bw/d

$PNEC_{oral\ for\ mammals}$ is derived from the NOAEL of 0.03 mg/kg bw/d origin from the 90-day subchronic test in rat. The NOAEL is transformed to NOEC (concentration in food) by multiplying with the conversion factor of 20 (TGD, Table 22). The appropriate assessment factor according to the TGD is 90.

$PNEC_{oral\ for\ mammals}$ = 0.6 mg/kg food/90 = 7 µg/kg food

$PNEC_{oral\ for\ mammals}$ = 0.03 mg/kg bw/d/90 = 0.3 µg/kg bw/d

2.8.2.5 Determination and summary of PNECs

Table 2.8.2.5: Summary of the difenacoum PNECs

Compartment		**Test value**	**AF**	**PNEC**
Aquatic	$PNEC_{water}$	LC_{50} = 0.064 mg/l	1000	0.064 µg/l
	$PNEC_{sediment}$	$PNEC_{water}$ in eq. 70 (TGD)		2.51 mg/kg wet weight
	$PNEC_{STP}$	water solubility = 0.48 mg/l		0.48 mg/l
Terrestrial	$PNEC_{soil}$	LC_{50} >994 mg/kg	1000	0.994 mg/kg dry weight 0.877 mg/kg wet weight
	$PNEC_{oral\ for\ birds}$	LC_{50} = 1.4 mg/kg food LD_{50} = 0.3 mg/kg bw/d	3000	0.5 µg/kg food eq. to 0.1 µg/kg bw/d
	$PNEC_{oral\ for\ mammals}$	NOEC = 0.6 mg/kg food NOAEL = 0.03 mg/kg bw/d	90	7 µg/kg food eq. to 0.3 µg/kg bw/d

2.8.3 Environmental exposure assessment

2.8.3.1 PEC in surface water, sewage treatment plant, ground water and sediment

In accordance with the approach taken in the CAR, the PEC values were calculated with reference to the guidance documents EUBEES 2 Emission Scenario Document (ESD) for biocides used as rodenticides (Larsen, 2003), and the Technical Guidance Document on Risk Assessment part II (TGD II).

The PEC in groundwater is calculated as a direct function of the PEC in soil, and therefore full calculations for both soil and groundwater are presented in Section 2.8.3.3.

PEC in surface water and sediment are considered below.

2.8.3.1.1 Sewer system

The product is applied in sewer systems by fixing, securing the wax block with wire and placed into the manhole in baiting station where the station is secured by tying to the wall a few centimetres above the bottom of the cesspool or hung from the roof of sewer tunnels. Animal carcasses and uneaten bait are not removed from sewer system after a campaign, with the exception of baiting stations where used.

The product is used as wax block between 10 g to 50 g, containing 0.005% a.i.

The amount of product used per application is often 25-50 g. per manhole. In the applicant's own scenario a total use of 100 bait points each applied with 200 g of bait in a 21-day programme, which would result in a total amount of 50 kg product. It is assumed that in principle all of this bait is applied during the first week. This scenario is slightly less conservative than the ESD worst case, which is the one that will be used in the risk assessment.

According to the realistic worst case scenario of the EUBEES ESD, in an area corresponding to 10000 person equivalents (pe), it is assumed that 300 g baits are placed in 300 manholes. After 7 days 100 baits have been eaten and are replaced, after two weeks 50 more baits have been eaten and are replaced and after three weeks no baits have been eaten. This means that the highest emission will occur during the first week of a 21-day campaign and that the amount of the product would be 30 kg during one week. Regional background concentrations can be regarded as negligible, according to the ESD, due to the very local emissions of the substance, the physical characteristics of the substance and the low overall usage of the product.

The predicted environmental concentrations in surface water, groundwater, soil and sediment have been calculated using TGD II and the ESD and the results of the calculations are presented below.

The main route of exposure for surface water, sediments and partly for soil is via the sewage treatment plant (STP) and the effluent water from STPs.

For groundwater exposure may also occur also through application of sewage sludge from the STP.

According to the ESD a maximum release to the sewage system could come directly from the applied wax blocks, and indirectly from animal excrement and the bodies of dead animals (less the degraded fraction).

According to the ESD the fraction of release ($F_{release}$) is 0.3 + (0.6*metabolised fraction).

Unintended release is estimated for fraction of 0.3 to which should be added the non-metabolised excreted fraction (i.e. 0.6 – the metabolised amount). Using the same value for the metabolised fraction as was used in the CAR (82% of a low dose and 74% of a high dose absorbed within 168h), the $F_{release}$ calculated according to the ESD is therefore 0.3 + 0.6*0.82 = 0.3 + 0.49 = 0.79.

The concentrations of difenacoum in the sewage water are calculated for 2 emission scenarios described by the ESD; worst case and normal use. In the normal use scenario an average of 60 kg product is used each year per 10 000 inhabitants, (although the use ranges widely from 0-600 kg/year). In the worst case scenario the maximum amount of 30 kg product is used in the first week of a campaign. The proposed use will be considered as a 3rd scenario.

Mean local emission ($Elocal_{water}$) of active substance to waste water during rodenticide application episodes can be calculated by the following equation:

$$Elocal_{water} = Q_{prod} * Fc_{prod} * F_{release} / T_{emission}$$

Where;

Q_{prod} = the amount of product used in control operations
Fc_{prod} = the fraction of active substance in the product
$F_{release}$ = the fraction that was metabolised by the target organism
$T_{emission}$ = the number of emission days

The concentration of difenacoum in the water entering the STP (C_{infl}) is calculated by considering the volume of water entering the STP. According to TGD II the average influx to a treatment plant for an equivalent area of 10 000 person equivalents (pe) is 2 x 10^6 L/d which will be used as default value for average influx. The concentration of difenacoum in the STP influx water is calculated by;

C_{infl} = $Elocal_{water}$ / influx volume
= $Elocal_{water}$ / 2 000 000

As the influx water passes through the STP the processes for elimination of difenacoum have to be taken into consideration. However, due to the low vapour pressure, the low Henry's law constant and the absence of biodegradation, the only relevant elimination process is partitioning to suspended matter. This takes place according to the so-called Simple Treat model presented in TGD II appendix II. The modelling for difenacoum assumes no biodegradation occurs, a log K_{ow} of 7.6 and Henrys law const of 1.75 x 10^{-6} Pa m^3/mol. The result is that 85% of the C_{infl} to the STP will end up in the sewage sludge and 15% in the water phase. Therefore, $F_{STPwater}$ = 0.15 meaning that 15% of the difenacoum will be found in the effluent, and $F_{STPsludge}$ = 0.85.

The concentration in the effluent from the STP is therefore calculated according to the equation;

$Clocal_{effl}$ = C_{infl} * $F_{STPwater}$
= C_{infl} * 0.15

As the effluent reaches fresh surface water a further dilution occurs. According to TGD II, (section 2.3.8.3) a general dilution factor can be set to the default value of 10 for substances reaching surface waters through release from STPs. The difenacoum concentration in surface water after dilution can be calculated by

$PEClocal_{water}$ = $Clocal_{effl}$ * dilution factor
= $Clocal_{effl}$ * 0.1

The calculations for each scenario are presented below, and are summarised in table 2.8.3.1.1.

Worst case scenario ESD (30 kg product in 1 week)

Q_{prod} = 30 kg per week (ESD model)
Fc_{prod} = 0.00005 (i.e. difenacoum 0.005%)
$F_{release}$ = 0.73
$T_{emission}$ = 7 days

$Elocal_{water}$ = Q_{prod} * Fc_{prod} * $F_{release}$ / $T_{emission}$
= 30 * 0.00005 * 0.73 / 7
= 156 mg difenacoum/day

C_{infl} = $Elocal_{water}$ / influx volume
= 156 mg / 2 000 000 l
= 78 x 10^{-6} mg/l

$Clocal_{effl}$ = C_{infl} * $F_{STPwater}$
= 78 x 10^{-6} mg/l * 0.15
= 11.7 x 10^{-6} mg/l

$PEClocal_{water}$ = $Clocal_{effl}$ * dilution factor
= 11.7 x 10^{-6} mg/l * 0.1
= 1.17 x 10^{-6} mg/l

Normal scenario ESD (60 kg product in 1 year)

Q_{prod} = 60 kg per year (ESD model)
Fc_{prod} = 0.00005 (i.e. difenacoum 0.005%)
$F_{release}$ = 0.73
$T_{emission}$ = 365 days

$Elocal_{water}$ = Q_{prod} * Fc_{prod} * $F_{release}$ / $T_{emission}$
= 60 * 0.00005 * 0.73 / 365
= 6 mg difenacoum per day

C_{infl} = $Elocal_{water}$ / influx volume
= 6 mg / 2 000 000 l
= 3 x 10^{-6} mg/l

$Clocal_{effl}$ = C_{infl} * $F_{STPwater}$
= 3 x 10^{-6} mg/l * 0.15
= 0.45 x 10^{-6} mg/l

$PEClocal_{water}$ = $Clocal_{effl}$ * dilution factor
= 0.45 x 10^{-6} mg/l * 0.1
= 0.045 x 10^{-6} mg/l

Normal scenario according to proposed use pattern (20 kg product in 1 week)

Q_{prod} = 20 kg per week
Fc_{prod} = 0.00005 (i.e. difenacoum 0.005%)
$F_{release}$ = 0.73
$T_{emission}$ = 7 days

$Elocal_{water}$ = Q_{prod} * Fc_{prod} * $F_{release}$ / $T_{emission}$

= 20 * 0.00005 * 0.73 / 7
= 104 mg difenacoum per day

C_{infl} = $Elocal_{water}$ / influx volume
= 104 mg / 2 000 000 l
= 52 x 10^{-6} mg/l

$Clocal_{effl}$ = C_{infl} * $F_{STPwater}$
= 52 x 10^{-6} mg/l * 0.15
= 7.8 x 10^{-6} mg/l

$PEClocal_{water}$ = $Clocal_{effl}$ * dilution factor
= 7.8 x 10^{-6} mg/l * 0.1
= 0.78 x 10^{-6} mg/l

It is assumed in TGD II that only the dissolved concentrations in the STP are bioavailable to microorganisms, therefore;

PEC_{STP} = $Clocal_{effl}$

According to equation 50 in TGD II the difenacoum concentrations in sediments depend on the concentration in water, the suspended matter/water coefficient and the bulk density of suspended matter. The $PEC_{sediment}$ was calculated in the CAR as 0.0112 mg/kg.

The partitioning to suspended matter will lead to increased concentrations of difenacoum in sewage sludge, which will be discussed in section 2.8.3.3.

A summary of all the PEC values calculated above is provided in table 2.8.3.1.1.

Table 2.8.3.1.1: Summary of PEC values following release from STP

Scenario	**Total daily emission (mg as/day)**	**Sewer influx concentration (mg/l)**	**Sewer effluent concentration (mg/l)**	**PEC_{sw} (mg/l)**	**PEC_{STP} (mg/l)**	**PEC_{sed} (mg/kg)**
ESD worst case	156	78 x 10^{-6}	11.7 x 10^{-6}	1.17 x 10^{-6}	11.7 x 10^{-6}	0.0112
ESD normal case	6.0	3.0 x 10^{-6}	0.45 x 10^{-6}	0.045 x 10^{-6}	0.45 x 10^{-6}	0.00876
Proposed use	104	52 x 10^{-6}	7.8 x 10^{-6}	0.78 x 10^{-6}	7.8 x 10^{-6}	--

2.8.3.1.2 In and around buildings

The exposure to surface water, STP or sediment following the use of the product in and around building is considered to be negligible. Possible exposure to groundwater is considered in Section 2.8.3.3.

2.8.3.1.3 Open areas

The exposure to surface water, STP or sediment following the use of the product in open areas is considered to be negligible. Possible exposure to groundwater is considered in section 2.8.3.3.

2.8.3.1.4 Waste dumps

The exposure to surface water, STP or sediment following the use of the product in waste dumps is considered to be negligible. Possible exposure to groundwater is considered in section 2.8.3.3.

2.8.3.2 PEC in air

The quantity of difenacoum used is very low, the vapour pressure is very low (6.7×10^{-9} Pa 20°C; EU Endpoint List), the Henry's law constant is very low (1.75×10^{-6} Pa m^3/mol; EU Endpoint List) and difenacoum is rapidly degraded in air (DT_{50} ~2 hours; EU Endpoint List). The PEC of difenacoum in air is therefore considered to be negligible.

