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

Evaluation of active substances

DRAFT COMPETENT AUTHORITY REPORT

(SUBMITTED BY THE EVALUATING COMPETENT AUTHORITY)

(13Z)-Hexadec-13-en-11-yn-1-yl acetate
Product type 19
(Repellents and attractants)

Evaluating Competent Authority: France

March 2022 (final CAR)

Substance Name: (13Z)-Hexadec-13-en-11-yn-1 acetate

EC Name: not available

EC Number: not available

CAS Number: 78617-58-0

Applicant: M2i Biocontrol

UUID: 08ef060a-80c0-4635-af3e-1d48a5fa4f3d

Table of Contents

1. STATEMENT OF SUBJECT MATTER AND PURPOSE

This assessment report has been established as a result of the evaluation of the active substance (13Z)-Hexadec-13-en-11-yn-1 acetate in product-type 19 (Repellents and attractants), carried out in the context of Regulation (EU) No 528/2012, with a view to the possible approval of this substance.

On 13 March 2018 the French competent authorities received a dossier from the applicant. The Evaluating Competent Authority accepted the dossier as complete for the purpose of the evaluation on 18 April 2018.

On 1st of June 2021 the Evaluating Competent Authority submitted to ECHA a copy of the assessment report containing the conclusions of the evaluation, hereafter referred to as the competent authority report (CAR). Before submitting the CAR to ECHA, the applicant was given the opportunity to provide written comments in line with Article 8(1) of Regulation (EU) No 528/2012.

In order to review the CAR and the comments received on it, consultations of technical experts from all Member States (peer review) were organised by ECHA. Revisions agreed upon were presented at the Biocidal Products Committee and its Working Groups meetings and the competent authority report (CAR) was amended accordingly.

The aim of the assessment report is to support the opinion of the Biocidal Products Committee and a decision on the approval of (13Z)-Hexadec-13-en-11-yn-1 acetate for product-type 19 and, should it be approved, to facilitate the authorisation of individual biocidal products. In the evaluation of applications for product authorisation, the provisions of Regulation (EU) No 528/2012 shall be applied, in particular the provisions of Chapter IV, as well as the common principles laid down in Annex VI.

For the implementation of the common principles of Annex VI, the content and conclusions of the assessment report, which is available from the web-site of ECHA shall be taken into account.

However, where conclusions of this assessment report are based on data protected under the provisions of Regulation (EU) No 528/2012, such conclusions may not be used to the benefit of another applicant, unless access to these data for that purpose has been granted to that applicant.

2. CONCLUSION

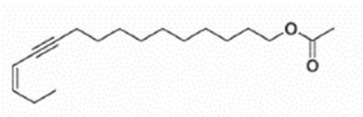
The outcome of the assessment for (13Z)-Hexadec-13-en-11-yn-1-yl acetate in product-type 19 is specified in the BPC opinions following discussions at the 42^{d} meeting of the Biocidal Products Committee (BPC). The BPC opinion is available from the ECHA website.

3. ASSESSMENT REPORT

Summary

1 PRESENTATION OF THE ACTIVE SUBSTANCE

1.1 IDENTITY OF THE ACTIVE SUBSTANCE

Main constituent(s)	
ISO name	(13Z)-Hexadec-13-en-11-yn-1 acetate (ISO) Synonym (French): (Z)-13-hexadecen 11 yn-1-yl- acetate Synonym : Processionary pine caterpillar's pheromone
IUPAC or EC name	(13Z)-Hexadec-13-en-11-yn-1 acetate
EC number	not allocated
CAS number	78617-58-0
Index number in Annex VI of CLP	None
Minimum purity / content	97 %
Structural formula	 Molecular formulation : $C_{18}H_{30}O_2$
Molar Mass	278.43 g/mol

Relevant impurities and additives		
IUPAC name or chemical name or EC name	**Maximum concentration in % (w/w)**	**Index number in Annex VI of CLP**
relevant impurity: (3Z-23Z)-hexacosa-3,23-dien-5,21-diyne (HCDD)	[redacted] %	-
relevant stabilizer: α-Tocopherol	[redacted] %	-

1.2 INTENDED USES AND EFFECTIVENESS

Use of the active substance

Product type	19
Intended use pattern(s)	Reduction of processionary pine caterpillars in pine areas and reduction of nests of the processionary pine caterpillar.
Users	Professionnal

Effectiveness of the active substance

Function	PT 19 - Attractant Sexual Pheromone
Organisms to be controlled	*Thaumetopoea pityocampa* Adult male
Limitation of efficacy including resistance	Level of pheromone. Development of resistance unlikely.
Mode of action	Mating Disruption

Field tests were conducted with the product Pine T Pro Ball/ Phero-Ball Pin to show the efficacy of the mating disruption treatment with the sexual confusion method against pine processionary moth (*Thaumetopoea pityocampa)*.
Based on the elements presented in the frame of active substance approval, reduction of pine processionary caterpillars and nests in pine areas is demonstrated in forest and urban areas, at the following application rates:

- In forests at the dose of 400 balls /ha
- In urban areas (groves, narrow band of trees, isolated trees): 1 ball per 1 m of height and per tree

Innate efficacy is therefore demonstrated for the active substance approval, nevertheless, new efficacy studies (especially for urban areas) should be submitted at product authorisation stage in order to confirm the efficacy at the application rates claimed and in various situations (forests, groves, narrow band of trees, isolated trees) with significant level of infestations.

1.3 CLASSIFICATION AND LABELLING

1.3.1 Classification and labelling for the active substance

Hazard class/ property	Proposed classification
Physical hazards	
Explosives	Non explosive substance (as oxygen balance of the active substance is -281.6)
Flammable gases	NA
Flammable aerosols	NA
Oxidising gases	NA
Gases under pressure	NA
Flammable liquids	Non flammable liquid (Flash point = 136°C)
Flammable solids	NA
Self-reactive substances	Non self-reactive substance
Pyrophoric liquids	Non Pyrophoric liquid (statement)
Pyrophoric solids	NA
Self-heating substances and mixtures	Non self-heating substance (the auto-ignition of the active substance is 250°C)
Substances which in contact with water emit flammable gases	NA
Oxidising liquids	Non oxidizing liquid (as oxygen atom is chemically bonded only to carbon)
Oxidising solids	NA
Organic peroxides	NA

Hazard class/ property	Proposed classification
Corrosive to metals	Non corrosive substance (expert judgement)
Human health hazards	
Acute toxicity via oral route	No classification
Acute toxicity via dermal route	No classification
Acute toxicity via inhalation route	NA
Skin corrosion/irritation	No classification
Serious eye damage/eye irritation	No classification
Respiratory sensitisation	NA
Skin sensitisation	No classification
Germ cell mutagenicity	No classification
Carcinogenicity	NA
Reproductive toxicity	NA
Specific target organ toxicity-single exposure	NA
Specific target organ toxicity-repeated exposure	NA
Aspiration hazard	NA
Environmental hazards	
Hazardous to the aquatic environment	Aquatic Acute 1, H400 (M=10) ; Aquatic Chronic 1, H410 (M=10)
Hazardous to the ozone layer	NA

Current Classification and Labelling according to Regulation (EC) No 1272/2008:

Classification		**Labelling**					
Hazard Class and Category	**Hazard statements**	**Pictograms**	**Signal word**	**Hazard statements**	**Suppl. Hazard statements**	**Precautionary statements**	**SCLs and M-factors**
No harmonised classification							

Proposed Classification and Labelling according to Regulation (EC) No 1272/2008:

Classification		**Labelling**					
Hazard Class and Category	**Hazard statements**	**Pictograms**	**Signal word**	**Hazard statements**	**Suppl. Hazard statements**	**Precautionary statements**	**SCLs and M-factors**
Aquatic acute 1 Aquatic chronic 1	H400 H410	GHS09	Warning	H410: Very toxic to aquatic life with long lasting effects	/	P273 P391 P501	M = 10 M = 10

1.3.2 Classification and labelling for the representative product(s)

Proposed Classification and Labelling according to Regulation (EC) No 1272/2008:

Classification		**Labelling**					
Hazard Class and Category	**Hazard statements**	**Pictograms**	**Signal word**	**Hazard statements**	**Suppl. Hazard statements**	**Precautionary statements**	**SCLs and M-factors**
Aquatic acute category 1	H400	GHS09	Warning	H410: Very toxic to aquatic	/	P273 P391	

Aquatic chronic category 1	H410			life with long lasting effects		P501	

Packaging of the biocidal product:

Type of packaging	**Size/volume of the packaging**	**Material of the packaging**	**Type and material of closure(s)**	**Intended user (e.g. professional, non-professional)**	**Compatibility of the product with the proposed packaging materials (Yes/No)**
Package of 500 balls	300 x 300 mm	PET Alu PE 12/8/140 µm	Pine T Pro Ball packaging is a three layer pocket, which are glued together : - Outermost layer in PET (polyethylene terephthalate) - Middle layer in Aluminium - Inner layer in PE = polyethylene. Pockets are sealed thanks to the PE inner layer. For easy opening and closer, the pockets are equipped with a zip, clicky type.	professional	Yes
Package of 100 balls	160 x 230 mm	PET Alu PE 12/8/100 µm		professional	Yes
Package of 10 balls	200 x 40	PET Alu PE 12/12/80 µm		Professional	Yes

2 SUMMARY OF THE HUMAN HEALTH RISK ASSESSMENT

Summary of the assessment of effects on human health

Endpoint	**Brief description**
Toxicokinetics	No data

Acute toxicity	Low acute oral and dermal toxicity with LD50 values greater than 2000 mg/kg b.w. In accordance with the Regulation (EC) No.1272/2008 on classification, labelling and packaging of substances and mixtures, no signal word or hazard statement is required for the (13Z)-Hexadec-13-en-11-yn-1-yl acetate regarding acute oral and dermal toxicity.
Corrosion and irritation	In accordance with the Regulation (EC) No. 1272/2008, the results obtained enable to conclude that the active substance does not have to be classified as corrosiveor irritant to skin and does not require classification for serious eye damage or eye irritation.
Sensitisation	The substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate is not classified as a skin sensitizer nor as a respiratory sensitiser, in accordance with the Regulation (EC) No.1272/2008 on classification, labelling and packaging of substances and mixture. No signal word or hazard statement is required.
Repeated dose toxicity	These data requirements are waived for the application technique via paintball (exposure to human considered as very low)
Genotoxicity	No classification required
Carcinogenicity	These data requirements are waived for the application technique via paintball (exposure to human considered as very low)
Reproductive toxicity	These data requirements are waived for the application technique via paintball (exposure to human considered as very low)
Neurotoxicity	These data requirements are waived for the application technique via paintball (exposure to human considered as very low)
Immunotoxicity	These data requirements are waived for the application technique via paintball (exposure to human considered as very low)

Disruption of the endocrine system	Lack of investigations of endpoints related to both ED adversity and activity since exemptions in data requirements apply for semiochemicals accordingly to the Guidance for Registration Requirements for Pheromones and Other Semiochemicals Used for Arthropod Pest Control ENV/JM/MONO (2001)12). Pheromones are substances that influence mating behavior but not the endocrine system as such. No effect on the endocrine system is expected for pheromones because of their nature.
Other effects	NA

Reference values

	Study	**NOAEL/ LOAEL**	**Overall assessment factor**	**Value**
$AEL_{short-term}$	Due to the intended use (application of the product *via* paintball with resulting exposure to human considered as very low) and the nature of the active substance, repeated dose toxicity studies (short, medium and long term), carcinogenicity, reproductive and developmental studies, are waived. Consequently, there is no setting of reference values.			
$AEL_{medium-term}$				
$AEL_{long-term}$				

Risk characterisation

The assessment of the risk for human health during the use of the product PINE T PRO BALL / PHERO-BALL PIN has been carried out for the active substance only (no substance of concern).

Considering the method of application of the product PINE T PRO BALL / PHERO-BALL PIN (outdoors, in the upper part of the pine canopy, using a compressed air gun), the professional exposure is considered very low and the risk is acceptable only if the following risk management measures are applied:

- Wear gloves during all phases of use (loading, application and collection of balls on the ground).

- During the application, a safety perimeter (approximately 10 m) must be set to avoid the presence of the general public.
- After application in forests, inspect carefully the area and pick up all the fallen balls.
- After application in urban zone, make sure that no balls or debris are left on the ground.

The risk for the general public is then considered acceptable.

To be noted that from a human health perspective, the conclusion of this assessment applies only to this specific intended use and this mode of application.

3 SUMMARY OF THE ENVIRONMENTAL RISK ASSESSMENT

At the time of the finalisation of the CAR, no harmonised guidance for the environmental assessment of pheromones was available under the BPR. The most recent guidance document on this subject for biocides is the Guidance for Waiving of Data Requirements for Pheromones for Inclusion in Annex I/IA of Directive 98/8/EC, applied under the Biocides Directive. The guidance document was mainly based on the OECD Monograph 12, 2001 which has been replaced by the Guidance documents on semiochemical active substance and plant protection products (2016 and Document 93 of 2018). In this CAR, the requirements and assessment for Biocides pheromones substances are based on these Pheromone specific PPP Guidances.

The proposed assessment takes into consideration the inherent differences between pheromones and conventional chemical biocides. Experience from the Plant Protection Products, based on environmental and health studies, has demonstrated that pheromones may provide effective pest control at low volumes, and at minimal risk. In this context, core data requirements may be reduced for pheromone based on their nature (physico-chemical properties) and their low exposure.

As detailed in the assessment, a very limited exposure is foreseen for the active substance, linked to its specific use and pheromone-specific physico-chemical properties. Therefore, a waiving of some core data has been applied and was agreed in WG-IV-2021 for this specific pheromone case.

Fate and behaviour in the environment

Summary table on compartments exposed and assessed		
Compartment	**Exposed (Y/N)**	**Assessed (Y/N)**
Freshwater	Y (indirect)	Y

STP	Negligible exposure	N
Air	Y (direct)	N
Soil	Y (indirect)	Y
Groundwater	Negligible exposure	N

Emissions to air from biocidal uses are not relevant. Indeed, the pheromone degrades quickly in air due to the low DT50 value of 3.5h (maximum value). Therefore, air compartment is not assessed.

Metabolites

The active substance is a pheromone, a natural substance generally assumed to dissipate rapidly in the environment, primarily by volatilization[1] and degradation, and this is partly because persistence is counterproductive to a communication signal received by and olfactory system. This is confirmed by the need to add an antioxidant to the formulation (Tocopherol) to prevent a very fast degradation of the substance. Moreover, in the direct exposed compartment, the atmosphere, the substance is not stable as its DT50 is very low (3.5 hours). At last, the exposure of the environment has been shown to be very low, despite the exposure assessment has been carried out without taking account of the unstability/degradation properties of the substance.

Consequently, as mentioned at the beginning of this summary, a waiving of some core data has been applied for this specific substance, due to its very limited exposure and to physico-chemical properties of pheromones. Thus, the identification of relevant metabolites and the assessment of their toxicity is not required. The same reasoning was applied in PPP Regulation for the assessment of SCLP (RAR, 2021).

Summary table on relevant physico-chemical and fate and behaviour parameter of the active substance			
	Value	**Unit**	**Remarks**
Molecular weight	278.43	[g/mol]	
Log Octanol/water partition coefficient	3.74	Log 10	Experimental value

[1] The vapour pressure value of the pheromone (1.2E-03 Pa) is within the range of values found for SCLPs, which are considered volatile. Moreover, the product operates by volatilisation of the active substance and as efficacy was proven in the field, the substance must have been volatilized into the air.

Summary table on relevant physico-chemical and fate and behaviour parameter of the active substance			
	Value	**Unit**	**Remarks**
Organic carbon/water partition coefficient (Koc)	847.6	[L/kg]	QSAR (KOCWIN v2.0, Kow method)
Henry's Law Constant (at 25°C / corrected at 12°C)	5.7 / 1.76	[Pa/m3/mol]	Experimental value
Biodegradability	-	[-]	No experimental data available. QSAR (BIOWIN v4.10) and WoE indicate that the substance is not P/vP
DT_{50} for biodegradation in surface water (whole system) (at 12°C)	1E+06	[d]	No data available, very worst case value is used in exposure assessment
DT_{50} for degradation in soil (at 12°C)	1E+06	[d]	No data available, very worst case value is used in exposure assessment
DT_{50} for degradation in air	3.5	[hr]	QSAR (AOPWIN v1.92)

Fate and distribution in the STP

As negligible exposure is expected from the claimed use, no fraction to air, sludge and water was calculated with Simple Treat. However, for future submissions of application for product authorisation, if other uses leading to urban environmental exposure are proposed, the fractions will have to be calculated based on appropriate information.

Substances of concern (SoCs)

The Substance of Concern assessment will be conducted at the product authorisation phase.

4 ASSESSMENT OF EXCLUSION, SUBSTITUTION CRITERIA AND POP

Conclusion on exclusion criteria	The active substance does not fulfill the exclusion criteria.
Conclusion on CMR	The active substance is not expected to be CMR.
Conclusion on ED assessment	The active substance is not expected to be an ED
Conclusion on PBT and vP/vB criteria	The substance active is not a PBT substance. Indeed it is not P/vP, not B/vB and potentially T.

Conclusion on substitution criteria	The active substance does not fulfill the exclusion criteria, thus is not considered as a candidate for substitution.

Conclusion on LRTAP/POP assessment	The active substance does not have potential for long-range transboundary atmospheric transport.

5 REQUIREMENT FOR FURTHER INFORMATION ON THE REPRESENTATIVE PRODUCT

The following information on the representative product should be provided at the authorisation stage:

- An auto-ignition temperature test of the product “PHEROBALL Pin”

- A flammability test for the product PHEROBALL Pin”: the statement provided cannot be considered as sufficient

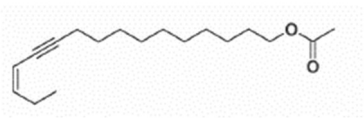
- Innate efficacy is demonstrated for the active substance, nevertheless, new efficacy studies for the product "PHEROBALL Pin" (especially for urban areas) should be submitted at the product authorisation stage in order to confirm the efficacy at the application rates claimed and in various situations (forests, groves, narrow band of trees, isolated trees) with significant level of infestations.

Part A Assessment of intrinsic properties and effects of the active substance

1 GENERAL SUBSTANCE INFORMATION

1.1 IDENTIFICATION OF THE SUBSTANCE

Summary table on substance identity	
Common name (ISO name, synonyms)	(13Z)-Hexadec-13-en-11-yn-1 acetate (ISO) Synonym (French): (Z)-13-hexadecen 11 yn-1-yl- acetate Synonym : Processionary pine caterpillar's pheromone
Chemical name (EC name, CA name, IUPAC name	(13Z)-Hexadec-13-en-11-yn-1 acetate
EC number	Not allocated
CAS number	78617-58-0
Other CAS numbers (e.g. deleted, related, preferred, alternate)	Not relevant
Molecular formula	$C_{18}H_{30}O_2$
SMILES notation	C(#CC=CCC)CCCCCCCCCCOC(=O)(C)
Molar mass	278.43 g/mol

Structural formula


Origin of the natural active substance or precursor(s) of the active substance
The substance is identical to the natural active substance.

Method of manufacture
Confidential information

1.2 COMPOSITION OF THE SUBSTANCE (REFERENCE SPECIFICATIONS)

Main constituent(s)	
Constituent (chemical name)	**Concentration %(w/w)**
(13Z)-Hexadec-13-en-11-yn-1 acetate	Minimum purity: 97%

Impurities	
Constituent (chemical name)	**Max concentration (%(w/w))**
Relevant impurity: (3Z-23Z)-hexacosa-3,23-dien-5,21-diyne (HCDD)	[redacted] %
Relevant stabilizer: α-Tocopherol	[redacted] %
Other impurities, please refer to confidential information	

Additives				
Constituent (chemical name)	**Function**	**Typical concentration (%(w/w))**	**Concentration range (%(w/w))**	**Remarks / Discussion**
Confidential information				

1.3 PHYSICAL AND CHEMICAL PROPERTIES OF THE ACTIVE SUBSTANCE

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comments
Aggregate state at 20°C and 101.3 kPa	Not relevant				**Acceptable**
Physical state (appearance) at 20°C and 101.3 kPa	Liquid	Not stated		II 3.1 / 01 Servajean (2017) Report 16-64-074-ES	**Acceptable**
Colour at 20°C and 101.3 kPa	A colourless translucent liquid			II 3.1 / 01 Servajean (2017) Report 16-64-074-ES	**Acceptable**
Odour at 20°C and 101.3 kPa	Fruity, pleasant odor			II 2.8 / 01 Gayon (2017) Report M2i-FAI-2017-09 V02 - M2i Manufacturing Report	**Acceptable**
Melting / freezing point	The mean of melting point of measurement the test item was **-26.4 °C ± 0.5 °C**.	EC A.1. method (2008) and OECD Guideline No. 102 (1995) The test item is heated within a nitrogen atmosphere, at the atmospheric pressure, using the Differential Scanning Calorimetry method (DSC). Therefore, the determination of the temperature at which the test item changes from the solid state to the liquid state is determined. Batch M2iD 18028-P1 [(13Z)-hexadec-13-en-11-yn-1-yl acetate ; purity 99.8%]	-	Report Defitraces R18-913033-009	**Acceptable**

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comments
Boiling point	Publication: 132 - 133 °C at 0.05 Torr	Pressure temperature nomograph tool of Sigma Aldrich: **390°C** at atmospheric pressure (Clausius-Clapeyron equation) and the purity of the active substance is 98%.	Existing data in Litterature	II 3.4 / 01 Pauriche (2017) Report M2iD-FAI-2017-03 V02 Publication Rossi II 3.4 / 01 Gayon (2017) Report M2i-FAI-2017-09 V02 - M2i Manufacturing Report Report Defitraces R21-913033-021	**Acceptable** The calculated boiling point at atmospheric pressure is only a theoretical value. Indeed, the DSC analysis (see self reactive properties) shows that the active substance is stable up to 150°C and after the active substance degrades, an exothermic peak is observed at 150°C with an energy of 25.43 J/g. That why the distillation step of the manufacturing process is performed at reduced pressure and under inert atmosphere (nitrogen). The reduce pressure allows to distillate the active substance at temperature below 150°C (around 140°C) and avoid the degradation of the active substance.
Relative density	The mean relative density of the test item was **0.902 ± 0.001 at 21.5 °C**.	EC A.3. method (2008) and OECD Guideline No. 109 (2012) The pycnometric method is used Batch M2iD 18028-P1 [(13Z)-hexadec-13-en-11-		Report Defitraces R18-913033-009	**Acceptable**

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comments
		yn-1-yl acetate ; purity 99.8%]			
Absorption spectra data (UV/Vis, IR, NRM) and mass spectrum, molar extinction at relevant wavelenghts	Interpretation of **UV and IR** spectra has been provided in available Report M2i-FAI-2017-09 V02. **Mass spectrum** is consistent with the structure of (13Z)-hexadec-13-en-11-yn-1-yl acetate. **^{13}C – NMR** and **H-NMR are** available in report and confirme the structure of (13Z)-hexadec-13-en-11-yn-1-yl acetate.	Batch M2iD 09105-3 [(13Z)-hexadec-13-en-11-yn-1-yl acetate; purity 98.1%]		Report M2i-FAI-2017-09 V02 - M2i Manufacturing Report	**Acceptable**
Granulometry	Study scientifically not necessary	/	The study does not need to be conducted because the substance is marketed or used in a non solid or granular form	/	**Acceptable**
Vapour pressure	The vapour pressure (P) of the test item is **1.2 x 10^{-3} Pa** extrapolated at **20 °C** and is **2.5 x 10^{-3} Pa** extrapolated at **25 °C**.	EC A.4. method (2009) and OECD Guideline No. 104 (2006) The quantity of substance leaving a cell per unit time through an aperture of known size is determined under vacuum conditions such that return of substance into the cell is negligible. The mass of effused vapour is obtained by determining the loss of mass of the cell. As the logarithm of the vapour pressure of a pure substance is a linear	/	Report Defitraces R18-913033-009	**Acceptable**

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comments
		function of the inverse of the temperature, the vapour pressure is determined in a limited temperature range. Batch M2iD 18028-P1 [(13Z)-hexadec-13-en-11-yn-1-yl acetate ; purity 99.8%]			
Henry's law constant	The volatility (H) of the test item calculated at 25 °C was **5.7 Pa.m3.mol^{-1}**.	The Henry law constant was calculated from the value of vapour pressure Batch M2iD 18028-P1 [(13Z)-hexadec-13-en-11-yn-1-yl acetate ; purity 99.8%]	/	Report Defitraces R18-913033-009	**Acceptable**
Surface tension	Study scientifically not necessary	Batch M2iD 09105-3 [(13Z)-hexadec-13-en-11-yn-1-yl acetate ; purity 98.1%]	OECD 115 test guideline precises that substance with water solubility < 1 mg/L does not have to be tested. Solubility in water of the pheromone was measured at 0,12mg/L	II 3.8 / 01 Servajean (2017) Report 16-64-074-ES	**Acceptable**
Water solubility at 20 °C	0,12mg/L	OECD 105 Batch M2iD 09105-3 [(13Z)-hexadec-13-en-11-yn-1-yl acetate ; purity 98.1%]	/	II 3.9 / 01 Servajean (2017a) Report 16-64-074-ES	**Acceptable**
Partition coefficient (n-octanol/water) and its pH dependency Surface tension at 20 °C	The value of the n-octanol/water partition coefficient $\log_{10}P_{ow}$ of (13Z)-hexadec-13-en-11-yn-1-yl acetate was found to be **3.74** using the shake flask method.	EC A.8. method (2008) and OECD Guideline No. 107 (1995) The partition coefficient is defined as the ratio of the equilibrium concentrations of the test substance in a two-phase system	/	Report Defitraces R18-913033-012	**Acceptable**

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comments
		consisting of two largely immiscible solvents. Batch M2iD 18028-P1 [(13Z)-hexadec-13-en-11-yn-1-yl acetate ; purity 99.8%]			
Thermal stability and identity of breakdown products	The Differential Scanning Calorimetry (DSC) analysis shows that the active substance is stable up to 150°C and after the active substance degrades, an exothermic peak is observed at 150°C with an energy of 25.43 J/g.			II 3.11 / 01 Gayon (2017) Report M2i-FAI-2017-09 V02- M2i Manufacturing Report Report Defitraces R21-913033-021	**Acceptable**
Reactivity towards container material	No reactivity towards glass and plactics		M2i statement	II 3.12 / 01 Gayon (2017) Report M2i-FAI-2017-09 V02- M2i Manufacturing Report	**Acceptable**
Dissociation constant	Study scientifically not necessary		The study does not need to be conducted because the substance has no ionic structure [study technically not feasible] ; the study does not need to be conducted because the active substance has a low water solubility.	/	**Acceptable**
Granulometry	Study scientifically not necessary		The study does not need to be conducted because the substance is marketed or used in a non solid or granular form.		-
Viscosity	The mean dynamic viscosity of the test item was **10.17 mPa.s at 20.0 °C** ± 0.2 °C (shear rate: 46.5 to 186 s^{-1})	OECD Test Guideline 114 The method used is the viscometer with rotational spindles. The rotation of the spindle submerged in the		Report Defitraces R18-913033-009	**Acceptable**

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comments
	and **5.82 mPa.s at 40.0 °C** ± 0.2 °C (shear rate: 93 to 186 s^{-1}).	test item allows to measure the torsion strength necessary to overcome the resistance due to the viscosity. Batch M2iD 18028-P1 [(13Z)-hexadec-13-en-11-yn-1-yl acetate ; purity 99.8%]			
Solubility in organic solvents, including effect of temperature on solubility	The solubility of the test item in **toluene is higher than 250 g/L.** The solubility of the test item in **dichloromethane is higher than 250 g/L.** The solubility of the test item in **methanol is higher than 250 g/L.** The solubility of the test item in **acetone is higher than 250 g/L.** The solubility of the test item in **ethyl acetate is higher than 250 g/L.** Soluble in acetonitrile and heptane in all proportions.	CIPAC MT 181 The solubility of the test item in organic solvents is determined by adding successive measured volumes of solvent to a known mass of the test item until complete dissolution is observed. A preliminary test is employed to determine the approximate solubility of the test item. The results of the preliminary test are used to select the most appropriate mass of test item for the test. Batch M2iD 18028-P1 [(13Z)-hexadec-13-en-11-yn-1-yl acetate ; purity 99.8%]	/	Report Defitraces R18-913033-011	**Acceptable**

1.4 PHYSICAL HAZARDS AND RESPECTIVE CHARACTERISTICS

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
Explosives	**Not explosive**	Statement	As Oxygen balance of the active substance is -281.6 (below -200), the active substance is not classified as explosive.	II 4. 1 /01 Pauriche (2017) M2iD-FAI-2017-08 V02 Report On Physical Hazard and Respective Characteristics	**Acceptable**
Flammable gases	Not relevant		The study does not need to be conducted because the substance is a liquid		-
Flammable aerosols	Not relevant		The study does not need to be conducted because the substance is a liquid		-
Oxidising gases	Not relevant		The study does not need to be conducted because the substance is a liquid		-
Gases under pressure	Not relevant		The study does not need to be conducted because the substance is a liquid		-
Flammable liquids	**Flash point = 136°C**	E.C Method A.9 Batch M2iD 18028-P1 [(13Z)-hexadec-13-en-11-yn-1-yl acetate ; purity 99.8%]	The substance can be considered as a non-flammable liquid.	No. Report Defitraces R18-913033-010	**Acceptable**
Flammable solids	Not relevant		The study does not need to be conducted because the substance is a liquid		-
Self-reactive substances and mixture	Not a self-reactive substance	Statement	The active substance is not classified as explosive and have a boiling point of 390°C. The applicant indicated that the pheromone distillation has been performed at M2i. No decomposition is observed at this temperature.	II 4.8 / 01 Gayon (2017) Report M2i-FAI-2017-09 V02- M2i Manufacturing Report	**Acceptable**

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
			(13Z)-Hexadec-13-en-11-yn-1-yl acetate does not contain any of the chemical groups listed in section 2.8.1 of the "Guidance on the Application of the CLP Criteria ". The Differential Scanning Calorimetry (DSC) analysis shows that the active substance is stable up to 150°C and after the active substance degrades, an exothermic peak is observed at 150°C with an energy of 25.43 J/g. That why the distillation step of the manufacturing process is performed at reduced pressure and under inert atmosphere (nitrogen). The reduce pressure allows to distillate the active substance at temperature below 150°C (around 140°C) and avoid the degradation of the active substance.	Report Defitraces R21-913033-021	
Pyrophoric liquids	Not pyrophoric liquid	Statement (ECHA Guidelines)	Experience in use with SCLPs over a long period of time demonstrates that they are not pyrophoric.	II 4.9 / 01 Pauriche (2017) M2iD-FAI-2017-08 V01 Report On Physical Hazard and Respective Characteristics	**Acceptable**
Pyrophoric solids	Not relevant		the study does not need to be conducted because the substance is a liquid		-

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
Self-heating substances and mixtures	Not self-heating substance. The phenomenon of self-heating applies only to solids. The surface of liquids is not large enough for reaction with air and the test method is not applicable to liquids. Therefore liquids are not classified as self-heating. However, if liquids are adsorbed on a large surface (e.g. on powder particles), a self-heating hazard should be considered", which is not the case.		Experience in use with SCLPs over a long period of time demonstrates that they are not pyrophoric.	II 4.11 / 01 Gayon (2017) Report M2i-FAI-2017-09 V02- M2i Manufacturing Report	**Acceptable**
Substances and mixtures which in contact with water emit flammable gases	The substance in contact with water does not emit flammable gases	Statement	As none of the structure of SCLPs contain metals or metalloids, this requirement can be waived.	II 4.12 / 01 Gayon (2017) Report M2i-FAI-2017-09 V02- M2i Manufacturing Report	**Acceptable**
Oxidising liquids	**Not oxidising liquid**	Statement	As oxygen atom is chemically bonded only to carbon, the substance has not be classified as oxidizing liquid.	II 4.13 / 01 Pauriche (2017a) M2iD-FAI-2017-08 V01 Report On Physical Hazard and Respective Characteristics	**Acceptable**
Oxidising solids	Not relevant		The study does not need to be conducted because the substance is a liquid		-
Organic peroxide	Not relevant		The study does not need to be conducted because the substance does not fall under the definition of organic peroxides according to GHS and the relevant UN Manual of tests and criteria An organic peroxide has got an 0-0 covalent bond. It is not		-

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
			the case for pine processionary pheromone.		
Corrosive to metals	No information available		Expert judgement : According to the CLP regulation, no test is required if the product is: - Halogen-free - No acid/base - No complexing agents - pH neutral The structure of the molecule (Z)-13- hexadecen-11-yn-1-yl acetate is halogen-free, I no complexing agent and has no acid/base groups causing high or low pH values, i.e. is pH neutral. The substance (Z)-13-hexadecen-11-yn-1-yl acetate is not expected to be corrosive.	Report M2iD-DEV-2020-03 "Assessment of potential hazard properties of the active substance (Z)-13 hexadecen-11-yn-1-yl acetate and Pine T Pro Ball product"	Acceptable
Auto-ignition temperature (liquids and gases)	The auto-ignition test report is available and show that the auto-ignition of the active substance is at 250°C.	E.C Method A.15 Batch M2iDLDS03027 [(13Z)-hexadec-13-en-11-yn-1-yl acetate]	:	Report Defitraces R21-913033-021	**Acceptable**
Relative self ignition temperature for solids	Not relevant		the study does not need to be conducted because the substance is a liquid		-
Dust explosion hazard	Not relevant		the study does not need to be conducted because the substance is a liquid		-

1.5 HAZARD IDENTIFICATION FOR PHYSICO-CHEMICAL PROPERTIES

All studies have been performed in accordance with the current requirements and the results are deemed to be acceptable. (13Z)-Hexadec-13-en-11-yn-1 acetate is a colourless translucent liquid (at room temperature and atmospheric pressure) with a fruity odor. Its boiling point is 132°C at 0.05 Torr and melting point is -26.4 °C. Based on the Differential Scanning Calorimetry (DSC) analysis the stability of (13Z)-Hexadec-13-en-11-yn-1 acetate is guaranteed up to 150°C. No decomposition was observed.

The physical and chemical properties of the active substance (13Z)-Hexadec-13-en-11-yn-1 acetate have been described and the available data lead to the conclusion that the active substance is a not flammable, not explosive and does not present any self-igniting neither oxidizing properties.

1.6 ANALYTICAL METHODS FOR DETECTION AND IDENTIFICATION

Analytical methods									
Analyte (type of analyte e.g. active substance, metabolite etc.)	**Principle**	**Linearity**	**Specificity**	**Precison**		**Recovery**	**Limit of quantification (LOQ)**	**Reference**	**Comment**
				Fortification range (Number of measurements)	RSD				
(13Z)-Hexadec-13-en-11-yn-1 acetate	A GC-FID method was developed for the quantification of Z-HAD (extraction at acetonitrile, colum "Supelco SLB-5ms 30 m x 0.25 mm x 0.25µm", FID 280°C)	0.42 – 420.9 mg/L ($0,37.10^{-3}$ – $535,43.10^{-3}$ g/kg) (n=11) r^2 = 99.98%	No interferences at the retention time of tested substance	976.8 g/kg (n=6)	1.3 %	Not necessary	0.42 mg/L	II 5.1 /01 Servajean (2017a) Report 16-64-073-ES	Analytical method using GC-FID for the determination isomer (13Z)-Hexadec-13-en-11-yn-1 acetate and isomer (13E)-Hexadec-13-en-11-yn-1 acetate is considered as validated according to SANCO/3030/rev.4.
Relevant impurity**:** HCDD (3Z, 23Z)-hexacosa-3,23-dien-5,21-diyne	A GC-FID method was developed for the quantification of HCDD / (extraction with acetonitrile, column "Supelco SLB-	0.36 – 357.9 mg/L ($0,46.10^{-3}$ – $455,29.10^{-3}$ g/kg) (prepared by serial dilution)	no interferences at the retention time of tested substance (chromatogr	1,47 g/kg (n=6; injected separately)	2.9%	with 2 distinct solutions: 98.6% and 102.6%	0.36 mg/L	II 5.1 /01 Servajean (2017a) Report 16-64-073-ES Magnet Stephanie, 2018	Analytical method using GC-FID for the determination HCDD is considered as validated according to SANCO/3030/rev.4.

	5ms 30 m x 0.25 mm x 0.25µm", FID 280°C)	(n=11) r^2=99.98%	ams are provided)					N°CHRONO: M2ID-ANA-2018-18 N°PROJET: M2ID-RECH 1632	
Relevant stabilizer: α-Tocopherol									Analytical method is missing
ALL OTHER INFORMATION ARE CONFIDENTIAL									

Analytical methods for plant material and foodstuffs of animal origin									
Analyte (type of analyte e.g. active substance)	**Analytical method**	**Fortification range / Number of measurements**	**Linearity**	**Specificity**	**Recovery rate (%)**			**Limit of quantification (LOQ) or other limits**	**Reference**
					Range	**Mean**	**RSD**		
No analytical method has been submitted as the environmental risk assessment shows that **(13Z)-hexadec-13-en-11-yn-1-yl acetate**, when used as a biocide, does not affect the levels of **(13Z)-hexadec-13-en-11-yn-1-yl acetate** found usually in the atmosphere, outside normal range.									

