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VEILIGHEID VAN DE VOEDSELKETEN
EN LEEFMILIEU

Product Assessment Report For a minor change of national authorisation

Mouskito Tropical Spray

September 2019

Case Number in R4BP:	BC-CD044680-60
Authorisation/Registration no:	BE2014-0022
Granting date/entry into force of authorisation/ registration:	31/07/2014
Expiry date of authorisation/ registration:	31/07/2024
Active ingredient:	N,N- diethyl-meta-toluamide (DEET)
Product type:	19

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

Contents

Overview of applications

Overview regarding all relevant applications

Application type	refMS	Case number in the refMS	Decision date	Assessment carried out (i.e. first authorisation / amendment /renewal)
NA-APP	BE	No case number (submitted under 98/8/EC)	31/07/2014	First authorisation
NA-MAC	BE	BC-FY017449-08	14/12/2016	Major change
NA-ADC	BE	BC-GR028532-31	31/05/2017	Administrative change
NA-MIC	BE	BC-HL034853-34	20/02/2019	Minor change
NA-AAT	BE	BC-BY049568-02	23/07/2019	Amendment by CA (Art.48)
NA-MIC	BE	BC-CD044680-60	23/10/2019	Minor change
NA-ADC	BE	BC-AA055353-68	18/12/2019	ADC Addition of a manufacturer of the active substance
NA-AAT	BE	BC-LE062215-52	03/02/2021	Amendment by CA (Art.48)
NA-ADC	BE	BC-KG072419-35	09/03/2022	ADC change of the name of the biocidal product
NA-ADC	BE	BC-YH076290-29	03/08/2022	ADC change of the name of the biocidal product

Minor Change September 2019

The product Mouskito Tropical Spray was originally approved with a packaging in a white PP bottle of 100 ml with spray (pump). The applicant now wishes to make a minor change to the authorization. Two new pack sizes are added : a green PP bottle of 75 ml and of 150 ml, both with spray pump.
The amendments made to the last version of the PAR (dd 23/07/2019) related to this minor change of the product are highlighted in blue.

1 General information about the product application

1.1 Applicant

Company Name:	Laboratoria QUALIPHAR N.V./S.A.
Address:	Rijksweg 9
City:	Bornem
Postal Code:	2880
Country:	Belgium
Telephone:	+32 3 889 17 21
Fax:	+32 3 889 37 00
E-mail address:	Please see the confidential version of the PAR for more details

1.1.1 Person authorised for communication on behalf of the applicant

Name:	Please see the confidential version of the PAR for more details
Function:	Please see the confidential version of the PAR for more details
Address:	Rijksweg 9
City:	Bornem
Postal Code:	2880
Country:	Belgium
Telephone:	+32 3 889 17 21
Fax:	+32 3 889 37 00
E-mail address:	Please see the confidential version of the PAR for more details

1.2 Current authorisation holder[1]

Company Name:	Laboratoria QUALIPHAR N.V./S.A.
Address:	Rijksweg 9
City:	Bornem
Postal Code:	2880
Country:	Belgium
Telephone:	+32 3 889 17 21
Fax:	+32 3 889 37 00

[1] Applies only to existing authorisations

E-mail address:	Please see the confidential version of the PAR for more details
Letter of appointment for the applicant to represent the authorisation holder provided (yes/no):	no

1.3 Proposed authorisation holder

Company Name:	Laboratoria QUALIPHAR N.V./S.A.
Address:	Rijksweg 9
City:	Bornem
Postal Code:	2880
Country:	Belgium
Telephone:	+32 3 889 17 21
Fax:	+32 3 889 37 00
E-mail address:	Please see the confidential version of the PAR for more details
Letter of appointment for the applicant to represent the authorisation holder provided (yes/no):	no

1.4 Information about the product application

Application received:	01/08/2012
Application reported complete:	
Type of application:	Application for first authorisation
Further information:	Mouskito Tropical Spray is currently authorised under authorisation number BE2014-0022.