2.8.3.3 PEC in soil

The PEC_{soil} values were calculated with reference to the guidance documents EUBEES 2 Emission Scenario Document (ESD) for biocides used as rodenticides (Larsen, 2003), and the Technical Guidance Document on Risk Assessment part II (TGD II).

$PEC_{groundwater}$ is also considered below (rather than in Section 2.8.3.1) as it is calculated directly from the PEC in soil. $PEC_{groundwater}$ was calculated according to equation 67 in TGD II, where it is assumed that PEC local groundwater equals to PEC local pore water in agricultural soils. The concentration in the soil pore waters is determined by the predicted difenacoum concentration in local soil, the bulk density of the soil and the soil-water partitioning coefficient.

2.8.3.3.1 Sewer systems

The product is applied in sewer systems by fixing, securing the wax block with wire and placed into the manhole in baiting station where the station is secured by tying to the wall a few centimetres above the bottom of the cesspool or hung from the roof of sewer tunnels. Animal carcasses and uneaten bait are not removed from sewer system after a campaign, with the exception of baiting stations where used.

<u>Calculation of PEC in soil</u>

Exposure to soil via the sewer system can occur through application of sewage sludge from a STP, which can be used as a fertiliser or soil improver. The concentrations in soil arising from such application of sewage sludge will depend on the concentration of difenacoum in sludge, the amount of sludge applied to soil, and the volume of soil mixed with the sewage sludge. Default values of soil depth and RHO_{soil} are used in accordance with TGD II for determination of soil volume.

The concentration in sewage sludge can be calculated according to equation 36 in TGD II;

$$C_{sludge} = F_{STPsludge} * Elocal_{sewage} * 10^6 / \text{sludge rate}$$

Where;

C_{sludge} = concentration of difenacoum in sludge (mg/kg)
$F_{STPsludge}$ = fraction of difenacoum bound to sludge solids = 0.85 (see Section 2.8.3.1.1)
$Elocal_{sewage}$ = emission rate of difenacoum to sewage sludge (kg/day) = $Elocal_{water}$
Sludge rate = daily sludge production rate (kg/day); this was calculated in the CAR using equations from TGD II, and shown to be 673 kg/day.

The concentrations in sludge are calculated for the three scenarios outlined in Section 2.8.3.1.1, and are summarised in table 2.8.3.3.1-1.

Worst case scenario ESD (30 kg product in 1 week)

C_{sludge} = $F_{STPsludge}$ * $Elocal_{sewage}$ * 10^6 / sludge rate
= 0.85 * 1.56 x 10^{-4} * 10^6 / 673
= 0.197 mg/kg

Normal scenario ESD (60 kg product in 1 year)

C_{sludge} = $F_{STPsludge}$ * $Elocal_{sewage}$ * 10^6 / sludge rate
= 0.85 * 6.0 x 10^{-6} * 10^6 / 673
= 0.00757 mg/kg

Normal scenario according to proposed use pattern (20 kg product in 1 week)

C_{sludge} = $F_{STPsludge}$ * $Elocal_{sewage}$ * 10^6 / sludge rate
= 0.85 * 1.04 x 10^{-4} * 10^6 / 673
= 0.131 mg/kg

Table 2.8.3.3.1-1: Summary of concentrations in sewage sludge

Scenario	**Sewer influx concentration (PEC_{sewage}) (mg/l)**	**$Elocal_{sewage}$ (kg/day)**	**C_{sludge} (mg/kg)**
ESD worst case	78 x 10^{-6}	1.56 x 10^{-4}	0.197
ESD normal case	3.0 x 10^{-6}	6.0 x 10^{-6}	0.00757
Proposed use	52 x 10^{-6}	1.04 x 10^{-4}	0.131

The worst case exposure to soil may be calculated using the value of the concentration in sludge produced during the first week of a campaign. However, this practice may be questioned since there is a retention time in the STP, e.g. in the digester, and also a possibility of mixing with "ESD normal case" sludge. Approximately 5 tons of sludge would be produced during the first week (worst case part) of the campaign (depending on country in the EU) and this would be enough to fertilise 1 to 5 ha. It is, again, unlikely that the same soil will be fertilised with such worst-case sludge every year during a ten-year period. Therefore, a worst-case concentration of difenacoum sludge during a 10 year period calculated this way would be regarded as unrealistically high.

When sludge is used for general purposes, in parks and golf courses, sludge is applied in layers 1m in thickness (please refer to CAR for source details), and therefore dilution of the sludge will not be accounted for. However, the concentration of difenacoum in the sludge applied for these purposes will be lower, since there is not enough sludge produced during the worst-case first week of a campaign for this purpose. Therefore, the concentrations in these soils can be assumed to be equal to the concentrations in "ESD normal case" sludge (table 2.8.3.3.1-1).

For the other uses, sludge is applied at lower rates, and the worst-case value for C_{sludge} can then reasonably be used. Calculations of the concentration in soil after 10 years of sludge application can then be performed using the equation below.

$PECsludge_{soil}$ = C_{sludge} * App_{sludge} / ($Depth_{soil}$ * RHO_{soil}) * 10 years (assuming no degradation)

Where;

C_{sludge} = concentration of difenacoum in sludge
App_{sludge} = application rate of sludge to soil (kg dw/m^2/year)
$Depth_{soil}$ = depth of soil
RHO_{soil} = bulk density of (wet) soil (=1700 kg m^{-3}; TGD II)

The results calculated for each soil use scenario are summarised in table 2.8.3.3.1-2.

Table 2.8.3.3.1-2: Summary of concentrations in soil

Scenario of soil use	**C_{sludge} (mg/kg)**	**APP_{sludge} (kg dw/m^2/year)**	**$Depth_{soil}$ (m)**	**$PECsludge_{soil}$ (mg/kg)**
General purpose (parks, golf courses etc.)	0.00757[1]	-	-	0.0019
Agricultural soil (crop cultivation)	0.197[2]	0.5	0.2	0.0029
Grassland (cattle grazing)	0.197[2]	0.1	0.1	0.00116

[1] Using undiluted sludge from 'ESD normal case scenario'

[2] Using diluted sludge from 'ESD worst case scenario'

Calculation of PEC in groundwater

During calculation of concentrations for soils photodegradation of the substance has not been taken into consideration since, although photolysis will occur at the soil surface both in the grassland and the agricultural scenario, it will not be as rapid as in surface waters, and it will not occur when sludge is applied in thick layers, which is the case in many of the general purposes. The $PECsludge_{soil}$ for general-purpose use is higher than in the other two scenarios, but there are several uncertainties in the calculations of $PECsludge_{soil}$ for this scenario. Therefore, in the CAR, the RMS followed the TGD II in this case, and the soil concentration from the agricultural soil scenario was used for calculation of groundwater concentration.

PEC in groundwater was calculated according to equation 68 in TGD II, where it is assumed that $PEClocal_{grw}$ is equal to PEC in local pore water in agricultural soils ($PEClocal_{agr.soil,\ porewater}$).

$PEClocal_{grw}$ = $PEClocal_{agr.soil,\ porewater}$ (eq. 68)

The concentration in the soil pore waters is determined by the predicted difenacoum concentration in local soil, the bulk density of the soil and the soil-water partitioning coefficient;

$PEClocal_{soil,\ porewater}$ = $PEClocal_{soil}$ * RHO_{soil}/ ($k_{soil\text{-}water}$*1000) (eq. 67)

Where;

$K_{soil\text{-}water} = (Fair_{soil} * K_{air\text{-}water}) + Fwater_{soil} + (Fsolid_{soil} * RHO_{solid} * Kp_{soil}/1000)$ (eq. 24)

And where;

$K_{air\text{-}water}$ = Henrys law constant / (gas constant * temp at air-water interface (K)) (eq. 22)
= 1.75×10^{-6} Pa m^3 mol^{-1} / (8.314 * 285) (from EU List of Endpoints, others from TGD)
= 7.39×10^{-10}

And;

Kp_{soil} = $Foc_{soil} * K_{oc}$ (eq. 23)
= 0.02 * 1803018 (Foc from Table 5 of TGD II, Koc from EU List of Endpoints)
= 36060.36

The QSAR K_{oc} value of 1.8×10^6 is used in the risk assessment instead of the experimentally derived K_{oc} values, because they were regarded unreliable. The K_{oc} values were determined with the HPLC method and although the studies per se were regarded valid, the test method appeared to be unsuitable for difenacoum. The HPLC method (OECD 121) is not an actual study with measurements in real soil, but only an estimation based on the comparison of test substance to reference substances under artificial system, and hence there may be more uncertainties than in the adsorption/desorption batch-test (OECD 106). The experimentally derived K_{oc} values were inversely related to pH, so that high values were obtained in acidic conditions (K_{oc} of 426 579 at pH 3-4) and low values in neutral or alkaline conditions (17-165 at pH 7-8.5). The experimentally derived K_{oc} values are not supported by the physical and chemical properties of difenacoum. Difenacoum is a large aromatic molecule with two polar groups which can potentially ionize at environmental relevant pH. Difenacoum has also a low water solubility and a high log Kow. The HLPC-method gives quite low K_{oc} value suggesting that ionized form of difenacoum will not have great affinity to organic matter. Although difenacoum is a weak acid with probably two dissociable sites, it might not be in ionized form with low adsorption in natural environment, or ionizable form might behave like a neutral form if the charge is shielded by the large molecule size. Also comparison to similar anticoagulant molecules supports the expert view that due to the intrinsic properties of these molecules the adsorption to particles is probable.

From end points, K_{oc} value of 1 803 018 calculated by the QSAR equation for 'predominantly hydrophobics' according to the TGD part 3, table 4 (log K_{oc}=0.81 log Kow +0.1) (used in PEC and PNEC calculations).

Therefore;

$K_{soil\text{-}water} = (Fair_{soil} * K_{air\text{-}water}) + Fwater_{soil} + (Fsolid_{soil} * RHO_{solid} * Kp_{soil}/1000)$ (eq. 24)
= $(0.2 * 7.39 \times 10^{-10}) + 0.2 + (0.6 * 2500 * 36060.36/1000)$ (Fxx, RHO from TGD II)
= 54090.74

Therefore;

$PEClocal_{soil,\ porewater} = PEClocal_{soil} * RHO_{soil} / (k_{soil\text{-}water} * 1000)$ (eq. 67)
= 0.00290* 1700 / (54090.74* 1000)
= 9.11×10^{-8} mg/l

Finally;

$PEClocal_{grw}$ = $PEClocal_{agr.soil,\ porew}$ (eq. 68)
= $PEClocal_{soil,\ porewater}$ (in this case calculated for agricultural soils)
= 9.11×10^{-8} mg/l

The concentrations in groundwater for the sewer scenario have been calculated as a worst case, which applies for soils where sludge is used as a soil improver for agricultural soils. The average K_{oc} value of 1803018 ml/g (EU Endpoint List) was used in the calculations for derivation of $k_{soil\text{-}water}$.

2.8.3.3.2 In and around buildings

The product is a ready to use bait. Under the proposed use up to 200 g of blocks are placed in each bait station. The bait stations are regularly inspected, refilled, and dead rodents are removed. The bait points are placed 5-10 m apart and the baiting programmes are repeated 2-3 times a year.

In the ESD worst case scenario 10 tamper resistant bait stations is used each filled with 250 g wax blocks, inspected and replenished 5 times (day 1, 3, 7, 14, 21). It is an assumption that all of the bait has been eaten. There is a large variation of the duration of a rodenticide campaign and a 21 days period represents a realistic worst case.

In a typical campaign (normal use), bait 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 1.5 x 100% replenishments. (CEFIC 2002)

In the so-called 'typical' scenario the replenishment is done only 1.5 times. The scenario represented by the proposed use differs from the ESD worst case scenario only regarding the amount of bait in each station, i.e. 200 g instead of 250 g; the other parameters are considered as equal to the worst case scenario.

Calculation of PEC in soil

In and around building emissions to soil in the area influenced by each bait box by direct release, and the total emission per campaign by indirect release are summarized in the table 2.8.3.3.2-1.

Direct release;

In the ESD it is estimated that the total direct release to the environment is 1%, which gives a direct release of (10*250*5*0.01)/21= 6 g product/day averaged over 21 days (worst case).

In a typical campaign (normal use): Roughly the equivalent of 1.5 x 100% replenishments corresponding to a total direct release of 10 x 250 x 1.5 x 0.01 / 21 = 1.8 g product/day, averaged over 21 days (CEFIC 2002).