Analytical methods for soil, water, air and animal and human body fluids and tissus									
Analyte (type of analyte e.g. active substance)	**Analytical method**	**Fortification range /**	**Linearity**	**Specificity**	**Recovery rate (%)**			**Limit of quantification**	**Reference**
					Range	**Mean**	**RSD**		

		Number of measurements						**(LOQ) or other limits**	
No analytical method has been submitted because the environmental risk assessment shows that **(13Z)-hexadec-13-en-11-yn-1-yl acetate**, when used as a biocide, does not affect the levels of **(13Z)-hexadec-13-en-11-yn-1-yl acetate** found usually in the atmosphere, outside normal range and because the active substance is not classified toxic or very toxic.									

2 EFFECTS AGAINST TARGET ORGANISMS

2.1 FUNCTION AND FIELD OF USE ENVISAGED

The (13Z)-Hexadec-13-en-11-yn-1 acetate is the pheromone that is naturally produced by the pine processionary moth *Thaumetopoea pityocampa*.

2.2 INTENDED USES

Summary table of intended use(s)	
Product Type	19
Product description	Balls filled with a natural wax emulsion containing the pine processionary moth sex pheromone.
Target organisms (including development stage)	Adult stage of *Thaumetopoea pityocampa* (male).
Description of use(s)	Reduction of pine processionary moth caterpillars in pine areas and reduction of pine processionary moth (PPM) nests.
Mode of action	Management technique designed to control pine processionary by introducing a cloud of sex pheromone that confuses the males and disrupts mate localization and/or courtship, thus preventing mating and blocking the reproductive cycle.
Objects to be protected	Indirect protection against caterpillar (by reducing their numbers) bristles that cause dermatological reactions in humans and animals.
Concentration of product in the in-use formulation/product	2,4 g of formulation in a ball.
Concentration of active substance in the in-use formulation/product	0,1 g of active substance /ball.

<table>
<tr><th colspan="2">Summary table of intended use(s)</th></tr>
<tr><td>Application rate(s)</td><td>
Forests:
400 balls/ha (40 g of active substance)/ha maximum for a pines area to treat < 0.5 ha.
The number of balls to apply decreases with the size of the treated pines area and the pest pressure level.

The decision rules according to the pines forest/grove size and the pest pressure level are described below:
<table>
<tr><td colspan="10">Number of balls to apply in function of the size pines area to protect and the level of T. pityocampa pressure inside</td></tr>
<tr><td>Size of the pines forest/grove (ha)</td><td>0,5</td><td>1</td><td>2</td><td>4</td><td>10</td><td>25</td><td>50</td><td>100</td><td>200</td></tr>
<tr><td>Number of balls/ha if low to moderate pest pressure, ≤ 10 nests/tree</td><td>365</td><td>180</td><td>140</td><td>105</td><td>70</td><td>45</td><td>35</td><td>25</td><td>15</td></tr>
<tr><td>Number of balls/ha if high pest pressure</td><td>400</td><td>290</td><td>220</td><td>165</td><td>110</td><td>70</td><td>50</td><td>40</td><td>25</td></tr>
</table>
Urban zones (groves, narrow band of trees, isolated trees): 1 ball per 1 m of height and per tree
</td></tr>
<tr><td>Frequency of application</td><td>Once a year.</td></tr>
<tr><td>Season/period for use (where relevant)</td><td>Before appearance of the first seasonal flight of PPM adult starting in May or June depending on the region and based on regional surveillance.</td></tr>
<tr><td>Field of use (indoors/outdoors)</td><td>Outdoors</td></tr>
<tr><td>Category(ies) of user(s)</td><td>Professional: Authorised Professionnal, Town Hall, municipalities via trained employees.</td></tr>
<tr><td>Instruction for use</td><td>The adaptation of the number of balls per hectare is an important parameter to take into account: it is proven that a high pest population densitiy required comparatively a higher dose/ point-sources of releasing pheromone to manage the disruptant signal homogeneity and reduce the probable risk of mate at close range between males and females.
Product application should be done by a person/company with the required agreement for biocontrol product application. Product will be applied by compressed air guns (similar to paintball guns). The formulation contained in the balls is</td></tr>
</table>

Summary table of intended use(s)	
	made of an aqueous solution that could be water washed if it is not allowed to dry. It is therefore recommended to apply the balls in the trees on a rain-free day and ensure that no rain will fall in the next 12 hours, the minimum time for the formulation to dry and to become hydrophobic.

2.3 SUMMARY ON EFFICACY

2.3.1 Efficacy

Due to the specificity of the active substance (pheromone), no efficacy data have been provided on the active substance alone. Please refer to part B for the demonstration of the efficacy.

2.3.2 Mode of action

Please refer to part B.

2.3.3 Resistance

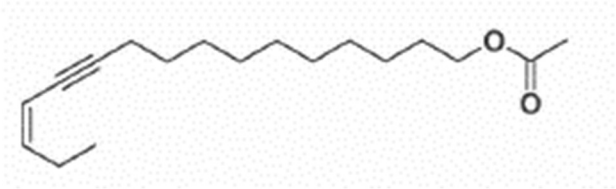
Please refer to part B.

2.4 CONCLUSION ON EFFICACY

Please refer to part B.

3 ASSESSMENT OF EFFECTS ON HUMAN HEALTH

The pheromone (13Z)-Hexadec-13-en-11-yn-1 acetate is a molecule containing a 1,3-enyne pattern with an alkyne function (triple bond) on position 11 and an alkene function (double bond) on position 13 of Z configuration.



Although this molecule is of natural origin (isolated and characterized in the extract from the sex pheromone producing glands of virgin females), the presence of the triple bond (alkyne function) makes that this pheromone is not considered to date as a molecule belonging to the family of straight chain lepidopteran pheromone (*i.e,* SCLPs).

Indeed, "SCLPs are a group of pheromones consisting of unbranched aliphatics having a chain of nine to eighteen carbons, containing up to three double bonds, ending in an alcohol, acetate or aldehyde functional group". This structural definition encompasses the majority of known pheromones produced by insects in the order Lepidoptera, which includes butterflies and moths."*

**2 SANTE/12815/2014 rev. 5.2, May 2016.*

The absence of impact of the triple bond (alkyne function) has not been demonstrated.
Even if very limited data available could indicate a changed metabolism because of the presence of a triple bond, it is not expected to affect mammals negatively.

On the basis of the available data, there is no information to justify the read-across with the SCLP substances. In this context, the different paragraphs on SCLPs that are included in the CAR after the toxicological endpoints have only an illustrative purpose.

Remark: In the absence of robust data to estimate the natural background, FR has not based the assessment on this approach.

According to the guidance for waiving of data requirements for Pheromones for inclusion in Annex I/IA of Directive 98/8/EC (based on the OECD Series on Pesticides (Number 12): Guidance for Registration Requirements for Pheromones and Other Semiochemicals Used for Arthropod Pest Control ENV/JM/MONO (2001)12), the short-term/sub-chronic/long-term/carcinogenicity/reproductive toxicity studies with the active substance can be waived, since there is not a significant exposure potential and no tolerance/MRL are to be set considering the intended use and the mode of application.

Indeed, considering that the pheromone is micro-encapsulated and then formulated to be introduced into biodegradable balls for application with a compressed air gun on pine trees, the exposure during the use of the compressed air gun can be considered as very low.

The balls are packed in aluminium bags and they are protected by a polymer shell that prevents any passage of the active substance to the outer compartment. In addition, the shell protection prevents any risk of inhalation of the active substance when opening the ball bag or when loading the balls into the compressed air gun.

The professionals that shoot the balls towards the tree are trained and their success rate is likely to be very high. If some balls/debris fall on the ground after application, they have to be removed.

The pheromone can only diffuse after the impact of the ball on the pine and its opening (in the canopy of pine trees (generally about 5 -10 meters high). Knowing that the content of the pheromone decreases with distance from the point of emission, its concentration at 2 meters from the ground (human level) can therefore be considered very low.

In addition, the professional user wears gloves during all steps of the use.

Before application, a safety perimeter (approximately 10 meters) is to be set and marked to avoid the presence of the general public.

During application, the projection speed of the balls is to be set to the minimum. The shooting must take place from 5 to 10m from the target, and must be located inside the land and not towards the outside. Consequently, the shooting will avoid the traffic lanes, the houses, the animals or people.

After application in urban zone, no balls or debris are to be left on the ground.

In forest zone, which is less frequented by the general public, the only debris that can be left on the ground because they are not found, are therefore expected to be in non accessible spots.

Sufficient measures are followed before, during and after application of the formulated pheromone in order to protect the professional users and the general public.
In these conditions, the exposure to the pheromone of the professional users and the general public can be considered very low.

Remark: In the Environmental section, during the peer review, a calculation of the deposition to soil from air compartment was included in the assessment. Based on very worst case assumptions, starting from 40g/ha for 3 months i.e 0, 44g/ha/day (= 0,044 mg/m2/day), it concluded to an estimation of deposition from air to soil of 1,25 E-07 mg/m2/day (please refer to the Environmental section). Considering the initial amount of active substance shot in the canopee, this fraction represents only 0,00028%.

Since (13Z)Hexadec-13-en-11-yn-1-yl acetate exposure to humans is considered to be very low regarding to the intended use and the specific mode of application, the waiving of the short-term / sub-chronic / long-term / carcinogenicity / reproductive toxicity studies with the active substance are considered justified and the derivation of TRVs as not necessary.

To be noted that from a human health perspective, the conclusion of this assessment applies only to this specific intended use and this mode of application.

Please also refer to annex presenting information from the applicant on the mode of application of the product.

3.1 TOXICOKINETICS

3.1.1 Short summary of the toxicokinetic information

No data

3.1.2 Values and conclusions used for the risk assessment

Data waiving	
Information requirement	In the Appendix I of the OECD ENV/JM/MONO(2001)12, it is stated that animal metabolism studies are required only if adverse effects or toxicity concerns arise from other data points of Human Health assessment.
Justification	According to the absence of noteworthy findings in the available toxicity studies and the waiving for repeated toxicity studies, no toxicokinetics data are considered necessary.

3.2 ACUTE TOXICITY

3.2.1 Acute oral toxicity

Summary table of animal studies on acute oral toxicity						
Method, Guideline, GLP status, Reliability	**Species, Strain, Sex, No/group**	**Test substance Dose levels, Type of administration** *(gavage, in diet, other)*	**Signs of toxicity** *(nature, onset, duration, severity, reversibility)*	**Value LD_{50}**	**Remarks** *(e.g. major deviations)*	**Reference**
OECD 423 GLP Reliability: 1	Sprague Dawley rat, 6 females, 8 week old	(13Z)-Hexadec-13-en-11-yn-1-yl acetate Batch M2iDSMS09139-Rec Purity 99% Dose: 2000 mg/kg by gavage (volume of 2.24 mL/kg)	-No mortality -No test item related clinical signs -No body weight change compared to controls -Macroscopic examination : no noteworthy change	>2000 mg/kg bw	A control study was conducted with animals receiving distilled water but no individual values on body weight were provided for comparison.	II 8.7.1/01 Richeux (2017) Report: TAO423-PH-17/0038

Body weight gain was considerably reduced in two rats (Rf 1103 and Rf 1104). Body weight gain from D0 to D14 in these animals was only half of the mean body weight gain of the remaining four rats in the study.
Individual body weight data for treated animals as reduction in body weight gain may point to (non-lethal) systemic toxicity.

Value used in the Risk Assessment – Acute oral toxicity	
Value	The LD_{50} of the test item is higher than 2000 mg/kg body weight by oral route. In accordance with the OECD N°423, the LD_{50} cut off of the test item may be considered to be higher than 2000 mg/kg by oral route in the rat. As a conclusion, the test item does not present acute oral toxicity. In accordance with the Regulation (EC) No.1272/2008 on classification, labelling and packaging of substances and mixtures, no signal word or hazard statement is required for the tested item (13Z)-Hexadec-13-en-11-yn-1-yl acetate.
Justification for the selected value	Selected value based on an experimental animal study (GLP test performed in accordance with OECD N°423 method - Report TAO423-PH-17/0038)

3.2.2 Acute dermal toxicity

Summary table of animal studies on acute dermal toxicity						
Method, Guideline, GLP status, Reliability	**Species, Strain, Sex, No/group**	**Test substance, Vehicle, Dose levels, Surface area,**	**Signs of toxicity** *(nature, onset, duration, severity, reversibility)*	**Value LD_{50}**	**Remarks** *(e.g. major deviations)*	**Reference**
OECD 402 GLP Reliability: 1	Sprague Dawley rats (5 males and 5 females), 8-9 weeks old	(13Z)-Hexadec-13-en-11-yn-1-yl acetate Batch M2iDSMS09139-Rec Purity 99% *Dose: 2000mg/kg (in a volume of 2.24 mL/kg bw) by topical application under non occlusive porous gauze* dressing (during 24h)	-No lethal systemic clinical signs related to the administration of the test item were observed. -Scab on the head noted in 2 out of 5 treated males (2/5) and 1 out of 5 treated female between days 11 and 14. These injuries were due to an aggressive behavior of the animals between them. Due to the severity of the head injury, one treated male was euthanized for ethical reason on day 13. -Erythema (grade not reported) was noted in all treated animals (10/10) at 48 hours post dose. This reaction was totally reversible at day 3. -No body weight change compared to controls -Macroscopic examination : no noteworthy change	>2000 mg/kg bw	The absence of reporting of the control animals' age considered as a minor deviation.	II 8.7.3/01 Richeux (2017) Report: TAD-PH-17/0038

Regarding body weight development, no individual body weight values for control animals were provided. Only graphical comparison with current controls (receiving distilled water) was possible. Based on the graphical representation, male control animals seemed to have a lower mean body weight (approx. -65 g) throughout the study period. This may suggest that these animals were younger than animals used in the main study.

According to the study report, body weight gain was impaired in 4/5 females (Rf 1083 - Rf 1086) from day 2 of the study. These females lost weight between D2 and D7. One of the females (Rf 1084) did not gain the lost weight by D14. This body weight reduction may highlight some systemic toxicity.

Regarding the observation of the aggressive behavior of some animals towards the others, no plausible explanation was given. It has to be noted that this finding was not observed in the acute toxicity study by oral route.
Also, no such behavior has been mentioned in the Acute toxicity studies performed for other pheromones such as SCLPs.
Finally, no literature data have been found on a potential behavioural effect of this type of pheromones on other organisms than the targeted insects.

No human data are available for the active substance.

Value used in the Risk Assessment – Acute dermal toxicity	
Value	The LD_{50} of the test item is higher than 2000 mg/kg body weight by dermal route in the rat. As conclusion, the test item does not present acute dermal toxicity. In accordance with the Regulation (EC) No.1272/2008 on classification, labelling and packaging of substances and mixtures, no signal word or hazard statement is required for the test item (13Z)-Hexadec-13-en-11-yn-1-yl acetate.
Justification for the selected value	Selected value based on an experimental animal study (GLP test performed in accordance with OECD N°402 method - Report TAD-PH-17/0038)

3.2.3 Acute inhalation toxicity

Conclusion used in the Risk Assessment – Acute inhalation toxicity	
Value/conclusion	No study has been conducted as exposure of human via inhalation is not likely to occur.
Justification for the value/conclusion	Considering the mode of application (passive non-retrievable products dispenser), and the encapsulation technology that prevent any direct contact of the active substance with the deposit support, the exposure to the active substance via inhalation is considered as very low.

Data waiving	
Information requirement	Potential for acute toxicity by inhalation
Justification	The vapour pressure of the active substance is estimated at 1.2 10^{-3} Pa at 25°C. In accordance with the Guidance on the BPR: Volume III. Part A, §8.7.2, the test by inhalation route is not appropriated in this case, as exposure of humans *via* inhalation is unlikely to happen taking into account that the vapour pressure of the substance is < 0.01 Pa. Moreover the active substance is not a powder (*i.e.* liquid) and is not included in products that are powders or are applied in a way that generates exposure to aerosols, particles or droplets of an inhalable size (*i.e.* active substance formulated in gel form, introduced into biodegradable balls applied on pine tree trunks using compressed air guns).

3.2.4 Overall conclusion on acute toxicity

Value used in the Risk Assessment – Acute systemic toxicity	
Value	The active substance was found to be of low acute oral and dermal toxicity with LD_{50} values greater than 2000 mg/kg b.w. In accordance with the Regulation (EC) No.1272/2008 on classification, labelling and packaging of substances and mixtures, no signal word or hazard statement is required for the (13Z)-Hexadec-13-en-11-yn-1-yl acetate as regards acute oral and dermal toxicity.

Justification for the selected value	Selected values based on experimental animal studies (GLP tests performed in accordance with OECD N°423 and OECD N°402 methods - Report TAO423-PH-17/0038 and report TAD-PH-17/0038)
Classification according to CLP	No signal word or hazard statement

Value/conclusion used in the Risk Assessment – Acute local effects	
Value/conclusion	As conclusion, based on oral and dermal studies, the active substance does not present any acute local effects.
Justification for the selected value/conclusion	Conclusion of Report TAO423-PH-17/0038 and report TAD-PH-17/0038.

3.3 IRRITATION AND CORROSION

3.3.1 Skin corrosion and irritation

Summary table of in vitro studies on skin corrosion/irritation					
Method, Guideline, GLP status, Reliability	**Test substance, Doses**	**Relevant information about the study**	**Results**	**Remarks** *(e.g. major deviations)*	**Reference**
OECD 431 epiCS® model GLP Reliability: 1	(13Z)-Hexadec-13-en-11-yn-1-yl acetate Batch M2iDSMS09139-Rec The test item was applied, as supplied, at the dose of 50 µL, at room temperature to the epidermal surface of 2 living human skin models, followed by a rinse with 20 mL of DPBS	Positive control: 8N KOH Negative control: DPBS	3 minutes and 1 hour after application, the mean percent viability of the epidermis skins treated with the test substance were 100.87% and 120.36%, versus 7.44% and 0.29%, respectively, with the positive control item. The test substance is showed to be non-corrosive	The difference in viability between the two epidermises treated with the test item at T0+1 hour is higher than 30% (*i.e.* 33.2%). This deviation is considered as without impact on the conclusion of the test.	II 8.1/01 Colas (2017) Report HSMC-PH-17/0038

OECD 439 SkinEthic RHE® model GLP Reliability: 1	(13Z)-Hexadec-13-en-11-yn-1-yl acetate Batch M2iDSMS09139-Rec The test substance was applied, as supplied, at the dose of 16 µL, to 3 living reconstructed human epidermis during 42 minutes, followed by a rince with 25 mL of DPBS and a 42 hours and 05 minutes post incubation period at 37°C, 5% CO_2	Positive control: 5% Sodium Dodecyl Sulfate Negative control: DPBS	The mean percent viability of the treated tissues was 146.1 % (considered as 100%), versus 1.3% in the positive control. The test substance is to be considered as non-irritant.	-	II 8.1/02 Colas (2017) Report HSMI-PH-17/0038

Summary table of animal studies on skin corrosion/irritation					
Method, Guideline, GLP status, Reliability	**Species, Strain, Sex, No/group**	**Test substance, Vehicle, Dose levels, Duration of exposure**	**Results** *Average score (24, 48, 72 h), observations and time point of onset, reversibility, other adverse local/systemic effects, histopathological findings*	**Remarks** *(e.g. major deviations)*	**Reference**
None.					

On one hand, the *in vitro* studies for skin corrosion/irritation are negative.
According to the CLP, it is possible to use other available data from other animal studies conducted for other purpose (i.e. Acute dermal study).
On the other hand, in the *in vivo* acute dermal rat study, after 24h of application of the test item, erythema was noted in all treated animals (10/10) at 48 hours post dose. This reaction was totally reversible at Day 3.
Unfortunately, the grades of these erythema observations were not reported.
Since the scores of the erythema observations are not available, it is thus quite difficult to include these data in a weight of evidence to assess the possible irritation properties of the test item.

In the LLNA test conducted in the mouse (see section 3.4.1), an excessive irritation was observed at the concentrations of 50% and 100%. In these conditions, since the test item is applied to the dorsum of the ear by open topical application, and specific vehicules for enhancement of skin penetration are used, it is not possible to use them to support a skin irritation classification.

eCA acknowledges there is a trend regarding the irritation potential of the test item.
Nevertheless, with regard to CLP, and based on the available data, FR considers that it is not relevant to propose a skin irritation classification for the active substance.

No human data is available for the active substance.

Conclusion used in the Risk Assessment – Skin irritation and corrosivity	
Value/conclusion	In accordance with the Regulation (EC) No. 1272/2008, the results obtained under these experimental conditions enable to conclude that the active substance does not have to be classified in Category 1 "Corrosive". The hazard statement "H314: Causes severe skin burns and eye damage" with the signal word "Danger" is not required. In accordance with the Regulation (EC) No. 1272/2008, the active substance has to be considered as non-irritant to skin. The hazard statement "H315: Causes skin irritation" with the signal word "Warning" is not required.
Justification for the value/conclusion	Based on experimental *in vitro* studies (GLP tests performed in accordance with OECD N°431 and OECD N°439 methods - Reports HSMC-PH-17/0038 and HSMI-PH-17/0038)

3.3.2 Eye irritation

Summary table of in vitro studies on serious eye damage and eye irritation					
Method, Guideline, GLP status, Reliability	**Test substance, Doses**	**Relevant information about the study**	**Results**	**Remarks** *(e.g. major deviations)*	**Reference**
Isolated Chicken Eye Test Method OECD 438 GLP Reliability: 1	(13Z)-Hexadec-13-en-11-yn-1-yl acetate Batch M2iDSMS09139-Rec The test substance was appied, as supplied, at the dose of 30 µL/enucleated eye during 10 s. Then the eyes were rinsed twice with 10 mL of physiological saline.	Positive control: 5% Benzalkonium chloride Negative control: physiological saline	The combination of the three endpoints for the test substance was 2 x I, 1 x II. No classification for serious eye damage or eye irritation.	-	II 8.2/01 Colas (2017) Report ICE-PH-17/0038

Summary table of animal studies on serious eye damage and eye irritation					
Method, Guideline, GLP status, Reliability	**Species, Strain, Sex, No/group**	**Test substance** **Dose levels, Duration of exposure**	**Results** *Average score (24, 48, 72 h), observations and time point of onset, reversibility*	**Remarks** *(e.g. major deviations)*	**Reference**
None.					

No human data is available for the active substance.

Conclusion used in Risk Assessment – Eye irritation and corrosivity	
Value/conclusion	In accordance with the Regulation (EC) No. 1272/2008, the results obtained under these experimental conditions enable to conclude that the test substance does not require classification for eye irritation and serious eye damage as defined by the UN GHS (No Category).
Justification for the value/conclusion	Based on experimental *in vitro* study (GLP test performed in accordance with OECD N°438 method - Report ICE-PH-17/0038).

3.3.3 Respiratory tract irritation

Conclusion used in the Risk Assessment – Respiratory tract irritation	
Conclusion	No relevant information available
Justification for the conclusion	According to Guidance on the BPR: Volume III. Part A §8.2, there is no testing requirement for respiratory irritation under the Biocides Regulation.

3.3.4 Overall conclusion on corrosion and irritation

Conclusion used in the Risk Assessment – Corrosion and irritation	
Value	In accordance with the Regulation (EC) No. 1272/2008, the results obtained enable to conclude that the active substance does not have to be classified in Category 1 "Corrosive", has to be considered as non-irritant to skin and does not require classification for eye irritation and serious eye damage.
Justification for the selected value	Based on experimental *in vitro* studies (GLP tests performed in accordance with OECD N°431, OECD N°439 and OECD N°438 methods - Report HSMC-PH-17/0038, HSMI-PH-17/0038 and ICE-PH-17/0038).
Classification according to CLP	No CLP classification.

3.4 SENSITISATION

3.4.1 Skin sensitisation

Summary table of animal studies on skin sensitisation					
Method, Guideline, GLP status, Reliability	**Species, Strain, Sex, No/group**	**Test substance, Vehicle,** **Dose levels, Route of exposure** *(topical/intradermal, if relevant)*, **Duration of exposure**	**Results** *(EC3-value or amount of sensitised animals at induction dose)*	**Remarks** *(e.g. major deviations)*	**Reference**

Local lymph node assay OECD 442B GLP Method: Measurement of BrDU content in DNA of lymphocytes using ELISA kit Reliability: 2	CBA/J strain mouse Groups of four females, 11 week-old	(13Z)-Hexadec-13-en-11-yn-1-yl acetate *Batch M2iDSMS09139-Rec* Purity 99% 3 groups treated by daily application of 25 µL of the test substance (100%, 50% and 25% in Acetone/olive oil (4:1, v/v)) to the dorsal surface of each ear for 3 consecutive days. 1 group treated with the vehicle.	The stimulation index (SI) calculated by individual approach was 1.28, 1.67 and 2.02 for the treated groups at 25%, 50% and 100%, respectively. The $EC_{1.6}$ determined by linear regression was 45.51%. The result of the study is positive due to the fact that the SI is higher than 1.6 in the treated groups at 50% and 100%. As the SI value higher than 1.6 was noted at the concentrations of 50% and 100% which induced an excessive irritation, the positive response may be considered as a	Deviation in the choice of the highest dose: One mouse was used in the preliminary study. No clinical sign, no cutaneous reaction except dryness on Day 6 was reported. The observed increase in ear thickness from 0.21 mm to 0.28 mm was not retained in the conclusion. As this increase was greater than 25%, the highest tested dose should have been lowered.	II 8.3/01 Richeux (2017) Report LLNA:BrdU-PH-17/0038

			false positive response.		

Conclusion used in Risk Assessment – Skin sensitisation	
Value/conclusion	The test substance is not classified as a skin sensitizer, in accordance with the Regulation (EC) No.1272/2008 on classification, labelling and packaging of substances and mixture. No signal word or hazard statement is required for the test substance.
Justification for the value/conclusion	Based on experimental study (GLP test performed in accordance with OECD 442B method - Report LLNA:BrdU-PH-17/0038).

3.4.2 Respiratory sensitisation

Conclusion used in the Risk Assessment – Respiratory sensitisation	
Value/conclusion	The active substance is not identified as a skin sensitiser and no event of respiratory hypersensitivity of exposed workers have been reported. Therefore the active substance is not expected to be a respiratory sensitiser.
Justification for the value/conclusion	Based on experimental skin sensitisation study (GLP test performed in accordance with OECD 442B method - Report LLNA:BrdU-PH-17/0038).

3.4.3 Overall conclusion on sensitisation

Conclusion used in the Risk Assessment – Sensitisation	
Value	The test substance is not classified as a skin sensitiser nor as a respiratory sensitiser, in accordance with the Regulation (EC) No.1272/2008 on classification, labelling and packaging of substances and mixture. No signal word or hazard statement is required.
Justification for the selected value	Based on experimental study (GLP test performed in accordance with OECD 442B method - Report LLNA : BrdU-PH-17/0038).
Classification according to CLP	No signal word or hazard statement.

Overall comparison of acute toxicity data of the pheromone (13Z)-Hexadec-13-en-11-yn-1 acetate with approved data of SCLPs (EFSA Journal 2021;19(6):6656)

Acute toxicity data for SCLPs are available for some of the notified substances. In agreement with the previous evaluation of SCLPs and with the OECD waiving arguments (OECD Series on Pesticides (Number 12): Guidance for Registration Requirements for Pheromones and Other Semiochemicals Used for Arthropod Pest Control ENV/JM/MONO (2001)12), SCLP active substances with very little or no data will be bridged to analogous SCLPs within the same chemical class (*i.e.* acetates, alcohols, aldehydes).

Acute oral, dermal and via inhalation toxicity:
All tested SCLP active substances were found to have LD50 values greater than 5000 mg/kg bw when administered by oral route. Classification for acute oral toxicity according to the CLP Regulation (EC) 1272/2008 is not needed.
With regard to the acute dermal toxicity, the SCLP active substances tested were not lethal when administered at 2000 mg/kg bw and above. Classification for acute dermal toxicity according to the CLP Regulation (EC) 1272/2008 is not needed.
The SCLPs acetate groups exhibited no acute inhalation toxicity when tested at limit concentrations (above 5 mg/l).

The acute toxicity data described for (13Z)-Hexadec-13-en-11-yn-1 acetate are comparable to the one described for SCLP acetates.

Skin Irritation:

Regarding the skin irritancy properties of the SCLPs, only SCLP aldehydes were found to be slightly irritating to the skin, but do not require classification and labelling towards skin irritation.
For SCLP acetates and SCLP alcohols, skin irritant effects were observed for (Z)-9-tetradecen-1-yl acetate and (E,E)-8,10-dodecadien-1-ol, respectively, and for a blend as (E)-5-decen-1-ol plus (E)-5-decen-1-yl acetate when tested on rabbit skin. Therefore, classification as skin irritant Category 2 according to Regulation (EC) No 1272/2008 was applied for same category SCLPs, in case of absence of data and where a bridging approach with substances of the same chemical category was claimed.

The skin irritation properties observed for the evaluated active substance (13Z)-Hexadec-13-en-11-yn-1 acetate were considered not sufficiently described to warrant classification according to CLP Regulation.

Eye Irritation:

As for SCLP acetates, the specific data available for (13Z)-Hexadec-13-en-11-yn-1 acetate showed no eye irritant properties.

Sensitisation:
As for SCLP acetates, the specific data available for (13Z)-Hexadec-13-en-11-yn-1 acetate showed no sensitizer properties.

3.5 SHORT TERM REPEATED DOSE TOXICITY

According to the Guidance for waiving of data requirements for Pheromones for inclusion in Annex I/IA of Directive 98/8/EC (2005) (based on the OECD Series on Pesticides (Number 12): Guidance for Registration Requirements for Pheromones and Other Semiochemicals Used for Arthropod Pest Control ENV/JM/MONO (2001)12), short-term repeated dose toxicity studies with the active substance are waived since there is not a significant exposure potential and no tolerance/MRL are to be set considering the intended use and the mode of application (pheromone micro-encapsulated and then formulated and introduced into biodegradable balls, applied with a compressed air gun on pine trees). Since (13Z)-Hexadec-13-en-11-yn-1-yl acetate exposure to humans is considered to be very low regarding to the intended use and the specific mode of application, the short-term toxicity studies can be waived.

3.5.1 Short-term oral toxicity

Value used in the Risk Assessment – Short-term oral toxicity	
Value/conclusion	Study scientifically not necessary.
Justification for the value/conclusion	See data waiving justication above.

Data waiving	
Information requirement	Short-term oral toxicity.
Justification	See data waiving justification above.

3.5.2 Short-term dermal toxicity

Value used in the Risk Assessment – Short-term dermal toxicity	
Value/conclusion	Study scientifically not necessary.
Justification for the value/conclusion	See data waiving justification above.

Data waiving	
Information requirement	Short-term dermal toxicity.
Justification	See data waiving justification above.

3.5.3 Short-term inhalation toxicity

Value used in Risk Assessment – Short-term inhalation toxicity	
Value/conclusion	Study scientifically not necessary.
Justification for the value/conclusion	See data waiving justification above.

Data waiving	
Information requirement	Short-term inhalation toxicity.
Justification	See data waiving justification above.

3.5.4 Overall conclusion on short-term repeated dose toxicity

Value used in the Risk Assessment – Short-term repeated dose systemic toxicity	
Value	Study scientifically not necessary.
Justification for the selected value	See data waiving justification above.
Classification according to CLP	NA

Value/conclusion used in the Risk Assessment – Short-term repeated dose local effects	
Value/conclusion	No data is available for the active substance (13Z)-Hexadec-13-en-11-yn-1 acetate.

Justification for the selected value/conclusion	See data waiving justification above.
Classification according to CLP	NA

With regard to short-term toxicity of SCLPs, an oral 28-day toxicity study was conducted with the active substance (E,E)-8,10-dodecadienol. This study was performed as limit dose test with the high dose of 1000 mg/kg bw/day. When given to rats by gavage for 28 days, the test substance was found to be well tolerated by females inducing no relevant effects. Therefore, the dose of 1000 mg/kg bw/day has been considered as a NOAEL in females. In males the test compound induced some changes mainly involving the stomach with erosions of the glandular mucosa and the kidney with tubular dilatation or vacuolation. Thus, the dose of 1000 mg/kg bw/day has been considered as a LOAEL in male rats.

3.6 SUB-CHRONIC REPEATED DOSE TOXICITY

According to the guidance for waiving of data requirements for Pheromones for inclusion in Annex I/IA of Directive 98/8/EC (based on the OECD Series on Pesticides (Number 12): Guidance for Registration Requirements for Pheromones and Other Semiochemicals Used for Arthropod Pest Control ENV/JM/MONO (2001)12), sub-chronic repeated dose toxicity studies with the active substance are waived since there is not a significant exposure potential and no tolerance/MRL are to be set considering the intended use and the mode of application (pheromone micro-encapsulated and then formulated and introduced into biodegradable balls, applied with a compressed air gun on pine trees). Since (13Z)-Hexadec-13-en-11-yn-1-yl acetate exposure to humans is considered to be very low regarding to the intended use and the specific mode of application, the the sub-chronic repeated toxicity studies can be waived.

3.6.1 Sub-chronic oral toxicity

Value used in Risk Assessment – Sub-chronic oral toxicity	
Value/conclusion	Study scientifically not necessary.
Justification for the value/conclusion	See data waiving justification above.

Data waiving	
Information requirement	Sub-chronic oral toxicity.
Justification	See data waiving justification above.

3.6.2 Sub-chronic dermal toxicity

Value used in Risk Assessment – Sub-chronic dermal toxicity	
Value/conclusion	Study scientifically not necessary.
Justification for the value/conclusion	See data waiving justification above.

Data waiving	
Information requirement	Sub-chronic dermal toxicity.
Justification	See data waiving justification above.

3.6.3 Sub-chronic inhalation toxicity

Value used in Risk Assessment – Sub-chronic inhalation toxicity	
Value/conclusion	Study scientifically not necessary.
Justification for the value/conclusion	See data waiving justification above.

Data waiving	
Information requirement	Sub-chronic inhalation toxicity.
Justification	See data waiving justification above.

3.6.4 Overall conclusion on sub-chronic repeated dose toxicity

Value used in the Risk Assessment – Sub-chronic repeated dose systemic toxicity	
Value	No data available.
Justification for the selected value	See data waiving justification above.
Classification according to CLP	NA

Value/conclusion used in the Risk Assessment – Sub-chronic repeated dose local effects	
Value/conclusion	No data available.
Justification for the selected value/conclusion	See data waiving justification above.
Classification according to CLP	NA

3.7 LONG-TERM REPEATED DOSE TOXICITY

According to the guidance for waiving of data requirements for Pheromones for inclusion in Annex I/IA of Directive 98/8/EC (based on the OECD Series on Pesticides (Number 12): Guidance for Registration Requirements for Pheromones and Other Semiochemicals Used for Arthropod Pest Control ENV/JM/MONO (2001)12), long-term repeated dose toxicity studies with the active substance are waived since there is not a significant exposure potential and no tolerance/MRL are to be set considering the intended use and the mode of application (pheromone micro-encapsulated and then formulated and introduced into biodegradable balls, applied with a compressed air gun on pine trees). Since (13Z)-Hexadec-13-en-11-yn-1-yl acetate exposure to humans is considered to be very low regarding to the intended use and the specific mode of application, the the long-term repeated toxicity studies can be waived.

3.7.1 Long-term oral toxicity

Value used in Risk Assessment –Long-term oral toxicity	
Value/conclusion	Study scientifically not necessary.
Justification for the value/conclusion	See data waiving justification above.

Data waiving	
Information requirement	Sub-chronic oral toxicity.
Justification	See data waiving justification above.

3.7.2 Long-term dermal toxicity

Value used in Risk Assessment – Long-term dermal toxicity	
Value/conclusion	Study scientifically not necessary.
Justification for the value/conclusion	See data waiving justification above.

Data waiving	
Information requirement	Sub-chronic dermal toxicity.
Justification	See data waiving justification above.

3.7.3 Long-term inhalation toxicity

Value used in Risk Assessment – Long-term inhalation toxicity	
Value/conclusion	Study scientifically not necessary.
Justification for the value/conclusion	See data waiving justification above.

Data waiving	
Information requirement	Sub-chronic inhalation toxicity.
Justification	See data waiving justification above.

3.7.4 Overall conclusion on long-term repeated dose toxicity

Value used in the Risk Assessment – Long-term repeated dose systemic toxicity	
Value	No data available.
Justification for the selected value	See data waiving justification above.
Classification according to CLP	NA

Value/conclusion used in the Risk Assessment – Long-term repeated dose local effects	
Value/conclusion	No data available.
Justification for the selected value/conclusion	See data waiving justification above.
Classification according to CLP	NA

For SCLPs, a waiving of long term repeated dose studies, including the setting of reference values, was accepted (see explanation in Carcinogenesis section below).