1.5 Information about the biocidal product

1.5.1 General information

Trade name:	Mouskito Tropical Spray
Manufacturer's development code number(s), if appropriate:	-
Product type:	19 Insect repellent against mosquitoes and flies.
Composition of the product (identity and content of active substance(s) and substances of concern; full composition see confidential annex):	50 % DEET (CAS N° 134-62-3) For the full composition, see confidential annex.

Formulation type:	AL – any other liquid to be applied undiluted, provided in a bottle with a sealed spray attachment.
Ready to use product (yes/no):	yes
Is the product the very same (identity and content) to another product already authorised under the regime of directive 98/8/EC (yes/no); **If yes: authorisation/registration no. and product name:** **or** **Has the product the same identity and composition like the product evaluated in connection with the approval for listing of active substance(s) on to Annex I to directive 98/8/EC (yes/no):**	no

1.5.2 Information on the intended uses

Overall use pattern (manner and area of use):	Mouskito Tropical Spray is an insect repellent against mosquitoes, flies and ticks that is applied on the uncovered skin of non-professional users.
Target organisms:	The target species are mosquitoes (*Culex, Aedes and Anopheles)* biting flies *(Stomoxys calcitrans)* and ticks *(Hyalomma marginatum)*.
Category of users:	Non-professional users
Directions for use including minimum and maximum application rates, application rates per time unit (e.g. number of treatments per day), typical size of application area:	The product has to be applied sufficiently on the exposed skin. Avoid every contact with eyes, mouth an mucous membranes. Maximum 2 applications a day. The product should only be applied to children older than 2 years. The use of the repellent for children between 2 and 12 years should be restricted to one application per day.
Potential for release into the environment (yes/no):	yes
Potential for contamination of food/feedingstuff (yes/no)	no
Proposed Label	According to Directive 1999/45/EC Class of danger Xn (Harmful) R-phrases: R22 : Harmful if swallowed R52/53: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment S-phrases: S2 : Keep out of the reach of children

	S13 : Keep away from food, drink and animal foodstuffs S23 : Do not breathe Spray S46 : If swallowed, seek medical advice immediately and show this container or label According to Regulation (EC) N° 1272/2008 [CLP] Pictogram *GHS02, GHS07* Signal Word: Warning Class of danger: Acute tox 4 Aquatic chronic 3 Hazard statements H302 :Harmful if swallowed. H412 : Harmful to aquatic life with long lasting effects P102 : Keep out of reach of children P260 : Do not breathe spray P264 : Wash hands thoroughly after handling P270 : Do not eat, drink or smoke when using this product P301+P312 : IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell P330 : Rinse mouth P405 : Store locked up
Use Restrictions:	For adults and children from the age of 2. The use of the product needs to be restricted to one application a day for children between 2 and 12 years old.

1.5.3 Information on active substance

Active substance chemical name:	N,N-diethyl-m-toluamide (DEET)
CAS No:	134-62-3
EC No:	205-149-7
Purity (minimum, g/kg or g/l):	980 g/kg
Inclusion directive:	2010/51/EU
Date of inclusion:	01/08/12
Is the active substance equivalent to the active substance listed in Annex I to 98/8/EC (yes/no):	yes
Manufacturer of active substance(s) used in the biocidal product:	
Company Name:	Vertellus Specialities Inc.
Address:	Please see the confidential version of the PAR for more details
City:	
Postal Code:	

Country:	
Telephone:	
Fax:	
E-mail address:	

1.5.4 Information on the substance(s) of concern

None of non-active ingredients was considered to be a substance of concern.

1.6 Documentation

1.6.1 Data submitted in relation to product application

Specific data were provided for the identification of the product, the physico-chemical properties and analytical methods.

Efficacy studies with the product performed on mosquitoes (*Culex, Aedes and Anopheles)*, biting flies *(Stomoxys Calcitrans)* and tropical ticks *(Hyalomma marginatum)* were provided.