According to the ESD the terrestrial environment is exposed via direct release at application and indirect release from the target animals' excrement. According to the ESD the fraction of release ($F_{release}$) is 0.3 + (0.6*metabolised fraction). Using the same value for the metabolised fraction as was used in the CAR (71%), the $F_{release}$ calculated according to the ESD is therefore 0.3 + 0.6*0.71 = 0.3 + 0.43 = 0.73. Since the toxicity of possible metabolites is unknown they will be assumed to be of similar toxicity as difenacoum.

Local direct emission to soil of the active substance is calculated by considering the total amount of the product used, the fraction of active substance in product, the number of application sites and

refilling times and the fraction of the product released directly to soil. This is calculated according to eq. 3 in the ESD;

$Clocal_{soil\text{-}D} = Elocal_{soil\text{-}D\text{-}campaign} * 1000 / (Area_{exposed\text{-}D} * Depth_{soil} * RHO_{soil} * N_{sites})$

Where;

$Elocal_{soil\text{-}D\text{-}campaign}$	= Weight of bait*as*N.stations*No.renewals*direct release rate
$Area_{exposed\text{-}D} * Depth_{soil}$	= 0.009 m^3 (0.09 m^2 x 0.1 m assumed by ESD)
RHO_{soil}	= 1700 kg m^{-3} (TGD II)
N_{sites}	= 10

Local direct emission to soil is calculated for ESD worst case and proposed use scenarios;

ESD worst case

$Clocal_{soil\text{-}D}$ = $Elocal_{soil\text{-}D\text{-}campaign} * 1000 / (Area_{exposed\text{-}D} * Depth_{soil} * RHO_{soil} * N_{sites})$
= (250 * 0.00005 * 10 * 5 * 0.01) * 1000 / (0.009 * 0.1 * 1700 * 10)
= 0.041 mg/kg

Proposed use, worst case

$Clocal_{soil\text{-}D}$ = $Elocal_{soil\text{-}D\text{-}campaign} * 1000 / (Area_{exposed\text{-}D} * Depth_{soil} * RHO_{soil} * N_{sites})$
= (200 * 0.00005 * 10 * 5 * 0.01) * 1000 / (0.009 * 0.1 * 1700 * 10)
= 0.032 mg/kg

Indirect release;

The local concentration in soil due to indirect release was calculated according to eq. 4 in the ESD. A calculation of the worst-case soil concentrations with the assumptions made above would then give;

$$Clocal_{soil\text{-}ID} = (Q_{prod} * Fc_{prod} * N_{sites} * N_{refill} * 10^3 * F_{release\text{-}ID,soil} * (1 - F_{release\text{-}D,soil})) / (Area_{exposed\text{-}ID} * Depth_{soil} * RHO_{soil})$$

ESD worst case

$Clocal_{soil\text{-}ID}$ = (250*0.00005*10*5*1000*0.73*0.99) / (550*0.1*1700)
= 0.0048 mg/kg

Proposed use, worst case

$Clocal_{soil\text{-}ID}$ = (200*0.00005*10*5*1000*0.73*0.99) / (550*0.1*1700)
= 0.0038 mg/kg

Total release;

The total local exposure to the soil around the bait boxes is obtained by adding the contributions from direct and indirect release, as calculated above.

ESD worst case

$Clocal_{soil}$ = $Clocal_{soil-D}$ + $Clocal_{soil-ID}$
= 0.041 + 0.0048 mg/kg
= 0.046 mg/kg

Proposed use, worst case

$Clocal_{soil}$ = $Clocal_{soil-D}$ + $Clocal_{soil-ID}$
= 0.032 + 0.0038 mg/kg
= 0.036 mg/kg

Emissions to soil in the area influenced by each bait box by direct release, and the total emission per campaign by indirect release, can be calculated from the values above. These values, together with the calculations for $Clocal_{soil}$, which is equivalent to PEC_{soil}, are summarized in table 2.8.3.3.2-1.

Table 2.8.3.3.2-1: Summary of difenacoum emissions and concentrations in soil after the use in and around buildings

Scenario	**$Elocal_{soil}$ Direct release per bait box* (mg as/0.09 m^2)**	**$Elocal_{soil}$ Indirect release per campaign** (mg as/550 m^2)**	**PEC_{soil} = $Clocal_{soil}$ Total released (mg as/kg)**
ESD worst case	0.625	452	0.046
ESD normal use	0.19	136	0.014
Proposed use	0.500	362	0.036

* Emission by direct release from individual bait box

** Emission by indirect release per campaign

For risk assessment purposes the worst case PEC_{soil}, represented by the ESD worst-case scenario, is selected. Therefore;

PEC_{soil} = 0.046 mg difenacoum/kg soil

Calculation of PEC in groundwater

PEC groundwater was calculated according to equation 67 in TGD II, where it is assumed that PEC local groundwater equals to PEC local pore water in agricultural soils. The concentration in the soil pore waters is determined by the predicted difenacoum concentration in local soil, the bulk density of the soil and the soil-water partitioning coefficient.

$$PEClocal_{soil,\ porewater} = PEClocal_{soil} * RHO_{soil} / (k_{soil\text{-}water} * 1000)$$

$PEClocal_{soil,\ porewater}$ = 0.0458* 1700/ (54090.74*1000) = 1.439 x 10^{-6} mg/l

An average K_{oc} value of 1803018 ml/g (EU Endpoint List) was used in the calculations for derivation of $k_{soil-water}$. However, due to the limited use of difenacoum in campaigns that last for a limited time, usually three weeks, and that good management practice prescribes that both leftover feed and dead rodents are collected and disposed of in a secure way, the exposure to groundwater is likely to be negligible

2.8.3.3.3 Open areas

This scenario covers control of rats and water voles in open areas such as around farmland, parks and golf courses where the aim is to prevent "nuisance" from burrows or "soil heaps" or due to public hygiene reasons.

A typical initial dose for a rat hole is 100-200 g wax block.hole^{-1}; and normally application is repeated twice with an interval of 5-6 days.

Inspection of the holes to assess the effect of the control action is usually carried out some 5-6 days after application of the poison and again with similar intervals if repeated applications are necessary.

Calculation of PEC in soil

Direct release;

Number of emission days per campaign is estimated to be 6 days during which the treatment is repeated twice. However, it is assumed that only the lower half of the hole and its surrounding environment is exposed.

$Clocal_{soil-D} = Elocal_{soil-D-campaign} * 1000 / (Area_{exposed-D} * Depth_{soil} * RHO_{soil})$

Where;

$Elocal_{soil-D-campaign}$	= Weight of bait*as*N.stations*No.renewals*direct release rate
$Area_{exposed-D} * Depth_{soil}$	= 0.009 m^3 (0.09 m^2 x 0.1 m assumed by ESD)
RHO_{soil}	= 1700 kg m^{-3} (TGD II)
N_{sites}	= 10

ESD worst case

The exposed soil area is assumed to be the lower half of the burrow wall surrounding an 8 cm diameter tunnel, with the mixing soil depth of 10 cm and up to 30 cm from the entrance hole. Thus the total soil volume is:

$Vsoil_{exposed}$ = 0.0085 m^3 (ESD page 31)

$Clocal_{soil-D} = Elocal_{soil-D-campaign} * 1000 / (Vsoil_{exposed} * RHO_{soil})$
$= (200 * 0.000005 * 1 * 2 * (0.05+0.2)) * 1000 / (0.0085/1700)$
$= 0.283$ mg/kg

In this scenario according to ESD $PEClocal_{soil} = Clocal_{soil-D}$ then,

$PEClocal_{soil}$ = 0.283 mg/kg

Calculation of PEC in groundwater

PEC groundwater was calculated according to equation 67 in TGD II, where it is assumed that PEC local groundwater equals to PEC local pore water in agricultural soils. The concentration in the soil pore waters is determined by the predicted difenacoum concentration in local soil, the bulk density of the soil and the soil-water partitioning coefficient.

$PEClocal_{soil,\ porewater}$ = $PEClocal_{soil} * RHO_{soil} / (k_{soil\text{-}water} * 1000)$
= 0.283* 1700/ (54090.74*1000)
= 8.89×10^{-6} mg/l

2.8.3.3.4 Waste dumps

This scenario covers control of rats and disposal of rats in waste dumps and landfills where the exposure is assumed to be higher than that described in the open area scenario.

Calculation of PEC in soil

Direct release;

See in/around buildings calculus.

$Clocal_{soil\text{-}D} = Elocal_{soil\text{-}D\text{-}campaign} * 10^6 / (Area_{exposed\text{-}D} * Depth_{soil} * RHO_{soil})$

Where;

$Elocal_{soil\text{-}D\text{-}campaign}$ = $Q_{prod} * Fc_{prod} * N_{app} * 10^3 * F_{release\text{-}ID,soil}$
$Area_{exposed\text{-}D} * Depth_{soil}$ = 1000 m^3 (10,000 m^2 x 0.1 m assumed by ESD)
RHO_{soil} = 1700 kg m^{-3} (TGD II)
$F_{release\text{-}ID,soil}$ = 0.73 (See in/around building calculus)

Local direct emission to soil is calculated for ESD worst case and proposed use scenarios;

ESD worst and proposed cases

$Clocal_{soil\text{-}D}$ = $Elocal_{soil\text{-}D\text{-}campaign} * 1000 / (Area_{exposed\text{-}D} * Depth_{soil} * RHO_{soil})$
= $(40 * 0.00005 * 7 * 0.73) * 10^6 / (10000 * 0.1 * 1700)$
= 0.006 mg/kg soil

In this scenario according to ESD $PEClocal_{soil}$ = $Clocal_{soil\text{-}D}$ and considering the worst case,

$PEClocal_{soil}$ = 0.006 mg/kg

Calculation of PEC in groundwater

PEC groundwater was calculated according to equation 67 in TGD II, where it is assumed that PEC local groundwater equals to PEC local pore water in agricultural soils. The concentration in the soil pore waters is determined by the predicted difenacoum concentration in local soil, the bulk density of the soil and the soil-water partitioning coefficient.

$PEClocal_{soil,\ porewater}$ = $PEClocal_{soil}$* RHO_{soil} / ($k_{soil\text{-}water}$*1000)
= 0.006* 1700/ (54090.74*1000)
= 1.89 x 10^{-7} mg/l

2.8.3.4 Summary of calculated PEC values used for risk assessment purposes

The summary of calculated PEC values used for risk assessment purposes are presented in the table below:

Table 2.8.3.4: Summary of PEC values

Scenario of proposed use (ESD worst case)	PEC_{sw} (mg/l)	PEC_{stp} (mg/l)	PEC_{sed} (mg/kg)	PEC_{soil} (mg/kg)	PEC_{grw} (mg/l)
Sewer systems	1.17 x 10^{-6}	11.7 x 10^{-6}	0.0112	0.0029	Negligible
In/around buildings	Negligible	Negligible	Negligible	0.046	1.439 x 10^{-6}
Open areas	Negligible	Negligible	Negligible	0.283	8.89 x 10^{-6}
Waste dumps	Negligible	Negligible	Negligible	0.006	1.89 x 10^{-7}

2.8.3.5 Non compartment specific exposure relevant to the food chain (secondary poisoning)

The exposure of difenacoum via direct consumption of the bait, i.e. primary poisoning, or indirectly via consumption of living or dead rodents that have been exposed to the bait, i.e. secondary poisoning to non-target birds and mammals is quantified in section 2.8.4.4.

2.8.4 Risk characterisation for the environment

The risk assessment is performed for RATONEX BLOQUE, i.e. solid wax blocks which contain 0.005% of the active substance difenacoum which equals 50 mg difenacoum/kg. The product is intended to be used in and around buildings, sewer systems, open areas and waste dumps. The risk characterisation is based on the product information from the applicant, the Technical Guidance Document II (TGD II, 2003) and the EUBEES 2 emission scenario document (ESD) for biocides used as rodenticides (Larsen, 2003). The risk characterisation is performed by comparing the predicted environmental concentration (PEC), with the predicted no effect concentration (PNEC). Considering the different ingredients in the product, only the active ingredient difenacoum will cause risk for the environment and the risk characterisation is therefore only performed for difenacoum.

2.8.4.1 Aquatic compartment (including sediment)

2.8.4.1.1 Sewers

2.8.4.1.1.1 Surface water

In section 2.8.3.1.1 the calculation of PEC values for surface water is presented. Calculations are made for three scenarios based on effluent from an STP: ESD worst case first week, normal case and applicant's worst case (first week). The resulting values are presented below.

$PEC_{sw\ (ESDwc)}$ = 1.17 x 10^{-6} mg/l

$PEC_{sw\ (normal\ case)} = 0.045 \times 10^{-6}$ mg/l

$PEC_{sw\ (applicantwc)} = 0.78 \times 10^{-6}$ mg/l

For the risk characterisation the highest PEC value will be used which is represented by the ESD worst case during the first week, 1.17×10^{-6} mg/l.