3.8 GENOTOXICITY

3.8.1 In vitro

Summary table of in vitro genotoxicity studies					
Method, Guideline,GLP status, Reliability	**Test substance, Doses**	**Relevant information about the study** *(e.g. cell type, strains)*	**Results**	**Remarks** *(e.g. major deviations)*	**Reference**
OECD 471 GLP Reliability: 1	(13Z)-Hexadec-13-en-11-yn-1-yl acetate Batch: M2iDSMS09139-Rec Purity 99% Doses: 5 000, 1 500, 500, 150 and 50 µg/plate Metabolic activation system: (S9-mix 10% (v/v))	*Salmonella typhimurium* TA 1535, TA 1537, TA 98, TA 100 and *Escherichia coli* WP2(uvrA-) (pKM 101)	Negative Evaluation criteria: No evidence of any increase in the number of revertant colonies with any strain without or with metabolic activation.	-	II 8.5.1 Savineau (2017) Report 2017-GHT-1

Under the described experimental conditions, the active substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate (Batch: M2iDSMS09139-Rec) does not induce any mutagenic change in Salmonella typhimurium TA 1535, TA 1537, TA 98, TA 100 and Escherichia coli WP2(uvrA-) (pKM 101) in the absence or presence of metabolic activation, according to the OECD Guideline 471.

OECD 490 GLP Reliability: 1	(13Z)-Hexadec-13-en-11-yn-1-yl acetate Batch: M2iDSMS16014-F5 Purity 98.8% In the absence of a metabolic activation system: 30, 20, 10 and 5 µg/ml of test item In the presence of of a metabolic activation system (S9-mix 2.5% (v/v)): 80, 60, 40 and 20 µg/ml of test item	*L5178Y Mouse Lymphoma cells* *Short term treatment* *Based on the solubility of the active substance in DMSO*, no long term treatment was considered necessary.*	Negative Evaluation criteria: The observed mutant frequency does not exceed the Global Evaluation Factor (GEF), in any tested conditions.	Light increase in small colonies.	Savineau (2019) Report MLA2-LM-18/0259

*Considering the solubility of the active substance in organic solvent such as acetone or methanol (about 250g/L) a comparable solubility in DMSO is expected.

Under the described experimental conditions, the active substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate (Batch: M2iDSMS16014-F5) does not induce mutagenic effect in L5178Y TK+/- Mouse Lymphoma cells in the absence or presence of metabolic activation, according to the OECD Guideline 490.

OECD 487 GLP Reliability: 1	(13Z)-Hexadec-13-en-11-yn-1-yl acetate Batch: M2iDSMS16014-F5 Purity 98.8% Metabolic activation system : S9-mix 7% (v/v) Short-term treatment without S9 at test item doses: 224, 128, 89.6 µg/mL Short-term treatment with S9 at test item doses: 20.48, 14.34, 8.19 µg/mL Long-term treatment without S9 at test item doses: 35.84, 20.48, 14.34µg/mL	CHO (Chinese Hamster Ovary) cells	Negative No induction of any clastogenic and aneugenic effects without or with metabolic activation, in cultured CHO Evaluation criteria (short term treatment +/- metabolic activation and long term treatment without metabolic activation): All 3 criteria for a negative outcome are fullfilled.		Guerinet (2018) Report MNS2-LM-18/0259

Under the described experimental conditions, the active substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate (Batch: M2iDSMS16014-F5) is not considered clastogenic and aneugenic in CHO cells, according to the OECD Guideline 487.

Conclusion used in Risk Assessment – Genotoxicity *in vitro*	
Conclusion	The active substance is considered as no mutagenic, nor clastogenic or aneugenic.
Justification for the conclusion	The active substance is not expected to have mutagenic, clastogenic or aneugenic potential. This was confirmed in an Ames test (OECD 471)(Report 2017-GHT-1), a Mouse Lymphoma cells test (OECD 490)(Report MLA2-LM-18/0259) and a *in vitro* micronucleus test (OECD 487)(Report MNS2-LM-18/0259).

3.8.2 In vivo

Conclusion used in Risk Assessment – Genotoxicity *in vivo*	
Conclusion	No data available.
Justification for the conclusion	

Data waiving	
Information requirement	No data available.
Justification	*In vivo* study for genotoxicity is considered as not required, since *in vitro* genotoxicity data confirm that the active substance does not have any mutagenic, clastogenic or aneugenic potential.

3.8.3 Overall conclusion on genotoxicity

Conclusion used in the Risk Assessment – Genotoxicity	
Conclusion	The active substance is not considered to have any mutagenic, clastogenic or aneugenic potential.
Justification for the conclusion	The active substance is not expected to have mutagenic, clastogenic or aneugenic potential. This was confirmed in an Ames test (OECD 471)(Report 2017-GHT-1), a Mouse Lymphoma cells test (OECD 490)(Report MLA2-LM-18/0259) and a in vitro micronucleus test (OECD 487)(Report MNS2-LM-18/0259).
Classification according to CLP	No classification.

Regarding the SCLPs, no genotoxic potential was observed *in vitro* in bacterial and mammalian cells gene mutation assays and chromosome aberration test covering the acetate and alcohol groups.

3.9 CARCINOGENICITY

According to the guidance for waiving of data requirements for Pheromones for inclusion in Annex I/IA of Directive 98/8/EC (based on the OECD Series on Pesticides (Number 12): Guidance for Registration Requirements for Pheromones and Other Semiochemicals Used for Arthropod Pest Control ENV/JM/MONO (2001)12), carcinogenicity toxicity studies with the active substance are waived since there is not a significant exposure potential and no tolerance/MRL are to be set considering the intended use and the mode of application (pheromone micro-encapsulated and then formulated and introduced into biodegradable balls, applied with a compressed air gun on pine trees).Since (13Z)-Hexadec-13-en-11-yn-1-yl acetate exposure to humans is considered to be very low regarding to the intended use and the specific mode of application, the carcinogenicity toxicity studies can be waived.

Conclusion used in Risk Assessment – Carcinogenicity	
Value/conclusion	No data available.
Justification for the value/conclusion	See justification above.
Classification according to CLP	NA

Data waiving	
Information requirement	Carcinogenicity
Justification	The active substance is a naturally occurring substance that was shown to be of low acute toxicity and not mutagenic. Furthermore, the application with the compressed air gun (pheromone micro-encapsulated, formulated as a gel introduced into biodegradable balls) with release rate *via* passive diffusion causes very low direct exposure to humans. Moreover no contamination of food and feed will occur (application on pine trees). Therefore, all data requirements are waived.

For SCLPs, a waiving of long term repeated dose and carcinogenesis studies, including the setting of reference values was accepted. Indeed, genotoxic adverse effects were not observed in dedicated studies conducted with SCLPs active substances. Moreover, long-term repeated exposure was expected to be low following the proposed applications of the products. According to the OECD Series on Pesticides (Number 12): Guidance for Registration Requirements for Pheromones and Other Semiochemicals Used for Arthropod Pest Control ENV/JM/MONO (2001)12, long-term toxicity (chronic) and carcinogenicity studies with the active ingredient are conditionally required. Such studies are triggered by adverse effects in mutagenicity or short-term studies and can be waived if long term exposure above background can be excluded. Therefore, the requirement for long-term toxicity and carcinogenicity toxicity studies was waived.

3.10 REPRODUCTIVE TOXICITY

According to the guidance for waiving of data requirements for Pheromones for inclusion in Annex I/IA of Directive 98/8/EC (based on the OECD Series on Pesticides (Number 12): Guidance for Registration Requirements for Pheromones and Other Semiochemicals Used for Arthropod Pest Control ENV/JM/MONO (2001)12), reproductive toxicity studies with the active substance are waived since there is not a significant exposure potential and no tolerance/MRL are to be set considering the intended use and the mode of application (pheromone micro-encapsulated and then formulated and introduced into biodegradable balls, applied with a compressed air gun on pine trees). Since (13Z)-Hexadec-13-en-11-yn-1-yl acetate exposure to humans is considered to be very low regarding to the intended use and the specific mode of application, the reproductive toxicity studies can be waived.

3.10.1 Developmental toxicity

Conclusion used in Risk Assessment – Effects on development	
Value/conclusion	No data available.
Justification for the value/conclusion	NA

Data waiving	
Information requirement	Effects on development.
Justification	Since the active substance is a naturally occurring substance and exposure to humans is considered to be very low when applied with the paintball gun, all data requirements are waived.

3.10.2 Fertility

Conclusion used in Risk Assessment – Fertility	
Value/conclusion	No data available.
Justification for the value/conclusion	NA

Data waiving	
Information requirement	Not relevant information available.
Justification	Since the active substance is a naturally occurring substance and exposure to humans is considered to be very low when applied with the paintball gun, all data requirements are waived.

3.10.3 Effects on or via lactation

Conclusion used in Risk Assessment – Effects on or via lactation	
Value/conclusion	No data available.
Justification for the value/conclusion	NA

Data waiving	
Information requirement	Effects on or *via* lactation.
Justification	Since the active substance is a naturally occurring substance and exposure to humans is considered to be very low when applied with the paintball gun, all data requirements are waived.

3.10.4 Overall conclusion on reproductive toxicity

Conclusion used in the Risk Assessment – Reproductive toxicity	
Value	No data available.
Justification for the selected value	Since the active substance is a naturally occurring substance and exposure to humans is considered to be very low when applied with the paintball gun, all data requirements are waived.
Classification according to CLP	NA

For SCLPs, a waiving of reproductive and developmental studies, including the setting of reference values was accepted.
Indeed, according to the OECD Series on Pesticides (Number 12): Guidance for Registration Requirements for Pheromones and Other Semiochemicals Used for Arthropod Pest Control ENV/JM/MONO (2001)12, developmental toxicity testing in one species is "required if there is a significant exposure potential, *e.g.* above background levels, or if a tolerance/MRL will be set. Data may be waived if the substance is a member of a well-known group of substances for which the teratogenicity/developmental toxicity is described." A teratogenicity study in a second species and reproductive toxicity testing is conditionally required, triggered by "adverse effects or toxicity concerns from other data points for Health Risks". Since SCLPs are naturally occurring substances and the exposure potential to humans and non-target organisms is considered to be very low, according to the proposed applications of the products, the reproductive toxicity characterization was waived.

3.11 NEUROTOXICITY

Conclusion used in Risk Assessment – Neurotoxicity	
Value/conclusion	No data available.
Justification for the value/conclusion	NA

Data waiving	
Information requirement	Study scientifically not necessary.
Justification	Since the active substance is a naturally occurring substance and exposure to humans is considered to be very low when applied with the paintball gun, all data requirements are waived.

3.12 IMMUNOTOXICITY

Conclusion used in Risk Assessment – Immunotoxicity	
Conclusion	No data available.
Justification for the conclusion	NA

Data waiving	
Information requirement	Study scientifically not necessary.
Justification	Since the active substance is a naturally occurring substance and exposure to humans is considered to be very low when applied with the paintball gun, all data requirements are waived.

3.13 DISRUPTION OF THE ENDOCRINE SYSTEM

3.13.1 Introduction

In June 2018, EFSA and the European Chemicals Agency (ECHA) published a Guidance for the identification of endocrine disruptors in the context of Regulations (EU) No. 528/2012 and (EC) No. 1107/2009, EFSA Journal 2018; 16(6)5311. To evaluate the potential concern for endocrine disrupting effects induced by (Z)-13-hexadecen-11-yn-1-yl acetate (see Figure 1), all available data were assessed according to the EFSA/ECHA GD for identification of endocrine disruptors[2] and throughout all levels (1-5) of the OECD Conceptual Framework for Endocrine Disrupters of the Guidance.

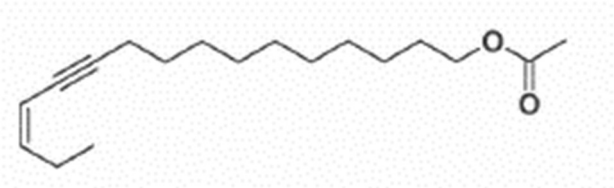


Figure 1: (Z)-13-hexadecen-11-yn-1-yl acetate structure

3.13.2 Gathering relevant information

3.13.2.1 *In silico* studies (Level 1)

Non test information such as read-across and category approaches, (Q)SAR and other *in silico* approaches, were used, using the following canonical SMILES/CAS number: C(#CC=CCC)CCCCCCCCCCOC(=O)(C) /78617-58-0.
The following table presents the results of the different QSARs (Danish QSAR, OECD QSAR Toolbox, Endocrine disruptome, VEGA):

[2] Guidance for the identification of endocrine disruptors in the context of Regulations (EU) No 528/2012 and (EC) No 1107/2009. EFSA Journal 2018;16(6):5311, 135 pp

QSARs	Models	Battery	Case Ultra	Leadscope	SciQSAR
Danish QSAR (Battery, Case Ultra, Leadscope, SciQSAR)	Substance not found				

QSARs	Output and conclusions	
OECD QSAR Toolbox v4.2 profilers	**Estrogen Receptor Binding, alerts in:**	
	- parent only	Non binder, without OH or NH2 group
	- metabolites from in vivo Rat metabolism simulator only	Non binder, non-cyclic structure
	- metabolites from Rat liver S9 metabolism simulator only	Non binder, non-cyclic structure
	rtER Expert System - USEPA, alerts in:	
	- parent only	No alert found
	- metabolites from in vivo Rat metabolism simulator only	No alert found
	- metabolites from Rat liver S9 metabolism simulator only	No alert found

QSARs	Receptors and output	Conclusions
Endocrine Disruptome	AR : -6.3	Low probability
	AR an.: -6.5	Low-Medium probability
	ER α: -6.5	Low probability
	ER α an.: -6.3	
	ER β: -6.7	
	ER β an.: -6.6	
	GR: -6.4	
	GR an.: -6.0	
	LXR α: -7.0	

	LXR β: -6.6	
	MR: -6.5	
	PPAR α: -5.8	
	PPAR β: -6.2	
	PPAR γ: -6.3	
	PR: -1.8	
	RXR α: -7.3	
	TR α: -7.0	
	TR β: -6.8	
High probability		
Medium-High		
Low-medium		
Low probability		
QSARs	**Models**	**Predictions**
VEGA v1.1.5	**Estrogen Receptor Relative Binding Affinity model (IRFMN) 1.0.1**	The pheromon is active on estrogenic receptors (reliability 2/3)
	Estrogen Receptor-mediated effect (IRFMN/CERAPP) 1.0.0	The pheromon is non-active on estrogenic receptors (reliability 3/3)
	Androgen Receptor-mediated effect (IRFMN/COMPARA) 1.0.0	The pheromon is non-active on androgenic receptors (reliability 3/3)
	Thyroid Receptor Alpha effect (NRMEA) 1.0.0	The pheromon is non-active on thyroid receptors alpha (reliability 3/3)
	Thyroid Receptor Beta effect (NRMEA) 1.0.0	The pheromon is non-active on thyroid receptors beta (reliability 3/3)

Overall , VEGA and the OECD QSAR Toolbox do not indicate any endocrine activity of the active substance. Among VEGA models, the Estrogen Receptor-mediated effect (IRFMN/CERAPP) 1.0.0 model has a better reliability than the Estrogen Receptor Relative Binding Affinity model (IRFMN) 1.0.1 model. It is therefore retained for the assessment and indicates that the pheromone is inactive on the estrogenic receptors.

Only one model from Endocrine disruptome estimates a low-medium degree of binding of the substance to AR receptors, with antagonistic effects. On the contrary, VEGA androgenic model defines the substance as non-active on androgen receptors with a maximum reliability.

Therefore, no clear Endocrine disruption alert has been raised for the substance (Z)-13-hexadecen-11-yn-1-yl acetate considering QSAR analysis.

It has to be noted that the *in silico* analysis conducted for SCLPs in the framework of their renewal under PPP Regulation (EU) 1107/2009, showed that none of them were identified as potential ER-binders. Therefore, it was concluded that it is very unlikely that SCLPs have ED properties based on the OECD QSAR Toolbox prediction.

The active substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate shares important structural similarities with the SCLPs family. Indeed, the common structural definition of a SCLP substance is "unbranched aliphatic having a chain of nine to eighteen carbons, containing up to three double bonds, and ending in an alcohol, acetate or aldehyde functional group" (SANCO/5272/2009). Besides the presence of a triple bond, the (13Z)-Hexadec-13-en-11-yn-1-yl acetate meets the common structural definition of a SCLP substance.

Consequently, the conclusion on metabolism of SCLP substances might be applicable to the (13Z)-Hexadec-13-en-11-yn-1-yl acetate, knowing that no demonstration has been done.

3.13.2.2 ***In vitro*** **mechanistic data – US EPA CompTox Chemicals and in vitro guidelines studies (Level 2)**

No level 2 data is available (ToxCast Models, EDSP21, Transcriptional assay...).

In the framework of SCLPs renewal under PPP Regulation (EU) 1107/2009, the data provided by the US EPA Comptox database regarding SCLP acetates indicated that all activity predictions are negative. Inactivity is predicted for androgen- or estrogen receptor agonism, antagonism or binding.
SCLP from aldehyde and alcohol groups are also considered active substances not having endocrine activity for EATS modalities.

3.13.2.3 **Mammalian toxicology: *in vivo* studies (level 3, 4, 5)**

3.13.2.3.1 *In vivo* assays providing data about selected endocrine mechanism(s) / pathway(s) (Level 3)

For mammalian toxicology, two tests are currently required:

- the Uterotrophic assay (OECD TG 440, OECD GD 71) on estrogenic effects
- the Hershberger assay (OECD TG 441, OECD GD 115) for (anti)-androgenic properties.

No information on such *in vivo* assays is available for (Z)-13-hexadecen-11-yn-1-yl acetate. According to the ED Guidance, in absence of these studies, it is not possible to conclude on the absence of endocrine activity.

3.13.2.3.2 ***In vivo* assays providing data on adverse effects on endocrine relevant endpoints (Level 4) and more comprehensive data on adverse effects on endocrine relevant endpoints over more extensive parts of the life cycle of the organism (Level 5)**

Toxicological data package lacks of repeated exposure assays where endpoints related to endocrine adversity and activity are investigated.
According to the guidance for waiving of data requirements for Pheromones for inclusion in Annex I/IA of Directive 98/8/EC (based on the OECD Series on Pesticides (Number 12): Guidance for Registration Requirements for Pheromones and Other Semiochemicals Used for Arthropod Pest Control ENV/JM/MONO (2001)12), repeated dose toxicity studies with the active substance are waived since there is not a significant exposure potential and no tolerance/MRL are to be set considering the intended use and the mode of application (pheromone micro-encapsulated and then formulated and introduced into biodegradable balls, applied with a compressed air gun on pine trees).
Studies investigating effects on short- medium and long-term period, reprotoxicity, metabolism, neurotoxicity, immunotoxicity are not required since they are not triggered by a significant exposure potential and/or concerns related to human health toxicity.

3.13.3 Review of scientific open literature : Mammalians

No systematic review was provided by the applicant.
FR-CA performed a literature search in June 2020 to identify potentially relevant information published using the SCOPUS database (https://www.scopus.com) and the following search terms were used:

("(Z)-13-hexadecen-11-yn-1-yl acetate" OR "SCLP" OR "Straight Chain Lepidopteran Pheromones" OR "78617-58-0" OR "C(#CC=CCC)CCCCCCCCCCOC(=O)(C)")
And
(endocrin* OR hormone* OR disrupt* OR endocrine AND activity OR estrog* OR androgen* OR thyro* OR steroido* OR endocrine AND gland* OR reproduct* OR teratog* OR malformation* OR developmental* OR hyperplasia* OR tumor OR tumour OR cancer)

15 results were obtained (see reference list).
No relevant publication for the potential endocrine disrupting properties of the active substance in mammalians have been identified.
No additional data on potential ED properties of (Z)-13-hexadecen-11-yn-1-yl acetate was thus found.

In the framework of SCLPs renewal under PPP Regulation (EU) 1107/2009, a literature search was conducted to identify their potential endocrine disrupting properties and no relevant studies were identified.

3.13.4 ED Assessment for Humans

- **Lines of evidence for adverse effects and endocrine activity related to EATS-modalities**

There are no available guideline studies that have investigated the effects of (Z)-13-hexadecen-11-yn-1-yl acetate on EATS-mediated parameters in mammals and no relevant and reliable studies have been identified in the published scientific literature.

With regards to the SCLPs adversity for human health, the limited data package reflects the reduced data requirement applicable for these semiochemicals. In the unique 28 day-repeated dose toxicity study available for SCLPs (see section 3.5.4), the adverse effects observed are only related to target organ and systemic tocicity.

- **Identification of relevant scenario for the ED assessment of EATS modalities**

Semiochemicals may be exempted from being tested in several assays normally required for chemical active substances, according to exposure considerations and concerns related to human health.
Identifying a scenario according to the ED Guidance do not lead to a conclusion. Lack of investigations of (Z)-13-hexadecen-11-yn-1-yl acetate endpoints related to both ED adversity and activity since exemptions in data requirements apply for semiochemicals.

Scenario 2a (iii) of the ED Guidance is the only one applicable for (Z)-13-hexadecen-11-yn-1-yl acetate. However, this scenario would lead to the generation of level 2 and level 3 information that is considered nor necessary or proportionate for naturally occurring substances used at concentrations not significantly above the background level, and for which human health concerns are not expected.

3.13.5 Conclusion

The possibility of waiving the testing for ED properties of (Z)-13-hexadecen-11-yn-1-yl acetate is based on the following:

Natural occurrence: The (13Z)-Hexadec-13-en-11-yn-1 acetate is the pheromone naturally produced by the *Thaumetopoea pityocampa* female moth. The substance presents a low toxicity profile which has not been tested for short- and long-term toxicity, and reproductive effects.

Non-endocrine Disruption mode of action: The (Z)-13-hexadecen-11-yn-1-yl acetate has a non-toxic mode of action based on mating disruption of *Thaumetopoea pityocampa* moth which relies on olfactory signals to find the location of conspecific females to mate.

Negligible exposure: The levels of human exposure to the substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate are considered to be very low regarding to the intended use and the specific mode of application.

No endocrine activity/adversity: No information indicating a potential concern for (13Z)-Hexadec-13-en-11-yn-1-yl acetate endocrine disrupting activity has been retrieved from the available data sources. No endocrine effects on humans are expected.

Considering the above points, the eCA proposes that no further investigations, accordingly to the ECHA/EFSA Guidance on ED assessment, are scientifically necessary to elucidate the ED potential of the (13Z)-Hexadec-13-en-11-yn-1-yl acetate.
Indeed according to the above-mentioned guidance, "*there may be cases in which due to the knowledge on the physico-chemical and (eco)toxicological properties of the substance an ED assessment does not appear scientifically necessary or testing for this purpose not technically possible.*"

The applicability of such a waiving has been endorsed at EFSA in the framework of SCLPs renewal under PPP Regulation (EU) 1107/2009. In this context, it has also been demonstrated that SCLPs' chemical structure is strictly close to that of components involved in the fatty acids metabolism. SCLPs are likely to be incorporated into normal metabolism, deriving non-toxic metabolites, fatty acids, which constitute a significant and essential part of the normal diet.

The active substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate shares important structural similarities with the SCLPs family. Indeed, the common structural definition of a SCLP substance is "unbranched aliphatic having a chain of nine to eighteen carbons, containing up to three double bonds, and ending in an alcohol, acetate or aldehyde functional group" (SANCO/5272/2009). Besides the presence of a triple bond, the (13Z)-Hexadec-13-en-11-yn-1-yl acetate meets the common structural definition of a SCLP substance.

Consequently, the conclusion on metabolism of SCLP substances might be applicable to the (13Z)-Hexadec-13-en-11-yn-1-yl acetate, knowing that no demonstration has been done.

Conclusion used in Risk Assessment – Endocrine disruption	
Conclusion	No effect on the endocrine system is expected for the active substance.
Justification for the conclusion	See above justification.

3.14 FURTHER HUMAN DATA

Conclusion used in Risk Assessment – Further human data	
Conclusion	No further human data are available.
Justification for the conclusion	NA

3.15 OTHER DATA

Conclusion used in Risk Assessment – Other data	
Conclusion	No further data are available.
Justification for the conclusion	NA

4 ENVIRONMENTAL EFFECTS ASSESSMENT

At the time of the finalisation of the CAR, no harmonised guidance for the environmental assessment of pheromones was available under the BPR. The most recent guidance document on this subject for biocides is the Guidance for Waiving of Data Requirements for Pheromones for Inclusion in Annex I/IA of Directive 98/8/EC, applied under the Biocides Directive. The guidance document was mainly based on the OECD Monograph 12, 2001 which has been replaced by the Guidance documents on semiochemical active substance and plant protection products (2016 and Document 93 of 2018). In this CAR, the requirements and assessment for Biocides pheromones substances was based on these Pheromone specific PPP Guidances.

The proposed assessment takes into consideration the inherent differences between pheromones and conventional chemical biocides. Experience from the Plant Protection Products, based on environmental and health studies, has demonstrated that pheromones may provide effective pest control at low volumes, and at minimal risk. In this context, core data requirements may be reduced for pheromone based on their nature (physico-chemical properties) and their low exposure.

As detailed in the assessment, a very limited exposure is foreseen for the active substance, linked to its specific use and pheromone-specific physico-chemical properties. Therefore, a waiving of some core data has been applied and was agreed in WG-IV-2021 for this specific pheromone case.

4.1 FATE AND DISTRIBUTION IN THE ENVIRONMENT

4.1.1 Degradation

4.1.1.1 Abiotic degradation

Hydrolysis

Since no information was provided on hydrolytic properties of the active substance, an evaluation was conducted using the EPISuite™ program developed by the US Environmental Protection Agency (EPA).

The Aqueous Hydrolysis Rate Program (HYDROWIN v2.0) estimates aqueous hydrolysis rate constants for the following chemical classes: esters, carbamates, epoxides, halomethanes, selected alkyl halides and phosphorus esters. The software requires only a chemical structure, entered by SMILES (Simplified Molecular Input Line Entry System) notations.
Active substance SMILES: C(#CC=CCC)CCCCCCCCCCOC(=O)(C)).

The results of the simulation are gathered in the table below:

Summary table - Hydrolysis						
Method, Guideline, GLP status, Reliability, Key/supportive study	**pH**	**Temp. [°C]**	**Total Kb (catalysed rate, L/mol-sec)**	**Kb Half-life, DT50**	**Fragments**	**Reference**
HYDROWIN (QSAR from EPISUITE)	8	25°C	4.568E-02	175.623 days	Ester: R1-C(=O)-O-R2 With: R1: -CH_3 R2: n-Octyl-*	Pauriche (2017a) Report M2iD-FAI-2017-04 V01 EPISuite.
	7	25°C		4.808 years		

*Fragment not represented in the training set, substitute(s) have been used.

Currently there is no accepted definition of model domain for HYDROWIN program. However, aqueous hydrolysis estimates are less accurate for compounds that have a functional group(s) or other structural features not represented in the training set. This is the case for the active substance (fragments indicated with *). However, as the model predicts that the substance is stable to hydrolysis, it is a worst-case that can be accepted in the risk assessment.

Value used in Risk Assessment	
Value/conclusion	The substance is considered stable to hydroysis.
Justification for the value/conclusion	-

Phototransformation in water

Data waiving	
Information requirement	Study scientifically not necessary.
Justification	Due to its UV/VIS absorption spectrum (220 nm for UVs) its susceptibility for photolytic breakdown can be considered as low. Therefore, no phototransformation in water is expected.

Estimated photo-oxidation in air

The Atmospheric Oxidation Program for Microsoft Windows (AOPWIN v1.92) estimates the rate constant for the atmospheric gas-phase reaction between photochemically produced hydroxyl (OH) radicals and organic chemicals. It also determines the rate constant for the gas-phase reaction between ozone and olefinic/acetylenic compounds. The calculated rate constants are then used to calculate atmospheric half-lives for organic compounds based upon average atmospheric concentrations of hydroxyl radicals and ozone.
The AOPWIN program allows the user to select the time frame (12 or 24 hours) and the atmospheric concentration of OH radicals and ozone. The model default OH radical concentration of 1.5×10^6 molecules (radicals)/cm^3 is the average global concentration across a 12 hour period of daylight based on literature data. It was noted that the Volume IV Part B+C recommends to use a lower OH radical concentration of 5×10^5 radicals/cm^3. This lower value is the seasonally and diurnally 24-hour averaged OH radical concentration estimated for the northern hemisphere, and takes into account that OH radicals are only formed photochemically during daylight hours.
Structures are entered into AOPWIN by SMILES (Simplified Molecular Input Line Entry System) notation.
Active substance SMILES: C(#CC=CCC)CCCCCCCCCCOC(=O)(C)).

The results of the simulation are gathered in the table below:

Summary table – Photo-oxidation in air					
Model	**Estimated daily (12h) OH concentration [OH/cm³]**	**Overall OH rate constant [cm³/molecule-sec]**	**Half-life [hr]**	**Remarks**	**Reference**
AOPWIN (QSAR from EPISUITE) Cis-isomer	5E+05	111.7048E-12	3.5	Radicals estimated : - Hydrogen abstraction - Triple bonds - Olefinic bonds (cis, trans)	Ii 10.3.1 / 01 Pauriche (2017) Report M2iD-FAI-2017-04 V02 Episuite
AOPWIN (QSAR from EPISUITE) Trans-isomer	5E+05	121.5848E-12	3.2		Ii 10.3.1 / 01 Pauriche (2017) Report M2iD-FAI-2017-04 V02 Episuite

Value used in Risk Assessment	
Value/conclusion	No persistence in the air is expected.
Justification for the value/conclusion	Half-life is very short, so once the pheromone is in the air the phototransformation is very fast.

4.1.1.2 Biotic degradation

4.1.1.2.1 Biodegradability (ready/inherent)

Since no information was provided on biotic degradation of the active substance, an evaluation was conducted to estimate the biodegradation properties of this chemical using the EPISuite™ program developed by the US Environmental Protection Agency (EPA) and recommended in the R.11 : PBT/vPvB assessment guidance (2017).
Therefore, to fully demonstrate that the use of a (Q)SAR simulation is relevant for this section:

- the different models are briefly presented,
- subsequently, it is demonstrated that the active substance is in the applicability domain of these models,
- finally, results from EPISuite™ software are provided and discussed.

a- Information on the (Q)SAR model of BIOWIN

BIOWIN (v 4.10) estimates the probability of rapid aerobic and anaerobic biodegradation of an organic compound in the presence of mixed populations of environmental microorganisms. The program contains seven separate models as follows:

- Biowin 1 (linear probability model) and 2 (nonlinear probability model) give a general indication of biodegradability under aerobic conditions, but not for any particular medium. The models, based on linear and nonlinear regressions, respectively, calculate the probability of rapid biodegradation and can be used to classify compounds as rapidly or not rapidly biodegradable.
- Biowin 3 and 4 (expert survey ultimate biodegradation models) yield a rating for "ultimate" degradation (*i.e.* complete degradation to carbon dioxide, water and other oxidized products) and "primary" degradation (*i.e.* initial degradation to a primary metabolite) in a typical aquatic environment. The ratings are semi-quantitative and give an indication of whether the DT_{50} values are likely to be hours, days, weeks, months or longer. This allows semi-quantitative prediction of primary and ultimate biodegradation rates using multiple linear regression.
- Biowin 5 (MITI linear model) and 6 (MITI nonlinear model) are predictive models for assessing a compound's biodegradability in the Japanese MITI (Ministry of International Trade and Industry) ready biodegradation test (OECD 301C). These models use an approach similar to the one used to develop Biowin 1 and 2.
- Biowin 7 (anaerobic biodegradation model) predicts the probability of rapid degradation in the "serum bottle" anaerobic biodegradation screening test.

  Structures are entered into BIOWIN by SMILES (Simplified Molecular Information and Line Entry System) notations.
  Active substance smile: (C(#CC=CCC)CCCCCCCCCCOC(=O)(C)).

b- Information on the applicability domain

- General applicability domain (chemical classes)

The intended application domain of EPISuite™ is organic chemicals. Inorganic and organometallic chemicals generally are outside the domain. As the pheromone is an organic substance, it is in the chemical domain of BIOWIN.

- Descriptor domain

The active substance must have a molecular weight in the range of the compounds in the training set (i.e. between 30.02 and 959.2 g/mol according to the appendix D of the BIOWIN models). This is the case for the (Z)-13-hexadecen-11-yn-1-yl acetate (278.43 g/mol).

- Structural fragment domain

The number of each fragment found in the active substance must not exceed the maximum number of this fragment that occurs in any individual compound of the training set. The table below allows checking this parameter.

Moreover, the fraction of compounds in the training set containing each of the fragment modelised has been added. It demonstrates that the fragments of the active substance are found in a lot of substances of the training set and therefore, the models have sufficient data about each fragment assessed.

	Active substance fragment type	Fraction of compounds in the training set containing this fragment: Representativeness of the fragment in the training set	Active substance number of fragment	Maximum fragment per compounds of the training set	Validation criteria met
BIOWIN 1 / 2	Linear C4 terminal chain [CCC-CH_3]	44/295 : good	1	3	Yes
	Ester [-C(=O)-O-C]	23/295 : good	1	3	
BIOWIN 3 / 4	Linear C4 terminal chain [CCC-CH_3]	26/200 : good	1	3	Yes
	Ester [-C(=O)-O-C]	25/200 : good	1	4	
BIOWIN 5 / 6	Ester [-C(=O)-O-C] x1	46/589 : good	1	3	Yes
	Methyl [CH_3]	295/589 : good	2	9	
	-CH2- [linear]	214/589 : good	11	51	
	-C=CH [alkenyl hydrogen]	68/589 : good	2	9	
BIOWIN 7	Linear C4 terminal chain [CCC-CH_3]	41/169 : good	1	3	Yes

	Ester [-C(=O)-O-C]	13/169 : good	1	3	
	Methyl [CH_3]	86/169 : good	2	4	
	-CH2- [linear]	67/169 : good	11	44	
	-C=CH [alkenyl hydrogen]	15/169 : good	2	11	

Biowin 1, Biowin 2, Biowin 3 and Biowin 4 do not correctly model the molecule since only two radicals are taken into account. On the other hand, Biowin 5, Biowin 6 and Biowin 7 describe the molecule well even if the triple bond is not taken into account.
As the validation criteria are met for the other fragments, the (Q)SARs simulation has been carried out and the results are gathered in the table below:

Summary table -Biodegradability			
Method	**Biodegradability Value**	**Associated prediction (time before biodegradation)**	**Ref**
BIOWIN 3 : Ultimate Biodegradability (QSAR from EPISUITE)	3.02	Weeks	Pauriche (2017a) Report M2iD-FAI-2017-04 V01 Episuite
BIOWIN 4 : Primary Biodegradability (QSAR from EPISUITE)	3.94	Days	
Method	**Probability of rapid biodegradation (%)**	**Associated Prediction**	
BIOWIN 1 (QSAR from EPISUITE)	0.8976	Biodegrades fast	
BIOWIN 2 (QSAR from EPISUITE)	0.9932	Biodegrades fast	
BIOWIN 5 (QSAR from EPISUITE)	0.7843	Readily Degradable	
BIOWIN 6 (QSAR from EPISUITE)	0.8525	Readily Degradable	
BIOWIN 7 (QSAR from EPISUITE)	0.6699	Biodegrades Fast	

Final prediction		
Ready biodegradability prediction	**Yes**	

Value used in Risk Assessment	
Value/conclusion	The substance is readily biodegradable according to BIOWIN simulations. However, during WG-IV-2021, it was reminded that an experimental data was necessary to prove that the substance is readily biodegradable. Therefore, the BIOWIN simulations were only used to define the substance as not P nor vP in a WoE approach presented below and the substance is considered as not readily biodegradable
Justification for the value/conclusion	Biowin 1, Biowin 2, Biowin 3 and Biowin 4 do not correctly model the molecule since only two radicals are taken into account. On the other hand, Biowin 5, Biowin 6 and Biowin 7 describe the molecule better even if the triple bond is not taken into account. According to an expert opinion, practice shows that Biowin 7 is not relevant and will therefore not be used in the risk assessment. The result "readily biodegrable" obtain from BIOWIN 5 and 6 is solid and corresponds well to what would be expected from the structure.

WoE approach presented and agreed during the WG-IV-2021 for the P/vP criterion:

In the R11 document (2017), it is stated that QSAR predictions can be used as part of a weight of evidence approach to conclude on the P/vP criteria of the substance. Therefore, a Woe approach was built, based on:

- The Nature of the active substance:

The substance is a pheromone, a substance generally assumed to dissipate rapidly in the environment, primarily by volatilization[3] and degradation, and this is partly because persistence is counterproductive to a communication signal received by and olfactory system. In the main compartment of emission, the atmosphere, the DT50 is very low (3.5 hours). Although there are no P threshold for the photodegradation, this value support a fast dissipation of the substance in the environment. In general, for pheromones from PPP regulation, it is even necessary to add an antioxidant to the formulation to prevent the substance from a very rapid degradation. This is also the case for the active substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate, as the specifications contain Tocopherol, an antioxidant.

- Ready Biodegradability tests for other Acetate pheromones:

[3] The vapour pressure value of the pheromone (1.2E-03 Pa) is within the range of values found for SCLPs, which are considered volatile. Moreover, the product operates by volatilisation of the active substance and as efficacy was proven in the field, the substance must have been volatilized into the air.