With regard to acute oral and dermal toxicity, skin sensitization and dermal absorption studies were performed on Mouskito Tropical Spray.

The potential for skin irritation of Mouskito Tropical Spray was assessed based on a GLP study according to the OECD Guideline No. 404 dated April 24th, 2002 and the test method B.4 of the Council regulation No. 440/2008 of 30 May 2008. The test was performed on a former formula of Mouskito Tropical Spray. Please see the confidential version of the PAR for more details concerning the differences between the two formulations .
No new studies with the product were performed with regard to the ecotoxicology.

1.6.2 Access to documentation

The applicant has submitted a letter of access of the owner of the data on the active substance DEET submitted for the inclusion of DEET into Annex I of Directive 98/8/EC.

2 Summary of the product assessment

2.1 Identity related issues

The source and manufacturing route of the active substance is unchanged to this of the N,N-diethyl-m-toluamide'(DEET) listed in Annex I of 98/8/EC (Vertellus, member of DEET EU Joint Venture).

Mouskito Tropical Spray contains 50% DEET.

Mouskito Tropical Spray is sold in 100 ml Spray flask with a sealed Spray attachment.

Minor Change September 2019 :
2 new pack sizes are added: a 75 ml and a 150 ml bottle, both with spray pump.

None of the non-active ingredients has an influence on the classification and labelling of the final product in the concentration that they are present in the formula. Therefore, none of the non-active ingredients was considered to be a substance of concern.

Mouskito Tropical Spray is not identical to the representative biocidal product evaluated with the Annex I inclusion of DEET.

2.2 Classification, labelling and packaging

2.2.1 Harmonised classification of the biocidal product

2.2.1.1 Proposed classification of the biocidal product based on Directive 1999/45/EC

Category of danger:	Xn (Harmful) Xi (Irritating)
Risk Phrases:	R10 : Flammable R22 : Harmful if swallowed R36 : Irritating to eyes R52/53: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment
Safety Phrases:	S2 : Keep out of the reach of children S13 : Keep away from food, drink and animal foodstuffs S23 : Do not breathe spray S25 : Avoid contact with eyes S46 : If swallowed, seek medical advice immediately and show this container or label S51 : Use only in well-ventilated areas

	S61: Avoid release into the environment. Refer to special instructions/Safety data sheets.

2.2.1.2 Proposed classification of the biocidal product based on Regulation EC 1272/2008

Signal Word	Warning		
Pictogram			
	Hazard class & category	**Code**	**Hazard Statement**
Hazard statements:	Flammable cat 3	H226	Flammable liquid and vapour
	Acute tox 4	H302	Harmful if swallowed
	Eye Irrit. 2	H319	Causes serious eye irritation
	Aquatic chronic 3	H412	Harmful to aquatic life with long lasting effects
Precautionary statements		P102 P210 P270 P271 P273 P301+P312 P305+P351+P338 +P310 P501	Keep out of reach of children Keep away from heat/sparks/open flames/hot surfaces – No smoking Do not eat, drink or smoke when using this product Use only outdoors or in a well-ventilated area Avoid release in the environment IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing Immediately call a POISON CENTER or doctor/physician Dispose of contents/container ... (in accordance with local/regional/national/international regulation (to be specified)).

2.2.2 Labelling of the biocidal product

The labelling according to Directive 1999/45/EC and Regulation (EC) 1272/2008 can be displayed here as appropriate.

Since the product is sold as a 100 ml Spray flask with a sealed Spray attachment some R&S-phrases and H&P phrases should not be on the label.

Following R&S-phrases and H&P statements should not be on the label based on the fact that the packaging the content do not exceed 125 ml:

- H226 flammable and S51 / P210, P271 should not be on the label
- R36 / H319 and S25 / P305+P351+P338+P310
- S61 / P273, P501

Following R&S-phrases, H&P statements, pictogram and Signal word should not be on the label based on the fact that the packaging is fitted with a sealed Spray attachment:

- R65

Minor Change September 2019 :
2 new pack sizes are added: a 75 ml and a 150 ml bottle, both with spray pump.
The labelling for the 100 ml bottle mentioned above can also be applied for the 75 ml bottle.
For the 150 ml bottle however the full labelling has to be put on the label since the content exceeds the 125 ml limit.