$PEC_{sw\ (ESDwc)} = 1.17 \times 10^{-3}$ µg/l

$PNEC_{water} = 0.06$ µg/l

$PEC/PNEC_{surface\ water}$ = 0.0195

This shows that the risk for organisms living in the surface water compartment resulting from STP effluent affected by the use in sewers is not considered unacceptable.

2.8.4.1.1.2 Sediment

$PEC_{sed} = 0.0112$ mg/l

The $PNEC_{sediment}$ was calculated using the equilibrium partitioning method.

$PNEC_{sediment} = 2.51$ mg/kg (wet weight)

$PEC/PNEC_{sediment}$ = 0.005

It can be concluded that the risk for sediment living organisms is not unacceptable.

2.8.4.1.1.3 Sewage treatment plants (STP)

According to TGD II only dissolved concentrations of the substance in the STP are bioavailable for microorganisms, so therefore;

$C_{local\ effl} = PEC_{STP}$

PEC_{STP} was determined to 11.7×10^{-6} mg/l = $1.17*10^{-5}$ mg/l (section 2.8.3.1.1)

The PNEC for sewage treatment plant (STP) micro-organisms is 0.48 mg/l.

$PEC/PNEC_{STP\ micro\ organisms} = 2.44 \times 10^{-5}$

It can be concluded that the risk for STP microorganisms caused by the product used for control of rodents in sewers and STP is not unacceptable.

2.8.4.1.2 In and around buildings

Use of RATONEX BLOQUE as a rodenticidal product for the use in and around buildings, risk assessment is only performed for groundwater since this is the only water compartment that can be contaminated.

2.8.4.1.2.1 Ground water

Concentration in soil pore water was calculated both for the use of RATONEX BLOQUE in section 2.8.3.3.2 above. The maximum permissible concentration according to directive 80/778/EEC is 10^{-4} mg/l, which is not exceeded as shown by the calculation.

Predicted concentration = 1.439×10^{-6} mg/l

Permissible concentration = 1×10^{-4} mg/l

The comparison above indicates there is not a significant risk of groundwater contamination. However, the in and around buildings scenario is a true worst case scenario which describes the

situation in very localised spots of soil, and no consideration is given to dilution when difenacoum migrates through soil layers.

2.8.4.1.3 Open areas

Use of RATONEX BLOQUE as a rodenticidal product for the use in open areas, risk assessment is only performed for groundwater since this is the only water compartment that can be contaminated.

2.8.4.1.3.1 Ground water

Concentration in soil pore water was calculated both for the use of RATONEX BLOQUE in section 2.8.3.3.3 above. The maximum permissible concentration according to directive 80/778/EEC is 10^{-4} mg/l, which is not exceeded as shown by the calculation.

Predicted concentration = 8.89×10^{-6} mg/l

Permissible concentration = 1×10^{-4} mg/l

The comparison above indicates there is not a significant risk of groundwater contamination.

2.8.4.1.4 Waste dumps

Use of RATONEX BLOQUE as a rodenticidal product for the use in waste dumps, risk assessment is only performed for groundwater since this is the only water compartment that can be contaminated.

2.8.4.1.4.1 Ground water

Concentration in soil pore water was calculated both for the use of RATONEX BLOQUE in section 2.8.3.3.4 above. The maximum permissible concentration according to directive 80/778/EEC is 10^{-4} mg/l, which is not exceeded as shown by the calculation.

Predicted concentration = 1.89×10^{-7} mg/l

Permissible concentration = 1×10^{-4} mg/l

The comparison above indicates there is not a significant risk of groundwater contamination.

2.8.4.2 Atmosphere

Since difenacoum will be used only locally and since it has a low vapour pressure, as a range of 6.7×10^{-9} – 5.4×10^{-14} Pa, and low Henrys law constant the concentration of difenacoum in the atmosphere will be negligible. Therefore no risk assessment is performed for the atmosphere.

2.8.4.3 Terrestrial compartment

Difenacoum can contaminate soil from use of RATONEX BLOQUE in sewers which contaminates the sewage sludge which later is applied to soils as a source of nutrients or as a soil improver, and also through the use of difenacoum bait in and around buildings, open areas and waste dumps. Therefore, the risk for soil organisms is assessed.

2.8.4.3.1 Sewers

The highest PEC for the use of sewage sludge was found for the scenario calculated in section 2.8.3.3.1 where meter-thick layers are applied at golf courses or for other general purposes for a time period of ten years. In this scenario the concentration in soil was assumed to be equal to the

concentration in the normal case sludge, i.e. PEC = 0.0019 mg/kg. The PECsludge$_{soil}$ value for agricultural soils (0.0029 mg/kg) will be used in the risk assessment.

PNEC$_{soil}$ of 0.877 mg/kg wet weight was determined in the Assessment Report.

Calculation of PEC/PNEC gives 0.0029/0.877 = 0.0033

PEC/PNEC$_{soil, sewage\ sludge}$ = 0.0033

The risk assessment for application of difenacoum contaminated sludge to soil indicates that the risk to soil organisms is not unacceptable.

2.8.4.3.2 In and around buildings

Difenacoum contamination of soil around buildings will occur both from direct contamination when bait blocks are deployed outdoors and from indirect contamination via dead bodies, urine and faeces from the target organisms. The worst case PEC$_{soil}$ which is the sum of the direct and indirect contamination was determined to 0.046 mg /kg (section 2.8.3.3).

The PNEC was determined in the Assessment Report. PNEC$_{soil}$ = 0.877 mg/kg

The risk quotient for the ESD worst case scenario is PEC/PNEC = 0.046/0.877 = 0.052

PEC/PNEC$_{soil}$ = 0.052

This indicates that the risk for soil organisms when difenacoum is used around buildings is not unacceptable.

2.8.4.3.3 Open areas

The PEC local soil in open areas has been calculated in section 2.8.3.3.3 as 0.283 mg/kg.

The PNEC was determined in the Assessment Report. PNECsoil = 0.877 mg/kg

According to the available data from this study (see Assessment Report) the PEC/PNEC$_{soil}$ value will be:

PEC/PNEC = 0.283/0.877 = 0.32

PEC/PNEC$_{soil}$ = 0.32

This indicates that the risk for soil organisms when difenacoum is used in open areas is not unacceptable.

2.8.4.3.4 Waste dumps

In some instances, applications of rodenticides to refuse dumps take place. Mostly the use is limited to occasions of population outbreaks of rats. Often the rodenticides are deployed around the perimeter of the dump, more than in the disposal area itself. The worst case PEC$_{soil}$ to 0.006 mg /kg (section 2.8.3.3.4).

The risk quotient for the ESD worst case scenario is PEC/PNEC = 0.006/0.877 = 0.0068.

PEC/PNEC$_{soil}$ = 0.0068

This indicates that the risk for soil organisms when difenacoum is used in waste dumps is not unacceptable.

2.8.4.3.5 Summary of risk assessment for the aquatic, terrestrial compartments and the atmosphere

When RATONEX BLOQUE containing difenacoum are used in and around buildings, sewer systems, open areas and waste dumps, the risk assessment shows that the risks for the atmosphere, organisms in surface waters and the soil compartment are not all inacceptable.

Table 2.8.4.3.5: Summary of PEC/PNEC values

	PEC/PNEC$_{sw}$	**PEC/PNEC$_{stp}$**	**PEC/PNEC$_{sed}$**	**PEC/PNEC$_{soil}$**	**PEC$_{grw}$ (mg/l)**
Sewer systems	0.0195	2.44×10^{-5}	0.005	0.0033	-
In/around buildings	-	-	-	0.052	1.439×10^{-6}
Open areas	-	-	-	0.32	8.89×10^{-6}
Waste dumps	-	-	-	0.0068	1.89×10^{-7}

2.8.4.4 Non compartment specific exposure relevant to food chain (primary and secondary poisoning)

Difenacoum is not readily biodegradable, has a relatively high bioconcentration factor and is very toxic to both aquatic organisms and mammals, and therefore a risk assessment for secondary poisoning was performed according to TGD II section 3.8.3.1 page 125. According to the calculations performed with the ESD and TGD II, the evaluated product with difenacoum will cause unacceptable risks both for primary and secondary poisoning.

It has been shown in numerous scientific reports (Newton *et al*., 1997; Fournier-Chambrillon, *et al*. 2004; Shore *et al*., 1999; Gillies and Pierce, 1999; Eason and Spurr, 1995) that non-target birds and mammals have been, and are continuously, exposed to second generation anticoagulant rodenticides in the environment. This exposure occurs most likely by consumption of living or dead rodents that have been poisoned by baits containing rodenticides (secondary poisoning). Moreover, year after year there are reports (Barnett *et al*., 2006) of accidents where non-target mammals have been poisoned by consumption of rodenticides (primary poisoning). Species included in the latter reports are e.g. dogs, badgers and squirrels. The reports include many bird species and also honeybees but there seems to be a lack of reports, and possibly lack of research, on rodenticide effects on snakes and amphibians. Secondary poisoning could e.g. pose a threat to snakes, and this animal group may not be regarded as protected by tests on mammals.

The risk of difenacoum to non-target birds and mammals has been assessed according to the ESD and the TGD II. However, although difenacoum has a potential to bioaccumulate, assessment of secondary poisoning through the aquatic food chain is not performed for the following reasons: the risk assessment for the aquatic compartment in section 2.8.4.1 above indicates that there will be very low concentrations of difenacoum in the aquatic compartment, and there was no risk identified of difenacoum for surface water or sediment dwelling organisms. The justification for not performing an assessment of secondary poisoning via the terrestrial food chain is that secondary poisoning will be limited due to the small area that potentially is contaminated by difenacoum around buildings and the limited number of earthworms inhabiting this area.

It seems from monitoring data published on barn owls that 1% of the owls had died from secondary poisoning by rodenticides (Newton *et al.*, 1997). The question is whether this 1-% lethality will have any effect on population level. Looking at the barn owl population in England it seems as it has

stabilised during the two last decades after a 60-70% decline between 1930 and 1980. Figures for mammals are more uncertain, especially since many mammals may hide before they die.

The probability of poisoning will depend on the duration of the treatment campaign, since the longer the campaign the higher is the probability for long-term toxic effects. Moreover, the frequency of campaigns in a specific area has to be considered, which means that campaigns have to be coordinated locally or regionally, taking into consideration the size of the hunting grounds of the species to protect. Otherwise predatory birds may catch rats with abnormal behaviour on one farm for a week and then on the next farm the next week and so forth. If the hunting grounds for a barn owl cover something like five farms the length of the exposure period to owls for poisoned rats could theoretically increase from 3 to 15 weeks. The frequency and length of the campaigns should be recorded by the professional users and could also be connected to monitoring programmes, e.g. monitoring of dead birds regarding cause of death and liver concentrations of rodenticides where the pattern of rodenticide use could be related to the variation over time of the recorded liver concentrations.

2.8.4.4.1 Sewers

2.8.4.4.1.1 Primary poisoning

Primary poisoning of non-target mammals or birds is not likely when fresh baits with difenacoum are applied to the sewage system, since only rats and cockroaches live and feed in sewers (information according to the ESD).

2.8.4.4.1.2 Secondary poisoning

Secondary poisoning of non-target species also has to be considered, but is relevant only if poisoned rats or cockroaches move to the surface (ESD). Secondary poisoning will be assessed more thoroughly in the in and around buildings scenario.

2.8.4.4.2 In and around buildings

2.8.4.4.2.1 Primary poisoning

Non-target animals such as wild and domestic animals may come in contact with baits if the bait is incompletely protected or if bait stations have been damaged. Also well protected bait may be encountered by animals which are small enough to be able to reach the bait, e.g. weasels, stoats and young cats (kittens), and therefore may be subject to primary poisoning.

- ***Tier 1 assessment***

In the Tier 1 assessment of primary poisoning it is assumed that the whole day's food requirement is satisfied by consumption of wax blocks, and therefore the concentration in food will be the same as the concentration of active substance in the bait, 50 mg/kg. This is then compared to the long-term PNECs for birds and mammals. The resulting PEC/PNEC ratios in table 2.8.4.4.4.1-1 reveal a high risk for both birds and mammals of long-term primary poisoning.

For the acute situation of primary poisoning only a qualitative risk assessment will be carried out in accordance with the decision from TM III-06. This will be done in the Tier 2 assessment below.