Experimental studies on other acetate pheromones, very similar to the (13Z)-Hexadec-13-en-11-yn-1-yl acetate, are available and indicate that they are readily biodegradable.

- On Z-9-dodecenyl acetate[4] (Figure 3: Z-9-dodecenyl acetate structural formula Molecular formula: **C14H26O2**, Conclusion of the peer review of the Pesticide risk assessment of the active substance SCLPs. Appendix B – List of endpoint for the active substance and the representative formulation). This test is the reference for all SCLP acetate pheromones. The carbon chain (C14) is lower than for the active substance (C18); however, a biocidal substance with an intermediate carbon chain length (ZE-TDA, C16) leads to the same conclusion.
- On (Z,E)-Tetradeca-9,12-dienyl acetate (Figure 4: (Z,E)-Tetradeca-9,12-dienyl acetate (ZE-TDA) structural formula Molecular formula**: C16H28O2**, ZE-TDA, CAR, 2010).

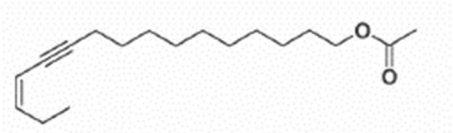


Figure 2: (13Z)-Hexadec-13-en-11-yn-1-yl acetate structural formula.
Molecular formula: **$C_{18}H_{30}O_2$**

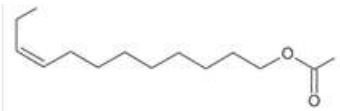


Figure 3: Z-9-dodecenyl acetate structural formula
Molecular formula: **$C_{14}H_{26}O_2$**

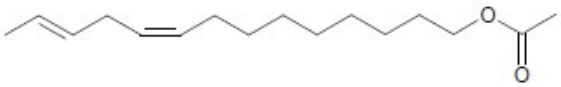


Figure 4: (Z,E)-Tetradeca-9,12-dienyl acetate (ZE-TDA) structural formula
Molecular formula**: $C_{16}H_{28}O_2$**

The 10 days window is not fulfilled for ZE-TDA (IIA, 2010). For the Z-9-dodecenyl acetate, the EFSA conclusion (Conclusion of the peer review of the Pesticide risk assessment of the active substance SCLPs. Appendix B – List of endpoint for the active substance and the representative formulation) defined the substance as readily biodegradable but does not mention that the 10-days windows is fulfilled or not.
However, according to the R11, it is not necessary to fulfil the 10 days window criterion to consider that the substance is not P nor vP. Therefore, these two tests show at least that these SCLP acetate are not persistent.

- QSAR data:

A QSAR simulation with EPISUITE BIOWIN, a software already used for potentially problematic substances, has been conducted on (13Z)-Hexadec-13-en-11-yn-1-yl (see section 4.1.1.2 – of this document). The result of the simulation is Readily Biodegradable.

Other simulations were also conducted on:

[4] Determination of the Biodegradability in the CO2-Evolution Test, Unpublished. Schwarz H. (2008a).

- Z-9-dodecenyl acetate (Figure 3: Z-9-dodecenyl acetate structural formula Molecular formula: **C14H26O2**),
- ZE-TDA (Figure 4: (Z,E)-Tetradeca-9,12-dienyl acetate (ZE-TDA) structural formula
  Molecular formula**: C16H28O2**),
- A substance with the same SMILE than the (13Z)-Hexadec-13-en-11-yn-1-yl, with two additional carbon atoms in the aliphatic chain. This simulation was used to show that the addition of 2 carbons in the chain does not change the result.

For all these substances, very similar results were obtained with models BIOWIN 2, 3 and 6 especially, according to the R11 guidance (see the table below).

Summary table - Biodegradability					
Method	**Substances**	**Number of carbons**	**Biodegradability Value**	**Associated prediction (time before biodegradation)**	
BIOWIN 3 : Ultimate Biodegradability (QSAR from EPISUITE)	(13Z)-Hexadec-13-en-11-yn-1-yl acetate **+2C***	20	2.9604	Weeks	
	(13Z)-Hexadec-13-en-11-yn-1-yl acetate	18	3.0224	Weeks	
	ZETDA	16	3.0799	Weeks	
	Z-9-dodecenyl acetate	14	3.1375	Weeks	
Method	**Substances**	**Number of carbons**	**Probability of rapid biodegradation (%)**	**Associated Prediction**	
BIOWIN 2 (QSAR from EPISUITE)	(13Z)-Hexadec-13-en-11-yn-1-yl acetate **+2C***	20	0.9898	Biodegrades fast	
	(13Z)-Hexadec-13-en-11-yn-1-yl acetate	18	0.9932	Biodegrades fast	

	ZETDA	16	0.9953	Biodegrades fast	
	Z-9-dodecenyl acetate	14	0.9967	Biodegrades fast	
BIOWIN 6 (QSAR from EPISUITE)	(13Z)-Hexadec-13-en-11-yn-1-yl acetate **+2C***	20	0.8585	Readily Degradable	
	(13Z)-Hexadec-13-en-11-yn-1-yl acetate	18	0.8525	Readily Degradable	
	ZETDA	16	0.8460	Readily Degradable	
	Z-9-dodecenyl acetate	14	0.9167	Readily Degradable	
Final prediction for <u>all substances</u>					
Ready biodegradability prediction	**Yes**				

***(13Z)-Hexadec-13-en-11-yn-1-yl acetate with two additional carbons in the aliphatic chain.

<u>Conclusion of the WoE approach:</u>

From all these arguments, it was agreed during the WG-IV-2021 that the (13Z)-Hexadec-13-en-11-yn-1-yl pheromone does not fulfill the P nor the vP criteria. To complete the approach, data on other SCLP pheromones were collected from the latest assessment of SCLP (PPP RAR, 2021) below.

- Data on other SCLP pheromone types

In the SCLP RAR (2021), it is indicated that when the exposure route is by the vapour phase only (i.e non-retrievable dispensers 2A), ([…] and where the exposure caused by the use of the plant protection product is similar to natural exposure level, the risk characterization is limited to physico chemical properties, the analytical methods and the efficacy of the product. Therefore, all endpoints for fate and behaviour in soil can be waived.
Due to their mode of application, no data on degradation were required for most SCLPs. However, the SCLPs applicants submitted additional information which indicate that SCLPs rapidly dissipate in soil and water *via* volatilisation and are not expected to persist in the environment:

- A dissipation study[5] on gossyplure (a racemate of Z,Z and Z,E 7,11-hexadecadien-1-ol acetate, Figure 5: (Z,E)-7,11-hexadecadien-1-yl acetate and Figure 6: (Z,Z)-7,11-hexadecadien-1-yl acetate) at 32°C shows that its DT50 was 24 hours in soil and 7 days in water.

[5] Environmental fate of gossyplure, *Environmental Entomology*, 6 821-822. Henson, R. D., 1977.

- An OECD 301F[6] study on Z-11-Hexadecenal (Figure 7: (Z)-11-hexadecenal, extrapolated across to all aldehyde SCLP indicates that the substance is not readily biodegradable but significant degradation occurred (10% of degradation reached at day 2, 43% at the end of the 10-day window and 55% biodegradation after 28 days). Moreoever, in a dissipation study[7], the DT50 of (Z)-9-tetradecenal (Figure 8: (Z)-9-Tetradecenal) and (Z)-11-hexadecenal were reported to be 29 and 50 hours, respectively, in moistened soil (22°C), and 30 and 90 hours in water (24°C).

For SCLP, data on degradation were only required if the claimed use could lead to non-negligible exposure such as uses in spray. Therefore, several studies were submitted and accepted on one alcohol SCLP, E,E-8,10-dodecadien-1-ol (Figure 9: (E,E)-8,10-dodecadien-1-ol) for which a use in spray was claimed:

- An OECD 301B[8] study on ready biodegradation extrapolated across to all SCLP alcohols showed that the substance is readily biodegradable,
- An OECD 308[9] study (2 water/sediment systems at 20°C in the dark) permited to calculate a geometric mean whole system DT50 of 0.13 days for parent compound,
- An OECD 307[10] study (4 soils at 20°C in the dark), reliable with minor deviations, has been carried out and very fast dissipation of the active ingredient has been observed.

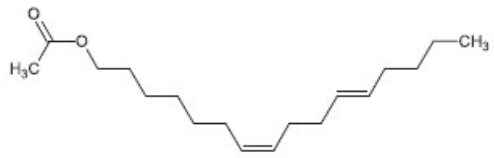


Figure 5: (Z,E)-7,11-hexadecadien-1-yl acetate

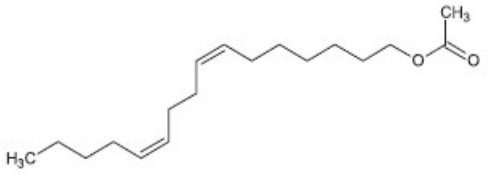


Figure 6: (Z,Z)-7,11-hexadecadien-1-yl acetate

6 Z-11-Hexadecenal: Ready Biodegradability in a Manometric Respiratory Test, Ibacon GmbH, Report No. 116801163, year 2016. Unpublished. Hammesfahr U. (2016)

7 Environmental fate of (Z)-11-Hexadecenal and (Z)-9-Tetradecenal, Components of a Sex Pheromone of the Tobacco Budworm, *Environmental Entomology*, 12, 1802-1804, Shaver, T.N, 1983

8 RAK 3 (BAS 285 1, Reg.No. 288873) Determination of the Biodegradability in the CO2-Evolution Test, Unpublished. Shwarz. (2008b)

9 Codlemone Aerobic Degradation and Metabolism in two water/sediment System. Eurofins Agroscience Service EcoChem GmbH. Laboratory study code: S17-06082, Year 2018. Unpublished. Schwarzkopf, A. (2018).

10 Codlemone Aerobic Degradation and Metabolism in Four Soils at 20°C in the dark. Eurofins Agroscien Service EcoChem GmbH. Laboratory study code: S17-06081, Year 2018. Unpublished. Kattwinkel, H., 2018a.

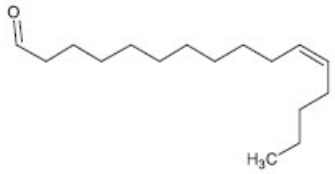


Figure 7: (Z)-11-hexadecenal

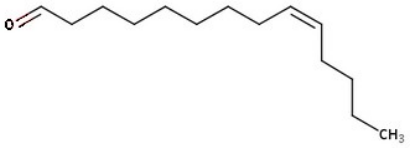


Figure 8: (Z)-9-Tetradecenal

Figure 9: (E,E)-8,10-dodecadien-1-ol

All this supportive information indicates that pheromones are not persistent in the environment and supports the WoE approach built for Acetate Pheromones.

4.1.1.3 Rate and route of degradation including identification of metabolites and degradation products

4.1.1.3.1 Biological sewage treatment

Aerobic and anaerobic biodegradation

Data waiving	
Information requirement	Study scientifically not necessary.
Justification	Not performed (negligible exposure, see Environmental exposure assessment section).

STP simulation test

Data waiving	
Information requirement	Study scientifically not necessary.
Justification	Not performed (negligible exposure, see Environmental exposure assessment section).

Water/sediment degradation test

Value used in Risk Assessment	
Value/conclusion	No experimental data available. Therefore, a very worst case value of 1E06 days has been used in the exposure assessment. Concerning the P criterion, a WoE is described in the section 4.1.1.2.1.
Justification for the value/conclusion	Degradation studies are not scientifically necessary as pheromones are non-stable substances that dissipates rapidly in the environment mainly by volatilization and fast air degradation. Experimental data and QSARs on SCLPs, as well as QSARs data on a.s. support this point (see 4.1.1.2.1). Moreover, the same specific waiving approach as for core data has been applied to this substance considering its pheromone-specific physico-chemical properties and the very limited exposure of the aquatic compartment (see the beginning to this 4. Section)

4.1.1.3.2 Biodegradation in seawater

Data waiving	
Information requirement	Biodegradation in seawater.
Justification	Not performed (no exposure according to intended uses).

4.1.1.3.3 Higher tier degradation studies in water or sediment

No data was submitted

4.1.1.3.4 Biodegradation during manure storage

Data waiving	
Information requirement	Effects on biodegradation during manure storage.
Justification	Not performed (no exposure according to intended uses).

4.1.1.3.5 Biotic degradation in soil

4.1.1.3.5.1 Laboratory soil degradation studies

Aerobic biodegradation

Value used in Risk Assessment	
Value/conclusion	No experimental data available. Therefore, a very worst case value of 1E06 days has been used in the exposure assessment. Concerning the P criterion, a WoE is described in the section 4.1.1.2.1.
Justification for the value/conclusion	Degradation studies are not scientifically necessary as pheromones are non-stable substances that dissipates rapidly in the environment mainly by volatilization and fast air degradation. Experimental data and QSARs on SCLPs, as well as QSARs data on a.s. support this point (see 4.1.1.2.1). Moreover, the same specific waiving approach as for core data has been applied to this substance, considering its pheromone-specific physico-chemical properties and the very limited exposure of the soil compartment (see the beginning to this 4. Section)

4.1.1.3.5.2 Higher tier degradation studies in soil

No data was submitted.

4.1.2 Distribution

4.1.2.1 Adsorption /desorption from soils

As no data was provided by the applicant, an evaluation was conducted to estimate the sorption properties of this chemical using the EPISuite™ program developed by the US Environmental Protection Agency (EPA).
Therefore, to fully demonstrate that the use of a (Q)SAR simulation is relevant for this section:

- the different models are briefly presented,
- subsequently, it is demonstrated that the active substance is in the applicability of the models,
- finally, results from EPISuite software are provided and discussed.

a- Information on the (Q)SAR models of KOCWIN

The Soil Adsorption Coefficient Program (KOCWIN v2.00) estimates the soil adsorption coefficient (Koc) of organic compounds. Two Koc values are presented, one determined using the MCI (first-order molecular connectivity index) method and one estimated from the log Kow (log P).

Structures are entered into KOCWIN by SMILES (Simplified Molecular Input Line Entry System) notations.

Active substance SMILE: (C(#CC=CCC)CCCCCCCCCCOC(=O)(C)).

b- Information on the applicability domain

- General applicability domain (chemical classes)

The intended application domain of EPI Suite™ is organic chemicals. Inorganic and organometallic chemicals generally are outside the domain. As the pheromone is an organic substance, it is in the chemical domain of KOCWIN.

- Descriptor domain

The active substance must have a molecular weight in the range of the compounds in the training set i.e. between 32.04 and 665.02 g/mol according to the Accuracy & Domain appendix of the KOCWIN models. This is the case for the (Z)-13-hexadecen-11-yn-1-yl acetate (278.43 g/mol).

- Structural domain of corrected fragment

The number of each corrected fragment found in the active substance must not exceed the maximum number of this fragment that occurs in any individual compound of the training set. The table below allows checking this parameter.

Moreover, the fraction of compounds in the training set containing each of the corrected fragment modelised has been added. It demonstrates that the fragments of the active substance are found in a lot of substance of the training set and therefore, the models have sufficient data about each fragment assessed.

	Active substance corrected fragment	Fraction of compounds in the training set containing this fragment = Representativeness of the fragment in the training set	Active substance number of fragment	Maximum fragment per compounds of the training set	Validation criteria met
MCI	Ester [-C(=O)-O-C]	50/447: good	1	2	Yes
Estimation from Log Kow	Ester [-C(=O)-O-C]	50/447: good	1	2	Yes

As the validation criteria are met, the (Q)SARs simulation has been carried out and the results are gathered in the table below:

Summary table - Adsorption /desorption					
Method, Guideline, GLP status, Reliability	**Model**	**Log Koc**	**Koc (L/kg)**	**Remarks**	**Reference**
KOCWIN (QSAR from EPISUITE)	Molecular Connectivity Index (MCI)	4.3960	2.489E+04	-	M2ID-FAI-2018-14-V01 QSAR Fate and distribution in the environment.pdf
	Estimation from measured log Kow **(=3.74)**	2.9282	847.6E+00		

Value used in Risk Assessment	
Value/conclusion	No experimental data is available, the Koc value used for the risk assessment is derived from KOCWIN QSAR simulation and is 847.6 L/kg.
Justification for the value/conclusion	Waiving of core data: As mentioned in 4., the waiving of core data has been applied for this specific substance, due to its very limited exposure and to physico-chemical properties of pheromones. The rapid volatilisation, unstability and air degradation of the active substance, its highly species-specific mode of action and its negligible exposure implies that the data requirement on adsorption can be waived. For completeness, *in silico* data were generated to determine a Koc value. Choice of the QSAR value: The pheromone falls into the domain of applicability of the two KOCWIN models. According to an expert opinion, the first-order molecular connectivity index (MCI) is a topological index encoding the size of molecules, its discriminating power is therefore low. The value estimated from the measured log Kow (=3.74) should be preferred and used in the risk assessment. However, for future submissions of authorization dossiers for products containing this active substance, if another use leading to environmental exposure is proposed, the concerned applicant will have to provide a Koc study at that time.

4.1.2.2 Higher tier soil adsorption studies

4.1.3 Bioaccumulation

Measured aquatic bioconcentration

No data was submitted.

Estimated aquatic bioconcentration

Since no information was provided on aquatic bioconcentration properties of the active substance, two values were estimated:
- Using the equation 93 from the Vol IV Part B+C (2017),
- Using the EPISuite™ BCFBAF program developed by the US Environmental Protection Agency (EPA).

To fully demonstrate that the use of a (Q)SAR simulation is relevant for this section:
- the model is briefly presented,
- subsequently, it is demonstrated that the active substance is in the applicability of the model,
- finally, results from EPISuite software are provided and discussed.

a- Information on the (Q)SAR model BCFBAF

The BCFBAF program (v3.01) estimates BCF of an organic compound using the compound's log octanol-water partition coefficient (Kow). For compounds presenting specific fragment (ketone, phenantrene ring…), corresponding additional correction factors have to be taken into account in the prediction.
BCFBAF also includes estimation of the Biotransformation Rate (kM) in fish and estimation of Bioaccumulation Factor (BAF) by the Arnot-Gobas method (Arnot and Gobas, 2003).

BCFBAF requires only a chemical structure to estimate BCF, BAF and kM. The experimental Log Kow of 3.74 was entered manually in BCFBAF program.

b- Information on the applicability domain

- General applicability domain (chemical classes)

The intended application domain of EPI Suite™ is organic chemicals. Inorganic and organometallic chemicals generally are outside the domain. As the pheromone is an organic substance, it is in the chemical domain of BCFBAF model.

- Descriptor domain

Currently there is no accepted definition of model domain. However, it has to be considered that biotransformation estimates are less accurate for compounds outside the Molecular weight and log Kow ranges of the training set compounds.

The table below compares the Molecular weight and Log Kow of the active substance to the compounds of the training set of BCFBAF model:

	Training set compounds range values	Active substance value
Molecular weight (g/mol)	68.08- 959.17	278.43
Log Kow	0.31-8.70	3.74

The active substance has a molecular weight and a Log Kow in the range of the compounds of the training set.

- Structural fragment domain

The number of each fragment found in the active substance must not exceed the maximum number of this fragment that occurs in any individual compound of the training set. The table below allows chechking this parameter.

Moreover, the fraction of compounds in the training set containing each of the fragment modelised has been added. It demonstrates that the fragments of the active substance are found in a lot of substance of the training set and therefore, the models have sufficient data about each fragment assessed.

	Active substance fragment type	Fraction of compounds in the training set containing this fragment = Representativeness	Active substance number of fragment	Maximum fragment per compounds of the training set	Validation criteria met

		of the fragment in the training set			
BCF Non-Ionic Correction Factors Used by BCFBAF	No applicable correction factor				
kM Biotransformation Fragments & Coefficient Values	Linear C4 terminal chain [CCC-CH_3]	43/421	1	3	Yes
	Ester [-C(=O)-O-C]	15/421	1	2	
	Methyl [CH_3]	170/421	2	12	
	-CH2- [linear]	109/421	11	28	
	-C=CH [alkenyl hydrogen]	34/421	2	6	

Unfortunately, no alkynyl carbon are included in the training set of BCFBAF models. Nevertheless, other fragments are covered by the software. As the validation criteria are met, the (Q)SARs simulation has been realized and the results are compared with the results of the equation 93 from the Vol IV Part B+C (2017), in the table below:

Summary table – Estimated aquatic bioconcentration					
Basis for estimation	**Log Kow (measured)**	**Estimated BCF for fish (freshwater) (L/kg)**	**Estimated BCF for upper trophic level fish (Arnot-Gobas model) (L/kg)**	**Remarks**	**Reference**
Calculations	3.74	301	-		Equation 93 from the Vol IV Part B+C (2017), Log BCF_{Fish} for substances with a Log Kow of 2-6
BCFBAF (QSAR from EPISUITE)	3.74	136.3 (regression based estimate)	Including biotransformation (upper trophic) : 52.03		M2ID-FAI-2018-14-V01 QSAR Fate and distribution in the environmen.pdf
			Without biotransformation (upper trophic) : 577.6		

Value used in Risk Assessment	
Value/conclusion	The value of bioaccumulation potential in fish (BCF) is 301 L/kg.
Justification for the value/conclusion	

According to the estimated log Kow = 3.74 (>3) (Vol IV Part B+C, 2017), there is a hazard for long-term adverse effects in the aquatic environment. However, based on information concerning degradation in air, accumulation of (13Z)-Hexadec-13-en-11-yn-1-yl acetate in aquatic compartment and biota is unlikely.

Measured terrestrial bioconcentration

No data was submitted.

Estimated terrestrial bioconcentration

Since no information was provided on terrestrial bioconcentration properties of the active substance, $BCF_{earthworms}$ was estimated using the equation 104d from the Vol IV Part B+C (2017).

Summary table – Estimated terrestrial bioconcentration				
Basis for estimation	**Log Kow (measured)**	**Estimated BCF for earthworms (L/kg)**	**Remark**	**Reference**
Calculations	3.74	7.67		Equation 104d from the Vol IV Part B+C (2017), Log $BCF_{earthworms}$

Value used in Risk Assessment	
Value/conclusion	The pheromone has not a bioaccumulation potential in earthworms, with an estimated BCF value of 7.67 L/kg.
Justification for the value/conclusion	

4.1.4 Monitoring data

No monitoring data available.

4.2 EFFECTS ON ENVIRONMENTAL ORGANISMS

4.2.1 Atmosphere

Emissions to air from biocidal uses are not relevant. Indeed, the pheromone degrades quickly in air due to the low DT50 value of 3.5h (maximum value).

4.2.2 Sewage treatment plant (STP)

Inhibition of microbial activity (aquatic)

Data waiving	
Information requirement	No scientifically necessary.
Justification	Waiving of core data: As mentioned in 4., the waiving of core data has been applied for this specific substance, due to its very limited exposure and to physico-chemical properties of pheromones. The rapid volatilisation, unstability and air degradation of the active substance, its highly species-specific mode of action and its very low exposure implies that the data requirement on microbial activity inhibition can be waived. However, for future submissions of application for authorization of products containing this active substance, if another use leading to urban environmental exposure is proposed, the concerned applicant will have to provide an ecotoxicity study on STP microorganisms at that stage.

4.2.3 Aquatic compartment

4.2.3.1 Freshwater compartment

Acute toxicity (freshwater)

Summary – Aquatic acute toxicity							
Method, Guideline, GLP status, Reliability	**Species**	**Endpoint**	**Exposure**		**Results**		**Reference**
			Design	**Duration**	**ValuesValues**		
Algae (growth inhibition)					**NOE$_r$C**	**E$_r$C$_{50}$[1]**	
OECD 201/ EPA OPPTS 850.5400 GLP, RI:1	Freshwater *Desmodesmus subspicatus*	Mean measured concentration 72h Growth rate	Static	Most sensitive period: 72h	Not derived	0.045 mg/L	II 9.1.3 (Servagean (2017) report 16-64-082-ES Freshwater algae, growth inhibition test with "Pheromone de la processionnaire du Pin"
[1]E$_r$C50 determined from the growth rate							

Value used in Risk Assessment	
Value/conclusion	E$_r$C50 = 0.045 mg/L (based on mean measured concentrations values of active substance)
Justification for the value/conclusion	Due to high adsorption of the test item, treatments were apparently reduced to less than 80% of the nominal value 6 hours after the treatment application. If the concentrations of the test substance vary more than 20% from nominal values during the test, the E$_r$C50 and NOEC values should be calculated with geometric mean of the substance concentrations. Therefore, the hazard values were based on mean measured concentrations. As the NOEC value is lower than the LOD, the E$_r$C50 has been preferred to calculate the PNEC and for classification purpose as it is calculated with higher and more reliable concentration values. In line with the Volume IV Part B+C (2017), when the active substance was not detected at the end of the exposure period, the final concentration was taken as the LOD.

Data waiving	
Information requirement	Acute toxicity on fish and aquatic invertebrates.
Justification	As presented in the argumentation below, algae seem to: - be more sensitive than fish to the active substance, - in an extreme worst-case, have a similar sensitivity than invertebrates to the active substance. Therefore, and considering that the exposure of non-target organisms is negligible (see Environmental exposure assessment section), FR CA assumes that the algae study is sufficient to assess the aquatic toxicity of the substance. Thus, acute study on fish and invertebrates were not performed in order to avoid unnecessary testing (especially on vertebrates). However, for future submissions of application for authorization of products containing this active substance, if another use leading to environmental exposure is proposed, the concerned applicant will have to provide at least one acute daphnia study at that stage. Considering that: - algae and daphnia have similar sensitivity to the active substance, - they are more sensitive than fish, - only data about acute toxicity was provided, ⇨ an AF of 1000 is considered to calculate the $PNEC_{surfacewater}$.

RELATIVE SENSITIVITY OF ALGAE, DAPHNIES AND FISH TO A.S

According to the evaluation documents of other lepidopteran pheromones of the Straight Chain Lepidopteran Pheromon group (SCLP, as ZE-TDA under the Biocides regulation, CAR of 2010 prepared by AT, or Full group of the SCLP under the Plant Protection Products regulation, RAR of 2008 currently under review but with the same conclusions, prepared by IT), these substances are considered to be toxic to aquatic organisms. This is demonstrated in a number of studies on algae, fish and daphnia presented in the SCLP PPP renewal assessment report (RAR) of 2021.
The common structural definition of a SCLP substance is "unbranched aliphatic having a chain of nine to eighteen carbons, containing up to three double bonds, and ending in an alcohol, acetate or aldehyde functional group" (SANCO/5272/2009). The active substance (13Z)-Hexadec-13-en-11-yn-1-yl presents an additional triple bond. However, (13Z)-Hexadec-13-en-11-yn-1-yl and SCLP substances share significant structural similarities as the active substance fully fulfills the other conditions of the definition.

In a weight of evidence approach, it will be demonstrated that the active substance has an aquatic ecotoxicity profile similar to the SCLPs ones. Then, a relative sensitivity of algae, fish and daphnia to this active substance will be estimated.

- MODE OF ACTION

As for most of the Lepidopteran pests SCLP based products, the active substance target is a moth with nocturnal habits. Males of those species are almost exclusively relying on olfactory cues to find the location of conspecific females to mate. Mating disruption technique takes advantage of this specific communication to control populations of the pest. The technique is made effective by releasing pheromone components of the species into the airborne, thus making much more difficult for the males to effectively find and mate suitable conspecific females. In consequence, the populations are dramatically reduced and the control of the pest is achieved.
This type of substance is known to be very target-specific and acts by modification of behavior of the target pest. They have a non-toxic target-specific mode of action and they are generally effective at very low rates.

The SCLPs and the active substance affect the behavior of insects in the same way, however, data at the receptor level for this pheromone are not available. It is therefore difficult to completely assume that the receptors induced by these substances are similar. Although the same mode of action could support a similar toxicity mechanisms, slight differences between substances cannot be excluded.

- ALGAE

The next table is a comparison of the algae ecotoxicy of the active substance and SCLP (PPP RAR of SCLP, 2021) completed with water solubility and Log Kow of each substances, significant parameters to take into account in aquatic ecotoxicity assessment.

	Substances	Water solubility (mg/L, 20°C)	Log Kow (exp)	Species	Test	Duration (h)	Values (ErC50, mg/L)	Ref
ALGAE	**Active substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate**							
	(Z)-13-hexadecen-11-yn-1-yl acetate	0.12	3.74	*Desmodesmus subspicatus*	OECD 201, semi-static	72	0.045, (mm)*	Servagean (2017) Freshwater algae, growth inhibition test
	SCLP Experimental studies							
	E,E-8,10-Dodecadien-1-ol	0.021	4.36	*Pseudokirchn. subcapitata*	OECD 201, static	72	0.75, (ini)**	SCLP RAR, Volume 3 B9 (2019) And SCLP RAR 27 Volume 3CP Check Mate CM-F B9 (2019)
				Scenedesmus subspicatus	OECD 201, static	72	0.221, (mm)**	
				Scenedesmus subspicatus	OECD 201, static	72	0.382, (n)**	
	Z-11-Hexadecenal	0.28	5.31 to 6.09	*Pseudokirchn. subcapitata*	OECD 201, static	72	0.187, (ini)**	
	Mixture CheckMate CM-F (14.4% w/w of (E,E)-8,10-dodecadienol)	(a.s.) 0.021	(a.s.) 4.36	*Pseudokirchneriella subcapitata*	OECD 201, static	72	3.61 mg formulation /L or 0.52 mg a.s./L(ini)**	

*see Justification for the value/conclusion of the algae test above.

** According to the PPP RAR of SCLP (2019) "Studies considered valid but with no reliable endpoints to be used in Tier 1 risk assessment, taking into account the results of the analytical measurements", see further explanation below.

ini: initial concentration

mm: mean measured concentration

n: nominal concentration

In all the algae studies of the SCLP PPP RAR (2021), the maintenance of the exposure concentrations during the tests was not demonstrated (indicated with **), since the tested substances were detected at the beginning of the tests but were below the LOQ or LOD at

the end of the tests. It is stated in the RAR that "The RMS believes that such studies should not be completely invalidated; however, the endpoints based on nominal, initial or mean measured concentrations derived from these studies should not be considered reliable for the use in Tier 1 risk assessment".

Moreover, in the 2021 SCLP RAR, the CheckMate CM-F product study was investigated in more detail. Indeed, it has been demonstrated that dissipation of the active substance of this product in the test is not faster than the one predicted in the field, according to a comparison of FOCUS SW profiles with measured concentrations from Check Mate CM-F algae toxicity study. It was concluded in the RAR that the endpoint obtained from this study expressed in initial measured concentration was acceptable for higher tier risk assessment purposes.

As all SCLP seem to present a similar behavior in the environment (moderate to high vapor pressure, low solubility, hydrophobicity…), it can therefore be extrapolated that they will all present a dissipation in the test not faster than the one predicted in the field. Therefore, FR CA assumes that all these studies (except the study on E,E-8,10- Dodecadien-1-ol because the ErC50 = 0.221 mg/L is a mean measured concentration) cannot be used to derive endpoint but enable to reveal a trend in the algae toxicity of the SCLP, even if the presented substances do not belong to the same chemical class. It also has to be noted that the SCLP group seems to have a homogenous algae toxicity.

Therefore, as:

- Most of the SCLPs E_rC50 values derived from studies on algae are based on initial or nominal concentrations (between 0.187 to 0.75 mg/L) and only one is based on mean measured concentrations (0.221 mg/L),
- (13Z)-Hexadec-13-en-11-yn-1-yl acetate presents an E_rC50 of 0.045 mg/L based on mean measured concentrations

⇨ It is not clear if the difference between SCLP and a.s E_rC50 is lower than a factor of 10 (non-significant), as it is between 4.1 and 16.6. However, these ratio are obtained with values not completely comparable, i.e values derived with mean measured concentrations and nominal or initial measured concentrations. When comparing endpoint of the a.s. and the E,E-8,10-Dodecadien-1-ol (both on mean measured concentrations), the ratio is less than 5 and therefore, it can be considered that SCLP and the active substance have a similar toxicity on algae.

❖ FISH

In the next table, aquatic hazard values determined in SCLP fish ecotoxicy studies and corresponding fish ecotoxicity QSAR (VEGA v1.1.4, 2017) are compared to check whether the software results sufficiently reflect the actual toxicity values.

Active substance fish toxicity prediction performed with VEGA is also added at the end of this table.

	Substances	Water solubility (mg/L, 20°C)	Log Kow (exp)	Species	Test	Duration (h)	Values (mg/L)	Ref
FISH	**SCLP Experimental studies**							
	E,Z-7,9-Dodecadien-1-yl acetate	0.67	5.61	*Oncorhynchus mykiss*	EPA 72-1, static	96	LC50 = 6.35#, (mm)	SCLP RAR, Volume 3 B9 (2021)
	Z-9-Dodencenyl acetate	0.14	6.36	Danio rerio	OECD 203, static	96	EC50 = 6.37, (mm)**	
	E,E-8,10-Dodecadien-1-ol	0.021	4.36	Danio rerio	OECD 203, Semi-Static	96	EC50 = 1.22, (mm)**	
	Mixture 5-decen-1-yl acetate (purity 84.2%); 5-decen-1-ol (purity 14.4%)	5-decen-1-yl acetate: 6 mg/L 5-decen-1-ol: 138 mg/L	4.95 (both substances)	Danio rerio	OECD 203, Semi-Static	96	EC50 = 1.089#, (mm)**	
	SCLP corresponding (Q)SARs results							
	Substances	Water solubility (mg/L, 20°C)	Log Kow (exp)	Duration	VEGA fish acute LC50, mg/L (classif, SarPy/IRFMN 1.0.2)		VEGA fish acute LC50, mg/L (toxicity model, KNN/Read/acrocc 1.0.0)	Ref
	E,Z-7,9-Dodecadien-1-yl acetate,	0.67	5.61	Acute	1-10 (reliability max)		2.1, (reliability max)	SCLP VEGA (Q)SAR report
	Z-9-Dodencenyl acetate	0.14	6.36	Acute	1-10 (reliability max)		5.34 (reliability max)	
	E,E-8,10-Dodecadien-1-ol	0.021	4.36	Acute	1-10 (reliability max)		3.06 (reliability max)	

	5-decen-1-yl acetate; 5-decen-1-ol	5-decen-1-yl acetate: 6 mg/L 5-decen-1-ol: 138 mg/L	4.95 (both substances)	Acute	1-10 (reliability max) 10-100 (reliability max)	3.31 (reliability max) 9.55 (reliability max)	
	Active substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate (Q)SARs results						
	Substances	Water solubility (mg/L, 20°C)	Log Kow (exp)	Duration	VEGA fish acute LC50, mg/L (classif, SarPy/IRFMN 1.0.2)	VEGA fish acute LC50, mg/L (toxicity model, KNN/Read/acrocc 1.0.0)	Ref
	(Z)-13-hexadecen-11-yn-1-yl acetate	0.12	3.74	Acute	1-10 (reliability max)	5.08 (reliability max)	

#Endpoint calculated with a geometric mean from LC0 and LC100
** According to the PPP RAR of SCLP (2019) "Studies considered valid but with no reliable endpoints to be used in Tier 1 risk assessment, taking into account the results of the analytical measurements", see explanation in the algae part.
***Reliability maximal, see explanations in (Q)SARs values section

(Q)SARs values

VEGA, a software recommended for aquatic toxicity simulation, provides a help in the determination of the reliability of a simulation. Every prediction of the dataset above presents a maximal reliability based on the guidance "How to use and report (Q)SARs" of 2016.

For VEGA fish acute (SarPy/IRFMN 1.0.2) model, this corresponds to:
- Good Global AD index = the predicted compounds is into the applicability of the model,
- Similar molecules with known experimental value = strongly similar compounds with known experimental value in the training set have been found,
- Accuracy of prediction for similar molecules = accuracy of prediction for similar molecules found in the training set is good,
- Concordance for similar molecules = similar molecules found in the training set have experimental values that agree with the predicted valued,
- Atom Centered Fragments similarity check = all atom centered fragment of the compound have been found in the compounds of the training set.

For VEGA fish acute (KNN/Read/acrocc 1.0.0), the same parameters are checked in addition to the following one:
- Maximum error of prediction among similar molecules = the maximum error in prediction of similar molecules found in the training set has a low value, considering the experimental variability.

Therefore, the criteria to validate the (Q)SARs predictions are met, these can therefore be used in a WoE approach.

For the active substance prediction, it has to be noted that even if strongly similar compounds with known experimental value in the training set have been found (similarity index ~0.81), none of them presents a triple bond fragment.

Experimental values

The study on E,Z-7,9-Dodecadien-1-yl acetate is acceptable without restriction and shows a toxicity to fish between 1-10 mg/L.
As explained in the ALGAE section, in the other SCLP fish tests (indicated with **) the maintenance of the exposure concentrations during the tests was not demonstrated, since the measured concentrations were detected at the beginning of the tests but were below the LOQ or LOD at the end of the tests. This situation is similar to the one in the active substance algae test. Therefore, these studies are taken into account as supportive data to determine the trend of the toxicity for fish of these group of substances.