So the labelling for the 75 and 100 ml packagings according to Directive 1999/45/EC and Regulation (EC) 1272/2008 can be displayed here as appropriate.

Category of danger:	Xn (Harmful)
Risk Phrases:	R22 : Harmful if swallowed R52/53: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment
Safety Phrases:	S2 : Keep out of the reach of children S13 : Keep away from food, drink and animal foodstuffs S23 : Do not breathe Spray S46 : If swallowed, seek medical advice immediately and show this container or label

Signal Word	Warning		
Pictogram			
	Hazard class & category	**Code**	**Hazard Statement**
Hazard statements:			
	Acute tox 4	H302	Harmful if swallowed
	Aquatic chronic 3	H412	Harmful to aquatic life with long lasting effects
Precautionary statements		P102 P270 P301+P312	Keep out of reach of children Do not eat, drink or smoke when using this product IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell

The labelling for the 150 ml packaging according to Regulation (EC) 1272/2008 can be displayed here as appropriate (no labelling for the 150 ml bottle according to Directive 1999/45/EC was added to the report since this labelling is no longer applicable) :

Signal Word	Warning		
Pictogram			
	Hazard class & category	**Code**	**Hazard Statement**
Hazard statements:	Flammable cat 3	H226	Flammable liquid and vapour
	Acute tox 4	H302	Harmful if swallowed
	Eye Irrit. 2	H319	Causes serious eye irritation
	Aquatic chronic 3	H412	Harmful to aquatic life with long lasting effects
Precautionary statements		P102 P210 P270 P271 P273	Keep out of reach of children Keep away from heat/sparks/open flames/hot surfaces – No smoking Do not eat, drink or smoke when using this product Use only outdoors or in a well-ventilated area Avoid release in the environment

		P301+P312 P305+P351+P338 +P310 P501	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing Immediately call a POISON CENTER or doctor/physician Dispose of contents/container ... (in accordance with local/regional/national/international regulation (to be specified)).

2.2.3 Packaging of the biocidal product

Mouskito Tropical Spray is packed in white polypropylene bottles of 100 ml fitted with a sealed Spray attachment.

Minor Change September 2019 :
2 new pack sizes are added: a green polypropylene bottle of 75 ml and of 150 ml, both with spray pump.

2.3 Physico/chemical properties and analytical methods

2.3.1 Physico-chemical properties

Table 2.3.1-1, containing the physico-chemical properties of the active substance is not needed since the necessary letter of access has been supplied for the active substance DEET.

A summary of the physical and chemical properties of the biocidal product is given in table 2.3.1-2.

Table 2.3.1-2: Physico-chemical properties of the biocidal product:

Subsection (Annex Point/TNsG)		Methods	Results	Remarks / Justification	GLP (Y/N)	Reference
B3.1	**Appearance (IIB3.1/Pt. I-B3.1)**					
B3.1.1	Physical state and nature	Organoleptic	Homogeneous liquid lotion	/	NA	Qualiphar - Mouskito Tropical Spray: Appearance Test Report (December 2014)
B3.1.2	Colour		Colourless	/	NA	
B3.1.3	Odour		Characteristic odour	/	NA	
B3.2	**Explosive properties (IIB3.2/Pt. I-B3.2)**	Statement	Waived	None of the ingredients of the product is classified as explosive.	Waived	Justification Laboratoria Qualiphar (19/01/2015)
B3.3	**Oxidising properties (IIB3.3/Pt. I-B3.3)**	Statement	Waived	None of the ingredients of the product is classified as oxidising.	Waived	Justification Laboratoria Qualiphar (19/01/2015)
B3.4	**Flash-point and other indications of flammability or spontaneous ignition (IIB3.4/Pt. I-B3.4)**					
B3.4.1	Flash point	EEC A.9 (flash point in a closed cup)	30.3 °C	The test irem is flammable: results in H226	Y	CRA-W (Gembloux) Project QUALIFAR / FO23734 / Ch.6080 / 2014 / A (2014)
B3.4.2	Auto-flammability	Statement	Waived	None of the ingredients of the product is classified as auto-flammable.	Waived	Justification Laboratoria Qualiphar (19/01/2015)
B3.4.3	Other indications of flammability	-	-	-	-	-