Table 2.8.4.4.2.1-1: PEC/PNEC ratios for primary poisoning – Tier 1 assessment

	PEC (conc. in food, mg/kg)	**PNEC (conc. in food)**	**PEC/PNEC**
Long-term			
Birds	50	0.0005 mg/kg	100000

Mammals	50	0.00019 mg/kg	7142.85

- ***Tier 2 assessment***

In the Tier 2 acute qualitative risk assessment the daily uptake (ETE) of difenacoum is compared with the effect data for birds and mammals. It is important to stress that this qualitative assessment is not intended to be used in the risk characterisation of primary and secondary poisoning of rodenticides and shall not be used in a comparative assessment. To refine the risk assessment the actual dose of difenacoum consumed by the bird after one day/one meal ETE is calculated using the equation below (equation 19 in the ESD). When calculating the dose both the typical body weight of the animal (BW) and daily mean food intake (FIR) are considered. The calculations are performed in two steps where the avoidance factor (AV), the fraction of the diet obtained from the rodenticide treated are (PT) and the fraction of food type in the animals diet (PD) are all considered in accordance with the ESD. In the worst case calculations performed in the first step avoidance factors, fraction of the diet from treated areas and fraction of food type in diet are all set to the default value of 1. In the realistic worst case calculations, step 2, performed according to the ESD the AV = 0.9, PT = 0.8 and PD = 1. The results are presented in tables 2.8.4.4.4.1-2 and -3 below.

ETE = (FIR/BW)*C*AV*PT*PD (mg /kg bw*day) Eq. 19

Table 2.8.4.4.2.1-2: ETE values calculated for acute exposure (ETE)

Non-target animal	Typical bodyweight (g)	Daily mean food intake (g dw/day)	Concentration of difenacoum in bait (mg/kg)	ETE (mg/kg bw)	
				Step 1	Step 2
Dog	10 000[a]	456[b]	50	2.28	1.64
Pig	80 000 [a]	600 [a]	50	0.38	0.27
Pig, young	25 000 [a]	600 [a]	50	1.20	0.86
Tree sparrow	22 [a]	7.6 [a]	50	17.27	12.44
Chaffinch	21.4 [a]	6.42 [a]	50	15.00	10.8
Wood pigeon	490 [a]	53.1 [a]	50	5.42	3.90
Pheasant	953 [a]	102.7 [a]	50	5.39	3.88

[a] According to table 3.1 in the ESD

[b] Calculated from log FIR=0.822 log BW-0.629 according to equation on page 50 ESD

Table 2.8.4.4.2.1-3: PEC values calculated for birds and mammals

Non-target animal	PEC_{oral} = ETE, concentration of difenacoum after one meal (mg/kg)		LD_{50} (mg/kg bw/d)	PEC_{oral} higher than LD_{50} (y/n)	
	Step 1	Step 2		Step 1	Step 2
Dog	2.28	1.64	1.8	y	n
Pig	0.38	0.27	1.8	n	n
Pig, young	1.20	0.86	1.8	n	n
Tree sparrow	17.27	12.44	56	n	n
Chaffinch	15.00	10.8	56	n	n
Wood pigeon	5.42	3.90	56	n	n
Pheasant	5.39	3.88	56	n	n

The ETE values calculated for acute exposure for the worst case (step 1) and realistic worst case (step 2) are compared to the LD_{50} values in the table 2.8.4.4.2.1-3. This comparison indicates that

birds are not at risk for acute primary poisoning; while the situation for mammals is more uncertain. Dogs are at risk and pigs are very close to being at risk.

- ***Tier 2 assessment long term***

The long-term risks of difenacoum are determined by the expected concentrations (EC) in the animal after metabolism and elimination, which is regarded as PEC. The EC is calculated by using the actual dose of the substance consumed by a non-target animal each day (ETE) using the realistic worst case scenario (step 2), calculated above in table 2.8.4.4.2.1-2. When calculating the long-term risks, elimination and metabolism of the substance (El) have to be considered. According to the ESD, a default value of 0.3 for El can be used if no studies are submitted that show different.

Calculations are performed according to equation 20 in the ESD;

EC = ETE*(1-El) Eq. 20

The long-term PNEC values used for mammals and birds are those from rabbit and Japanese quail according to the calculations performed in section 2.8.2.4, and they are presented in table 2.8.4.4.2.1-4.

Table 2.8.4.4.2.1-4: PEC/PNEC ratios for primary poisoning - Tier 2 assessment long term

Non-target animal	PEC = EC, concentration of difenacoum after one day of elimination (mg/kg)	PNEC dose (mg/kg bw/day)	PEC/PNEC
Dog	1.15	0.0001	11500
Pig	0.19	0.0001	1900
Pig, young	0.60	0.0001	6000
Tree sparrow	8.71	0.0003	29033
Chaffinch	7.56	0.0003	25200
Wood pigeon	2.73	0.0003	9100
Pheasant	2.72	0.0003	9066

The result of the PEC/PNEC calculations shows that there are very high risks for long-term primary poisoning of both mammals and birds. The calculations are based on that bait is consumed only during one day and then eliminated from the animal, but it should also be considered that an animal might consume bait again before the first dose is eliminated. On the other hand it should been taken into consideration that the actual doses are strictly worst case and that consumption of these quantities of difenacoum bait by the non-target animals exemplified above are generally not realistic. These results are discussed and compared to monitoring data after the assessment of secondary poisoning in the next section.

2.8.4.4.2.2 Secondary poisoning

Secondary poisoning of difenacoum occurs when poisoned rodents are caught by predators and eaten by scavengers that hunt and forage around difenacoum treated areas. It has been reported by Shore *et al*. (1999) that there is an increased hazard of exposure for predators during the winter months which might be caused by that there is less prey available in the winter season. It should also be considered that behaviour of poisoned rodents might change as presented in two reports referred to in the ESD. According to these reports more than half of the rats that died by rodenticide poisoning died away from cover. Moreover, it seemed as the rats changed their behaviour when still

alive and were more active during the days than rats normally are and also spent more time unprotected above ground. Such behaviour can make them a more easy prey to predators and they are also more easily found by scavengers. It was found, when water voles were studied during a campaign, that 38% of them died above ground (Saucy *et al*., 2001, in ESD).

- ***Tier 1 assessment, acute***

Calculations of the risk for secondary poisoning of scavengers and predators are done by determining the concentration of difenacoum in their food, i.e. the poisoned rodents. This PEC_{oral} is then compared to the LC_{50} values presented in section 2.8.2.4 for a qualitative risk assessment in accordance with the decision from TM III-06. According to the ESD section 3.3.1 the consumption of rodenticides makes up at least 20% of total consumptions in a choice test and could in a worst case be up to 100%, whilst 50% would be considered the normal situation. Therefore, in the calculations PD values are set to 0.2, 0.5 and 1.0. The FIR/BW quotient is a default value set to 0.1, i.e. it is assumed that the rats eat 10% of their bodyweight each day. The avoidance factor (AV) is 1, which means no avoidance, since rats is their natural prey, and the fraction of diet (PD) obtained in the area is set to 1. The calculation is done according to equation 19 in the ESD;

$$ETE = (FIR/BW)*C*AV*PT*PD \text{ (mg /kg bw*day)} \qquad \text{Eq. 19}$$

This equation gives the concentration of difenacoum in the rat (PEC_{oral}) after a meal the first day. Considering the elimination rate and that the mean time to death is seven days the concentration in the rodents each day can be calculated by;

$$EC_n = \sum_{n=1}^{n-1} ETE * (1\text{-}El)_n \qquad \text{Eq 21}$$

Table 2.8.4.4.2.2-1: Residues in target animals at specific point in times and varying bait consumptions.

	Residues in target animal (mg/kg bw), with bait consumption in % of daily consumption (PD)		
	20%	**50%**	**100%**
Day 1 after the first meal	1.0	2.5	5.0
Day 2 before new meal	0.7	1.8	3.5
Day 5 after the last meal	2.8	6.9	13.9
Day 7 mean time to death	1.4	3.4	6.8

The concentrations of difenacoum in rats are at peak after consuming bait for 5 days; thereafter the concentrations in rodents are decreasing until day 7 due to excretion and metabolism of the rodenticide. The values from day 5 are used as PEC_{oral}. The effect data used for birds is the LD_{50} for Japanese quail of 56 mg/kg bw recalculated, using equation 77 in the TGD II and the conversion factor bw/dfi of 8 (domestic hen) from table 22 in the TGD II, which seems in good agreement with the actual food consumption noted in the study. The result is LC_{50} = 448 mg/kg food, which seems rather high. The effect data used for mammals is the LD_{50} for the rat of 1.8 mg/kg bw recalculated, using the conversion factor bw/dfi of 20 from table 22 in the TGD II, resulting in an LC_{50} = 36 mg/kg food.

Table 2.8.4.4.2.2-2: Calculated PECs and recalculated LC_{50} values for mammals and birds.

	PEC Expected concentration in rodent (mg/kg) caught on day 5 after meal			LC_{50} (mg/kg food)
	PD = 0.2	PD = 0.5	PD = 1	
Mammals	2.8	6.9	13.9	36
Birds	2.8	6.9	13.9	448

This qualitative assessment indicates that birds and mammals are likely to survive if they eat poisoned rats.

- ***Tier 1 assessment, long term***

To assess the risk of long-term secondary poisoning to birds and mammals, the PEC in rodents after 5 days is used and compared to the long-term $PNEC_{oral}$ for birds and mammals (table 2.8.4.4.4.2-3). For birds, the PNEC value from the reproduction test is used, and for mammals the PNEC value calculated from the 90 day test with rabbits (see section 2.8.2.4).

Table 2.8.4.4.2.2-3: PEC/PNEC ratios for secondary poisoning - Tier 1 assessment long term

	$PNEC_{oral}$ (conc. in food)	PEC_{oral} Difenacoum conc. in target rodent (mg/kg bw), ESD default values	PEC/PNEC
Birds	0.0005 mg/l	13.9	27800
Mammals	0.0003 mg/kg	13.9	46333

The PEC/PNEC ratios indicate very high risks for long-term secondary poisoning of birds and mammals by consumption of rodenticide poisoned rodents.

- ***Tier 2 assessment, long term***

For the Tier 2 assessment the average food intake for each species and the average weight of the species have been considered, and the values are taken from table 3.5 in the ESD. The amount of active substance consumed by the non-target animal is 13.9 mg/kg bw for rodents caught on day 5 and 16.6 mg/kg bw for resistant rodents caught on day 14, also assuming that the non-target animals feed to 50% on the rodents, all in accordance with the ESD. By knowing the amount of active substance consumed by the non-target animal and the weight of the animal the PEC (concentration in non-target animal) after one day consumption of rodents can be calculated. The results are presented below in table 2.8.4.4.2.2-4.

Table 2.8.4.4.2.2-4: Concentrations in non-target animals (PEC) after one day consumption of rodents

Species	Body weight (g)	Daily mean food intake (g/day)	Normal susceptible rodents caught on day 5		Resistant rodents caught on day 14	
			amount a.i. consumed by non-target animal (mg)	Conc. in non-target animal (mg/kg)	amount a.i. consumed by non-target animal (mg)	Conc. in non-target animal (mg/kg)
Barn owl *(Tyto alba)*	294	72.9	0.51	1.7	0.61	2.1
Kestrel *(Falco tinnunculus)*	209	78.7	0.55	2.6	0.65	3.1
Little owl *(Athene noctua)*	164	46.4	0.32	2.0	0.39	2.3

Tawny owl *(Strix aluco)*	426	97.1	0.67	1.6	0.81	1.9
Fox *(Vulpes vulpes)*	5700	520.2	3.60	0.6	4.32	0.8
Polecat *(Mustela putorius)*	689	130.9	0.9	1.3	1.09	1.6
Stoat *(Mustela erminea)*	205	55.7	0.40	1.9	0.46	2.3
Weasel *(Mustela nivalis)*	63	24.7	0.17	2.7	0.21	3.3

The results of the PEC/PNEC calculations are presented in table 2.8.4.4.2.2-5, below. For birds the PNEC (dose) from the reproduction test is used, and for mammals the PNEC (dose) calculated from the 90 day rabbit test, as presented in section 2.8.2.4.