Comparison Experimental/(Q)SARs values

- The result of E,Z-7,9- Dodecadien-1-yl acetate study is comparable to the predictions performed with both VEGA models.
- For the other substances, even if they are just considered as supportive data, the predictions performed with VEGA are comparable to the results of the test for each substances considered.

Therefore, it can be concluded that the two VEGA models can estimate well the ecotoxicity to fish for this type of substance. It worths noting that E,Z-7,9- Dodecadien-1-yl acetate is an acetate substance as (Z)-13-hexadecen-11-yn-1-yl acetate, the active substance.

The last prediction on (Z)-13-hexadecen-11-yn-1-yl acetate estimates a toxicity to fish similar to the ones for SCLP substances (between 1-10 mg/L). It has been concluded that VEGA modelises well the ecotoxicity to fish for acetate but that the triple bond has not been modelised. Considering this limitation of the model, FR CA assumes that this prediction is still considered reliable for the active substance.

Conclusion: comparison data on algae/data on fish

The data from SCLP dossier indicate that fish tend to be less sensitive than algae to these substances. A 10-factor is not observed between the fish and algae endpoints, however studies were not carried out with the same substances. Besides, software prediction for fish toxicity have high reliability for the active substance and are supported by predictions and experimental data on acetate SCLP. Therefore, for the active substance:

- For algae, ErC50 is 0.045 mg/L (ini),
- For fish, LC50 is between 1-10 mg/L,

⇨ All these data suggest that fishes are less sensitive to (Z)-13-hexadecen-11-yn-1-yl acetate than algae.

❖ DAPHNIA

The next table gathers the daphnia ecotoxicy values of SCLPs, completed with water solubility and Log Kow of each substance, significant parameters to take into account in

aquatic ecotoxicity assessment. Corresponding daphnia ecotoxicity QSAR (VEGA v1.1.4, 2017) are not presented as they show a medium reliability.

	Substance	Water solubility (20°C)	Log Kow	Species	Test	Duration (h)	Values EC50, mg/L	Ref
DAPHNIA	Mixture 5-decen-1-yl acetate (purity 84.2%); 5-decen-1-ol (purity 14.4%)	5-decen-1-yl acetate: 6 mg/L 5-decen-1-ol: 138 mg/L	4.95 (both substances)	*Daphnia magnia*	OCDE 202, semi-static	48	2.203, (mm)	SCLP RAR, Volume 3 B9 (2021)
				Daphnia magna	OCDE 202, flow through	48	1.9, (mm)	
	Z-11-Hexadecenal	0.106 (extrapolated from Z-9 hexadecenal)	5.31 to 6.09	*Daphnia magna*	OCDE 202, semi-static limit test	48	0.678, (mm)	
	Z-9-Dodencenyl acetate	0.14	6.36	*Daphnia magna*	OECD 202, static	48	1.1, (mm)**	
	E,Z-7,9-Dodecadien-1-yl acetate	0.67	5.61	*Daphnia magna*	OECD 202, static	48	0.38, (mm)**	
	E,E-8,10-Dodecadien-1-ol	0.021	4.36	*Daphnia magna*	OECD 202, static	48	0.3, (mm)**	
	Mixture E/Z-8-Dodecenyl Acetate; Z-8-Dodecenol			*Daphnia magna*	OECD 202, semi-static	48	0.31, (n)**	

** According to the PPP RAR of SCLP (2019) "Studies considered valid but with no reliable endpoints to be used in Tier 1 risk assessment, taking into account the results of the analytical measurements", see explanation in the algae part.
ini: initial concentration
mm: mean measured concentration
n: nominal concentration

As explained in the ALGAE section, in other SCLP daphnia tests (indicated with **) the maintenance of the exposure concentrations during the tests was not demonstrated, since the measured concentrations were detected at the beginning of the tests but were below the LOQ or LOD at the end of the tests. This situation is similar to the one in the active substance algae test..
Therefore, these studies are taken into account as supportive data to determine the trend of the toxicity for daphnia of these group of substances.

Considering that:

- Algae toxicity E_rC50 for the a.s. is 0.045 mg/L (mm),
- Algae toxicity of SCLP E_rC50 in mean measured concentrations is 0.221mg/L,
- Daphnia toxicity of SCLP EC50 are between 0.3 and 2.203 mg/L (mm)

⇨ The comparison of the lower SCLP daphnia EC50 (0.3 mg/L, mean measured concentrations) and the algae E_rC50 (0.045 mg/L, for a.s. or 0.221 mg/L for SCLP, mean measured) shows it cannot completely be excluded that daphnia can have the same sensitivity to the a.s. than algae.

Chronic toxicity (freshwater)

Data waiving	
Information requirement	Chronic toxicity on freshwater organisms.
Justification	Since no data were submitted for fish and invertebrate, $PNEC_{surfacewater}$ was derived only from the acute study.

4.2.3.2 Sediment compartment

Acute toxicity (freshwater sediment)

Value used in Risk Assessment	
Value/conclusion	-
Justification for the value/conclusion	As PNEC sediment should be derived by EPM from the freshwater data (algae study), the risk ratio $PEC/PNEC_{sediment}$ is covered by the risk ratio $PEC/PNEC_{surfacewater}$. Thus, the sediment compartment calculated risk is not presented, and the $PNEC_{sediment}$ EPM calculations as well.

Chronic toxicity (freshwater sediment)

Value used in Risk Assessment	
Value/conclusion	-
Justification for the value/conclusion	As PNEC sediment should be derived by EPM from the freshwater data (algae study), the risk ratio $PEC/PNEC_{sediment}$ is covered by the risk ratio $PEC/PNEC_{surfacewater}$. Thus, the sediment compartment calculated risk is not presented, and the $PNEC_{sediment}$ EPM calculations as well.

4.2.3.3 Marine compartment

Acute toxicity (seawater)

Not performed (no exposure according to intended uses).

4.2.3.4 Sea sediment compartment

Acute toxicity (sea sediment)

Not performed (no exposure according to intended uses).

4.2.3.5 Higher tier studies on aquatic organisms

No additional data available.

4.2.4 Terrestrial compartment

Value used in Risk Assessment	
Value/conclusion	$PNEC_{soil}$ is 6.78E-04 mg/kg wwt.
Justification for the value/conclusion	Since no data were submitted, $PNEC_{soil}$ was derived by EPM. Considering an estimated Koc of 847.6 L/kg, and therefore a $K_{soilwater}$ of 25.63 m^3/m^3, calculated $PNEC_{soil}$ is 6.78E-04 mg/kg wwt.

4.2.5 Groundwater

No additional data available.

4.2.6 Birds and mammals

Mammals and birds

Value used in Risk Assessment	
Value/conclusion	Study scientifically not necessary.
Justification for the value/conclusion	According to the Annex II BPR, this is an additional data requirement, therefore, no test on birds or mammals was performed by the applicant. Moreover, as negligible exposure is foreseen (see Environmental exposure assessment section), no additional data is scientifically required.

4.2.7 Primary and secondary poisoning

Primary poisoning

Data waiving	
Information requirement	Study scientifically not necessary.
Justification	As negligible exposure is foreseen (see Environmental exposure assessment section), no additional data is scientifically required.

Secondary poisoning

Value used in Risk Assessment	
Value/conclusion	Study scientifically not necessary.
Justification for the value/conclusion	As negligible exposure is foreseen (see Environmental exposure assessment section), no additional data is scientifically required.

4.3 METABOLITES

The active substance is a pheromone, a natural substance generally assumed to dissipate rapidly in the environment, primarily by volatilization[11] and degradation, and this is partly because persistence is counterproductive to a communication signal received by and olfactory system. This is confirmed by the need to add an antioxidant to the formulation (Tocopherol) to prevent a very fast degradation of the substance. Moreover, in the direct

[11] The vapour pressure value of the pheromone (1.2E-03 Pa) is within the range of values found for SCLPs, which are considered volatile. Moreover, the product operates by volatilisation of the active substance and as efficacy was proven in the field, the substance must have been volatilized into the air.

exposed compartment, the atmosphere, the substance is not stable as its DT50 is very low (3.5 hours). At last, the exposure of the environment has been shown to be very low, despite the exposure assessment has been carried out without taking account of the unstability/degradation properties of the substance.

Consequently, as mentioned at the beginning of this section, a waiving of some core data has been applied for this specific substance, due to its very limited exposure and to physico-chemical properties of pheromones. Thus, the identification of relevant metabolites and the assessment of their toxicity is not required. The same reasoning was applied in PPP Regulation for the assessment of SCLP (RAR, 2021).

4.4 ENDOCRINE DISRUPTING PROPERTIES

Conclusion used in Risk Assessment – Endocrine disruption	
Conclusion	The active substance is not expected to be an endocrine disruptor.
Justification for the conclusion	Please see the data waiving below.

Data waiving	
Information requirement	Endocrine disrupting properties.
Justification	Pheromones influence mating behaviour, but not the endocrine system as such. No endocrine disruption effects have been identified for pheromones produced by lepidopteran insects and none are expected because of their use. (See the explanations below).

4.4.1 Introduction

In June 2018, EFSA and the European Chemicals Agency (ECHA) published a Guidance for the identification of endocrine disruptors in the context of Regulations (EU) No. 528/2012 and (EC) No. 1107/2009, EFSA Journal 2018; 16(6)5311. To evaluate the potential concern for endocrine disrupting effects induced by (Z)-13-hexadecen-11-yn-1-yl acetate (see Fig. 10: (Z)-13-hexadecen-11-yn-1-yl acetate structure), all available data were assessed throughout all levels (1-5) of the OECD Conceptual Framework for Endocrine Disrupters of the Guidance.

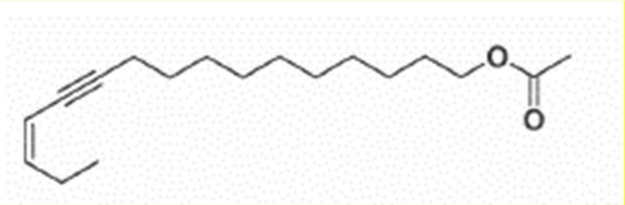


Fig. 10: (Z)-13-hexadecen-11-yn-1-yl acetate structure

4.4.2 Gathering relevant information

4.4.2.1.1 *In silico* studies (Level 1)

Non-test information such as read-across and category approaches, (Q)SAR and other in silico approaches were used, using the following canonical SMILES / CAS number: C(#CC=CCC)CCCCCCCCCCOC(=O)(C) / 78617-58-0.
The following table presents the results of the different QSARs (Danish QSAR, OECD QSAR Toolbox, Endocrine disruptome, VEGA):

QSARs	**Models**	**Battery**	**Case Ultra**	**Leadscope**	**SciQSAR**
Danish QSAR (Battery, Case Ultra, Leadscope, SciQSAR)	Substance not found				

QSARs	**Output and conclusions**	
OECD QSAR Toolbox v4.2 profilers	**Estrogen Receptor Binding, alerts in:**	
	- parent only	Non binder, without OH or NH2 group
	- metabolites from in vivo Rat metabolism simulator only	Non binder, non-cyclic structure
	- metabolites from Rat liver S9 metabolism simulator only	Non binder, non-cyclic structure
	rtER Expert System - USEPA, alerts in:	
	- parent only	No alert found
	- metabolites from in vivo Rat metabolism simulator only	No alert found
	- metabolites from Rat liver S9 metabolism simulator only	No alert found

QSARs	**Receptors and output**	**Conclusions**
Endocrine Disruptome	AR : -6.3	Low probability
	AR an.: -6.5	Low-Medium probability
	ER α: -6.5	Low probability
	ER α an.: -6.3	
	ER β: -6.7	
	ER β an.: -6.6	

	GR: -6.4	
	GR an.: -6.0	
	LXR α: -7.0	
	LXR β: -6.6	
	MR: -6.5	
	PPAR α: -5.8	
	PPAR β: -6.2	
	PPAR γ: -6.3	
	PR: -1.8	
	RXR α: -7.3	
	TR α: -7.0	
	TR β: -6.8	
High probability		
Medium-High		
Low-medium		
Low probability		

QSARs	Models	Predictions
VEGA v1.1.5	**Estrogen Receptor Relative Binding Affinity model (IRFMN) 1.0.1**	The pheromon is active on estrogenic receptors (reliability 2/3)
	Estrogen Receptor-mediated effect (IRFMN/CERAPP) 1.0.0	The pheromon is non-active on estrogenic receptors (reliability 3/3)
	Androgen Receptor-mediated effect (IRFMN/COMPARA) 1.0.0	The pheromon is non-active on androgenic receptors (reliability 3/3)
	Thyroid Receptor Alpha effect (NRMEA) 1.0.0	The pheromon is non-active on thyroid receptors alpha (reliability 3/3)
	Thyroid Receptor Beta effect (NRMEA) 1.0.0	The pheromon is non-active on thyroid receptors beta (reliability 3/3)

CONCLUSIONS

Overall, VEGA and the OECD QSAR Toolbox do not indicate any endocrine activity of the pheromone. Among VEGA models, the Estrogen Receptor-mediated effect (IRFMN/CERAPP) 1.0.0 model has a better reliability than the Estrogen Receptor Relative Binding Affinity model (IRFMN) 1.0.1 model. It is therefore retained for the assessment and indicates that the pheromone is inactive on the estrogenic receptors."
Only one model from Endocrine disruptome estimates a low-medium degree of binding of the substance to AR receptors, with antagonistic effects. On the contrary, VEGA androgenic model defines the substance as non-active on androgen receptors with a maximum reliability.

Therefore, no clear ED alert has been raised for the substance (Z)-13-hexadecen-11-yn-1-yl acetate considering QSAR analysis.

4.4.2.1.2 *In vitro* mechanistic data – US EPA CompTox Chemicals and in vitro guidelines studies (Level 2)

No level 2 data are available (ToxCast Models, EDSP21, Transcriptional assay...)

4.4.2.1.3 Mammalian toxicology: *in vivo* studies (level 3, 4, 5)

4.4.2.1.3.1 IN VIVO ASSAYS PROVIDING DATA ABOUT SELECTED ENDOCRINE MECHANISM(S) / PATHWAY(S) (LEVEL 3)

For mammalian toxicology, two tests are currently required: the Uterotrophic assay (OECD TG 440, OECD GD 71) on estrogenic effects and the Hershberger assay (OECD TG 441, OECD GD 115) for (anti)-androgenic properties.
No information on such in vivo assays is available for (Z)-13-hexadecen-11-yn-1-yl acetate. According to the ED Guidance, in absence of these studies, it is not possible to conclude on the absence of endocrine activity.

4.4.2.1.3.2 IN VIVO ASSAYS PROVIDING DATA ON ADVERSE EFFECTS ON ENDOCRINE RELEVANT ENDPOINTS (LEVEL 4) AND MORE COMPREHENSIVE DATA ON ADVERSE EFFECTS ON ENDOCRINE RELEVANT ENDPOINTS OVER MORE EXTENSIVE PARTS OF THE LIFE CYCLE OF THE ORGANISM (LEVEL 5)

Toxicological data package lacks of repeated exposure assays where endpoints related to endocrine adversity and activity are investigated.
According to the guidance for waiving of data requirements for Pheromones for inclusion in Annex I/IA of Directive 98/8/EC (based on the OECD Series on Pesticides (Number 12): Guidance for Registration Requirements for Pheromones and Other Semiochemicals Used for Arthropod Pest Control ENV/JM/MONO (2001)12), short-term toxicity studies with the active substance are waived since there is not a significant exposure potential and no tolerance are to be set considering the intended use and the mode of application (pheromone micro-encapsulated and then formulated and introduced into biodegradable balls, applied with a gun on pine trees).
Studies investigating effects on short- and long-term period, reprotoxicity, metabolism, neurotoxicity, immunotoxicity are not required since they are not triggered by a significant exposure potential and/or concerns related to human health toxicity.

4.4.2.1.4 Ecotoxicological (non-target and non-mammalian organisms) studies

The dossier does not contain any of the studies of the minimal data package to consider the EATS modalities for non-target organisms other than mammals (fish short-term reproduction assay (OECD 229) or a 21-day fish assay (OECD 230) for EAS modalities, and an amphibian metamorphosis assay (AMA, OECD 231) for the T modality).

4.4.2.1.5 Review of scientific open literature

4.4.2.1.5.1 MAMMALIANS

No systematic review was provided by the applicant.

A literature search was performed in June 2020 to identify potentially relevant information published using the SCOPUS database (https://www.scopus.com) and the following search terms were used:
("(Z)-13-hexadecen-11-yn-1-yl acetate" OR "SCLP" OR "Straight Chain Lepidopteran Pheromones" OR "78617-58-0" OR " C(#CC=CCC)CCCCCCCCCCOC(=O)(C)")
And
(endocrin* OR hormone* OR disrupt* OR endocrine AND activity OR estrog* OR androgen* OR thyro* OR steroido* OR endocrine AND gland* OR reproduct* OR teratog* OR malformation* OR developmental* OR hyperplasia* OR tumor OR tumour OR cancer)

15 results were obtained (see reference list).
No relevant publications for the potential endocrine disrupting properties of the active substance in mammalians have been identified.
No additional data on potential ED properties of (Z)-13-hexadecen-11-yn-1-yl acetate were thus found.

4.4.2.1.5.2 NON-MAMMALIAN VERTEBRATE SPECIES

No systematic review was provided by the applicant. The targeted literature search into potential endocrine properties was conducted on SCOPUS (https://www.scopus.com) (updated on June 2020) using terms related to the substance and its synonyms ("(Z)-13-hexadecen-11-yn-1-yl acetate" OR "SCLP" OR "Straight Chain *Lepidopteran* Pheromones" OR "78617-58-0" OR " C(#CC=CCC)CCCCCCCCCCOC(=O)(C)") and an endocrine disrupting mode of action on non-mammalian organisms. As the active substance is very close to SCLPs (Straight Chain Lepidopteran Pheromones) in terms of structure and toxicity (see section 4.2.3 of the non-confidential CAR), the research has indeed been extended to these substances.
The review was conducted without any temporal limits and the results in terms of number of hits are provided in the following table.

Query		**Number of results**
("(Z)-13-hexadecen-11-yn-1-yl acetate" OR "SCLP" OR "Straight Chain Lepidopteran Pheromones" OR "78617-58-0" OR " C(#CC=CCC)CCCCCCCCCCOC(=O)(C)")		
... AND ("hormon*")		0
... AND ("vtg" OR "vitellogenin")		0
... AND ("endocrin*" OR "endocrin disrupt*")	**... AND ("*fish*" OR "amphib*"OR "xenop*")**	0
	... AND ("bird*" OR "quail" OR "Anas*" OR "Colinus*")	
	... AND ("folsomia" OR "springtail" OR "mite*")	

	... AND ("invertebrat*" OR "mollusc" OR "crusta*" OR "arthopod*")	
	... AND ("wildlife")	
... AND ("estro*" OR "andro*" OR "steroido*" or "thyroid*")	**... AND "*fish*" OR "amphib*"OR "xenop*"**	0
	... AND ("bird*" OR "quail" OR "Anas*" OR "Colinus*")	
	... AND ("folsomia" OR "springtail" OR "mite*")	
	... AND ("invertebrat*" OR "mollusc" OR "crusta*" OR "arthopod*")	
	... AND "wildlife"	
... AND ("metamorph*"OR"repro*"OR"embryo*"OR "delay"OR"generat*"OR"populat*")	**... AND "*fish*"**	0
	... AND "amphib*"	
	...AND "xenop*"	
	...AND("bird*"OR"quail"OR"Anas* "OR"Colinus*")	
	... AND(f"folsomia"OR"springtail"OR" mite*")	
	...AND("invertebrat*"OR"mollusc" OR"crusta*"OR"arthopod*")	
	... AND("wildlife")	

From this literature review no relevant publications for the potential endocrine disrupting properties of the active substance against non-mammalian organisms (fish, invertebrate and amphibian) has been identified.
To conclude, the literature review did not allow to identify additional data on potential ED-effect of the active substance on non-mammalian organisms.

4.4.3 ED assessment

Available data on (Z)-13-hexadecen-11-yn-1-yl acetate were assessed throughout all levels (1-5) of the OECD Conceptual Framework (CF) for Endocrine Disrupters (Guidance for the identification of endocrine disruptors in the context of Regulations (EU) No 528/2012 and (EC) No 1107/2009, June 2018).

4.4.3.1 ED assessment for Humans

There are no available guideline studies that have investigated the effects of (Z)-13-hexadecen-11-yn-1-yl acetate on EATS-mediated parameters in mammals and no relevant and reliable studies have been identified in the published scientific literature.

4.4.3.2 ED assessment for non-target organisms

Analysis of evidence for EATS-mediated parameters

There are no available guideline studies that have investigated the effects of (Z)-13-hexadecen-11-yn-1-yl acetate on EATS-mediated parameters in non-target organisms and no relevant and reliable studies have been identified in the published scientific literature.

Analysis of evidence for parameters sensitive to be not diagnostic of EATS

There are no available guideline studies that have investigated the effects of (Z)-13-hexadecen-11-yn-1-yl acetate on sensitive but not diagnostic parameters in non-target organisms and no relevant and reliable studies have been identified in the published scientific literature.

Analysis of evidence for *in vitro* mechanistic data

No *in vitro* mechanistic data are available for non-target organisms.

Analysis of evidence for *in vivo* mechanistic data

No *in vivo* mechanistic data are available for non-target organisms.

4.4.4 Identification of relevant scenario for the ED assessment of EATS modalities and conclusions

Following the Guidance for the identification of endocrine disruptors in the context of Regulations (EU) N°528/2012 and (EC) N° 1107/2009 (June 2018), the minimal data package to consider the EATS modalities for mammals and non-target organisms other than mammals sufficiently investigated should include:

- an Uterotrophic assay (OECD TG 440, OECD GD 71) on estrogenic effects and a Hershberger assay (OECD TG 441, OECD GD 115) for (anti)-androgenic properties.
- a Fish short-term reproduction assay (OECD 229) or a 21-day fish assay (OECD 230) for EAS modalities, and an amphibian metamorphosis assay (AMA, OECD 231) for the T modality.

The only available, substance-specific data are Level 1 information taken from the VEGA QSAR models (v1.1.5), Endocrine disruptome and the QSAR ToolBox (v4.2), see section 2.1. Therefore, based solely on the current data set, no clear ED alert has been raised but the pheromone is considered not to be sufficiently investigated for mammals and non-target organisms other than mammals according to the EFSA/ECHA ED guidance.
However, the active substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate shares important structural similarities with the SCLPs family (see also the section 4.2.3 of the non-confidential CAR). Indeed, the common structural definition of a SCLP substance is "unbranched aliphatic having a chain of nine to eighteen carbons, containing up to three double bonds, and ending in an alcohol, acetate or aldehyde functional group" (SANCO/5272/2009). The (13Z)-Hexadec-13-en-11-yn-1-yl acetate meets the common structural definition of a SCLP substance in despite of the presence of a triple bond.

Consequently, the conclusions for toxicity or metabolism resulting from the ED assessment of SCLP substance could be transposed to the (13Z)-Hexadec-13-en-11-yn-1-yl acetate by read-across.

In the SCLP dossier, the applicability of a derogation from the ED assessment for this type of substance has been raised. The applicability of such a waiving has been endorsed in the

framework of SCLPs renewal under PPP Regulation (EU) 1107/2009 during the EFSA Expert Meeting of November 2020. Considering the specificity of these substances, a similar approach based on the arguments presented for PPP is proposed for the ED assessment of pheromones in Biocides Regulation:
(13Z)-Hexadec-13-en-11-yn-1-yl acetate has a non-toxic mode of action based on mating disruption of Lepidoptera which rely on olfactory cues to find the location of conspecific females to mate. The signals exchanged between males and females are very species-specific for an effective mating when adult processionnary search for mates at the top of pine trees. Consequently the mode of action of (13Z)-Hexadec-13-en-11-yn-1-yl acetate is very species-specific and there are no indications for adverse effects on the endocrine systems of vertebrates. Moreover, the available information on endocrine activity of Acetate SCLPs (in vitro mechanistic data for all 21 tested SCLP acetates), SCLP substances most structurally similar to the (13Z)-Hexadec-13-en-11-yn-1-yl acetate, show no EATS activity. Nevertheless, a disruption of the endocrine system for Lepidopterans cannot be excluded but it seems unlikely. However, even if that would be the case, the ED criteria would not apply since "if the intended biocidal mode of action of the active substance being assessed consists of controlling target organisms other than vertebrates via their endocrine systems, the effects on organisms of the same taxonomic phylum as the targeted one shall not be considered for the identification of the substance as having endocrine- disrupting properties with respect to non-target organisms" (COMMISSION DELEGATED REGULATION (EU) 2017/2100 of 4 September 2017).

Consequently, no further investigations are scientifically needed.

4.5 DERIVATION OF PNECS

Compartment	PNEC	Remarks/Justification
Surface Water	PNEC = 4.50E-05 mg/L	Organism: Algae (Desmodesmus subspicatus) Endpoint: E_rC50 (72 h, growth inhibition): 4.50E-02 mg/L (mean measured concentration) Assessment factor: 1000 Extrapolation method: assessment factor Justification: Since the three taxonomic groups (fish, invertebrates, algae) are covered but no chronic toxicity data are available, an assessment factor of 1000 is applied.
Sediment (SW)	Not relevant	As PNEC sediment should be derived by EPM from the freshwater data (algae study), the risk ratio PEC/$PNEC_{sediment}$ is the same than PEC/$PNEC_{surfacewater}$. Thus, the sediment compartment calculated risk is not presented, and the $PNEC_{sediment}$ EPM calculations as well.
STP	Not relevant	Organism: - Endpoint: - Assessment factor: - Extrapolation method: - Justification: No relevant since the exposure is negligible
Soil	PNEC = 6.78E-04 mg/kg wwt	Organism: - Endpoint: - Assessment factor: - Extrapolation method: EPM Justification: Since no ecotoxicity data were available for the soil compartment, the $PNEC_{soil}$ was calculated by EPM. Therefore, the PNEC calculated is a $PNEC_{initiale}$.

4.6 CONCLUSION ON CLASSIFICATION AND LABELLING FOR ENVIRONMENTAL HAZARDS AND COMPARISON WITH THE CLP CRITERIA

The worst case acute endpoint is derived from the algal study: E_rC50 = 4.50E-02 mg./L. As this endpoint is between 0.01 < E_rC50 ≤ 0.1 mg/L, the pheromone is classified Acute 1 (H400) with a M factor of 10.

As only acute data are available for the classification of the active substance, the chronic classification is calculated with the E_rC50 and the M-factor derived for acute aquatic hazard classification is also applied to the long-term aquatic hazard classification. Therefore, the pheromone is classified Chronic 1 (H410) with a M factor of 10.

5 ASSESSMENT OF EXCLUSION CRITERIA, SUBSTITUTION CRITERIA AND POP

5.1 EXCLUSION CRITERIA

5.1.1 Assessment of CMR properties

Criteria (BPR Article 5[1])	**Assessment**
Active substances which have been classified in accordance with Regulation (EC) No 1272/2008 as, or which meet the criteria to be classified as, carcinogen category 1A or 1B	Active substance is not classified and does not meet the criteria to be classified as Carc. Cat. 1A or 1B.
Active substances which have been classified in accordance with Regulation (EC) No 1272/2008 as, or which meet the criteria to be classified as, mutagen category 1A or 1B	Active substance is not classified and does not meet the criteria to be classified as Muta. Cat. 1A or 1B.
Active substances which have been classified in accordance with Regulation (EC) No 1272/2008 as, or which meet the criteria to be classified as, toxic for reproduction category 1A or 1B	Active substance is not classified and does not meet the criteria to be classified as Repr. Cat. 1A or 1B.

Conclusion on CMR properties	The exclusion criteria in BPR Article 5(1)a-c are not met.

5.1.2 Assessment of endocrine disrupting properties

Criteria (BPR Article 5)	**Assessment**
Active substances which, on the basis of the criteria specified pursuant to the first subparagraph of paragraph 3 are considered as having endocrine-disrupting properties that may cause adverse effects in humans and to the environment.	Active substance has not been identified as having endocrine disrupting properties.

[1] This refers to the criteria mentioned in the first row.
[2] These active substances shall be considered as having endocrine-disrupting properties
[3] These active substances may be considered as having endocrine-disrupting properties

Conclusion on ED properties	The exclusion criteria in BPR Article 5(1)d are not met.

5.1.3 PBT Assessment (following Annex XIII to Regulation (EC) No 1907/2006)

Assessment of persistence

Screening

Assessment

P Criteria	Assessment
T1/2 > 60 days in seawater, or	No experimental data, but a WoE presented in the 4.1.1.2.1 section shows that the substance is not P nor vP
T1/2 > 40 days in fresh- or estuarine water, or	No experimental data, but a WoE presented in the 4.1.1.2.1 section shows that the substance is not P nor vP
T1/2 > 180 days in seawater sediment, or	No experimental data, but a WoE presented in the 4.1.1.2.1 section shows that the substance is not P nor vP
T1/2 > 120 days in freshwater- or estuarine sediment, or	No experimental data, but a WoE presented in the 4.1.1.2.1 section shows that the substance is not P nor vP
T1/2 <= 120 days in soil.	No experimental data, but a WoE presented in the 4.1.1.2.1 section shows that the substance is not P nor vP

vP Criteria	Assessment
T1/2 > 60 days in sea-, fresh- or estuarine water water, or	See above
T1/2 > 180 days in seawater-, freshwater- or estuarine sediment, or	See above
T1/2 > 180 days in soil.	See above

Conclusion on P / vP properties	Not P / vP

Assessment of bioaccumulation

Screening

Assessment

B Criteria	Assessment
BCF > 2000	Estimated BCF_{Fish} = 301 L/kg Estimated $BCF_{earthworms}$ = 7.67 L/kg

vB Criteria	Assessment

BCF > 5000	See above

Conclusion on B / vB properties	**Not B / vB**

Assessment of toxicity

Screening

Assessment

T Criteria	**Assessment**
NOEC/EC10 (long-term) < 0.01 mg/L for freshwater or seawater organisms, or	Only ecotoxicity data on algae were provided by the applicant. According to read across and QSAR, fish are less sensitive than algae and daphnia are assumed to have the same sensitibity as algae. As the 72h-E_rC50 in the *Desmodesmus subspicatus* test is 0.045 mg a.i./L (E_rC50 < 0.1 mg/L), the pheromone is potentially T, based on screening data.
substance meets the criteria for classification as carcinogenic (category 1A or 1B), germ cell mutagenic (category 1A or 1B), or toxic for reproduction (category 1A, 1B or 2) according to the CLP Regulation, or	The substance does not meet the criteria for classification as carcinogenic (category 1A or 1B), germ cell mutagenic (category 1A or 1B), or toxic for reproduction (category 1A, 1B or 2) according to the CLP Regulation
there is other evidence of chronic toxicity, as identified by the substance meeting the criteria for classification:specific target organ toxicity after repeated exposure (STOT RE category 1 or 2) according to the CLP Regulation.	The substance does not meet the criteria for classification as specific target organ toxicity after repeated exposure (STOT RE category 1 or 2) according to the CLP Regulation

Conclusion on T properties	Not T

Summary and overall conclusions on PBT or vPvB properties

Overall conclusion:

Based on the assessment described in the subsections above the submission substance is not a PBT / vPvB substance.

5.2 SUBSTITUTION CRITERIA

Substitution criteria (BPR, Article 10)	**Assessment**
One of the exclusion criteria listed in Article 5(1) is met but AS may be approved in accordance with Article 5(2)	Not applicable
The criteria to be classified, in accordance with Regulation (EC) No 1272/2008, as a respiratory sensitiser is met	Not applicable
The acceptable daily intake, acute reference dose or acceptable operator exposure level, as appropriate, is significantly lower than those of the majority of approved active substances for the same product-type and use scenario	Not applicable
Two of the criteria for being PBT in accordance with Annex XIII to Regulation (EC) No 1907/2006 are met	Not applicable
There are reasons for concern linked to the nature of the critical effects which, in combination with the use patterns, amount to use that could still cause concern, such as high potential of risk to groundwater, even with very restrictive risk management measures	Not applicable
The AS contains a significant proportion of non-active isomers or impurities.	Not applicable

Conclusion on substitution criteria	The substitution criteria in BPR Article 10(1)a-f are not met.

5.3 ASSESSMENT OF LONG-RANGE ENVIRONMENTAL TRANSPORTATION AND IMPACT ON ENVIRONMENTAL COMPARTMENTS

	Assessment
The active substance or a degradation product is a persistent organic pollutant (POP) listed in Annex I of EC 850/2004	Not listed
Assessment of long-range transport potential (LRTAP): • Vapour pressure <1000 Pa and • half-life in air > 2 days or • Monitoring data in remote area showing that the substance is found in remote regions or • Result of multi media modelling	Vapour pressure : 6.75E-04 Pa at environmental temperature (12°C) Half-life for Cis-isomer :3.5h Half-life for trans-isomere : 3.2h Monitoring data : No additional data Multi data modelling : No additional data
The active substance or a degradation product is vP/vB or T?	The active substance is not vP/vB and not T.

Conclusion on LRTAP/POP asessment	The active substance does not have potential for long-range transboundary atmospheric transport.

Part B Exposure assessment and effects of the active substance in the biocidal product(s)

6 GENERAL PRODUCT INFORMATION

6.1 IDENTIFICATION OF THE PRODUCT

Name(s) of the product	
Trade name(s) or proposed Trade name(s)	PHEROBALL Pin / PINE T PRO BALL
Manufacturer's development code and number of the product	
Formulation type	EO Emulsion, water in oil N.B.: Pheromone is micro-encapsulated in a wax emulsion. This emulsion is inserted into oxo-biodegradable paint balls.

6.2 COMPLETE QUALITATIVE AND QUANTITATIVE COMPOSITION OF THE BIOCIDAL PRODUCT

Active substance(s)				
ISO or Trivial name	**IUPAC name or other accepted chemical name**	**EC number**	**CAS number**	**Concentration in the product in % (w/w)**
(Z)-13-hexadecen-11-yn-1-yl acetate	Acétate de (Z)-13-hexadécén-11-yn-1-yle	na	78617-58-0	4.33 (pure)

Other components / ingredients of the product					
ISO or Trivial name	**IUPAC name or other accepted chemical name**	**EC number**	**CAS number**	**Concentration in in the product in % (w/w)**	**Function**
Confidential information					

6.3 PHYSICAL, CHEMICAL AND TECHNICAL PROPERTIES

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
Physical state at 20°C and 101.3 kPa	Homogeneous slightly yellow opaque liquid. Transparent beads of about 1.7 cm diameter full of slightly yellow opaque liquid.	CIPAC Handbook J - MT 46.3 method (2000)	Visual observation	Defitraces report R18-913034-003	**Acceptable**
Colour at 20°C and 101.3 kPa	Homogeneous slightly yellow opaque liquid. Transparent beads of about 1.7 cm diameter full of slightly yellow opaque liquid.	CIPAC Handbook J - MT 46.3 method (2000)		Defitraces report R18-913034-003	**Acceptable**
Odour at 20°C and 101.3 kPa	Characteristic odour	The colour, the physical state, the odour of the test item were observed before the accelerated storage procedure.		Defitraces report R18-913034-003	**Acceptable**
Acidity / alkalinity	The mean pH value of the pure test item was: **7.14** at 21.0 °C after 1 min. **7.12** at 21.1 °C after 2 min.	CIPAC MT 75.3	pH of the emulsion to be determined before/after storage. Acidity/alkalinity should not be necessary: 4 < pH < 10	Defitraces report R18-913034-003	**Acceptable**
Relative density	The mean relative density of the test item was **0.985** ± 0.002 at 20.4 °C.	Relative density of the emulsion (OECD 109). Bulk density of the ball (MT 186)		Defitraces report R18-913034-001	**Acceptable**

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
Storage stability, stability and shelf-life					
Accelerated storage	The appearance of the test item was considered to be stable after an accelerated storage procedure for 14 days at 54 °C ± 2 °C. The packaging material (silver plastic bag) was considered to be stable after an accelerated storage procedure for 14 days at 54 °C ± 2 °C; **no significant change of weight was observed**. No significant change was observed in the content of the active substance after the accelerated storage procedure for 14 days at 54 °C ± 2 °C. **Content a.s before: 4.31%** **Content a.s after: 4.39%** The test item was considered to be stable. Before the accelerated storage procedure The mean pH value of the pure test item was: **7.14** at 21.0 °C after 1 min. 7.12 at 21.1 °C after 2 min.	CIPAC method MT 46.3 (storage at 54 °C for two weeks) - appearance - weight of the balls - a.s. content - pH - attrition (balls) Analytical method validated in the study No. 18-913034-005	Identification XP CS PIN (Emulsion, water in oil) Batch PINB 062018-1 Manufacturing date 04 September 2018 Supplier M2I DEVELOPMENT Packaging Silver plastic bag (PET/Alu/PE) Storage In darkness at room temperature	Defitraces report R18-913034-003	**Acceptable** An analytical method (GC-FID) of (13Z)-hexadec-13-en-11-yn-1-yl acetate in XP CS PIN was provided and considered as validated. The biocidal product is considered as stable 14 days at 54 °C in packaging silver plastic bag (PET/Alu/PE).