Subsection (Annex Point/TNsG)		Methods	Results	Remarks / Justification	GLP (Y/N)	Reference
B3.5	**Acidity / Alkalinity (IIB3.5/Pt. I-B3.5)**	CIPAC MT 75.3	pH = 6-7 pH (pure product) = 6.96	/	Y	CRA-W (Gembloux) Project QUALIFAR / FO23734 / Ch.6080 / 2014 / A (2014)
B3.6	**Relative density / Bulk density (IIB3.6/Pt. I-B3.6)**	EEC A.3	0.92 – 0.98 g/ml D^{20}_4= 0.9463	At 20 ± 0.5 °C	Y	CRA-W (Gembloux) Project QUALIFAR / FO23734 / Ch.6080 / 2014 / A (2014)
B3.7	**Storage stability / Stability and shelf life (IIB3.7/Pt. I-B3.7)**					
B3.7.1	Effects of temperature	CIPAC MT 46 Accelerated study for 8 weeks at 40 °C (dry conditions)	Variation of 3.1% after storage: 50.91% w/w versus 52.52 % w/w	MOUSKITO TROPICAL SPRAY is considered to be physically and chemically stable during 8 weeks at 40°C/dry conditions.	Y	Qualiphar - Mouskito Tropical Spray: Storage Stability Report (test start – 31/07/2014 signature – 19/05/2015)
		CIPAC MT 46 Accelerated study for 8 weeks at 40 °C (75 % relative humidity)	Variation of 3.9 % after storage: 54.57 % w/w versus 52.52 % w/w	MOUSKITO TROPICAL SPRAY is considered to be physically and chemically stable during 8 weeks at 40°C/75% RH conditions.	Y	Qualiphar - Mouskito Tropical Spray: Storage Stability Report (test start – 31/07/2014 signature – 19/05/2015)
		Shelf life at ambient temperature (25 °C/60 % relative humidity) over 36 months	Variation of 1.6 % after 36 month storage: 51.64 % w/w versus 52.52% w/w	Test on-going, protocol/commitment for 60 months study submitted. Submission of the test results (3, 4, 5 years) within a deadline will be a condition for obtaining an authorization with the corresponding shelf-life for MOUSKITO TROPICAL SPRAY if necessary.	Y	Qualiphar - Mouskito Tropical Spray: Stability Commitment (19/05/2015) Qualiphar - Mouskito Tropical Spray: Storage Stability Report (test start – 31/07/2014 signature – 06/10/2017)

Subsection (Annex Point/TNsG)		Methods	Results	Remarks / Justification	GLP (Y/N)	Reference
B3.7.2	Effects of light	IHC Q1B	Variation of 0.1 % after photostabillity study: 52.47 % w/w versus 52.52 % w/w	Storage conditions : 25°C / 60%RH	Y	Qualiphar - Mouskito Tropical Spray: Storage Stability Report_Effects of light (07/05/2015) Qualiphar - Photostability Testing (19/02/2015)
B3.7.3	Reactivity towards container material	CIPAC MT 46 Accelerated study for 8 weeks at 40 °C (dry conditions) CIPAC MT 46 Accelerated study for 8 weeks at 40 °C (75 % relative humidity) Shelf life at ambient temperature (25 °C/60 % relative humidity) over 36 months	There is no interaction and no visual damage with the primary packaging material after 8 weeks at 40°C/dry and 40°C/75% RH and after 36 months at 25°C/60% RH.	Interaction with primary packaging is monitored during the temperature-effects studies under B3.7.1.	NA	Qualiphar - Mouskito Tropical Spray: Storage Stability Report (test start – 31/07/2014 signature – 06/10/2017)
B3.8	**Technical characteristics (IIB3.8/Pt. I-B3.8)**					
B3.8.1	Wettability/Suspensibility	-	-	Not applicable since biocidal product is not wettable/water dispersable.	-	-
B3.8.2	Wet sieve analysis	-	-	Not applicable since biocidal product is not wettable powders, suspension concentrates, water dispersible granules, aqueous capsules suspensions, dispersibles concentrates suspo-emulsions, water solubles granules and water soluble powders.	-	-