Table 2.8.4.4.2.2-5: Expected concentrations (PEC) in non-target animals after a single day of exposure and resulting PEC/PNEC ratios. PNEC values expressed as dose (mg/kg bw/day) are used in the calculations

Species	PEC day 5 (conc. in food, mg/kg bw)	PNEC (dose, mg/kg bw/day)	PEC/ PNEC (day 5)	PEC day 14 (conc. in food, mg/kg bw)	PNEC (dose, mg/kg bw/day)	PEC/ PNEC (day 14)
Barn owl *(Tyto alba)*	1.7	0.0001	17000	2.1	0.0001	1600
Kestrel *(Falco tinnunculus)*	2.6	0.0001	26000	3.1	0.0001	2400
Little owl *(Athene noctua)*	2.0	0.0001	20000	2.3	0.0001	1800
Tawny owl *(Strix aluco)*	1.6	0.0001	16000	1.9	0.0001	1500
Fox *(Vulpes vulpes)*	0.6	0.007	857	0.8	0.007	114
Polecat *(Mustela putorius)*	1.3	0.007	185	1.6	0.007	228
Stoat *(Mustela erminea)*	1.9	0.007	271	2.3	0.007	328
Weasel *(Mustela nivalis)*	2.7	0.007	385	3.3	0.007	471

The worst case calculations according to the ESD show very high risks for secondary poisoning of difenacoum to both birds and mammals. The concentrations in the rodents in principle need to be reduced with 3-6 orders of magnitude in order to bring down the risk for non-target animals to acceptable levels.

Conclusions based on monitoring data

It seems from monitoring data published on barn owls that 1% of the owls had died from secondary poisoning by rodenticides (Newton *et al*., 1997). The question is whether this 1-% lethality will have any effect on population level. Looking at the barn owl population in England it seems as it has stabilised during the two last decades after a 60-70% decline between 1930 and 1980. Figures for mammals are more uncertain, especially since many mammals may hide before they die.

The probability of poisoning will depend on the duration of the treatment campaign, since the longer the campaign the higher is the probability for long-term toxic effects. Moreover, the frequency of campaigns in a specific area has to be considered, which means that campaigns have to be coordinated locally or regionally, taking into consideration the size of the hunting grounds of the species to protect. Otherwise predatory birds may catch rats with abnormal behaviour on one farm for a week and then on the next farm the next week and so forth. If the hunting grounds for a barn

owl cover something like five farms the length of the exposure period to owls for poisoned rats could theoretically increase from 3 to 15 weeks. The frequency and length of the campaigns should be recorded by the professional users and could also be connected to monitoring programmes, e.g. monitoring of dead birds regarding cause of death and liver concentrations of rodenticides where the pattern of rodenticide use could be related to the variation over time of the recorded liver concentrations.

Monitoring data for Barn owls (Newton *et al*., 1997) provides a basis for calculations to determine what relevance the worst case calculations above, which indicate large implications on non-target bird and mammal populations, may have in the environment. The data based on 1100 collected birds shows that 30% of the birds collected the recent decades have residues of second generation rodenticides. It also shows that ca 1% of the collected birds had died of rodenticide poisoning (table 2.8.4.4.2.2-6).

Table 2.8.4.4.2.2-6: Rodenticide residues in livers of Barn owls killed by rodenticides (from Newton *et al*., 1997)

Owl no.	Rodenticide	Rodenticide concentration (mg/kg liver)
1	Bromadiolone	0.13
2	Bromadiolone Brodifacoum Flocoumafen	0.05 0.002 0.003
3	Difenacoum	0.17
4	Bromadiolone	1.07
5	Brodifacoum	0.87
6	Bromadiolone Brodifacoum	1.72 0.07
7	Bromadiolone	0.33
8	Brodifacoum	0.42

For difenacoum, the residues in the liver were not measured in either test, and hence the comparison to the monitoring data is difficult. The residue levels measured from dead barn owls ranged from 0.05-0.2 mg/kg in liver.

2.8.4.4.3 Open areas

2.8.4.4.3.1 Primary poisoning

The bait may also attract other vertebrates and small birds. The situation in the open area and waste dumps scenarios is basically similar to what is mentioned for commensal rodents above regarding the risk of primary poisoning. See point 2.8.4.4.2.

2.8.4.4.3.2 Secondary poisoning

Secondary poisoning hazard may occur in the open area and waste dumps scenarios. Predators among mammals and birds may occur in the immediate vicinity of buildings or landfills. When moving around the rats may be caught by raptors and scavengers may find dead rats. See point 2.8.4.4.2.

2.8.4.4.4 Waste dumps

2.8.4.4.4.1 Primary poisoning

Concerning the risk of primary poisoning the situation is regarded similar to that described above for vole control in the open areas. See point 2.8.4.4.2.

2.8.4.4.4.2 Secondary poisoning

The secondary poisoning hazard applies to predators among mammals and birds and scavengers and thus the situation is comparable to that described for commensal rodents; however, there might be more predators around a landfill than in the open areas e.g. sea gulls, craws, etc. See point 2.8.4.4.2.

2.8.4.5 Discussion on risks of primary and secondary poisoning in comparison to monitoring data and proposal of risk mitigation measures

According to the risk calculations the proposed normal use of difenacoum causes unacceptable risk for primary and secondary poisoning of non-target vertebrates. However, the risk for primary poisoning is assumed to be negligible in the ESD if the rodenticidal baits are used according to the label instructions. In the aquatic food chain (fish-eating birds and mammals) 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 for difenacoum residues in raptorial birds and mammalian predators. Not only the risk characterisation shows risk for secondary poisoning, but also the published laboratory studies confirm bioaccumulation of difenacoum in the owls. Bioaccumulation of difenacoum in predators has been shown in the measurements of difenacoum residues in the animal carcasses found from the field in United Kingdom. The target organ for difenacoum is liver and difenacoum residues in the carcasses have been measured from the liver. In one laboratory study highest residues were measured in the liver, and residues in other tissues including the wax tissue were low. Owls exposed to difenacoum showed variable effects from no foreseeable effects to death. Other observed effects were increased coagulation times and haemorrhages. The effects disappeared gradually after the end of exposure. Population level effects of difenacoum have not been studied.

In the laboratory studies, the owls fed entirely or mostly on poisoned rodents which may not be probable in the field conditions. The carcasses found from the field were diagnosed to have died to other reason than difenacoum and difenacoum residues were assumed to be sublethal. It is, however, possible that sublethal difenacoum residues have contributed to the death of predators. Reproductive effects of difenacoum in avian or mammalian predators or scavengers have not been studied in the laboratory or in field experiments. Dose-related effects on the reproduction were observed in Japanese quail in the reproduction study. The NOEC of 0.31 mg/l drinking water and NOEL of 58 µg/kg bw were determined in this study. The residues in the liver were not measured in the reproduction test, and hence the comparison to the monitoring data is difficult. The residue levels measured from dead barn owls ranged from 0.05-0.2 mg/kg in liver.

In conclusion difenacoum does not fulfil the environmental acceptance criteria due to bioaccumulation and unacceptable effects in the non-target vertebrates.

2.8.4.6 PBT assessment

Difenacoum is not readily or inherently biodegradable and half-life in marine or freshwater sediment is expected to be more than 180 days or 120 days, respectively. Difenacoum is also hydrolytically stable. Difenacoum has a high potential for bioaccumulation based on the calculated log Kow and BCF. Based on both the ecotoxicological and toxicological data, difenacoum fulfils the T criterion.

Difenacoum is a potential PBT and vPvB substance. Nevertheless, difenacoum is not a candidate for a persistent organic pollutant (POP), as it does not have a potential for long-range atmospheric transport.

2.9 Measures to protect man, animals and the environment

In general, for the product RATONEX BLOQUE, we propose the following conditions:

1. Category of user:

There are three kind of user:

- Trained professional users (TP): pest control operators, having received specific training in rodent control according to the national legislation in force.
- Non-trained professional users (NTP): professionals that use the biocidal product in the context of his profession that is not pest control operator and that are unlikely to have received any specific training in the use of rodenticides. It can be expected that they have some knowledge and skills handling chemicals (if they must use it in their job) and they are able to use correctly PPE if necessary. In this context in Spain, for rodenticides, we consider NTP to workers in livestock environment.
- Non-professional users (NP): users who are not professionals and that apply the biocidal product is in his private life.

2. Tamper-resistant bait station:

The rodenticide product must always be placed in a tamper-resistant bait station correctly labelled.

For trained professional users it is mandatory to use tamper-resistant bait stations, lockable and correctly labelled. These tamper-resistant bait stations **can be refillable.** They have to be placed only in areas that are inaccessible to children, companion animals and other no-target animals.

For non-trained professional users and non-professional users, it is also mandatory to use tamper-resistant bait stations, lockable and correctly labelled. They could be refillable only if it is NOT possible to have a direct contact with the bait.

The quantity of bait placed in the tamper-resistant bait station has to be proportionate to the duration of the treatment and appropriate to the size of a single rodent infestation in order to avoid or to reduce the resistances, applying the following criteria:

- **Block bait:** biocidal products in block bait can be supplied loose (without sachets).

3. The aversive agent and dye use.

It is mandatory to use an aversive agent and a dye to alarm other non-target animals from the bait. The bait is dyed 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.

4. The upper limit to package size.

The maximum package size for non-professional users and non-trained professional users is 1 kg.

5. Packaging

All packaging (packs and tamper-resistant bait stations) shall be marked with the following phrases in the label:

- Bait stations must be securely placed in non-accessible areas in order to prevent the consumption by other animals.
- In order to minimize the risk of secondary poisoning, search for and remove dead rodents at frequent intervals during treatment, at least as often as when baits are checked and/or replenished.

For professional users:

- Remove all packaging, uneaten baits, bait boxes and dead rodents after treatment and dispose of them in accordance with current regulations through registered establishment or undertaking carrying out waste management operations.

For non-professional users:

- Packaging, uneaten baits, bait boxes and dead rodents must be deposited at collection points or points established by the local authority in accordance with their respective ordinances.

2.9.1 Recommended method and precautions concerning handling, use, storage, transport or fire

Handling and use:

- Always read the label before use and follow the instructions provided.
- Avoid contact with eyes, skin and mouth. Avoid ingestion.
- Do not smoke eat or drink while handling this product.
- Keep away from food, drink and animal feeding stuffs.
- Keep out of reach of pets.
- Wear gloves for the handling and disposal of the product.
- Wash hands after application and use of the product, and before eating, drinking or smoking.
- Use tamper-resistant bait stations and place them in inaccessible areas to prevent the access of non-target species, children and companion animals.
- Bait stations must always be correctly labelled.
- Collect dead rodent during all control operations to minimise the risk of consumption and poisoning to children, companion animals and other non-target animals.
- Do not throw the product on the ground, into a water course, into the sink or down the drain and into the environment.

Storage:

- Store in the original container in dry, well-ventilated place
- Store original container tightly closed
- Keep away from sun radiation and all other heat sources
- Protect against frost
- Keep away from strong smelling stuff
- Keep/store out of reach of children and companion animals
- Keep/store away from food, drink and animal feedstuffs

Transport:

- The transport of the product will meet the legal requirements

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.
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.

2.9.2 Specific precautions and treatment in case of an accident

Human health precautions:

Poisoning may cause:

Bleeding diathesis, derivated from antiprothrombin efect – prolonged prothrombin time – that may became evident at minimum 24 – maximum 72 hours (A normal prothrombin time when the patient is admitted in the hospital, does not exclude the diagnosis)

First aid:

Move the person away from the contaminated zone
Remove contaminated or spattered clothing
Rinse the eyes with plenty of water for 15 minutes. Do not forget to remove the contact lenses
Wash off the skin with soap and plenty of water, without rubbing
If swallowed, do not make him/her vomit
Keep the patient warm and at rest
Check the breath. If necessary, give artificial respiration
If the person is unconscious, make him/her lay on his/her side, with the head at lower level than the rest of the body, bending the legs.
Take person to a hospital and show the label or packaging when possible

DO NOT LEAVE POISONED PERSON ALONE UNDER ANY CIRCUMSTANCE

Medical advice for doctors and sanitary staff

If less than 2 hours has passed from the intake, gastric emptying must be performed, and activated carbon dispensed (25 g)
Antidote: Vitamin K (Konakion ®).
Check the prothrombin time
Treat symptomatically

IN CASE OF ACCIDENT CONTACT THE POISON CENTER

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.

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 as hazardous waste according to local legislation.

- Subsequently, wash the contaminated area with water, taking care to prevent the washings entering sewers or drains.

2.9.3 Procedures for waste management of the biocidal product and its packaging

Dispose of packaging, remains of unused product and dead rodents as hazardous waste according to local legislation.

2.9.4 Possibility of destruction or decontamination following accidental release

Air:
In case of solid baits, the risk of release of the active ingredient or the product to the atmosphere is negligible.
Water (including drinking water):
It will be considered case by case
Soil:
In the event of spillage of an appreciable amount of product, this material should be collected for incineration.