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
	After the accelerated storage procedure The mean pH value of the pure test item was: **6.98** at 19.9 °C after 1 min. 6.97 at 19.9 °C after 2 min. Before the accelerated storage procedure The attrition resistance of the test item was **100.0%.** After the accelerated storage procedure The attrition resistance of the test item was **99.8%**. Based on the UV spectra, the active substance does not have any absorbance above 290 nm. Therefore, the active substance is not considered as light sensitive. Moreover, the product is packaged in silver plastic bag which can be considered as barrier to light. Concerning the effect of the humidity, as the product is packaged in a plastic bag, no mitigation measure is necessary.				
Long term storage at ambient	The appearance of the test item was considered to be stable after an	Shelf life at ambient temperature for 2 years	Identification XP CS PIN (Emulsion, water in oil) Batch PINB 062018-1	PE18-913034-004	**Acceptable**

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
temperature	accelerated storage procedure for 2 years at 20 °C ± 2 °C. The packaging material (silver plastic bag) was considered to be stable after an accelerated storage procedure for 2 years at 20 °C ± 2 °C; **no significant change of weight was observed**. A significant change (decrease 9%) was observed in the content of the active substance after the storage procedure for 2 years at 20 °C ± 2 °C but considered as acceptable (below 10%). **Content a.s before: 4.31%** **Content a.s after: 3.92%** The test item was considered to be stable. Before the storage procedure The mean pH value of the pure test item was: **7.14** at 21.0 °C after 1 min. 7.12 at 21.1 °C after 2 min. After 2 years at 20 °C ± 2 °C of storage procedure The mean pH value of the pure test item was: **7.00** at 21.6 °C after 1 min. 6.98 at 21.5 °C after 2 min.	GIFAP, CropLife Monograph No.17 - appearance of the product - packaging stability (including weight change, loss of ball integrity or caking on storage, and if flexible packs: effect of stacking packs) - weight of the balls - a.s. content - pH - attrition (balls)	Manufacturing date 04 September 2018 Supplier M2I DEVELOPMENT Packaging Silver plastic bag (PET/Alu/PE) Storage In darkness at room temperature		An analytical method (GC-FID) of (13Z)-hexadec-13-en-11-yn-1-yl acetate in XP CS PIN was provided and considered as validated. The biocidal product is considered as stable 2 years at ambient temperature in packaging silver plastic bag (PET/Alu/PE).

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
	Before the storage procedure The attrition resistance of the test item was **100.0%.** After 2 years at 20 °C ± 2 °C of storage procedure The attrition resistance of the test item was **99.4%**. Based on the UV spectra, the active substance does not have any absorbance above 290 nm. Therefore, the active substance is not considered as light sensitive. Moreover, the product is packaged in silver plastic bag which can be considered as barrier to light. Concerning the effect of the humidity, as the product is packaged in a plastic bag, no mitigation measure is necessary.				
Low temperature stability (liquids)	At the start of the test, the test item was a homogeneous slightly yellow opaque liquid. The appearance of the test item was considered to be stable after a low temperature stability at 0 ± 2 °C for 7 days**, no change was observed in the test item aspect.**	CIPAC MT 39.3 including a 'freeze/thaw' cycle - appearance - a.s. content () - pH	**Identification XP CS PIN (Emulsion, water in oil)** **Batch** PINB 062018-1 **Manufacturing date** 04 September 2018 **Supplier** M2I DEVELOPMENT **Appearance** Slightly yellow opaque liquid **Packaging** Silver plastic bag (PET/Alu/PE)	Defitraces report R18-913034-002	**Acceptable** The PPP is considered stable 7 days at 0°C in packaging silver plastic bag (PET/Alu/PE).

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
	WET SIEVE TEST AFTER LOW TEMPERATURE STABILITY In compliance with CIPAC Handbook K - MT 185 method (2003) The mean percentage retention of the test item held on a **75-µm sieve was 0.1%** of the total sieved test item. DETERMINATION OF pH VALUES In compliance with CIPAC Handbook J - MT 75.3 method (2000) Before the low temperature stability (Results from study No. 18-913034-003) The mean pH value of the pure test item was: **7.14** at 21.0 °C after 1 min. 7.12 at 21.1 °C after 2 min. After the low temperature stability The mean **pH** value of the pure test item was: **7.12** at 18.8 °C after 1 min. 7.09 at 18.8 °C after 2 min. ATTRITION RESISTANCE OF GRANULES In compliance with CIPAC Handbook H - MT 178 method (1998) Before the low temperature stability (Results from study No. 18-913034-003)		**Quantity received** 50 Units **Storage** In darkness at room temperature		

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
	The **attrition resistance** of the test item was **100%.** After the low temperature stability The attrition resistance of the test item was **100%.**				
Effects on content of the active substance					
Light	Based on the UV spectra, the active substance does not have any absorbance above 290 nm. Therefore, the active substance is not considered as light sensitive. Moreover, the product is packaged in silver plastic bag which can be considered as barrier to light. Concerning the effect of the humidity, as the product is packaged in a plastic bag, no mitigation measure is necessary.		See stability studies above.		Acceptable
Temperature and humidity			See stability studies above.		-
Reactivity towards container material			See stability studies above.		-
Technical characteristics					
Wettability	Not required		Product has not to be dissolved in water.		-

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
Suspensibility, spontaneity and dispersion stability	Not required		Product has not to be dissolved in water.		-
Wet sieve analysis and dry sieve test	Wet sieve test: Not required Dry sieve test: Not adapted		Wet sieve test: product has not to be dissolved in water. Dry sieve test: MT170 is not adapted to the balls.		**Acceptable**
Emulsifiability, reemulsifiability and emulsion stability	Not required		Product has not to be dissolved in water.		-
Disintergration time	Not relevant		Product is not a tablet		-
Particle size distribution, content of dust / fines, attrition, friability	The attrition resistance of the test item was 100.0%.	Emulsion: Particle size distribution: CIPAC MT 187 test Balls: Attrition: MT 178 test (before and after storage)		Defitraces report R18-913034-003	**Acceptable**
Persistent foaming	Not required		Product has not to be dissolved in water.		-
Flowability,	Not required		Product has not to be dissolved in water.		-

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
pourability, dustability					
Burning rate – smoke generators	Not relevant		Product is not applied as smoke.		-
Burning completeness – smoke generators	Not relevant		Product is not applied as smoke.		-
Composition of smoke – smoke generators	Not relevant		Product is not applied as smoke.		-
Spraying pattern - aerosols	Not relevant		Product is not applied as aerosol.		-
Other technical characteristics	-				-
Physical and chemical compatibility with other products including other biocidal products with which its ues is to be authorised					
Physical compatibility	Not required		Not intended to be applied with other products		-
Chemical compatibility	Not required		Not intended to be applied with other products		-

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
Degree of dissolution and dilution stability	Not required		Product has not to be dissolved in water		-
Surface tension	The measurement of the surface tension of the test item was not possible due to its too high viscosity.	EEC A5 / OECD 115 test (emulsion)		Defitraces report R18-913034-001	**Acceptable**
Viscosity	Taking into account the results obtained at 20.0 °C and 40.0 °C, the test item was considered to have non-newtonian properties in the experimental conditions used. The **dynamic viscosity** varied as following: At **20.0 °C** ± 0.2 °C, from **h(0.003 s-1) = 6814171 mPa.s to h(0.015 s-1) = 256195 mPa.s.** At **40.0 °C** ± 0.2 °C, from **h(0.003 s-1) = 5220761 mPa.s to h(0.023 s-1) = 795664 mPa.s.**	OECD 114 test at 20°C and 40°C (emulsion)		Defitraces report R18-913034-001	**Acceptable**
Physical hazards and characteristics					
Explosives	Not expected to be explosive	Statement	Regarding properties of the active substance and all the co-formulants which compose the PHEROBALL PIN product, none of these compounds could induce explosive properties to the product. Therefore, we can conclude that the Pine T Pro Ball product is not expected to present explosive properties.	Report M2iD-DEV-2020-03 "Assessment of potential hazard properties of the active substance (Z)-13-	**Acceptable**

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
				hexadecen-11-yn-1-yl acetate and Pine T Pro Ball product"	
Flammable gases	Not relevant		The product is not a gas		-
Flammable aerosols	Not relevant		The product is not an aerosol		-
Oxidising gases	Not relevant		The product is not a gas		-
Gases under pressure	Not relevant		The product is not a gas		-
Flammable liquids	Data not available	EEC A9	This test will be provided. The applicant plans to perform them during the provisional marketing authorization period. In the meantime, the applicant propose a theorical assessment of flash point value. Final flash point of the product is not expected being below 100°C.		additionnal data should be provided at product authorisation stage
Flammable solids	Not required		Polymer of the ball is not flammable.		Data gap
Self-reactive substances and mixtures	Not expected to be self-reactive		None of the compounds of the biocidal product formulation contains any of the chemical groups		Acceptable

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
			listed in section 2.8.1 of the "Guidance on the Application of the CLP Criteria "		
Self-heating substances and mixtures	Not applicable.		The product is a non-flammable containing no flammable ingredients. The product contains a large percentage of water		Acceptable
Pyrophoric liquids	Not expected to be pyrophoric		Pheromone is not pyrophoric		Acceptable
Pyrophoric solids	Not expected to be pyrophoric		Polymer of the ball is not pyrophoric		Acceptable
Substances and mixtures which in contact with water emit flammable gases	Not expected to emit flammable gases in contact with water.		Pheromone is not expected to emit flammable gases in contact with water, neither the polymer of the ball and the other ingredients.		Acceptable
Oxidising liquids	Not expected to be oxidising		Regarding the properties of the active substance and all the co-formulants which compose the Pine T Pro Ball product, without the shell, none of these compounds present oxidising properties. The substance or other consituents of the mixture does not contain oxygen, fluorine or chlorine. Therefore, we can conclude that the product is not	Report M2iD-DEV-2020-03 "Assessment of potential hazard properties of the active substance (Z)-13-hexadecen-11-yn-1-yl	**Acceptable**

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
			expected to have oxidising properties.	acetate and Pine T Pro Ball product"	
Oxidising solids	Not expected to be oxidising		The final physical state of the biocidal product is shell ball. The shell is a polymer which has no oxidising properties.		**Acceptable**
Organic peroxides	Not required		Pheromone and other ingredients are not an organic peroxide.		**Acceptable**
Corrosive metals	No information available		The applicant undertakes to carry out the corrosivity test of Pine T Pro Ball product during the period of the provisional marketing authorization. None of these compounds (active substance and co-formulants) could induce corrosive properties to the product. The product is considered as a solid, therefore the corrosive properties are not considered.	Report M2iD-DEV-2020-03 "Assessment of potential hazard properties of the active substance (Z)-13-hexadecen-11-yn-1-yl acetate and Pine T Pro Ball product	**Acceptable**
Auto-ignition temperature of products (liquid and gas)	Data not available	EEC A15 test or N4 test	The applicant undertakes to carry out the auto-ignition study of PHEROBALL PIN product during the period of the provisional marketing authorization. However, regarding flammability of the active substance and all the co-	Report M2iD-DEV-2020-03 "Assessment of potential hazard properties of the active	Additionnal data should be provided at product authorisation stage

Property	Result	Test method applied or description in case of deviation	Remarks / Discussion / Justification for waiving	References	Comment
			formulants which compose the PHEROBALL PIN product, none of these compounds present value below 100°C. Furthermore, the product is composed of more than 75% of water.	substance (Z)-13-hexadecen-11-yn-1-yl acetate and Pine T Pro Ball product	
Relative self-igniton temperature of solids	Not required				-
Dust explosion hazard	Not relevant		The product is not a powder and does not produce dust.		-

6.4 HAZARD IDENTIFICATION FOR PHYSICAL AND CHEMICAL PROPERTIES

The product PHERO-BALL PIN is a pheromone in a natural wax emulsion. This emulsion is inserted into paint balls (EO containing 100 mg pheromone/ ball (i.e. 4.33% (pure) w/w)). All studies have been performed in accordance with the current requirements and the results are deemed to be acceptable.
The appearance of the product is an homogeneous slightly yellow opaque liquid (transparent beads of about 1.7 cm diameter full of slightly yellow opaque liquid) with a characteristic odour. There is no effect of high temperature on the stability of the formulation, since after 14 days at 54 °C in packaging silver plastic bag (PET/Alu/PE), neither the active ingredient content nor the technical properties were changed.
After 7 days at 0°C, the appearance and technical characteristic have not significantly changed. The product is stable at 0°C. The stability data indicate a shelf life of at least 2 years at ambient temperature in commercial packaging.

Its technical characteristics are acceptable for an EO formulation.

The product PHERO-BALL PIN is not explosive and not oxidizing.

Data Gap
Concerning the auto-ignition and flammability properties of the product, the statement provided cannot be considered as sufficient. According to the CLP guidance document 1272/2008, tests should be provided.

6.5 ANALYTICAL METHODS FOR DETECTION AND IDENTIFICATION

Analytical methods for the analysis of the product as such including the active substance, impurities and residues									
Analyte (type of analyte e.g. active substance)	**Analytical method**	**Precision**	**Linearity**	**Specificity**	**Recovery rate (%)**			**Limit of quantification (LOQ) or other limits**	**Reference**
					Range	Mean	RSD		
(13Z)-hexadec-13-en-11-yn-1-yl acetate	(13Z)-hexadec-13-en-11-yn-1-yl acetate is analysed after 4 extractions (heptane) from the formulation and quantified by gas chromatography using a flame ionisation detector (GC-FID). The nominal value of the active substance is 100 mg/ball (4% w/w).	4,35% w/w (n=5) RSD=0.55%	Calibration solutions of the reference item at five concentrations between 50% and 150% of the expected concentration were analysed. The response of the detector during the analysis of (13Z)-hexadec-13-en-11-yn-1-yl acetate was linear within the range of 91.83 x 10^{-3} g/kg to 255.39 x 10^{-3} g/kg (y = 1.45E-02 x – 2.58E-01; r = 0.9997).	No interference was observed in solvent blank, formulation blank, reference item and test item at the retention times of (13Z)-hexadec-13-en-11-yn-1-yl acetate.	121,41 x 10^{-3} g/kg (n=2) 129,17 x 10^{-3} g/kg (n=2)	101.2%	<2%	Not required	**R18-913034-005**

Analytical methods for plant material and foodstuffs of animal origin

Analyte (type of analyte e.g. active substance)	Analytical method	Fortification range / Number of measurements	Linearity	Specificity	Recovery rate (%)			Limit of quantification (LOQ) or other limits	Reference
					Range	Mean	RSD		
No analytical method has been submitted as the environmental risk assessment shows that **(13Z)-hexadec-13-en-11-yn-1-yl acetate**, when used as a biocide, does not affect the levels of **(13Z)-hexadec-13-en-11-yn-1-yl acetate** found usually in the atmosphere, outside normal range.									

Analytical methods for soil, water, air and animal and human body fluids and tissus									
Analyte (type of analyte e.g. active substance)	**Analytical method**	**Fortification range / Number of measurements**	**Linearity**	**Specificity**	**Recovery rate (%)**			**Limit of quantification (LOQ) or other limits**	**Reference**
					Range	**Mean**	**RSD**		
No analytical method has been submitted because the environmental risk assessment shows that **(13Z)-hexadec-13-en-11-yn-1-yl acetate**, when used as a biocide, does not affect the levels of **(13Z)-hexadec-13-en-11-yn-1-yl acetate** found usually in the atmosphere, outside normal range and because the active substance is not classified toxic or very toxic.									

7 EFFICACY

7.1 EFFICACY

- Intended uses:

The (13Z)-Hexadec-13-en-11-yn-1 acetate is the pheromone naturally produced by the *Thaumetopoea pityocampa* female moth.
This active substance is aimed to be used into a passive diffuser (PHEROBALL PIN / Pine T Pro Ball) to disrupt mating in pine tree forests in order to control the pine processionary Caterpillar. The pine processionary Caterpillar has an impact on human health as its bristles can cause inflammatory skin reactions, as well as more serious allergic reactions of the respiratory mucosa.

The active substance (13Z)-Hexadec-13-en-11-yn-1 acetate is micro-encapsulated using water-based process into waxes/oils leading to a formulated material in gel form. This gel is then introduced into balls.

The balls are then applied on pine trees trunks closed to canopy using paint-ball guns. Under impact, the balls burst and gel formulation is sticked on the truncks closed to canopy. After water evaporation, a film containing the pheromone and wax/oil is left on the trunck. This film acts as a passive diffuser that will diffuse the (13Z)-Hexadec-13-en-11-yn-1 acetate on a controlled way via volatilisation like for the dissipation of pheromone observed naturally near each emitting female moth.

According to the applicant, for forest areas, the product is intended to be used at the dose of 400 balls of Pine T Pro Ball per hectare, applied once a year, before the appearance of the first seasonal flight of pine processionary moth (PPM) adults. Each Pine T Pro Ball contains 2.4 g of gel (formulation of (13Z)-Hexadec-13-en-11-yn-1 acetate in natural waxes/oils) which corresponds to 0,1 g of active substance per ball. Thus, 40 g of active substance equivalent to 400 balls will be applied by hectare once a year.
Specific applications rates are also claimed for isolated tree and gloves for urban areas (groves, narrow band of trees, isolated trees). The application rate claimed is 1 ball per meter of height and per tree

- Efficacy studies performed:

The applicant claims both a reduction of pine processionary caterpillars in pine areas and reduction of pine processionary nests.

Efficacy guidance Vol II part B/C does not provide requirements and criteria for such uses. Therefore, eCA has considered that 70% to 80% of reduction of both pine processionary caterpillars and nests is the minimum threshold for a sufficient efficacy.

No laboratory tests have been performed. Indeed, the applicant explained that it is due to the short living of the *T. pityocampa* adults: usually females die after egg laying (from 24 to 48 hours) after emergence, and males can persist for 3-4 days (Zang & al, 1998).
eCA agreed with this waiving

Therefore the efficacy data submitted are only carried out in the field.
First, the effective dose test of the product Phero-Ball Pin / Pine T Pro Ball has been then identified following a specific experimental protocol design in 2016, in the framework of "Optim'Phero project".

Then, 14 field trials were performed:

- ⇨ Nine studies have been performed in forest: 5 trials in France, one in Israel and 3 in Spain.
- ⇨ Five trials have been performed in urban zones in France.

The sites were selected on the basis of a history of lepidoptera defoliating pest infestation, in areas representative of typical forest and woodland. Trials were carried out to evaluate the efficacy of the product Pine T Pro Ball/ Phero-Ball Pin when applied directly on trees with a compressed air gun against *Thaumetopoea pityocampa*:

- The trial conducted in 2015-2016 (Massif de la Montagnette - France) was considered as a pre-test because the aim was to optimize the diffusion regarding the *T. pityocampa* flight behaviour.
- The trial conducted in 2016-2017 (Col d'Eze - France) aimed to test the dosage of 400 balls (40 g of a.s.)/ha.
- The trials conducted from 2017 to 2020 (French and Spanish forests) aimed to confirm the efficacy of the dose of 400 balls (40 g a.s)/ha.

- The trials conducted in urban zones in France from 2016 to 2020 aimed to test the efficacy in urban zones (groves, narrow band of trees, isolated trees) with range doses of 5 to 30 balls/tree.

In all the field tests, efficacy was assessed:
- By counting the number of pine processionary moths trapped (adult males) and,
- By counting the winter nests (before and after the trial) to reveal the consequences of mating disruption in terms of population dynamics.

It has to be noted that to correct the bias due to normal fluctuating population levels accross time, the average number of nests has been calculated by the Henderson and Tilton formula and corrected taking into account the natural dynamics in the control plot over the 2 years. Indeed, the *Thaumetopoea pityocampa* population dynamic is very singular, relies on several factors such as climate suitability, active dispersal capabilities and habitat distribution/host trees density. Clearly the unit of measure, the number of nests per pine in the treated area, need to be connected and corrected according to the trends of the general pine processionary moth population dynamic in the local geographic area to express the fair efficiency of the mating disruption application as a sort of a non-treated control.

<table>
<tr><th colspan="8">Experimental data on the efficacy of the biocidal product against target organism(s)</th></tr>
<tr><th>Function</th><th>Field of use envisaged</th><th>Test substance</th><th>Test organism(s)</th><th>Test method</th><th>Test system / concentrations applied / exposure time</th><th>Test results: effects</th><th>Reference</th></tr>
<tr>
<td>PT 19- Attractant Reducing population of pine processionary caterpillars and nests in trees</td>
<td>Forest
Optim’ Phero project</td>
<td>Pine T Pro Ball/ Phero-Ball Pin ((13Z)-Hexadec-13-en-11-yn-1 acetate)

(0.1 g of active substance/ball)</td>
<td>Pine processionary moth

Thaumetopoea pityocampa

Adult, male</td>
<td>Mating disruption by deposition of balls using a paintball

Field trial

Pre-test performed in the Massif of Montagnette (departement 13) in France.</td>
<td>The experimental surface and the control area both of 6 hectares
Each area is gridded to install the dispensers at each intersection of the mesh. Shooting is done on the tallest trees in order to optimize the impact.
In the test area, 5 pheromone traps were put in place. They were placed in the middle of the area along an alignment axis, along a path. Similarly, 6 pheromone traps are installed in the control area, located nearby the study site but over a larger area.
A total of 11 traps were set.
80 balls (0.12 g of pheromone/ball) were fired per hectare, i.e. one dose of 10 g/ha of pheromone.
Sentinel traps (pheromone traps) were monitored every 2 weeks for the duration of the adults' flight.
Sentinel traps are used to caught male butterflies. They are positionned in control and treated plots. These traps are designed to simulate the behaviour of adult females. Comparison between control and treated plots is performed.</td>
<td>Results for the number of male pine processionary moths captures:
<table>
<tr><th></th><th>Number of pine processionary trapped</th></tr>
<tr><td>Control</td><td>739</td></tr>
<tr><td>Treated area</td><td>166</td></tr>
</table>
=>Only 22.5% of the catches came from the Pine T Pro Ball/ Phero-Ball Pin area, that demonstrate the effect of the mating disruption treatment and the slowdown density of the T. pityocampa population inside.

Results for the number of winter nests:
<table>
<tr><th></th><th>Nb winter nest Feb 2015 (before treatment)</th><th>Nb winter nest Feb 2016 (after treatment)</th></tr>
<tr><td>Control</td><td>12.2</td><td>14.2</td></tr>
<tr><td>Treated area</td><td>8.2</td><td>9.8</td></tr>
</table>
=>The Pine T Pro Ball/ Phero-Ball Pin treatment has allowed to decrease the pine processionary population by 2.68%.</td>
<td>VI.2 Proof of concept trial (site Montagnette-2015-2016)

EFFICACY DATA and RELEVANT INFORMATIONS

R.I = 2 Supportive data</td>
</tr>
</table>

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td>The assessment in the control and the mating disruption area is done by counting winter nests of the pine processionary in 5 sub areas (A, B, C, D, E) of 10 trees each, both in February 2015 (before treatment) and February 2016 (after treatment).</td><td>This trial demonstrate that the rate of 10 g/ha is not sufficient.</td><td></td></tr>
<tr><td></td><td>Forest</td><td>Pine T Pro Ball/ Phero-Ball Pin ((13Z)-Hexadec-13-en-11-yn-1 acetate)

(0.1 g of active substance/ball)</td><td>Pine processionary Thaumetopoea pityocampa</td><td>Mating disruption by deposition of balls using a paintball</td><td>The trial was conducted at Col d’Eze in the Grande Corniche departmental park in France.
Four different numbers of balls/ha (100 ; 200 ; 400 ; 1000) were tested in 2 forest plots of 4 hectares each (except the 400 balls/ha modality and the 100 balls/ha modality which have been tested on one plot of 4 ha only) and even an application in two times (100 + 100), the first 100 balls/ha before the flight and the second application (100 balls/ha) in the middle of the pest flight curve. This doubling of the dose is intended to verify both the double-dose effect on the capture of male butterflies and the persistence of action of the microencapsulated pheromone used in the balls.
It has been included in the protocol the installation of 5 sentinel traps per control and mating disruption plots, checked every 15 days in order to follow the population dynamics on both sides and to</td><td>Results of moths capture counting:<table><tr><td></td><td>Nb moths caught</td></tr><tr><td>Untreated area</td><td>49.6</td></tr><tr><td>Treated area</td><td>7.6</td></tr></table>
Results of nests counting:<table><tr><td></td><td>Before treatment</td><td>After treatment</td></tr><tr><td>Untreated area</td><td>7</td><td>5.5</td></tr><tr><td>Treated area</td><td>54</td><td>14</td></tr></table>
=> Reduction up to 85% of moths capture and 74% of nests number in pine trees of the treated area at the dose of 400 balls/ha.</td><td>VI.3 Minimum effective dose tests: forest areas (site Col d’Eze, 2016-2017)

EFFICACY DATA and RELEVANT INFORMATIONS

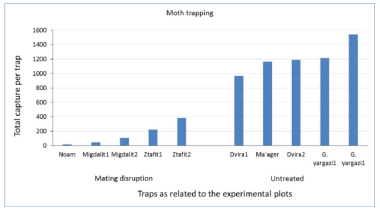
RI=2</td></tr>
</table>

					control the effectiveness of the disruption treatment too. Outside plots five additional traps were suspended every 25 meters at a distance of 100 meters from the edge of the plots. Thus, two control areas were selected to follow, throughout the adult flight period, the natural fluctuations of the pine processionary moth population. Caterpillar nest counts were performed in January 2016 before the Pine T Pro Ball treatment and were replicated the following winter in January 2017. This enumeration has been carried out in the 3 plots sampled of 30 trees each.		
	Forest	Pine T Pro Ball/ Phero-Ball Pin ((13Z)-Hexadec-13-en-11-yn-1 acetate) (0.1 g of active substance/ball)	Pine processionary *Thaumetopoea pityocampa*	Mating disruption by deposition of balls using a paintball	The trial was conducted at Col d'Eze in the Grande Corniche departmental park in France. 300 balls/ha and 400 balls/ha have been tested in two plots as a replication. At last, three control plots were defined. On each experimental plots selected for the study, a 10x10m square mesh was constructed by SIG (Geographic Information System) in order to better distribute the Pine T Pro Ball/ Phero-Ball Pin balls over the 4 hectares area. Treatments have been performed before the adults started flying (last week of June). The protocol included five sentinel traps (Cameratrap®	Results for the number of males pine processionary moths captures: <table><tr><td></td><td>Number of pine processionary trapped</td></tr><tr><td>Control</td><td>28.5</td></tr><tr><td>300 balls/ha</td><td>26.8</td></tr><tr><td>400 balls/ha</td><td>16.3</td></tr></table> ⇨ no statistically difference were highlighted in the different numbers of male moths captured between treated plots and those non-treated analysed in an ANOVA test followed by a posthoc Tukey test) ; Nonetheless, there is evidence that the sentinel traps from the 400 balls/ha treated plots tend to catch consistently less pine	VI.5 a-1 Efficacy trials in forest area a-1 Col d'Eze (France) (2017-2018) EFFICACY DATA and RELEVANT INFORMATIONS RI = 2

<table>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>model loaded with Process'Attract pheromone diffuser) distributed in the middle of each plot in order to monitor the pine processionary moth every 15 days until the end of the T. pityocampa flight and to control the "disruption effect on the males present in the "mating disruption" plots compared to the controls</td>
<td>processionary moths than the rest of the test system

Results for the number of winter nests before and after treatment:
<table>
<tr><th></th><th>Before treatment</th><th>After treatment</th></tr>
<tr><td>control</td><td>22</td><td>18</td></tr>
<tr><td>300 balls/ha</td><td>65</td><td>37</td></tr>
<tr><td>400 balls/ha</td><td>77</td><td>41</td></tr>
</table>
% reduction (readjusted in relation to natural dynamics)
300 balls/Ha : 29 %
400 balls/Ha : 35.9 %

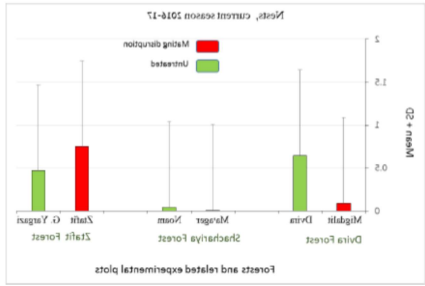
Results of this trial showed low reduction of the number of nests, between 29 and 36 % for 300 and 400 balls/ha respectively in winter 2018</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Forest</td>
<td>Pine T Pro Ball/ Phero-Ball Pin ((13Z)-Hexadec-13-en-11-yn-1 acetate)

(0.1 g of active substance/ball)</td>
<td>Pine processionary Thaumetopoea pityocampa</td>
<td>Mating disruption by deposition of balls using a paintball</td>
<td>Mating disruption treatments took place within three Pine planted forests in the northern Negev, with T. pityocampa pine cultivar. The sites «Ovira or Driva” and “Lashich or Shachariya” were treated with 300 balls/ha of Pine T Pro Ball while a third site “Tsafit or Tzafit” was treated with a dose rate of 400 ball/ha of Pine T Pro Ball/ Phero-Ball Pin.
A control plot was also defined near the treated area in each</td>
<td>Results are only illustrated in histogram, no raw data provided
Cumulative moth trapping within monitoring
 

The results showed significant regression in catches in mating</td>
<td>a-2: Israel (Zvi Mandel - 2016-2017)

EFFICACY DATA and RELEVANT INFORMATIONS

Supportive data</td>
</tr>
</table>

					site. In all paired plots significant population of pine processionary moth were identified before the applications. Two new parameters have been also assessed: observation of the number of early feeding spots and the measure of egg clusters.	disruption treated plots compared to the number of adults captured in the untreated plots. Comparison of mean pine processionary moth nest per tree (March 2017):  It has to be noted that the two sites treated with the dose rate of 300 balls/ha registered a real decline in the number of winter nests. A high significant difference is observed in Ovira or Dvira forest sites	
	Forest - grove	Pine T Pro Ball/ Phero-Ball Pin ((13Z)-Hexadec-13-en-11-yn-1 acetate) (0.1 g of active substance/ball)	Pine processionary moth *(Thaumetopoea pityocampa).*	*Assessment of the moth reduction with mating disruption using traps monitoring.*	Etang du Corra (French department of Yvelines (78): The trial is divided in 3 mating disrupted areas (Zone 1, Zone 2, Zone 3). The first zone (Zone 1) is composed of 6 young individual pine trees. The Zone 2 is a grove of 17 pines Zone 3 is a grove of 35 pines. The pines trees were treated with the Pine T Pro Ball the 25/07/2019 with 10 balls per tree.	Traps results in Zone 1, Zone 2, Zone 3  *Figure 9. Traps results in Zone 1, Zone 2 and Zone 3* The captures were very low in the non-MD area but no males were found in the MD area, which shows a significant effect of MD reducing the males number even if the application of the balls was done late in the season (the flight was already started). The number of nests was only evaluated one single year in mating	DELMAS L., 2021, report n°M2iD-ESS-2021-02, "EFFICACY TRIALS of the Pine T Pro Ball for Mating Disruption of Pine Processionary Moth (*Thaumetopoea pityocampa*)

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td>The traps were installed the same day. One trap in the mating disturbed area (MD area) and one trap outside of the disturbed area (non-MD area) were placed in each area (Zone 1, Zone 2, Zone 3).
The observation of traps was done at 3 dates in August (week 32, S32), September (week 36, S36) and in October (week 39, S39).</td><td>disruption area, which does not allow nests number comparison

=> This test has been considered as supportive data since application has been performed after moths flight starting, which explains low number of captures. Furthermore, nests number before the application is unknown, thus the estimation of nests reduction number was not possible.</td><td>2019-2020 FRANCE”

Supportive data</td></tr>
<tr><td></td><td>Forest</td><td>Pine T Pro Ball/ Phero-Ball Pin ((13Z)-Hexadec-13-en-11-yn-1 acetate)

(0.1 g of active substance/ball)</td><td>Pine processionary moth (Thaumetopoea pityocampa).</td><td>Assessment of the moth reduction with mating disruption using traps monitoring. Evaluation of the number of nests before the application and the year after application.</td><td>Forêt de Gréolières (French department of Alpes-Maritimes (06)):
The trial is divided in 2 sites (Suy and Combes).
The Suy site is 3ha and the Combes site is 1,6ha.
The Suy site is composed of 640 pine trees and the Combes site is composed of 160 pine trees.
The pines trees were treated with the Pine T Pro Ball the 07/07/2019 with an average of 350 - 400 balls/ha.
The traps were installed this same day. One trap in the mating disturbed area (MD area) and one trap outside of the disturbed area (non-MD area) were placed in Suy and Combes sites. The traps were observed from July to September 2019.</td><td>Results of flight monitoring:
<table>
<tr><td>Site Combes</td><td>Nb moths caught</td></tr>
<tr><td>Untreated area (Non – MD area)</td><td>0</td></tr>
<tr><td>Treated area (MD area)</td><td>0</td></tr>
</table>
<table>
<tr><td>Site Suy</td><td>Nb moths caught</td></tr>
<tr><td>Untreated area (Non – MD area)</td><td>1</td></tr>
<tr><td>Treated area (MD area)</td><td>0</td></tr>
</table>
Results of nest count:
<table>
<tr><td>Site Combes</td><td>Before treatment</td><td>After treatment</td></tr>
<tr><td>Treated area (MD area)</td><td>65</td><td>39</td></tr>
</table>
<table>
<tr><td>Site Suy</td><td>Before treatment (2019)</td><td>After treatment (2020)</td></tr>
<tr><td>Treated area (MD area)</td><td>325</td><td>115</td></tr>
</table>
The moths’ pressure was very low on both sites in 2019. Indeed, only</td><td>DELMAS L., 2021, report n°M2iD-ESS-2021-02, “EFFICACY TRIALS of the Pine T Pro Ball for Mating Disruption of Pine Processionary Moth (Thaumetopoea pityocampa) 2019-2020 FRANCE”

RI : 2</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>1 capture was found in non-MD area of Suy site and no moth was found in the MD areas of the two sites (Suy and Combes). However, a reduction of nests has been observed in the MD area between 2018 and 2019. In the Combes site a reduction of 40% of the nest is observed between 2018 and 2019. In the Suy site, the nests reduction reaches 64% between 2018 and 2019.