Subsection (Annex Point/TNsG)	Methods	Results	Remarks / Justification	GLP (Y/N)	Reference
B3.8.3 Emulsifiability	-	-	Not applicable since biocidal product does not need to be emulsified.	-	-
B3.8.4 Disintegration time	-	-	Not applicable since biocidal product is not a tablet and is not used in a water soluble bag.	-	-
B3.8.5 Attrition / Friability of granules Integrity of tablets	-	-	Not applicable since biocidal product is not a granule or tablet.	-	-
B3.8.6 Persistence of foaming	-	-	Not applicable since biocidal product is a ready for use product.	-	-
B3.8.7 Flowability / Pourability	-	-	Not applicable since biocidal product is not granular/a suspension.	-	-
B3.8.8 Dustability	-	-	Not applicable since biocidal product is not granular.	-	-
Additional technical properties					
B3.8.9 Burning rate smoke generators	-	-	Not applicable since the biocidal product is no smoke generator.	-	-
B3.8.10 Burning completeness smoke generators	-	-	Not applicable since the biocidal product is no smoke generator.	-	-
B3.8.11 Composition smoke of smoke generators	-	-	Not applicable since the biocidal product is no smoke generator.	-	-
B3.8.12 Spraying pattern aerosols	-	-	Not applicable since the biocidal product is no aerosol.	-	-
B3.9 Compatibility with other products (IIB3.9/Pt. I-B3.9)	-	-	The biocidal product is not intended to be added or mixed with any other products.	-	-
B3.10 Surface tension and viscosity (IIB3.10/Pt. I-B3.10)					

Subsection (Annex Point/TNsG)	Methods	Results	Remarks / Justification	GLP (Y/N)	Reference
B3.10.1 Surface Tension	PA-U10-METTENS (equivalent to method EAC A.5)	32.0 mN/m	Product is surface active. Tested at 25 ± 0.5 °C	Y	CRA-W (Gembloux) Project QUALIFAR / FO23734 / Ch.6080 / 2014 / A (2014)
B3.10.2 Viscosity	ASTM D445 (kinematic viscosity)	• 31.0357 cSt (20°C, shear rate 0.04511 mm^2/s^2) • 30.4116 cSt (20°C, shear rate 0.09513 mm^2/s^2) • 13.6976 cSt (40°C, shear rate 0.02994 mm^2/s^2) • 13.5556 cSt (40°C, shear rate 0.04511 mm^2/s^2)		Y	CRA-W (Gembloux) Project QUALIFAR / FO23734 / Ch.6080 / 2014 / A (2014)
B3.11 Particle size distribution (IIB3.11/Pt. I-B3.11)	-	-	*At the time of the first authorisation this endpoint was not applicable. However, now, the applicable PhysChem guidance clearly states that the MMAD has to be determined for products that generate exposure to aerosols, particles or droplets. MMAD data on fresh and aged product have been requested from the applicant at the end of 2018, and will be provided together with the next change application.*	-	-

2.3.2 Analytical methods

2.3.2.1 Formulation analysis

A general analytical method for the determination of DEET and the impurities in the technical material was developed and evaluated in the DEET CAR, Document III-A, section 4.1. For the determination of DEET in the reference product, a HPLC-UV method was provided. However, supporting validation data was only provided for the 15% DEET aerosol.