2.9.5 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 must be considered and avoided when using bait.

3 Proposal for decision

The assessment presented in this report has shown that the ready-to-use product, RATONEX BLOQUE, with the active substance difenacoum, 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):

- Professional:
  - Trained: Indoors (inside private, public and farm buildings), in and around (private, public and farm buildings) and outdoors (waste dumps and open areas).
  - Non-trained: Indoors and around (maximum: 0.5 m) farm buildings
- Non-professional: Indoors (only inside private houses and outbuildings) and around (maximum: 0.5 m) private building premises and private gardens.

The product has been shown not to present a physical-chemical hazard to end users and does not classify as flammable, oxidising or explosive.

The product was shown to be efficacious against the intended target organisms (*Mus musculus* and *Rattus norvegicus)*, in the proposed areas for use at the proposed dose rate.

Concerning the human health, an exposure and effects assessment for RATONEX BLOQUE has been carried out for professionals and non-professionals, based on the larger baiting quantities for rats. Both the MOE and AEL approaches for risk assessment indicate 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, non-trained professionals and non-professionals (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 (1.13×10^{-6} mg/kg bw/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 secured in sealed packs and tamper resistant bait stations are essential to reducing the risk of secondary exposure. Baits should not be placed where food, feeding stuffs or drinking water could be contaminated. Additionally, baits should be placed in areas inaccessible to children.

The risk for the environment for the use of RATONEX BLOQUE in and around buildings, in open areas, in waste dumps/landfill sites and in sewers has been evaluated. The overall conclusion is that the intended uses of RATONEX BLOQUE do not pose an unacceptable risk to the sewage treatment plant, soil, air, surface water, sediment, and groundwater compartments.

However, the performance of bait stored in sewer conditions was not studied for the block bait, then, RATONEX BLOQUE can be concluded not to be suitable for baiting in damp or wet conditions (i.e. sewers).

An unacceptable risk is identified for the primary and secondary poisoning of non-target vertebrates, and specific risk mitigation measures on the use of the product are required to reduce the risk for the environment. The measures include use of tamper resistant bait boxes, collection of unconsumed baits after termination of the control campaign and collection of dead rodents during and after the control campaign at frequent intervals, proper disposal of dead rodents and unused baits, restriction of the use in open areas or in waste dumps to trained professional users only.

Conditions of authorisation

It is concluded that the evaluation has shown that sufficient data have been provided to verify the outcome and conclusions, and permit authorisation of the product RATONEX BLOQUE according to the following restrictions:

- This authorisation of RATONEX BLOQUE is valid until 31 March 2015.
- The concentration of the active substance, difenacoum, in RATONEX BLOQUE shall not exceed 0.05 g/kg (0.005% w/w).
- Only ready-to-use RATONEX BLOQUE product is authorised.
- The product is stable.
- The product is authorised to be applied in tamper-resistant bait stations in and around buildings by non-professional, non-trained professional and trained professional users.
- The product is authorised to be used in tamper-resistant bait stations in open areas and waste dumps/landfill sites only by trained professional users.
- The product is authorised only for use against rats (*Rattus norvegicus*) and mice (*Mus musculus*). Authorisation of this product does not allow use against non-target organisms.
- As a poison control measure, the authorisation requires that the product shall contain an aversive or bittering agent.
- The authorisation requires that the product be dyed with a colour to make them unattractive to wildlife, and birds in particular.
- The size of the package placed on the market should be proportionate to the duration of the treatment. For non- professional use products placed on the market packaging restrictions are to be limited to a maximum size of 1kg.
- Difenacoum baits must not be placed where food, feeding stuffs or drinking water can become contaminated.
- Apply hygiene measures: do not eat, drink or smoke during the handling of the product and wash hands after use
- Baits must be securely deposited in a way so as to minimize the risk of consumption by other animals or children. Where possible, baits should be secured so that they cannot be dragged away.
- Search for and remove dead rodents at frequent intervals during treatment, at least as often as when baits are checked and/or replenished.
- Collect dead rodent during all control operations to minimise the risk of consumption and poisoning to children, companion animals and other non-target animals.
- Dispose of dead rodents in compliance with local requirements.
- Remove all baits and bait boxes after treatment and dispose of them in accordance with local requirements.
- In order to prevent resistance and secondary poisoning for non-target animals, do not use the product as permanent bait.
- Do not clean the bait stations with water between two applications.
- Do not throw the product on the ground, into a water course, into the sink or down the drain.

To avoid resistance and because of cross-resistances occurrence to rodenticides:

- The treatment has to be alternated with other kinds of active substances.

- The use of anticoagulant rodenticides as permanent baits is not permitted.
- Integrated pest management (combination of chemical control, physical and hygienic measures) has to be taken into account.
- The level of efficacy have to be monitored (periodic check), and the case of reduced efficacy has to be investigated for possible evidence of resistance.

Further information is required:

The authorization holder has to report any observed suspected incidents of rodenticide poisoning of vertebrate wildlife, pets or some livestock to the Spanish Competent Authorities previously to the renovation of the authorisation. Data should be collected from veterinary clinics, NGOs of animal protection or citizen complaints.

Annex:

1. **Summary of product characteristics**
2. **List of studies reviewed**
3. **Analytical methods residues – active substance**
4. **Toxicology and metabolism –active substance**
5. **Toxicology – biocidal product**
6. **Safety for professional operators**
7. **Safety for non-professional operators and the general public**
8. **Residue behaviour**

(b) (ii) Is the product identical to the representative product, assessed for the purpose of the Annex I inclusion?

☐ **yes** **X no** ☐ **unknown**

If not, briefly describe the difference.

The product presented is a solid (blocks) but the co-formulants are not the same

(b) (iii) Does the biocidal product contain or consist of Genetically Modified Organisms (GMOs) within the meaning of Directive 2001/18/EC?

☐ **yes** **X no**

If yes, does the product comply with Directive 2001/18/EC?

☐ **yes** ☐ **no**

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.

(c) Manufacturer(s) of the active substance(s) (name(s) and address(es) including location of plant(s))[5]

Name of the active substance: Difenacoum

Manufacturer

Company Name:	Activa S.r.l.				
Address:	Via Tree Ponti, 22				
City:	Maria de Zevio	Postal Code:	37050 S	Country:	Italy
Telephone:	+39 0456069004	Fax:	+39 0456069118	E-Mail:	

Intra-Community VAT number or, for non EU companies, company registration number:

Manufacturing site(s) (if different)

Company Name:	.				
Address:					
City:		Postal Code:		Country:	
Telephone:		Fax:		E-Mail:	

Intra-Community VAT number or, for non EU companies, company registration number:

(d) Formulator(s) of the biocidal product (name(s) and address(es) including location of plant(s))[5]

Formulator

Company Name:	Will Kill, S.A.				
Address:	C/. 4 de noviembre, 6				
City:	Palma de Mallorca	Postal Code:	07011	Country:	Spain
Telephone:	971 203013	Fax:	971 759434	E-Mail:	laboratorio@willkill.com

Intra-Community VAT number or, for non EU companies, company registration number:

Formulation site(s) (if different)

Company Name:					
Address:					
City:		Postal Code:		Country:	
Telephone:		Fax:		E-Mail:	

Intra-Community VAT number or, for non EU companies, company registration number:

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

Physical state and nature of the biocidal product:

(e) Type of formulation: Wax blocks

(f) Ready-to-use product: ☐no X yes

Classification and labelling statements of the biocidal product:

(g) Product classification: No classification

(h) Risk and Safety Phrases:

a. Risk phrases: Any risk phrase is considered necessary

b. Safety phrases:

S2: Keep out of the reach of children
S13: Keep away from food, drink and animal feedingstuffs
S37: Wear gloves
S46: If swallowed, seek medical advice immediately and show this container or label

(i) Product classification according to GHS: The biocidal product does not require any classification and precautionary statements are:

P102: Keep out of reach of children.
P103: Read label before use.
P280: Wear protective gloves
P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

(j) Hazard statement according to GHS: Any hazard statement is considered necessary

Intended uses and efficacy:

(k) PT: 14 (rodenticide)

(l) Target harmful organisms:

I.1. R*odentia*
I. 1.1 *Muridae Murids*
I.1.1.1. *Rattus norvegicus*
I.1.1.3. *Mus musculus*

(m) Development stage of target organisms:

II.1. Juveniles
II.2. Adults

(n) 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

(o) Field of use:

IV.1 indoor use

IV.2 outdoor use

(p) Application aim:

VII.1 Stored product protection
VII.2 Health protection
VII.3 Material protection

(q) User category:

V.1 non-professional / general public
V.2 non-trained professional
V.3 trained professional

(r) Application method[6]:

VI.2.1 in bait stations

Directions for use[7]:

(s) Manner and area of use[8]:

The product is an anticoagulant rodenticide / Vitamin K antagonists intended to control rats and mice by trained professionals (in and around buildings, open areas and waste dumps) and non-professional and non-trained users (in and around buildings)

(t) Conditions of use[9]:

For rats, baits of 200g should be placed each 3 to 5 m.
For mice, baits of 40-50g should be placed each 3 to 5 m.

For trained professional users, the product is placed on the market as solid blocks of 6, 10 or 15g in containers of 1, 2.5, 3, 9, 10, 20 and 25 kg and they will have to fill the bait box with the corresponding number of blocks.

For non-trained professional and non-professional users, the product is placed on the market as solid blocks of 6, 8, 10 or 15g inside boxes of 25, 50, 100, 180, 250 and 500 g and 1kg. No manipulation is expected.

(u) Instructions for safe use of the product:[10]

6 Indicate how the product will be applied (e.g. brush, spray, dipping, bait, etc). Where the product is to be used by more than one user category, indicate the application method(s) intended for each user category.
7 Provide in the following sections the information as it is proposed to appear on the product label or appropriate product literature.
8 Indicate information on the target organisms, the mode of action, the field of use, the application aim, the user category and the application method. All efficacy claims should be reflected.
9 Include the details of the directions for use. This should be expressed in terms of amount of product per unit area or a length of application (e.g. dip for 3 minutes). For aerosols and sprays a discharge rate should be included. If the product is a concentrate, indicate the dilution rate(s) here (e.g. *dilute 1 part of product with x parts of water*).
10 Where appropriate, indicate here the period of time needed for the biocidal effect, the interval to be observed between applications of the biocidal product or between application and the next use of the product treated, or the next access by man or animals to the area where the biocidal product has been used, including particulars concerning decontamination means and measures and duration of necessary ventilation of treated areas;

Always read the label before use and follow the instructions provided.

Avoid contact with eyes, skin and mouth. Avoid ingestion.

Do not smoke eat or drink while handling this product.

Keep away from food, drink and animal feeding stuffs.

Wear gloves for the handling and disposal of the product.

Wash hands after application and use of the product, and before eating, drinking or smoking.

Bait stations must always be correctly labelled.

Baits should not be placed where food, feedingstuffs or drinking water could be contaminated.

Do not use anticoagulant rodenticides as permanent baits. Alternate the use of difenacoum baits with other active substance baits, in order to avoid resistance.

Use tamper-resistant bait stations and place them in inaccessible areas to prevent the access non-target species, children and companion animals.

Collect dead rodent during all control operations to minimise the risk of consumption and poisoning to children, companion animals and other non-target animals.

Bait points have to be checked every 2-3 days during the first 14 days of treatment. Bait points should be removed, in a typical campaign, 6 weeks after initial placement

For professional users: Remove all dead rodents after treatment and dispose of them in accordance with current regulations through registered establishment or undertaking carrying out waste management operations.

For non-professional users: Dead rodents must be deposited at collection points or points established by the local authority in accordance with their respective ordinances.

(v) Particulars of likely direct or indirect adverse effects and first aid instructions

Poisoning may cause:

Bleeding diathesis, derivated from antiprothrombin efect – prolonged prothrombin time – that may became evident at minimum 24 – maximum 72 hours (A normal prothrombin time when the patient is admitted in the hospital, does not exclude the diagnosis)

First aid:

Move the person away from the contaminated zone
Remove contaminated or spattered clothing
Rinse the eyes with plenty of water for 15 minutes. Do not forget to remove the contact lenses
Wash off the skin with soap and plenty of water, without rubbing
If swallowed, do not make him/her vomit
Keep the patient warm and at rest
Check the breath. If necessary, give artificial respiration
If the person is unconscious, make him/her lay on his/her side, with the head at lower level than the rest of the body, bending the legs.
Take person to a hospital and show the label or packaging when possible

DO NOT LEAVE POISONED PERSON ALONE UNDER ANY CIRCUMSTANCE

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particulars for adequate cleaning of equipment; particulars concerning precautionary measures during use, storage and transport (e.g. personal protective clothing and equipment, measures for protection against fire, covering of furniture, removal of food and feedingstuff and directions to prevent animals from being exposed).