=> An absence of captures in the MD area (low pressure) for the two sites and a diminution up to 40-64% of the nests was observed, showing the efficacy of the mating disruption product for nest reduction at 400 balls/ha.</td><td></td></tr>
<tr><td></td><td>Forest</td><td>Pine T Pro Ball/ Phero-Ball Pin ((13Z)-Hexadec-13-en-11-yn-1 acetate)

(0.1 g of active substance/ball)</td><td>Pine processionary moth (Thaumetopoea pityocampa).</td><td>Assessment of the moth reduction with mating disruption using traps monitoring. Evaluation of the number of nests before the application and the year after application.</td><td>Catalonia (Spain) in 2020:
The trial is divided in 5 zones and each zone had a treated plot and untreated plot. The plots size range is from 0.44ha to 10ha.
Application with respectively:
Zine 1 & 2: 160 balls/ha
Zone 3: 550 balls/ha
Zone 4:180 balls/ha
Zone 5: 70 balls/ha
The number of nests was evaluated in January 2020 (before application) and in January 2021 (after application). The number of adults moths was also followed in the treated and untreated plots using traps.</td><td>Results of nests counting before and after treatment in treated area:
<table>
<tr><th>Zone</th><th>Before treatment (2020)</th><th>After treatment (2021)</th></tr>
<tr><td>1</td><td>400</td><td>81</td></tr>
<tr><td>2</td><td>39</td><td>0</td></tr>
<tr><td>3</td><td>29</td><td>16</td></tr>
<tr><td>4</td><td>52</td><td>8</td></tr>
<tr><td>5</td><td>48</td><td>105</td></tr>
</table>
Results of nests counting before and after treatment in untreated area:
<table>
<tr><th>Zone</th><th>Before treatment (2020)</th><th>After treatment (2021)</th></tr>
<tr><td>1</td><td>68</td><td>137</td></tr>
<tr><td>2</td><td>15</td><td>13</td></tr>
<tr><td>3</td><td>25</td><td>19</td></tr>
</table></td><td>DELMAS L., 2021, report n°M2iD-ESS-2021-03, “EFFICACY TRIALS of the Pine T Pro Ball for Mating Disruption of Pine Processionary Moth (Thaumetopoea pityocampa) 2020 SPAIN”

RI : 2</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>4</td><td>21</td><td>4</td></tr>
<tr><td>5</td><td>48</td><td>118</td></tr>
</table>

Results of moths captures in treated and untreated areas:
<table>
<tr><td></td><td>Treated area</td><td>Nb of adults</td></tr>
<tr><td>Zone 1</td><td>Rodajos</td><td>253</td></tr>
<tr><td>Zone 2</td><td>Pso. Piñoneros</td><td>109</td></tr>
<tr><td>Zone 3</td><td>El Renegado</td><td>164</td></tr>
<tr><td>Zone 4</td><td>Pinar repoblación</td><td>356</td></tr>
<tr><td>Zone 5</td><td>El Separado</td><td>766</td></tr>
<tr><td></td><td>Unteated area</td><td></td></tr>
<tr><td>Zone 1</td><td>El Pocillo - C</td><td>540</td></tr>
<tr><td>Zone 2</td><td>Covatillas- C</td><td>346</td></tr>
<tr><td>Zone 3</td><td>El Renegado - C</td><td>347</td></tr>
<tr><td>Zone 4</td><td>Pinar repoblación -</td><td>290</td></tr>
<tr><td>Zone 5</td><td>Oeste del Separad</td><td>1276</td></tr>
</table>

Efficacy of mating disruption on moths population in treated and untreated areas:
<table>
<tr><td></td><td>Capture difference btw untreated and treated plot</td><td>Efficacy %</td></tr>
<tr><td>Zone 1</td><td>287</td><td>53</td></tr>
<tr><td>Zone 2</td><td>237</td><td>68</td></tr>
<tr><td>Zone 3</td><td>183</td><td>53</td></tr>
<tr><td>Zone 4</td><td>-66</td><td>-23</td></tr>
<tr><td>Zone 5</td><td>510</td><td>40</td></tr>
</table>

=> Efficacy of product in forest has been demonstrated by nests reduction up to 92 - 100%, and by moths captures up to 53 - 68 % respectively in zone 1 and 2 at 160 balls/ha.</td><td></td></tr>
<tr><td></td><td>Forest: Rural pine forest</td><td>Pine T Pro Ball/ Phero-Ball Pin ((13Z)-Hexadec-13-en-11-yn-1 acetate)

(0.1 g of active substance/ball)</td><td>Pine processionary moth (Thaumetopoea pityocampa).</td><td>Evaluation of the number of nests after application.</td><td>Lakidain, Navarra, (Spain):

The Pine T Pro Ball application was performed on the edges of the path that ascends through the pine forest using 250 balls /0.5 ha (168 linear meters of path). The balls are distributed on both sides of the path, covering a depth of 15 m.</td><td>Results of the flight monitoring and nest count:
<table>
<tr><td>Lakidain</td><td>Nb moths caught</td><td>Nb nest</td></tr>
<tr><td>Untreated area</td><td>ND</td><td>11</td></tr>
<tr><td>Treated area</td><td>ND</td><td>4</td></tr>
</table></td><td>DELMAS L., 2021, report n°M2iD-ESS-2021-03, “EFFICACY TRIALS of the Pine T Pro Ball for Mating Disruption of</td></tr>
</table>

<table>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>The application was implemented the 02/07/2020.
To attest the number of nests, 10 observed areas (composed of 10 trees each) were evaluated (number of nests) 4 months after application in the treated and untreated areas.
Traps were placed in the treated areas and the non-treated areas, to monitor the pest.</td>
<td>=> Despite low pressure, the nests number reduced to 63% (with regard to the untreated area) on a base of 200 trees in each plot at the dose of 250 balls/ha.
The trap placed in the treated area does not show any catch and the untreated plot trap has disappeared, thus it is not possible to conclude about moth captures efficacy.</td>
<td>Pine Processionary Moth (Thaumetopoea pityocampa) 2020 SPAIN”

RI: 3
The dose tested is higher (500 balls/ha) than the claimed dose</td>
</tr>
<tr>
<td></td>
<td>Forest: Peri-urban pine forest</td>
<td>Pine T Pro Ball/ Phero-Ball Pin ((13Z)-Hexadec-13-en-11-yn-1 acetate)

(0.1 g of active substance/ball)</td>
<td>Pine processionary moth (Thaumetopoea pityocampa).</td>
<td>Evaluation of the number of nests after application.</td>
<td>Zizur, pinar de Ardoi, Navarra, (Spain) :
Application was performed on two bands:
- the southern edge of the pine forest with 125 balls/0.5 ha
- on the north edge of the delimited plot with 250 balls/0.5 ha</td>
<td>Results of the flight monitoring and nest count:
<table>
<tr><td>Zizur</td><td>Nb moths caught</td><td>Nb nest</td></tr>
<tr><td>Untreated area</td><td>ND</td><td>7</td></tr>
<tr><td>Treated area</td><td>ND</td><td>0</td></tr>
</table>
=> The Pine T Pro Ball application allowed a nests reduction of 100% (with regard to the untreated area) in low pest pressure condition at the dose of 250 balls/0.5 ha (500 balls/ha).
No conclusion can be made on the efficacy of the product on the males moths (trap lost).</td>
<td>DELMAS L., 2021, report n°M2iD-ESS-2021-03, “EFFICACY TRIALS of the Pine T Pro Ball for Mating Disruption of Pine Processionary Moth (Thaumetopoea pityocampa) 2020 SPAIN”

RI: 3
The dose tested is higher (500 balls/ha) than the claimed dose</td>
</tr>
</table>

<table>
<tr>
<td></td>
<td>Urban zone: groves, isolated trees</td>
<td>Pine T Pro Ball/ Phero-Ball Pin ((13Z)-Hexadec-13-en-11-yn-1 acetate)

(0.1 g of active substance/ball)</td>
<td>Pine processionary Thaumetopoea pityocampa</td>
<td>Mating disruption by deposition of balls using a paintball</td>
<td>Cannes - 2016 (France)
2016: dose response in small areas in 6 sites (5 to 27 balls per tree). Trap captures and number of winter nests have been assessed and compared with the natural population dynamics observed in the controls plots associated.</td>
<td>Results 2016:
 

Results suggested that a minimum dose rate exposure of around 10 balls may be interesting in the case of a narrow group of 13 or more pines as well up than 25 balls may be efficient in the case of an isolated tree. Dose-rate between 1 to 10 balls/tree was not sufficient.</td>
<td>VI.4 Minimum effective dose tests: groves, narrow band of trees, isolated (2016-2017)

EFFICACY DATA and RELEVANT INFORMATIONS

Supportive data (qualitative results)</td>
</tr>
<tr>
<td></td>
<td>Urban zone: groves, isolated trees</td>
<td>Pine T Pro Ball/ Phero-Ball Pin ((13Z)-Hexadec-13-en-11-yn-1 acetate)

(0.1 g of active substance/ball)</td>
<td>Pine processionary Thaumetopoea pityocampa</td>
<td>Mating disruption by deposition of balls using a paintball</td>
<td>Hospital Centre of Avignon (department 84) – France - 2017:
Six small groves composed by 3 to 7 pines were selected for treatment by mating disruption with a dose rate of 30 balls/tree.
The grove 1 received finally the double dose: 60 balls/tree were fired. (30 balls/pine at 28/06/2017 followed by another application of 30 balls/pine because of the rain.
The groves 2 to 6 treated with 30 balls/tree (03/07/2017 for grove 2 and 28/06/2017 for the other groves).
Two other groves defined by 5 and 8 pines respectively, were untreated and used as control.</td>
<td>The mean male moth captures did not allow to demonstrate a measurable effect or the mating disruption treatment all along the T. pityocampa flight in 2017
Results for the number of winter nests:
<table>
<tr><th>Mesures</th><th>Before treatment (2017)</th><th>After treatment (2018)</th></tr>
<tr><td>Control (n*=13)</td><td>6.5±9.2 ns</td><td>8.5±6.4 ns</td></tr>
<tr><td>Treated area (n=28)</td><td>24.67±11.36 a</td><td>12.16 ± 5.38 b</td></tr>
</table>
*: number of trees
Letters indicate the statistical results obtained after analysis with Wilcxon test (a,b: statistical difference (p≤0.05; ns: non significant)</td>
<td>VI.4 Minimum effective dose tests: groves, narrow band of trees, isolated (2017-2018)

RI : 2
Supportive data</td>
</tr>
</table>

<table>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pine T Pro Ball/ Phero-Ball Pin applications were performed before the moth flight.</td>
<td>
Test en zone urbaine processionnaire du pin : 2017
<table>
<tr><th>Sites</th><th colspan="4">Bosquets phéroball</th><th colspan="3">Témoin</th></tr>
<tr><th></th><th>Nombre de pins</th><th>Modalités</th><th>2017</th><th>2018</th><th>Nombre de pins</th><th>2017</th><th>2018</th></tr>
<tr><td>Avignon CHU 1</td><td>7</td><td>60* Billes/pin</td><td>106</td><td>39</td><td>13</td><td>13</td><td>17</td></tr>
<tr><td>Avignon CHU 2</td><td>7</td><td>30 Billes/pin</td><td>9</td><td>9</td><td>13</td><td>13</td><td>17</td></tr>
<tr><td>Avignon CHU 3</td><td>3</td><td>30 Billes/pin</td><td>25</td><td>19</td><td>13</td><td>13</td><td>17</td></tr>
<tr><td>Avignon CHU 4</td><td>3</td><td>30 Billes/pin</td><td>21</td><td>7</td><td>13</td><td>13</td><td>17</td></tr>
<tr><td>Avignon CHU 5</td><td>3</td><td>30 Billes/pin</td><td>44</td><td>18</td><td>13</td><td>13</td><td>17</td></tr>
<tr><td>Avignon CHU 6</td><td>6</td><td>30 Billes/pin</td><td>27</td><td>13</td><td>13</td><td>13</td><td>17</td></tr>
<tr><td>Avignon CHU 7</td><td>4</td><td>30 Billes/pin</td><td>22</td><td>7</td><td>13</td><td>13</td><td>17</td></tr>
</table>
=> In this urban zone, the treatment have a significant impact on the pine processionary moth population with 58% (±21%) of decline in the number of winter nests.
However the height of pines is not known therefore the claimed application rate of 1 ball per meter of height and per tree cannot be validated.
</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Urban zone: groves, isolated trees</td>
<td>Pine T Pro Ball/ Phero-Ball Pin ((13Z)-Hexadec-13-en-11-yn-1 acetate)

(0.1 g of active substance/ball)</td>
<td>Pine processionary moth (Thaumetopoea pityocampa).</td>
<td>Assessment of the moth reduction with mating disruption using traps monitoring. Evaluation of the number of nests before the application and the year after application.</td>
<td>Tours de Seysses Résidence:

The trial started in 2020 and is set-up for 3 years.

Individual pines and pines groves are spread in six parts of the residence.
24 pines have been treated

The treatment has been done the 10/06/2020 with the application of 260 balls in 24 pines (average of 11 balls per pine as trees height between 8 and 15 m).
To assess the moth reduction with mating disruption, 2 traps are placed in the treated area and 1 trap is placed outside the treated area</td>
<td>Results of moths caught counting:
<table>
<tr><th></th><th>Nb moths caught</th></tr>
<tr><td>Untreated area</td><td>64</td></tr>
<tr><td>Treated area</td><td>13</td></tr>
</table>
Results of nests counting:
<table>
<tr><th></th><th>Before treatment</th><th>After treatment</th></tr>
<tr><td>Treated area</td><td>250</td><td>48*</td></tr>
</table>
=> Reduction up to of 80% of moths capture and the number of nests in pine trees of the treated area with the claimed dose of 1 ball per meter of height and per tree.</td>
<td>DELMAS L., 2021, report n°M2iD-ESS-2021-02, “EFFICACY TRIALS of the Pine T Pro Ball for Mating Disruption of Pine Processionary Moth (Thaumetopoea pityocampa) 2019-2020 FRANCE”

RI : 2</td>
</tr>
</table>

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td>The number of nests is also evaluated before the application and the year after the application. 250 nests were present in 2020 before the first application.</td><td></td><td></td></tr>
<tr><td></td><td>Urban zone: groves, isolated trees</td><td>Pine T Pro Ball/ Phero-Ball Pin ((13Z)-Hexadec-13-en-11-yn-1 acetate)

(0.1 g of active substance/ball)</td><td>Pine processionary moth (Thaumetopoea pityocampa).</td><td>Assessment of the moth reduction with mating disruption using traps monitoring.</td><td>Fontaine Roseraie Résidence (Toulouse – France):

This trial has been performed in 2019 and 2020 on 2 isolated pine trees. The pines are 12 meters high and 8 meters large and close to each other.

Two first applications were done :
- In June 2019: 20 balls per tree.
- In June 2020:20 balls per tree.
To assess the efficacy of the product, 1 trap is put in a tree (MD area) and another trap is put outside of the residence in hardwood (non MD area)</td><td>Results of flight monitoring:<table><tr><td></td><td>Before treatment (2019)</td><td>After treatment (2020)</td></tr><tr><td>Untreated area (non – MD)</td><td>5</td><td>3</td></tr><tr><td>Treated area (MD)</td><td>3</td><td>1</td></tr></table>
The pressure was very low for the 2 years (maximum 5 captures in non-MD area). Nevertheless, for the 2 years application, less males were caught in the MD area than in the untreated area. Indeed, in 2019, 3 males were caught in the treated area while 5 were found in the non-MD area. In 2020, only 1 adult was caught versus 3 in the non-MD area.

There is no data collected on nests

This trial has been considered as supportive data since no data were collected for nests and there was very low pressure, thus impact of product on the moths captures and nests reduction was not clearly demonstrated.
Moreover, the application rate (20 balls/tree) is not correlated to the one claimed with regard to the height of the pines (12 m)</td><td>DELMAS L., 2021, report n°M2iD-ESS-2021-02, “EFFICACY TRIALS of the Pine T Pro Ball for Mating Disruption of Pine Processionary Moth (Thaumetopoea pityocampa) 2019-2020 FRANCE”

Supportive data</td></tr>
</table>

<table>
<tr>
<td></td>
<td>Urban zone - Groves</td>
<td>Pine T Pro Ball/ Phero-Ball Pin ((13Z)-Hexadec-13-en-11-yn-1 acetate)

(0.1 g of active substance/ball)</td>
<td>Pine processionary moth (Thaumetopoea pityocampa).</td>
<td>Assessment of the moth reduction with mating disruption using traps monitoring. Evaluation of the number of nests before the application and the year after application.</td>
<td>Jean de La Fontaine school in Gujan-Mestrats (France) :

An average of 10 balls per trees were applied in 2020 on the 17 trees of the grove.
The number of nests was counted before the application and the year after the application.
For flight monitoring, one trap was placed in the treated grove and another trap was placed in an isolated tree in the untreated area.</td>
<td>Results of moths caught counting:
<table>
<tr><td></td><td>Nb moths caught</td></tr>
<tr><td>Untreated area</td><td>25</td></tr>
<tr><td>Treated area</td><td>3</td></tr>
</table>
Results of nests counting:
<table>
<tr><td></td><td>Before treatment (2020)</td><td>After treatment</td></tr>
<tr><td>Treated area</td><td>20</td><td>0-3*</td></tr>
</table>
=> Reduction up to of 88% of moths capture and 85% of nests in pine trees of the treated area, with 10 balls/pine. However the height of pines is not known therefore the claimed application rate of 1 ball per meter of height and per tree cannot be validated.</td>
<td>DELMAS L., 2021, report n°M2iD-ESS-2021-02, "EFFICACY TRIALS of the Pine T Pro Ball for Mating Disruption of Pine Processionary Moth (Thaumetopoea pityocampa) 2019-2020 FRANCE"

Supportive data</td>
</tr>
</table>

7.2 MODE OF ACTION

Mating disruption aims to disrupt chemical communication between organisms of a same species, pest insects in this present case, using very specific and non harmful substances : the pheromones. The mate-finding behavior in males is disturbed or disrupted by the progressive and passive release of relatively large amounts of synthetic female sex pheromone in the atmosphere. By sensing the smell of female "everywhere" the male is unable to find his way to the females, he is "confused." This leads to fewer matings within the treated area, fewer offsprings and consequently less damages in the crop.
Pin T Pro Ball is based on mating disruption by sexual confusion by saturating the air with a large amount of synthetic pheromone specific to the *Thaumetopoea pityocampa* during the flight period to reduce the chances of encounter between males and females, thus limiting the mating and, therefore, the number of spits.

Lepidopteran male moths such as pine processionary male moths use an upwind flight system for mate finding via an attractant pheromone released by the female.
The control of PPM (pine processary moth) is performed by introducing a cloud of sex pheromone that confuses the males and disrupts mate localization and/or courtship, thus preventing mating and blocking the reproductive cycle.

By introducing many sources of the sex pheromone into the ecosystem, the probability of the male finding the female is reduced, as is the likelihood of successful mating. As a result, mating is either delayed (with a subsequent negative affect on overall fertility) or prevented. If female moths do not mate, they cannot lay fertile eggs and, if their mating is delayed, they will lay fewer fertilized eggs in their lifetime. Consequently, the subsequent population is reduced, and fewer larvaes are present.
There are several mechanisms that may induce mating disruption, each of which may vary in importance as a function of the type of dispenser being used and the insect species. The release of sufficiently large quantities of synthetic sex pheromone into the atmosphere interferes with mate location by:
- Masking the natural pheromone plumes,
- Affecting the males' ability to respond to calling females,
- Causing the male to follow "false pheromone trails" at the expense of finding mates.

7.3 RESISTANCE

No report has described resistance to the active substance(13Z)-Hexadec-13-en-11-yn-1 acetate due to mating disruption treatment.

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

7.4 CONCLUSION ON EFFICACY

Field tests were conducted with the product Pine T Pro Ball/ Phero-Ball Pin to show the efficacy of the mating disruption treatment with the sexual confusion method against pine processionary moth.
The applicant claims both a reduction of pine processionary caterpillars in treated areas and a reduction of pine processionary nests.
T Pro Ball/Phero-Ball Pin is intended to be applied before the appearance of the Pine Processionary moths, in forests and urban areas, once a season, at respectively up to 400

balls/ha in forests and for urban areas (groves, narrow band of trees, isolated trees), the application rate is 1 ball per meter of height and per tree. The number of balls per hectare varies depending on the area to be protected and the density of the trees.

The product tested in some studies before 2019 differs slightly from the product T Pro Ball/ Phero-Ball Pin. Nevertheless, the read across is acceptable as the co-formulant (anti-foam agent) present in the tested formulation and removed from the current composition of T Pro Ball/ Phero-Ball Pin hasn't impact on the efficacy of the product. Furthermore, the tested product contains 4% w/w of active substance which is bit lower than the content of active substance in T Pro Ball/ Phero-Ball Pin (4.12 % w/w).

- For use in forests:

Four trials conducted in forest demonstrate nest reduction at the claimed dose of 400 balls (40 g of active substance) / ha. Moths capture has been demonstrated in three of them.
- The first test conducted in 2016-2017 (site Col d'Eze, France), shows 85% of reduction of moths capture and 74% of nests reduction at the dose of 400 balls/ha.
- The second trial, conducted in 2017-2018, in the same trial site of 2016-2017 (site Col d'Eze, France), shows some evidences that the sentinel traps from the 400 balls/ha treated plots tend to catch consistently less pine processionary moths than the rest of the test system (16.3 against 28.5 in the control), and only 36 % of the reduction of pine processionary caterpillar nests with 400 balls/ha in winter 2018. The applicant explained this drop by the decrease of processionary pine dynamic population.
- The third trial conducted in 2019 (Forêt de Gréolières) doesn't demonstrate reduction of capture's moth in treated areas because of low pressure of moths. However, a nests reduction of 40 to 64% was observed in both treated areas at the dose of 400 balls/ha.
- The last trial provided and conducted in Catalonia (Spain) in 2020 showed 53 to 68 % of capture moths reduction, and 92 – 100% of nests reduction in treated areas, at the dose of 160 balls/ha.

- The trials conducted in Lakidain and Zizur (Spain) are not accepted as the tested dose (500 balls/ha) was higher than the claimed dose (400 balls/ha).

Supportive data have been provided with trials in Israel and France.
Trial in Israel demonstrates regression in catches is also shown. Specific assessments have been also performed: the observation of the number of early feeding spots and the measure of egg clusters. The evaluation of these two new parameters demonstrates with the treatment at 300 balls /ha less early feeding spots per tree in comparison of the natural *T. pityocampa* larvae behaviour in the untreated plot. This decrease is also confirmed with the number of egg clusters which was significantly reduced in the 300 balls/ha treated plot in Dvira forest.
- Trial in Etang du Corra (France) where the application has been performed after moths' flight starting and explains low number of capture. Furthermore, nest number before the application is unknown, thus the estimation of nests reduction number was not possible.

<u>Efficacy conclusion for use in forests:</u> based on the submitted trials, it can be concluded that the product Pine T Pro Ball/ Phero-Ball Pin shows efficacy of the mating disruption treatment against pine processionary moth by both a reduction of pine processionary caterpillars and a reduction of pine processionary nests, in forests at the dose of 400 balls/ha.

- For use in urban areas (groves, narrow band of trees, isolated trees):

Three trials demonstrate nests and moth capture reduction:
- A first trial (site Avignon) with small planted grove plots trials, which assessed the number of winter nests in trees between winter of 2017 and 2018, demonstrated a

significant decline in the number of nests after treatment (58%) at 30 balls/ha (height of trees unknown), but not on all the sites.
- A second trial (site Tour de Seysses) with individual pines and pines groves spread in six parts of a residence, treated with the dose 11 balls/pine (hegiht of trees between 8 and 15 m), showed a reduction of 80% of moths capture and nests number.
- A thirst trial (site Jean de la Fontaine) with 17 trees treated with 10 balls/ha (height of trees unknown), in a residence showed a reduction of 88% of moths capture and up to 85% of nests in pine trees of the treated area.

Efficacy conclusion for use in urban areas: The field tests conducted in urban zones (on isolated trees) showed both a reduction of moths capture and nests number. The application rate claimed of 1 ball per meter of height and per tree showed a sufficient efficacy on at least one site tested.

Conclusion of Efficacy assessment:
Based on the elements presented in the frame of active substance approval, reduction of pine processionary caterpillars and nests in pine areas is demonstrated in forest and urban areas, at the following application rates:
- In forests at the dose of 400 balls /ha
- In urban areas (groves, narrow band of trees, isolated trees): 1 ball per 1 m of height and per tree

Innate efficacy is therefore demonstrated for the active substance approval, nevertheless, new efficacy studies (especially for urban areas) should be submitted at product authorisation stage in order to confirm the efficacy at the application rates claimed and in various situations (forests, groves, narrow band of trees, isolated trees) with significant level of infestations.

8 HUMAN EXPOSURE ASSESSMENT

The application of the product Pine T Pro Ball is an alternative method to control by mating disruption the spread of the insect *Thaumetopoea pityocampa* using sex pheromone non retrievable dispensers. Pine T Pro Ball is intended for seasonal application on the top of the pine (about generally about 5 -10 meters from the ground) by the mean of a Paintball gun. As explained in the "Guidance document on semiochemical active substances and plant protection products, 2016", the semiochemical diffuses continuously from the device into the air where the active substance becomes diluted (2A Passive non-retrievable dispensers according to the guidance).
Pine T Pro Ball application will be performed by specific end-users: authorised professional, town hall, municipalities via trained employees with the required agreement for biocontrol product application.
The active substance (13Z)-Hexadec-13-en-11-yn-1 acetate is encapsulated into natural waxes/oils leading to a gel (formulation) that will be itself introduced into a biodegradable polymer shell to form the final balls.

8.1 IDENTIFICATION OF MAIN PATHS OF HUMAN EXPOSURE TOWARDS ACTIVE SUBSTANCE FROM ITS USE IN BIOCIDAL PRODUCT

Summary table: relevant paths of human exposure							
Exposure path	**Primary (direct) exposure**			**Secondary (indirect) exposure**			
	Industrial use	**Professional use**	**Non-professional use**	**Industrial use**	**Professional use**	**General public**	**Via food**
Inhalation	NA	no	NA	NA	no	no	-
Dermal	NA	no	NA	NA	no	no	-
Oral	NA	no	NA	NA	no	no	no

8.2 LIST OF SCENARIOS

Summary table: scenarios			
Scenario number	**Scenario**	**Primary exposure Description of scenario**	**Exposed group** (e.g. professionals, non-professionals, bystanders)
1.	Compressed air gun loading	Balls loaded into the paintball gun	professionals
2.	Post application	Collection of the balls fallen on the ground during application	professionals

8.3 INDUSTRIAL EXPOSURE

Not applicable. The product PHEROBALL PIN is intended for professional use only.

8.4 PROFESSIONAL EXPOSURE

Pine T pro Balls are packed in Aluminium bags (500 balls per package) and are protected by a biodegradable polymer shell that prevents any passage of the active substance to the outer compartment. In addition, the protection of the shell prevents any inhalation of the active substance when opening the ball bag or when loading the ball into the Paint ball gun. For the application, the balls are loaded into the paint-ball gun thanks to a closed reservoir. The handling of balls is performed using protective gloves to prevent any contact with the material. The balls are shot on the top of the pine trees (generally about 5 -10 meters from the ground). Under impact, the balls burst and gel formulation is applied on the trunks closed to canopy. After water evaporation, a film containing pheromone is left on the trunk. This film is a passive diffuser that will diffuse slowly the (Z13)-hexadec-13-en-11-yn-1-yl-acetate on a controlled way in a very short diffusion radius of around 2 meters. Indeed, due to its low vapour pressure (VP = 1,2.10-3 Pa at 20°C), the active substance is located at the top of the trees in the air compartment. Furthermore, thanks to the high position of the film containing the pheromone (close to canopy), and knowing that the content of the pheromone decreases with distance from the point of emission, its concentration at human level can therefore be considered as very low.

In conclusion:

No inhalation of the active substance is expected when opening the ball bag or when loading the balls into the Paint ball gun.

The application of the balls is done via a Paintball gun.

During the collection of the balls fallen on the ground, exposure via dermal route is also considered as very low.

Moreover, gloves are worn during all phases.

➔ Thus, professional exposure to the product, before, during and after Pine T Pro Ball/ Phero-Ball Pin product application, is considered very low.

8.5 NON-PROFESSIONAL EXPOSURE

Not applicable. The product PHEROBALL PIN is intended for professional use only.

8.6 SECONDARY EXPOSURE OF THE GENERAL PUBLIC EXCLUDING DIETARY EXPOSURE

Before application, a safety perimeter (approximately 10 meters) is to be set and marked to avoid the presence of the general public.

During application, the projection speed of the balls is to be set to the minimum. The shooting must take place from 5 to 10 meters from the target, and must be located inside the land and not towards the outside. Consequently, the shooting will avoid the traffic lanes, the houses, the animals or people.

In case of a ball misses the tree and falls after shooting, it will burst when impacting the ground and it is very unlikely that some balls will remain intact.
Regarding the potential debris ending up on the ground, the active substance being trapped in the matrix, if any diffusion occurs, it will be on a very slow mode.

Anyway, after application in urban zone, no balls or debris are to be left on the ground.

In forest zone, which is less frequented by the general public, the only debris that can be left on the ground because they are not found, are therefore expected to be located in non accessible spots.

In conclusion:

No secondary exposure of the general public is foreseen as balls will be directly shot and burst in the canopy of pine trees (generally about 5 -10 meters high).

The content of the pheromone decreases with distance from the point of emission, its concentration at 2 meters from the ground (human level) is therefore very low.

Moreover, the balls fallen on the ground will be collected.

➔ Thus, sufficient measures are followed before, during and after application of the formulated pheromone in order to protect the general public. In these conditions, the exposure to the pheromone of the general public can be considered very low.

8.7 DIETARY EXPOSURE

Not relevant as no contamination of food or feed is expected based on the localized application on the tree trunks.

8.8 EXPOSURE ASSOCIATED WITH PRODUCTION, FORMULATION AND DISPOSAL OF THE BIOCIDAL PRODUCT

8.8.1 Scenario [n]

Not applicable. The product PHEROBALL PIN is intended for professional use only.

8.9 COMBINED RESIDENTIAL SCENARIOS

Not relevant

9 ENVIRONMENTAL EXPOSURE ASSESSMENT

9.1 EMISSION ESTIMATIONS

9.2.1 Redeposition via the air compartment

As the active substance is used in a passive diffuser, the main route of emission to the environment is by gaseous phase to the atmosphere.

As explained in the Guidance document on semiochemical active substances and plant protection products, 2016, the semiochemical diffuses continuously from the device into the air where the active substance becomes diluted (2A Passive non-retrievable dispensers according to the guidance). Therefore, no deposition of the substance on the ground was expected as the substance is not carried away by particles contrary to active diffusers that propel the active substances with a vector and no environmental exposure was expected.

At WG-IV-2021, it was nevertheless agreed that quantitative exposure calculations were needed to support this statement.
For this quantitative assessment, it is considered that the active substance can also adsorb on air particles and may subsequently deposit on the ground (soil or surface water). A standardised scenario, the Gaussian plume model OPS, is proposed in the Volume IV Part B+C (2017) to estimate deposition fluxes, usually used for the calculation of PEC_{soil} after air redeposition. It is further used to estimate the $PEC_{surfacewater}$.

All the calculations are conducted according the equations of the Volume IV Part B+C (2017).

1) $Elocal_{air}$ calculations:

$Elocal_{air}$ calculations			
Parameters	**Value**	**Unit**	**Ref**
Q_{ai}, the quantity of active substance applied / ha	40	g/ha	Maximum application rate
T_{max}	2160	h	3 months
FAI	1	[-]	-
T_{day}	24	h	Passive dispenser
$F_{application,floor}$	1	[-]	-
$Elocal_{air}$	4.44E-04	kg/d/ha	O – Q_{ai} x FAI x $F_{application,floor}$ x (T_{day} / T_{max}) x 1.10E-03

2) $DEP_{total,ann}$ calculations (equation 47 of the Volume IV Part B+C, 2017):

The total deposition flux during emission episode (DEP_{total}) was calculated without considering any emission from the STP (E_{STPair}), as it does not correspond to the emission pattern of the pheromone.

$DEP_{total,ann}$ calculations			
Parameters	**Value**	**Unit**	**Ref**
CON_{junge} x $SURF_{aer}$	1.00E-04	Pa	D
VP	1.20E-03	Pa at 20°C	S
$F_{ass,aer}$	7.69E-02	-	O – Equation 21
DEP_{total}	5.06E-07	kg/d	O - Equation 46
$T_{emission}$	90	d	3 months
$DEP_{std,aer}$	1.00E-02	mg/m²/d	D
$DEP_{std,gas}$	4.00E-04	mg/m²/d	D value
$DEP_{total,ann}$	1.25E-07	mg/m²/d	O – Equation 47

9.2.2 Accidental exposure pathways

In addition to redeposition of the a.s *via* air, two accidental situations are examined:
- the professional user misses his target (the pine trunk) and the ball falls to the ground,
- the product leaches to the ground following heavy rainfall.

For the rare cases where the trained professionals miss their target, the following RMM is applied:
"After application, inspect carefully the area and pick up all the fallen balls."

According to the applicant, the product dries 12 hours after application, then adheres perfectly to the trunk and the pheromone starts diffusing. There is no loss of active substance if it's raining after this waiting period because the dry product is stable in presence of water. Indeed, the dry product is a film made of hydrophobic materials (oil, waxes, pheromone nearly insoluble…) that prevent the leaching of the active substance. Therefore, a use instruction related to the efficacy of the product already states that it is recommended to apply the balls to the trees on a rain-free day and if no rainfall is expected within 12 hours of application, the minimum time for the formulation to dry and become hydrophobic.
Even if the instruction of use is accidentally disregarded, it has to be taken into consideration that the product is applied on the trunk, just below the canopy, about 10 m from the ground. Thus, the formulation will be protected by the structures of the trees (branches, tufts of needles) that constitute the canopy. If the rainwater still reaches the formulation, largely hydrophobic, it will be spread over the 10 m length of the trunk before reaching the ground. For all these reasons, emissions to the soil during a raining event are considered negligible and thus, a quantitative evaluation is not carried out and no PEC are calculated.

9.3 CALCULATED PEC VALUES

9.3.1 Redeposition via the air compartment

Very conservative input values have been taken into account in the PEC calculations, even though the mode of use and the nature of the active substance theoretically result in very limited exposure:

- 10 years of continuous application, which is not the intended use,
- A k value derived from very worst case $DT50_{soil}$ and $DT50_{surfacewater}$ defaut values of 1E6 days, while pheromone generally degrades rapidly in the environment,
- A $depth_{soil}$ of 0.05 m,
- No degradation in the atmosphere, although a DT50 in air of 3.5 hours (maximal value) is stated for this active substance.

k values for soil and water were derived from these worst case input values and from efate parameter values defined for the active substance in this document:

SOIL	
$K_{biosoil}$	6.93E-07
K_{volat}	3.92E-04
k_{leach}	3.75E-04
$Total_{removal}$	7.67E-04
SURFACE WATER	
k_{water}	6.93E-07

Equations for the calculations of PEC_{soil} after air redeposition in Volume IV Part B+C (2017) are used and are adapted to estimate the $PEC_{surfacewater}$.

a) Concentration in Soil

PEC_{soil} calculations			
Parameters	**Value**	**Unit**	**Ref**
$DEP_{total,ann}$	1.25E-07	mg/m²/d	Emission calculation
$DEPTH_{soil}$	0.05	m	D
RHO_{soil}	1700	kg/m³	D
k_{soil} = $Total_{removal}$	7.67E-04	-	S – no degradation
$D_{air\ (soil)}$	1.47E-09	mg/kg/d	O – equation 58
$PEC_{soil} = C_{depsoil10(0)}$	1.80E-06	mg/kg	O – equation 60

b) Concentration in Surface water

$PEC_{surfacewater}$ calculations			
Parameters	**Value**	**Unit**	**Ref**
$DEP_{total,ann}$	1.25E-07	mg/m²/d	Emission calculation
$DEPTH_{water}$	0.5	m	D
RHO_{water}	1000	kg/m³	D

K_{water}	6.93E-07	-	S – no degradation
$D_{air\ (water)}$	2.50E-10	mg/L/d	O – adapted equation 58
$PEC_{surfacewater}$ = $C_{depsurfacewater10(0)}$	9.10E-07	mg/L	O – adapted equation 60

Considering the worst-case input values leading to very low PEC values for soil and surface water, it was concluded during the WG-IV-2021 that exposure for this specific product can be considered negligible.

9.4 PRIMARY AND SECONDARY POISONING

Primary poisoning

It is not believed that gels without food attractant are in a form that could be sufficiently appetent to bird or mammals so they would be at risk (ESDTP18, 2008).

Secondary poisoning

As negligible exposure is foreseen (see Environmental exposure assessment), no quantitative risk assessment is needed.

10 ASSESSMENT OF EFFECTS ON HUMAN HEALTH FOR THE PRODUCT

10.1 PRODUCT(S)

PHERO-BALL PIN / Pine T Pro Ball is constituted of a compressed air gun to be used with balls containing pine processionary pheromone micro-encapsulated in a natural wax emulsion. This emulsion is inserted into oxo-biodegradable paint balls (EO containing 100 mg pheromone/ ball (i.e. 4% w/w)).

10.2 DERMAL ABSORPTION

Data waiving	
Information requirement	No study is considered necessary since no quantitative assessment for human exposure is deemed expected.
Justification	Considering the specific context of application via a passive diffuser such as paintballs (PHERO-BALL Pin) and the resulting very low exposure, no dermal absorption study was necessary for the active substance. No dermal contact with the product is neither expected during the product application. No dermal absorption has to be derived.

10.3 ACUTE TOXICITY

Acute toxicity by oral route

Value used in the Risk Assessment – Acute oral toxicity	
Value	No data available for the product.
Justification for the selected value	The active substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate does not present any acute oral toxicity. According to the rules laid down in Regulation (EC) No 1272/2008 (CLP) (calculation method), taking into account all the co-formulants, the product is not classified for acute oral toxicity.
Classification of the product according to CLP	Not classified

Acute toxicity by dermal route

Value used in the Risk Assessment – Acute dermal toxicity	
Value	No data available for the product.
Justification for the selected value	The active substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate does not present acute dermal toxicity. According to the rules laid down in Regulation (EC) No 1272/2008 (CLP) (calculation method), taking into account all the co-formulants, the product is not classified for acute dermal toxicity.
Classification of the product according to CLP	Not classified

Acute toxicity by inhalation

Value used in the Risk Assessment – Acute inhalation toxicity	
Value	No study for the product.
Justification for the selected value	No study for the active substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate for acute toxicity via inhalation. The vapour pressure of the active substance is estimated at 1.2 10^{-3} Pa at 25°C. In accordance with the Guidance on the BPR: Volume III. Part A, §8.7.2, the test by inhalation route is not appropriated in this case, as exposure of humans *via* inhalation is unlikely to happen taking into account that the vapour pressure of the substance is < 0.01 Pa. The product is not a powder and is not applied in a way that generates exposure to aerosols, particles or droplets.
Classification of the product according to CLP	Not classified

Value used in the Risk Assessment – Acute toxicity	
Value(s)	No data available for the product.
Justification for the selected value	The active substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate does not present any acute oral, dermal or via inhalation toxicity. According to the rules laid down in Regulation (EC) No 1272/2008 (CLP) (calculation method), taking into account all the co-formulants, the product is not classified for acute oral, dermal and via inhalation toxicity.
Classification for the product according to CLP	Not classified

10.4 CORROSION AND IRRITATION

10.4.1 Skin corrosion and irritation

No data available for the product. According to the rules laid down in Regulation (EC) No 1272/2008 (CLP) (calculation method), taking into account all the co-formulants, the product is not classified.

10.4.2 Serious eye damage and eye irritation

No data available for the product. According to the rules laid down in Regulation (EC) No 1272/2008 (CLP) (calculation method), taking into account all the co-formulants, the product is not classified.

10.4.3 Respiratory tract irritation

No data available.