	Principle of method
Technical active substance as manufactured:	GC-FID
Impurities in technical active substance:	GC-FID
Active substance in the formulation:	HPLC-UV

For other products except the 15 % DEET aerosols, analytical methods with supporting validation data are needed at the product authorisation stage. The applicant introduced two validations for a HPLC-DAD method according to B.E.A.Gx method MR-116-01-01. The results are given in Table 2.3.1-4. The first validation of method (on new formula of Mouskito Tropical Spray) demonstrates that matrix effect is not detected by the method. The second validation (on previous formula of Mouskito Tropical Spray) demonstrates that the method used is validated to quantify DEET concentration in the biocidal product. The BE CA considers this method suitable for the determination of the DEET content in Mouskito Tropical Spray, new formula.

Table 2.3.2-1: Analytical method for formulation analysis:

Sample	Test Substance	Analytical Method	Number of Measurements / Fortification Range	Linearity	Specificity	Recovery Rate (%)			Limit of Quantitation (LOQ)	Reference
						Range	Mean	RSD		
Tropical Spray with 50% DEET	DEET	HPLC-DAD	9 levels & triplicates, for old formula 5 levels & 4 replicates for new formula	r^2 of calibration curve = 0.9976	No interference with matrix No interference with impureties	Range: 103.1 – 106.2 % Mean: 104.8 % RSD: <4 % for all levels < 15% at LOQ level			33 mg/g	Université de Liège - Gembloux Agro-Bio Tech (Gembloux) 4-QUADEET 14/07 (09/09/2014) Université de Liège - Gembloux Agro-Bio Tech (Gembloux) 4-QUADEET 14/02 (02/09/2014)

2.3.2.2 Residue analysis

Analytical methods for the determination of DEET in relevant environmental media (soil, air, water), residues in animal/human body fluids/tissues and in/on food or feedstuffs have not been submitted for the biocidal product. These points have been covered by the data set for the active substance, which can be found in the DEET CAR, Document II-A, section 1.3.3, and the DEET Assessment Report, section 2.1.1. Because Mouskito Tropical Spray shows similarities to the reference product OFF! AEROSOL from the DEET CAR, the BE CA could agree with non submission of a method for air.

2.3.2.2.1 Justification of non-submission of data on the active ingredient

Not applicable

2.3.2.2.2 Justification of non-submission of data on the substance of concern

Not applicable

2.4 Risk assessment for Physico-chemical properties

As described in the DEET CAR, the active ingredient does not exhibit hazardous physic-chemical properties. However, the product Mouskito Tropical Spray is classified as flammable.

The Mouskito Tropical Spray (new formula) is considered to have a shelf life of three years. A test on stability at ambient temperature conditions is on-going and a protocol for 60 months study was submitted. Submission of the results at 4 and 5 years within a deadline of, the 1st of September of 2018 and 2019 will be a condition for obtaining an authorisation with the corresponding shelf-life for the biocidal product.

2.5 Effectiveness against target organisms

Mouskito Tropical Spray is a ready-for-use solvent-based Spray containing 50% DEET. This product is used by the non-professional user/consumer to repel flies, mosquitoes and ticks. It is intended to be used on the skin.

2.5.1 Function

MG03: Pest control

PT19: Repellents and attractants

2.5.2 Field of Use Envisaged

The Mouskito Tropical Spray (new formula) 50% DEET is presented as a ready-to-use spray to be applied on uncovered human skin of non-professional users/consumers in tropical regions This product is for adults and children from the age of 2. Between the age of 2 and 12 years the use of the product should be limited.

2.5.3 Target organisms to be controlled

The product Mouskito Tropical Spray (new formula) 50% DEET is intended to be used to repel arthropods. The target organisms to be controlled are ticks (Hyalomma marginatum) and flying insects i.e. mosquitoes (*Culex sp, Aedes sp and Anopheles gambiae)* and biting flies *(Stomoxys Calcitrans)*. The repellent activity against *Glossina sp.*, vector of African sleeping sickness, has not yet been proven. The applicant will place a warning on the label.