Medical advice for doctors and sanitary staff

If less than 2 hours has passed from the intake, gastric emptying must be performed, and activated carbon dispensed (25 g)
Antidote: Vitamin K.
Check the prothrombin time
Treat symptomatically

IN CASE OF ACCIDENT CONTACT THE POISON CENTER

(w) Instructions for safe disposal of the product and its packaging

Do not throw the product on the ground, into a water course, into the sink or down the drain.

For professional users: Remove all packaging, uneaten baits and bait boxes after treatment and dispose of them in accordance with current regulations through registered establishment or undertaking carrying out waste management operations.

For non-professional users: Packaging, uneaten baits and bait boxes must be deposited at collection points or points established by the local authority in accordance with their respective ordinances.

(x) Conditions of storage and shelf-life of the product under normal conditions of storage

Store in the original container in dry and well ventilated place.

Keep away from sun radiation and other heat sources. Protect against frost.

The product is stable.

(y) Additional information:

Regarding the packaging of the product, the following types are proposed:

For trained professional users, the product is placed on the market as solid loose blocks of 6, 10 or 15g inside containers of 1, 2.5, 3, 9, 10, 20 and 25kg

For non-trained professional and non-professional users, the product is placed on the market as solid loose blocks of 6, 8, 10 and 15g inside boxes of 25, 50, 100, 180, 250 and 500g and 1kg.

Annex 3: Analytical methods residues – active substance

<Active Substance>

Data on the active substance difenacoum were required at the product authorization stage as stated in the AR of the active substance and were provided by Activa.

- Analytical data to prove the isomeric composition and impurity profile of the active substance,
- A validated method for the analysis of difenacoum in animal and human tissues,
- Validation data for the determination of residues of difenacoum in meat and oil-seed rape (food/feeding stuffs),
- Validation data for the determination of difenacoum in sediment.

France has evaluated them and concluded that they are acceptable.

Matrix, action levels, relevant residue and reference

matrix	limit	relevant residue	reference or comment
plant products	LOQ= 0.01mg/kg	Difenacoum	
food of animal origin	LOQ= 0.01mg/kg	Difenacoum	
soil	LOQ= 0.0214 µg/g	Difenacoum	
drinking water	LOQ 0.05µg/l	Difenacoum	
surface water	LOQ 0.5µg/l	Difenacoum	
air			Not relevant due to the low vapour pressure
body fluids / tissues	LOQ= 0.01mg/kg	Difenacoum	

Methods suitable for the determination of residues (monitoring methods)

Methods for products of plant origin

reference	matrix	LOQ (mg/kg)	principle	comment	owner

reference	matrix	LOQ (mg/kg)	principle	comment	owner
Marshall, L., 2009, Method Validation for the Determination of Difenacoum in Animal Matrices (Liver and Muscle) and Crop Matrix (Oilseed Rape), CEM Analytical Services Limited, Study CEMR-4469	Oil-seed rape	LOQ is 0.01 mg/kg	LC-MS/MS	Method of residue analysis for cucumber, wheat and lemon has been validated acceptably. The purified extracts are analysed for residues of difenacoum by LC-MS	

Methods for foodstuffs of animal origin

reference	matrix	LOQ (mg/kg)	principle	comment	owner
Marshall, L., 2009, Method Validation for the Determination of Difenacoum in Animal Matrices (Liver and Muscle) and Crop Matrix (Oilseed Rape), CEM Analytical Services Limited, Study CEMR-4469	Meat	LOQ is 0.01 mg/kg	LC-MS/MS		Activa / PelGar Brodifacoum and Difenacoum Task Force

Methods for soil

reference	LOQ (mg/kg)	principle	comment	owner

reference	LOQ (mg/kg)	principle	comment	owner
Morlacchini, M., 2006, Residues determination of Brodifacoum, Difenacoum and Bromadiolone in soil, CERZOO (Italy), Study CZ/05/002/Activa/Soil	LOQ is 0.0214 mg/kg	HPLC – UV-VIS	After extraction of the soil samples by chloroform:acetone, concentrated extracts are purified with a Florisil-sodium sulphate column. Quantification is done by HPLC-DAD detector. The method has been acceptably validated for samples of soil containing difenacoum at levels of 0.016, 0.063 and 0.158 mg/kg.	Activa /Pelgar

Methods for drinking water and surface water

reference	matrix	LOQ (µg/l)	principle	comment	owner
Difenacoum Technical: Validation of the Analytical Method for the Determination of the Residues in Drinking, Ground and Surface waters, Test Laboratory of ChemService S.r.l. ChemService Study No. CH-288/2005	water	LOQ is 0.05 µg/l for drinking water and groundwater and 0.5 µg/l for surface water.	HPLC – MS/MS	The test method for determination of difenacoum in drinking, ground and surface waters is based on extraction by dichloromethane. Quantification is done by LC-MS/MS (both SIM and SMR mode).	Activa / PelGar Brodifacoum and Difenacoum Task Force

Methods for air

reference	LOQ (µg/m3)	principle	comment	owner
			Not relevant, due to the low vapour pressure of difenacoum	

Methods for body fluids/tissue

reference	matrix	LOQ (mg/kg)	principle	comment	owner

reference	matrix	LOQ (mg/kg)	principle	comment	owner
Marshall, L., 2009, Method Validation for the Determination of Difenacoum in Animal Matrices (Liver and Muscle) and Crop Matrix (Oilseed Rape), CEM Analytical Services Limited, Study CEMR-4469	Liver	LOQ is 0.01 mg/kg	LC-MS/MS		Activa / PelGar Brodifacoum and Difenacoum Task Force

* Some studies on the active substance difenacoum were required for the product authorization stage from the Task Force Activa/Pelgar. The French CA (FR) had to evaluate these studies as agreed during a PAMRFG: method for the analysis of difenacoum in animal and human tissues, analytical methods for determination of residues of difenacoum in meat and oil-seed rape (food/feeding stuffs) and in sediment (based on the analysis method for difenacoum in soil). These methods were validated and were acceptable.

Annex 4: Toxicology and metabolism –active substance

Difenacoum

This information can be consulted in the Assessment Reports of the active substance Difenacoum

Annex 5: Toxicology – biocidal product

<Biocidal Product>

General information

Formulation Type	Wax blocks
Active substance(s) (incl. content)	Difenacoum 0.005%
Category	

Acute toxicity, irritancy and skin sensitisation of the preparation (Annex IIIB, point 6.1, 6.2, 6.3)	
Rat LD50 oral (OECD 420)	It has not been provided*
Rat LD50 dermal (OECD 402)	It has not been provided*
Rat LC50 inhalation (OECD 403)	It has not been provided*
Skin irritation (OECD 404)	It has not been provided*
Eye irritation (OECD 405)	It has not been provided*
Skin sensitisation (OECD 429; LLNA)	It has not been provided*

***This means that the assessment of the hazards of the biocidal product has been carried out by using the appropriate calculation method (Directive 1999/45/EC) and the specific concentration limits of the active substance**

The vapour pressure of the active substance difenacoum (P (45°C) < 0.05 mPa = < 5 x 10–5 Pa) and the formulation type justifies the no classification as harmful by inhalation

Additional toxicological information (e.g. Annex IIIB, point 6.5, 6.7)	
Short-term toxicity studies	*
Toxicological data on active substance(s) (not tested with the preparation)	*
Toxicological data on non-active substance(s) (not tested with the preparation)	*
	*
Further toxicological information	*

***We do not have any additional toxicological information about biocidal product**

Classification and labelling proposed for the preparation with regard to toxicological properties (Annex IIIB, point 9)	
Directive 1999/45/EC	No classification S2: Keep out of the reach of children S13: Keep away from food, drink and animal feedingstuffs S37: Wear gloves S46: If swallowed, seek medical advice immediately and show this container or label
Regulation 1272/2008/EC	No classification P102: Keep out of reach of children. P103: Read label before use. P280: Wear protective gloves P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

RATONEX BLOQUE

Exposure assessment

Exposure scenarios for intended uses (Annex IIIB, point 6.6)

Primary exposure of professionals

Component	CAS	Scenario	Actual Dermal Total [mg/day]	Actual Dermal Total [mg/kg/d]	Inhalation Exposure [mg/m³]	Model
Difenacoum	56073-07-5	Trained professional (without gloves)	2.61×10^{-4}	4.34×10^{-6}	Negligible	CEFIC study
Difenacoum	56073-07-5	Trained professional (gloves penetration factor: 10%)	2.61×10^{-5}	4.34×10^{-7}	Negligible	CEFIC study
Difenacoum	56073-07-5	Non-trained professional (without gloves)	2.22×10^{-5}	3.70×10^{-7}	Negligible	CEFIC study
Difenacoum	56073-07-5	Non-trained professional (gloves penetration factor: 10%)	2.22×10^{-6}	3.70×10^{-8}	Negligible	CEFIC study

Risk assessment

Component	CAS	Scenario	AEL [mg/kg/d]	MOE	%AEL
Difenacoum	56073-07-5	Trained professional loading and cleanig the bait (without gloves)	0.0000011	78	395
Difenacoum	56073-07-5	Trained professional loading and cleanig the bait (gloves penetration factor: 10%)	0.0000011	783	39
Difenacoum	56073-07-5	Non-trained professional loading and cleanig the bait (without gloves)	0.0000011	918	34
Difenacoum	56073-07-5	Non-trained professional loading and cleanig the bait (gloves penetration factor: 10%)	0.0000011	9181	3

Annex 7: Safety for non-professional operators and the general public

Difenacoum

General information	
Formulation Type	Solid (blocks)
Active substance(s) (incl. content)	Difenacoum 0.005%
Category	
Authorisation number	

Difenacoum

Data base for exposure estimation

according to Appendix: Toxicology and metabolism – active substance/CAR

Exposure scenarios for intended uses (Annex IIIB, point 6.6)

Primary exposure	non-professional users
Secondary exposure, acute	infant transient mouthing of poison bait'
Secondary exposure, chronic	none

Conclusion:

Exposure of non-professionals and the general public to the biocidal product containing difenacoum as active substance is considered acceptable, if the biocidal product is used as intended and all safety advices are followed.

The accidental ingestion of baits poses a risk to infants since the AEL is exceeded.

Details for the exposure estimates:

Component	**CAS**	**Scenario**	**Actual Dermal Total [mg/day]**	**Actual Dermal Total [mg/kg/d]**	**Inhalation Exposure [mg/m³]**	**Model**
Difenacoum	56073-07-5	Non-professional loading and cleanig the bait (without gloves)	2.22×10^{-5}	3.70×10^{-7}	Negligible	CEFIC study
Difenacoum	56073-07-5	Non-trained professional cleaning the bait (without gloves)	6.70×10^{-7}	1.12×10^{-8}	Negligible	CEFIC study

Component	**CAS**	**Scenario**	**Oral Exposure (mg/kg bw)**	**Model**
Difenacoum	56073-07-5	Infant transient mouthing of poison bait' (5 g)	2.5×10^{-2}	User Guidance
Difenacoum	56073-07-5	Infant transient mouthing of poison bait'(10 mg)	5×10^{-5}	TNsG

Risk assessment

Component	CAS	Scenario	AEL [mg/kg/d]	MOE	%AEL
Difenacoum	56073-07-5	Non-professional loading and cleanig the bait (without gloves)	0.0000011	918	34
Difenacoum	56073-07-5	Non-trained professional cleaning the bait (without gloves)	0.0000011	30459	1

Component	CAS	Scenario	MOE
Difenacoum	56073-07-5	Infan transient mouthing of poison bait' (5 g)	0.01
Difenacoum	56073-07-5	Infant transient mouthing of poison bait'(10 mg)	6.8

Annex 8: Residue behaviour

Difenacoum

Intended Use (critical application): Control of rats and mice.
Active substance(s): Difenacoum
Formulation of biocidal product: Wax block
Place of treatment: In and around buildings, open areas,and waste dumps.

The product is a wax block to be placed in bait stations. No contamination is expected for food or feeding stuffs.

The intended use descriptions of the difenacoum-containing biocidal products for which authorisation is sought indicate that these uses are not relevant in terms of residues in food and feed. The product is to be used for for the control of rats and mice. No further data are required concerning the residue behaviour.