10.4.4 Overall conclusion on corrosion and irritation

Conclusion used in the Risk Assessment – Corrosion and irritation	
Value(s) or Conclusion(s)	No data available for the product.
Justification for the selected value/ conclusion	The active substance is not classified for corrosion or irritation. Thus, according to the rules laid down in Regulation (EC) No 1272/2008 (CLP), the product Pine T Pro Ball should not be classified.
Classification of the product according to CLP	Not classified.

10.5 SENSITISATION

[Please only include additional studies not covered in Part A. If a relevant study performed with the product is included in Part A, please only refer to the respective study. If no data is available, delete the tables and indicate only that no data is available.]

10.5.1 Skin sensitisation

Conclusion used in Risk Assessment – Skin sensitisation	
Value/conclusion	No data available for the product. The active substance (13Z)-Hexadec-13-en-11-yn-1-yl acetate is not classified for sensitisation. The product is not classified for sensitisation.
Justification for the value/conclusion	According to the rules laid down in Regulation (EC) No 1272/2008 (CLP), taking into account all the co-formulants, the product is not classified.
Classification of the product according to CLP	Not classified

10.5.2 Respiratory sensitisation

Data waiving	
Information requirement	No data available
Justification	The product is not classified for skin sensitisation and is not expected to be respiratory sensitizer.

10.5.3 Overall conclusion on sensitisation

Conclusion used in the Risk Assessment – Sensitisation	
Conclusion(s)	No data available for the product. Both substance and product are expected to be not classified as sensitizer.
Justification for the conclusion(s)	The product is not classified for skin sensitisation and is not expected to be respiratory sensitizer.
Classification of the product according to CLP	Not classified

10.6 OTHER

Not relevant

11 ENVIRONMENTAL EFFECTS ASSESSMENT FOR THE PRODUCT

The ecotoxicological properties of the product may be derived from the properties of the active substance. Information on the ecotoxicity of the active substance is presented in Part A, Section 4.2. There are no compounds which are considered as substance of concern in the formulated product that adversely affect the conclusions of the risk assessment for the active substance in the product, therefore no further assessment is needed.

Part C Risk characterisation of the biocidal product(s)

12 RISK CHARACTERISATION FOR HUMAN HEALTH

12.1 CRITICAL ENDPOINTS

The application of the product Pine T Pro Ball is an alternative method to control by mating disruption the spread of the insect *Thaumetopoea pityocampa using sex pheromone non retrievable dispensers.* The product Pine T Pro Ball is intended for seasonal application on the top of the Pine (generally about 5 -10 meters from the ground) by the mean of a Paintball gun.
As explained in the "Guidance document on semiochemical active substances and plant protection products, 2016", the semiochemical diffuses continuously from the device into the air where the active substance becomes diluted (2A Passive non-retrievable dispensers according to the guidance).
The application of the product Pine T Pro Ball will be performed by specific end-users: authorised professional, town hall, municipalities via trained employees with the required agreement for biocontrol product application.
The active substance (13Z)-Hexadec-13-en-11-yn-1 acetate is encapsulated into natural waxes/oils leading to a gel (formulation) that will be itself introduced into a biodegradable polymer shell to form the final balls.

There is no possibility of professional contact with the pheromone when loading the ball into the paintball gun. The pheromone can only diffuse after the impact of the ball on the pine and opening of the ball.
The professional exposure can therefore be considered very low as no direct contact is expected with the pheromone during production and formulation of the preparation, as well as during the use and disposal of the product.
No secondary exposure of the general public is foreseen as balls will be directly shot and burst in the canopy of pine trees (generally about 5 -10 meters high).

12.1.1 Systemic effects

No unacceptable risk is forseen.

12.1.2 Local effects

Not relevant.

12.1.3 Absorption

No oral and dermal absorption values are available.

12.2 REFERENCE VALUES

No reference values are available.

12.3 INDUSTRIAL USES

Not applicable. The product PHEROBALL PIN is intended for professional use only.

12.4 PROFESSIONAL USES

Considering the method of application of the product PINE T PRO BALL / PHERO-BALL PIN (outdoors, in the upper part of the pine canopy, using a paintball gun), the professional exposure is considered very low and the risk is acceptable only if the following risk management measures are applied:

- Wear gloves during all phases of use (loading, application and collection of balls on the ground).
- During the application, a safety perimeter (approximately 10 m) must be set to avoid the presence of the general public.
- After application in forests, inspect carefully the area and pick up all the fallen balls.
- After application in urban zone, make sure that no balls or debris are left on the ground.

12.5 NON-PROFESSIONAL USERS

Not applicable. The product PHEROBALL PIN is intended for professional use only.

12.6 SECONDARY (INDIRECT) EXPOSURE AS A RESULT OF USE

Considering the method of application of the product PINE T PRO BALL / PHERO-BALL PIN (outdoors, in the upper part of the pine canopy, using a paintball gun), no secondary (indirect) exposure to the general public is foreseen.

Moreover, the following risk management measures will be applied by the professional users:

- During the application, a safety perimeter (approximately 10 m) must be set to avoid the presence of the general public.
- After application in forests, inspect carefully the area and pick up all the fallen balls.
- After application in urban zone, make sure that no balls or debris are left on the ground.

The risk for the general public is thus considered acceptable.

12.7 INDIRECT EXPOSURE VIA FOOD

Not relevant as no contamination of food or feed is expected based on the localized application on the tree trunks.

12.8 PRODUCTION / FORMULATION OF ACTIVE SUBSTANCE

Not applicable. The product PHEROBALL PIN is intended for professional use only.

12.9 AGGREGATED EXPOSURE

Not relevant.

13 RISK CHARACTERISATION FOR THE ENVIRONMENT

13.1 ATMOSPHERE

Concerning the atmosphere, emissions to air from biocidal uses are not relevant. The pheromone degrades quickly in the air due to the low DT_{50} value of 3.5 h (maximum value).

13.2 AQUATIC COMPARTMENT INCLUDING SEWAGE TREATMENT PLANT (STP), TERRESTRIAL COMPARTMENT, GROUNDWATER

Considering the worst-case input values and the very low PEC values for soil and surface water, it was concluded during the WG-IV-2021 that the exposure for this specific product can be considered negligible. Therefore, based on this qualitative assessment, no RCR was calculated and the risks were considered acceptable.

As a note:
According to the former Guidance "Guidance for Waiving of Data Requirements for Pheromones for Inclusion in Annex I/IA of Directive 98/8/EC", a natural background of 375 g of Straight Chain Lepidopteran Pheromones/ha/year was generally understood to result in exposure levels which comparable to natural emissions and safe for non-target species. This value is no longer used as a threshold *stricto sensu* in more recent PPP Guidances[12], but it shows that the maximum active substance emissions (40 g of pheromone/ha/year) are approximately 10 times lower than the background value of 375 g/ha/year used in the initial guidelines.

13.3 NON-TARGET INSECTS

According to the OECD Guidance Document 93[12], semiochemicals are more target specific than conventional insecticides and are expected to dissipate rapidly in the atmosphere. Indeed, when adult processionnary moths search for mates at the top of pine trees, it is crucial that the signals exchanged between males and females are species-specific enough for an effective mating. Therefore, the processionary's signals will not interfere with the intra-species communications of other insects.

Concerning the toxicity to other arthropods, the non-target insects actually exposed *via* the air compartment would be limited to those that also live at the top of the pines, where the product is sufficiently concentrated and where they are already in a disturbed environment because of the processionary caterpillar invasion. The others, living nearby, would be exposed to much lower concentrations (considered negligible in soil and water). Moreover, in the SCLP RAR of PPP (2021), acetate pheromones does not present any toxicity for bees and no data on other arthropod species was considered necessary because of the negligible exposure.

13.4 PRIMARY AND SECONDARY POISONING

Primary poisoning

[12] Guidance document on semiochemical active substances and plant protection products Series on Pesticides No. 93, 2018

It is not believed that gels without food attractant are in a form that could be sufficiently appetent to bird or mammals so they would be at risk (ESDTP18, 2008).

Secondary poisoning

As negligible exposure is foreseen (see Environmental exposure assessment), no quantitative risk assessment is needed and no risk is foreseen for secondary poisoning.

13.5 AGGREGATED EXPOSURE (COMBINED FOR RELEVANT EMMISSION SOURCES)

Not relevant.

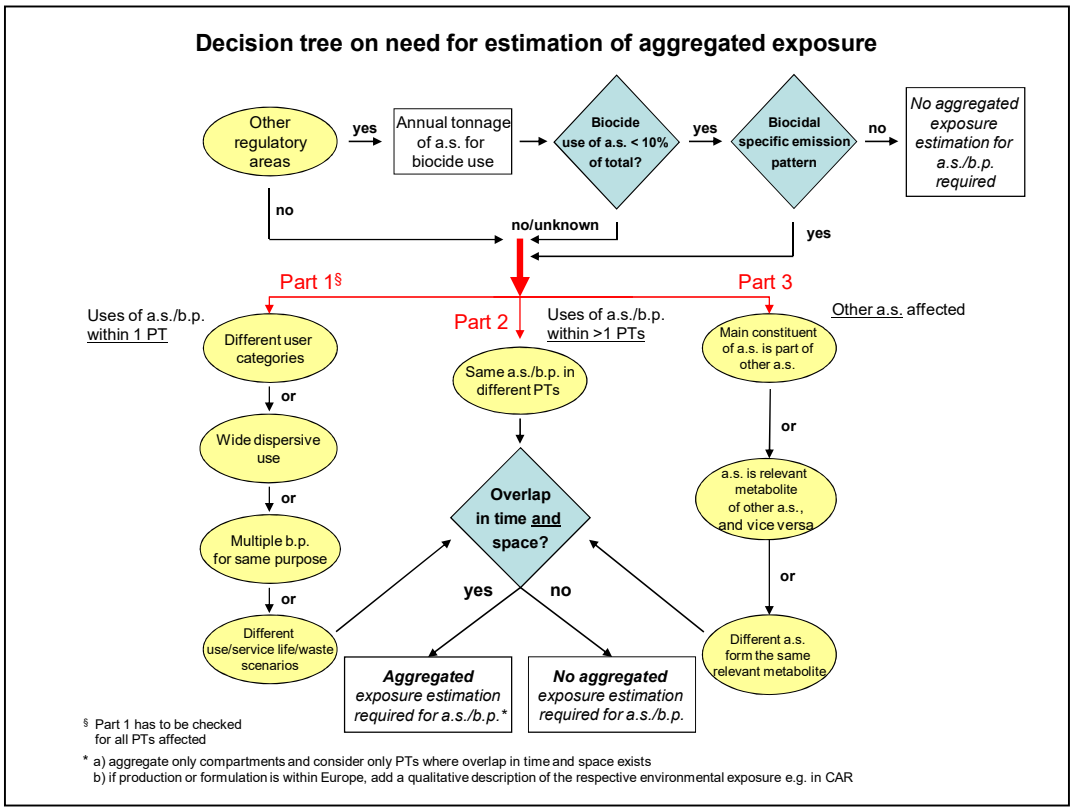


Figure 1: Decision tree on the need forestimation of aggregated exposure

14 RISK CHARACTERISATION FOR THE PHYSICO-CHEMICAL PROPERTIES

Neither the active substance nor the formulated product exhibit any properties that require to be classified for physical or chemical hazard.

15 MEASURES TO PROTECT MAN, ANIMALS AND THE ENVIRONMENT

The use of the product is exclusively targeted to professionals who must be trained in the handling of the paintball shotgun. The velocity of the shotgun balls must be set to a minimum.

The handling of the product and the paintball type shotgun must be carried out with the wearing of personal protective equipment (paintball eye protection equipment and colored safety jacket). The thruster must be in safety mode as long as the sight to the trees is not taken. The shot will be made at a distance between 5 to 10 meters from the trees.

Information to the general public should be given in the treated areas, before and after the application of the product.

No specific measure is needed to protect the environment.

Part D: Appendices

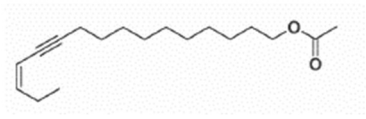
Appendix I: List of endpoints

Chapter 1: Identity, Physical and Chemical Properties, Classification and Labelling

Active substance (ISO Name)	(13Z)-Hexadec-13-en-11-yn-1-yl acetate
Product-type	19 (Repellents and attractants)

Identity

Chemical name (IUPAC)	(13Z)-Hexadec-13-en-11-yn-1-yl acetate
Chemical name (CA)	_
CAS No	78617-58-0
EC No	_
Other substance No.	_
Minimum purity of the active substance as manufactured (g/kg or g/l)	97 %
Identity of relevant impurities and additives (substances of concern) in the active substance as manufactured (g/kg)	[redacted] % (3Z-23Z)-hexacosa-3,23-dien-5,21-diyne (HCDD) [redacted] %α-Tocopherol (stabilizer) confidential information
Molecular formula	$C_{18}H_{30}O_2$
Molecular mass	278.43

Structural formula	

Physical and chemical properties [with (13Z)-hexadec-13-en-11-yn-1-yl acetate ; purity >98%]

Melting point (state purity)	The pheromon is liquid at room temperature
Boiling point (state purity)	132°C at 0.05 Torr
Thermal stability / Temperature of decomposition	The active substance is stable up to 150°C. Guarantee of stability during storage and field uses.
Appearance (state purity)	a colourless translucent liquid
Relative density (state purity)	0.902 ± 0.001 at 21.5 °C
Surface tension (state temperature and concentration of the test solution)	Test not conducted as not relevant due to the low pheromone water solubility
Vapour pressure (in Pa, state temperature)	1.2×10^{-3} Pa extrapolated at 20 °C and is 2.5×10^{-3} Pa extrapolated at 25 °C
Henry's law constant (Pa m^3 mol^{-1})	5.7 Pa.m3.mol^{-1} at 25°C
Solubility in water (g/l or mg/l, state temperature)	0.12mg/L at 20°C
Solubility in organic solvents (in g/l or mg/l, state temperature)	The solubility of the test item in toluene is higher than 250 g/L. The solubility of the test item in dichloromethane is higher than 250 g/L. The solubility of the test item in methanol is higher than 250 g/L. The solubility of the test item in acetone is higher than 250 g/L. The solubility of the test item in ethyl acetate is higher than 250 g/L. Soluble in acetonitrile and heptane in all proportions.
Stability in organic solvents used in biocidal products including relevant breakdown products	The study does not need to be conducted because the stability of the substance is not considered to be critical
Partition coefficient (log P_{OW}) (state temperature)	The value of the n-octanol/water partition coefficient $log_{10}P_{ow}$ of (13Z)-hexadec-13-en-

	11-yn-1-yl acetate was found to be 3.74 using the shake flask method.
Dissociation constant	The study does not need to be conducted because the substance has no ionic structure and is insoluble.
UV/VIS absorption (max.) (if absorption > 290 nm state ε at wavelength)	Not applicable
Flammability or flash point	Not flammable (Flash point = 136°C)
Explosive properties	Not explosive (oxygen balance of the active substance is -281.6)
Oxidising properties	Not oxidising liquid (oxygen atom is chemically bonded only to carbon)
Auto-ignition or relative self ignition temperature	the auto-ignition of the active substance is 250°C.

Classification and proposed labelling

with regard to physical hazards	Not classified based on tests available and chemical structure of the active substance.
with regard to human health hazards	Not classified in absence of appropriate data.
with regard to environmental hazards	<u>Classification:</u> H400: Very toxic to aquatic life H410: Toxic to aquatic life with long lasting effects <u>Labelling:</u> H410: Very toxic to aquatic life with long lasting effects

Chapter 2: Methods of Analysis

Analytical methods for the active substance

Technical active substance (principle of method)	GC FID
Impurities in technical active substance (principle of method)	GC FID

Analytical methods for residues

Soil (principle of method and LOQ)	Not required (negligible exposure)
Air (principle of method and LOQ)	Not required (vapour pressure < 0.01 Pa)

Water (principle of method and LOQ)	Not required (negligible exposure)
Body fluids and tissues (principle of method and LOQ)	Not required (a.s. not classified as toxic or very toxic)
Food/feed of plant origin (principle of method and LOQ for methods for monitoring purposes)	Not required (not intended to be used on food/feed)
Food/feed of animal origin (principle of method and LOQ for methods for monitoring purposes)	Not required (not intended to be used on food/feed)

Chapter 3: Impact on Human Health

Absorption, distribution, metabolism and excretion in mammals

Rate and extent of oral absorption:	Not determined
Rate and extent of dermal absorption*:	Not determined
Distribution:	Not determined
Potential for accumulation:	Accumulation not expected.
Rate and extent of excretion:	Not determined
Toxicologically significant metabolite(s)	Not determined

Acute toxicity

Rat LD_{50} oral	>2000 mg/kg bw
Rat LD_{50} dermal	>2000 mg/kg bw
Rat LC_{50} inhalation	Not required (vapour pressure < 0.01 Pa)

Skin corrosion/irritation	Non-irritant
Eye irritation	Non-irritant
Respiratory tract irritation	No data available
Skin sensitisation (test method used and result)	Not skin sensitizer (OECD 442B)
Respiratory sensitisation (test method used and result)	Not expected to be a respiratory sensitiser

Repeated dose toxicity

Short term	Not determined (very low exposure potential and tolerance/MRL not considered as necessary based on the intended use and on the mode of application)
Species / target / critical effect	No data available
Relevant oral NOAEL / LOAEL	No data available
Relevant dermal NOAEL / LOAEL	No data available
Relevant inhalation NOAEL / LOAEL	No data available

Subchronic	Not determined (very low exposure potential and tolerance/MRL not considered as necessary based on the intended use and on the mode of application)
Species/ target / critical effect	No data available
Relevant oral NOAEL / LOAEL	No data available
Relevant dermal NOAEL / LOAEL	No data available
Relevant inhalation NOAEL / LOAEL	No data available

Long term	Not determined (very low exposure potential and tolerance/MRL not considered as necessary based on the intended use and on the mode of application)
Species/ target / critical effect	No data available
Relevant oral NOAEL / LOAEL	No data available
Relevant dermal NOAEL / LOAEL	No data available
Relevant inhalation NOAEL / LOAEL	No data available

Genotoxicity	Not mutagenic.

Carcinogenicity

Species/type of tumour	Not determined (exposure to human considered as very low)
Relevant NOAEL/LOAEL	No data available

Reproductive toxicity

Developmental toxicity

Species/ Developmental target / critical effect	Not determined (exposure to human considered as very low)

Relevant maternal NOAEL	No data available
Relevant developmental NOAEL	No data available
Fertility	
Species/critical effect	No data available
Relevant parental NOAEL	No data available
Relevant offspring NOAEL	No data available
Relevant fertility NOAEL	No data available

Neurotoxicity

Species/ target/critical effect	Not determined (exposure to human considered as very low)

Developmental Neurotoxicity

Species/ target/critical effect	No data available

Immunotoxicity

Species/ target/critical effect	Not determined (exposure to human considered as very low)

Developmental Immunotoxicity

Species/ target/critical effect	Not determined (exposure to human considered as very low)

Other toxicological studies

No data available

Medical data

No adverse effects known.

Summary

	Value	Study	Safety factor
$AEL_{long\text{-}term}$	Not determined	No data available	**-**
$AEL_{medium\text{-}term}$	Not determined	No data available	-
$AEL_{short\text{-}term}$	Not determined	No data available	-

ADI[13]	Not relevant	-	-
ARfD	Not relevant	-	-

MRLs

Relevant commodities	Not required.

Reference value for groundwater

According to BPR Annex VI, point 68	Not required.

Dermal absorption

Study (*in vitro/vivo*), species tested	No data available
Formulation (formulation type and including concentration(s) tested, vehicle)	Not determined
Dermal absorption values used in risk assessment	Not applicable. Only a qualitative assessmentperformed.

Acceptable exposure scenarios (including method of calculation)

Formulation of biocidal product	Pine T Pro Ball
Intended uses	Loading, application and collection of balls
Industrial users	Not intended for industrial users
Professional users	Exposure considered as very low
Non professional users	Not intended for non professional users
General public	Exposure considered as very low
Exposure via residue in food	None.

Chapter 4: Fate and Behaviour in the Environment

Route and rate of degradation in water

Hydrolysis of active substance and relevant metabolites (DT_{50}) (state pH and temperature)	No data available
pH 5	Not determined
pH 9	Not determined

[13] If residues in food or feed.

Other pH: *[indicate the value]*	At pH 8 and 25°C = 175.623 days (HYDROWIN 2.0) At pH 7 and 25°C = 4.808 years (HYDROWIN v2.0)
Photolytic / photo-oxidative degradation of active substance and resulting relevant metabolites	No data available (absorption <400 nm)
Readily biodegradable (yes/no)	No data available
Inherent biodegradable (yes/no)	No data available
Biodegradation in freshwater	No data available The worst-case value used in the exposure assessment is 1E06 days.
Biodegradation in seawater	No data available
Non-extractable residues	No data available
Distribution in water / sediment systems (active substance)	No data available
Distribution in water / sediment systems (metabolites)	No data available

Route and rate of degradation in soil

Mineralization (aerobic)	No data available
Laboratory studies (range or median, with number of measurements, with regression coefficient) DT_{50lab} (20°C, aerobic): DT_{90lab} (20°C, aerobic): DT_{50lab} (10°C, aerobic): DT_{50lab} (20°C, anaerobic): degradation in the saturated zone:	No data available The worst-case value used in the exposure assessment is 1E06 days.
Field studies (state location, range or median with number of measurements) DT_{50f}: DT_{90f}:	No data available
Anaerobic degradation	No data available
Soil photolysis	No data available
Non-extractable residues	No data available
Relevant metabolites - name and/or code, % of applied a.i. (range and maximum)	No data available
Soil accumulation and plateau concentration	No data available

Adsorption/desorption

Ka , Kd Ka_{oc} , Kd_{oc} pH dependence (yes / no) (if yes type of dependence)	Log Koc: 2.9282 (KOCWIN v2.00)

Fate and behaviour in air

Direct photolysis in air	No data available
Quantum yield of direct photolysis	No data available
Photo-oxidative degradation in air	Latitude: northern hemisphere, Period: OH formed during daylight only, DT_{50}: 3.5 hours (AOPWIN v1.92)
Volatilization	No data available

Reference value for groundwater

According to BPR Annex VI, point 68	No data available

Monitoring data, if available

Soil (indicate location and type of study)	No data available
Surface water (indicate location and type of study)	No data available
Ground water (indicate location and type of study)	No data available
Air (indicate location and type of study)	No data available

Chapter 5: Effects on Non-target Species

Toxicity data for aquatic species (most sensitive species of each group)

Species	Time-scale	Endpoint	Toxicity
Fish			
LC50 = 5.08 mg/L (QSAR VEGA)			
Invertebrates			
Not determined, slightly less sensitive than algae based on read across			
Algae			

Desmodesmus subspicatus	72 h	E_rC_{50} : 0.045 mg/L	H400: Very toxic to aquatic life (M factor = 10) H410: Very toxic to aquatic life with long lasting effects (M factor = 10)
Microorganisms			
Not determined (no exposure according to intended uses)			

Effects on earthworms or other soil non-target organisms

Acute toxicity to ……..	No data available
Reproductive toxicity to ……	No data available

Effects on soil micro-organisms

Nitrogen mineralization	No data available
Carbon mineralization	No data available

Effects on terrestrial vertebrates

Acute toxicity to mammals	No data available
Acute toxicity to birds Dietary toxicity to birds Reproductive toxicity to birds	No data available

Effects on honeybees

Acute oral toxicity	Not required
Acute contact toxicity	Not required

Effects on other beneficial arthropods

Acute oral toxicity	Not required
Acute contact toxicity	Not required
Acute toxicity to ……..	Not required

Bioconcentration

Bioconcentration factor (BCF)	301 L/kg.
Depuration time (DT_{50})	No data available
Depuration time (DT_{90})	No data available

Level of metabolites (%) in organisms accounting for > 10 % of residues	No data available

Chapter 6: Other End Points

Appendix II: Human exposure calculations

The application of the product Pine T Pro Ball is an alternative method to control by mating disruption the spread of the insect *Thaumetopoea pityocampa* using sex pheromone non retrievable dispensers. Pine T Pro Ball is intended for seasonal application on the top of the pine (generally about 5 -10 meters from the ground) by the mean of a Paintball gun.
As explained in the "Guidance document on semiochemical active substances and plant protection products, 2016", the semiochemical diffuses continuously from the device into the air where the active substance becomes diluted (2A Passive non-retrievable dispensers according to the guidance).
The active substance (13Z)-Hexadec-13-en-11-yn-1 acetate is encapsulated into natural waxes/oils leading to a gel (formulation) that will be itself introduced into a biodegradable polymer shell to form the final balls.
There is no possibility of professional contact with the pheromone when loading the ball into the paintball gun. The pheromone can only diffuse after the impact of the ball on the pine and opening of the ball.
The professional exposure can therefore be considered very low as no direct contact is expected with the pheromone during the use and disposal of the product.

Knowing the pheromone decreases with distance from the point of emission, its concentration at 2 meters from the ground (human level) is therefore considered very low.

No secondary exposure of the general public is foreseen as balls will be directly shot and burst in the canopy of pine trees (generally about 5 -10 meters high).

In conclusion, no exposure calculations have been performed.

Appendix III: Information from the applicant = Method of application of the product

Adobe Acrobat Document

Appendix IV: List of terms and abbreviations

AE	Acid equivalent
AEL	Cf AOEL
AF	Assesment factor
Ai	Active ingredient
AOEL	Acceptable operator exposure level
Approx.	approximate
ARfD	Acute reference dose
As	Active substance
BAF	Bioaccumulation factor
BCF	Bioconcentration factor
bp	Boiling point
BP	Biocidal Product
BPD	Biocidal Products Directive
bw	body weight
c	Centi- (x10-2)
CA	Controlled atmosphere
CAS	Central authentification service
cf	Confer, compare to
CI	Confidence interval
CL	Confidence limits
CLP	Classification, Labelling, Packaging
Cm	Centimetre
CMR	cancérogènes, mutagènes, reprotoxiques
cv	Coefficient of variation
CV	Ceiling value
d	days
DIS	Draft international standard (ISO)
DPBS	phosphate buffered saline
DT 50(lab)	Period required for 50 percent dissipation (under laboratory conditions)
DT 90(field)	Period required for 90 percent dissipation (under field conditions)
EbC50	Median effective concentration, biomass
EC	Enzyme comission
ED	

ErC50	Median effective concentration, growth rate
EC50	Median effective concentration
ED50	Median effective dose
e.g.	
EINECS	European inventory of existing commercial substances
Email	Electronic mail
EN	European norm
F	field
FID	Flame ionisation detector
fp	Freezing point
g	grams
GC	Gas chromatography
GC-FID	Gas chromatography with flame ionisationdetector
GC-MS	Gas chromatography-mass spectrometry
GLP	Good laboratory practice
GMI	Genetically modified organism
h	hours
H	Henry’s law constant (calculation as a unitless value)
ha	hectare
hL	hectolitre
HPLC	High pressure liquid chromatography or high performance liquid chromatography
I50	Inhibitory dose, 50%
IC50	Median immobilisation concentration or median inhibitory concentration1
i.e.	
ID	Ionisation detector
Inh	inhalation
IR	infrared
ISO	internationale Organisation normalisation
IUCLID	International Uniform Chemical Information Database
IUPAC	International Union of Pure and Applied Chemistry

k	kilo
K	Kelvin
Ka	Acid dissociation constant
Kb	Base dissociation constant
Kads	Adsorption constant
Kg	kilogram
KH	Henry's law constant
Koc	Organic carbon adsorption coefficient
Kow	Octanol water partition coefficient
Kp	Solid-water partition coefficient
kPa	kilopascal
L	litre
LC50	Lethal concentration, median
LD50	Lethal dose, median : dosis letalis media
LLNA	Local lymph node assay
LOAEC	Lowest observable adverse effect concentration
LOAEL	Lowest observable adverse effect level
LOD	Limit of detection
LOEC	Lowest observable effect concentration
LOEL	Lowest observable effect level
Log	Logarithm to the base 10
LOQ	Limit of quantification (determination)
LRTAP/POP	
m	mètre
M	molar
µm	Micrometer
µg	Microgram
mg	milligram
Min	minutes
mL	millilitre
mm	millimetre
mo	month
mol	mole
Mp	Melting point
MRL	Maximum residue level or limit

MS	Mass spectrometry
MSDS	Material safety data sheet
MT	Material test
MW	Molecular weight
n.a. / NA	Not applicable
N	Number of observation
N	No
NAEL	No adverse effect level
nd	Not detected
ng	nanogram
nm	nanometre
NMR	Nuclear magnetic resonance
no, n°	number
NOAEC	No observed adverse effect concentration
NOAEL	No observed adverse effect level
NOEC	No observed effect concentration
NOErC	No observed effect concentration, growth rate
NOED	No observed effect dose
NOEL	No observed effect level
NR	Nor reported
OECD	Organization for Economic Co-operation and Development
OH	hydroxide
Pa	pascal
PBT	
PEC	Predicted environmental concentration
PECA	Predicted environmental concentration in air
PECS	Predicted environmental concentration in soil
PECsw	Predicted environmental concentration in Surface water
PECGW	Predicted environmental concentration in ground water
PED	Plama-emissions-detector
pH	pH-value

pKa	Negative logarithm (to the base 10) of the acid dissociation constant
pKb	Negative logarithm (to the base 10) of the base dissociation constant
PNEC	Predicted no effect concentration(compartment to be added as subscript)
ppm	Parts per billion (10-9)
PT	Product type
QA	Quality assurance
(Q)SAR	Quantitative structure-activity relationship
r	Correlation coefficient
r2	Coefficient of determination
RA	Risk assesment
Rf	Retardation factor
RfD	Reference dose
RH	Relative humidity
RL50	Median residual lifetime
rpm	Revolutions per minute
rRNA	Ribosomal ribonucleic acid
RRT	Relative retention time
RSD	Relative standard deviation
s	second
S	solubility
SCLPs	Straight Chain Lepidopteran Pheromones
SD	Standard deviation
se	Standard error
sec	second
SI	Stimulation index
SOP	Standard operating procedures
ep	species
STP	Sewage treatment plant
T1/2	Half-life (define method of estimation)
UV	Ultrat violet
v/v	Volume ratio
Vis	Visible
Wk	week

wt	weight
w/v	Weight per volume
w/w	Weight per weight
YR	year
Y	Yes
<	Less than
≤	Less than or equal to
≥	Greater than or equal to
>	Greater than

Appendix V: Overall reference list *(including data owner and confidentiality claim)*

Section No / Reference No.1	Author(s)	Year	Title. Source (where different from company) Company, Report No. GLP (where relevant) / (Un)Published	Data Protection Claimed (Yes/No)	Owner
II 2.8 / 01 II 3.11/ 01 II 3.4 / 01 II 3.12 / 01 II 4.4 / 01 II 4.11 / 01	Gayon E.	2017	Manufacturing Process and Process Controls - 13Z-Hexadecen-11-yn-1-yl acetate M2i-FAI-2017-09 V02 Non GLP Unpublished	Y	M2i
II 3.7 / 01 II 3.7.1 / 01 II 3.10 / 01 II 9. / 01 II 10.1.1.2 / 01 II 10.3.1 / 01	Pauriche A.	2017	Episuite - Test Item Pheromone de la Processionnaire de Pin M2iD-FAI-2017-04 V02 Non GLP Unpublished	Y	M2i
II 3.1 / 01 II 3.9 / 01 II 3.16 / 01	SERVAJEAN	2017	Analytical validation for the quantification of Pheromone de la Processionnaire du Pin in water. Solubility and stability in water Solubility in acetonitrile and n-heptane 16-64-074-ES GLP Unpublished	Y	M2i
II 3.4 / 01	Pauriche A.	2017	Publication Rossi - Test Item Pheromone de la Processionnaire de Pin M2iD-FAI-2017-03 V02 Non GLP Unpublished	Y	M2i
II 3.5 / 01 II 4.17.1 / 01	Pauriche A.	2017	ACD-lab - chemspider - Test Item Pheromone de la Processionnaire de Pin M2iD-FAI-2017-06 V02 Non GLP Unpublished	Y	M2i
II 3.6 / 01	Pauriche A.	2017	Absorption spectra and MS - Test Item	Y	M2i

			Pheromone de la Processionnaire de Pin M2iD-FAI-2017-07 V02 Non GLP Unpublished		
II 4.1 / 01 II 4.6 / 01 II 4.9 / 01 II 4.13 / 01	Pauriche A.	2017	Report On Physical Hazard and Respective Characteristics - Test Item Pheromone de la Processionnaire de Pin M2iD-FAI-2017-08 V02 Non GLP Unpublished	Y	M2i
II 5.1 / 01	SERVAJEAN	2017	Quantification of isomer Z and isomer E of 13-hexadecen-11-yn-1-yl acetate, (3Z,23Z)-hexacosa-3,23-dien-5,21-diyne and dodec-3-yn-1-yl acetate in 5 batches of Pheromone de la Processionnaire du Pin 16-64-073-ES GLP Unpublished	Y	M2i
II 8.1 / 01	Colas S.	2017	Pheromone de la Processionaire du Pin IN VITRO SKIN CORROSION: Reconstructed human epidermis (RhE) test method HSMC-PH-17/0038 GLP Unpublished	Y	M2i
II 8.1 / 02	Colas S.	2017	Pheromone de la Processionaire du Pin IN VITRO SKIN IRRITATION Reconstructed Human Epidermis test method HSMI-PH-17/0038 GLP Unpublished	Y	M2i

II 8.2 / 01	XXXX	2017c	Phéromone de la Processionnaire du Pin : Isolated Chicken Eye Test Method for Identifying (i) Chemicals Inducing Serious Eye Damage and (ii) Chemicals Not Requiring Classification for Eye Irritation or Serious Eye Damage ICE-PH-17/0038 GLP Unpublished	Y	M2i
II 8.3 / 01	XXXX	2017	Phéromone de la Processionnaire du Pin : ASSESSMENT OF THE SKIN SENSITIZATION POTENTIAL IN THE MOUSE USING THE LOCAL LYMPH NODE ASSAY (LLNA:BrdU) LLNA:BrdU-PH-17/0038 GLP Unpublished	Y	M2i
II 8.5.1 / 01	Savineau C.	2017	Phéromone de la Processionnaire du Pin : BACTERIAL REVERSE MUTATION TEST : Determination of mutagenic activity in mutated "Salmonella typhimurium his-" and "Escherichia coli" Doc.ames-1/V3 GLP Unpublished	Y	M2i
II 8.7.1 / 01	XXXX	2017	Phéromone de la Processionnaire du Pin : EVALUATION OF ACUTE ORAL TOXICITY IN RATS – ACUTE TTTOXIC CLASS METHOD TAO423-PH-17/0038 GLP	Y	M2i

			Unpublished		
II 8.7.3 / 01	XXXX	2017	Phéromone de la Processionnaire du Pin : EVALUATION OF ACUTE DERMAL TOXICITY IN RATS TAD-PH-17/0038 GLP Unpublished	Y	M2i
II 9.1.3 / 01	SERVAJEAN	2017	Freshwater algae, growth inhibition test with Pheromone de la Processionaire du Pin 16-64-082-ES GLP Unpublished	Y	M2i
II 9.1.7 / 01	Pauriche A.	2017	Summary of effect of SCLPs acetate on toxicity data for aquatic species M2iD-FAI-2017-11 V02 Non GLP Unpublished	Y	M2i
II 9.4 / 01 II 9.5 / 01	Pauriche A.	2017	Summary of effect of SCLPs acetate on toxicity data for honeybees, birds and arthropods M2iD-FAI-2017-12 V02 Non GLP Unpublished	Y	M2i
III 5.1/01	Verones V.	2017	Evaluation Stabilité Actif lors Fab Billes de paintball et dosage de l'actif M2ID ANA 2016 41 V02 Non GLP Unpublished	Y	M2i
II 6.6 / 01	Martin JC.	2017	OPTIMPHERO Report On Product Efficiency 2015 2018 Non GLP Unpublished	Y	M2i
	Verones V.	2017	Evaluation Stabilité Actif PHERO BALL PIN au vieillissement M2ID ANA 2017 12 V02 Non GLP	Y	M2i

			Unpublished		
	Gayon E.	2017	Argumentary (13Z)-Hexadec-13-en-11-yn-1-yl acetate M2iD-FAI-2017-20 Non GLP Unpublished	Y	M2i
Section 6 of iuclid	M2i	2019	Efficacy data and relevant information Non GLP Unpublished	Y	M2i
Section 6 of iuclid	Léa Delmas		DELMAS L., 2021, report n°M2iD-ESS-2021-02, "EFFICACY TRIALS of the Pine T Pro Ball for Mating Disruption of Pine ProcessionnaryProcessionary Moth (*Thaumetopoea pityocampa*) 2019-2020 FRANCE"	Y	M2i
Section 6 of iuclid	Léa Delmas		DELMAS L., 2021, report n°M2iD-ESS-2021-03, "EFFICACY TRIALS of the Pine T Pro Ball for Mating Disruption of Pine Processionary Moth (*Thaumetopoea pityocampa*) 2020 SPAIN"	Y	M2i