The product is supplied as a liquid in a plastic bottle (100 ml) which should be applied using the spray system.
The product is supplied ready to use.
It is spread (moistened sufficiently) maximum twice a day on the skin by spraying carefully over the skin. For application on the face, the product should be sprayed on the hands and then applied on the face.

According to the information given by the Applicant, the product Mouskito Tropical Spray (new formula) 50% DEET is intended to protect against mosquitoes during 10 hours and against ticks & flies during 8 hours.

2.5.4 Effects on Target Organisms - Mode of action

Mouskito Tropical Spray is an insect repellent without time delay. The mechanism of action of the active ingredient *N,N*-diethyl-meta-tolueenamide (DEET) is not revealed yet. However its effectiveness is determined experimentally.

In the CAR, one laboratory test and different field tests revealed already a limited activity of the active substance against: mosquitoes (*Aedes aegypti, Culex annulirostris,…*), flies (*Stomoxys calcitrans*), black flies, deer flies and chiggers (*Trombicula sp.*) (DOC III–A5).

Due to the low concentration of perfume and the fact that the most important perfume-elements in the product are also present in the product in the CAR, we may assume that the perfume himself will be of no importance regarding the repelling activity of the product.

2.5.5 Efficacy data

2.5.5.1 Efficacy data on the active substance used in the Assessment Report for inclusion to Annex I

The assessment of the biocidal activity of DEET demonstrates that it has a brief but sufficient activity against the target organisms in a concentration of 0,23 mg/cm^2 (15% DEET).
In Mouskito Tropical Spray, DEET is present in an increased concentration of 0,75 mg/cm^2 (50% DEET).

2.5.5.2 Efficacy data on the representative products used in the Assessment Report for inclusion to Annex I

The Mouskito Tropical Spray formulation is different from that of OFF!™ Aerosol. The concentration of the active substance is increased and there is a change in the non-active substances. As a result of the changes, you can see a prolonged repellent effect of the product in the test.

2.5.5.3 Efficacy tests with Mouskito Tropical Spray

- An arm-in-cage study conducted with 5 human volunteers with the product Mouskito Tropical Spray (new formula) 50% DEET on 3 mosquito species (*Aedes aegypti*, *Culex pipiens* and *Anopheles gambiae*)

The duration of efficacy of the product *Mouskito Tropical Spray (new formula) 50% DEET* was tested according to an "arm-in-cage" simulated-use test (Report 1832b-MTROSNF/0914R) The test system was based on MS 1497 (2000) and WHO/HTM/NTD/WHOPES/2009.4 methods. The test is conducted in a testing chamber (30 m^3 with 30 m^3/h-smooth ventilation) under "tropical" climatic conditions (+30°C ±1°C ; 80±5% rH) with 5 volunteers against females of *Aedes aegypti*, *Culex pipiens* and *Anopheles gambiae.*
The product was sprayed at the dose of 1 g *Mouskito Tropical Spray (new formula) 50% DEET* /600 cm² on the forearm. The control forearm was inserted into the cage, and after validation of this control (10 landings), the treated forearm was inserted into the cage for 3 minutes every hour until 9 hours or inefficacy considered as the first bite followed by a second one within 30 minutes.
According to this test, the product *Mouskito Tropical Spray (new formula) 50% DEET* when used at a dose of 1g/600 cm^2 provides up to 10 hours protection time against mosquitoes (*Aedes aegypti*, *Culex pipiens* and *Anopheles gambiae*) found in tropical areas..

Conclusion of the efficacy expert : BE CA decided to accept this test (reliability 1)
According to this test, the product *Mouskito Tropical Spray (new formula) 50% DEET* when used at a dose of 1g/600 cm^2 provides up to 10 hours protection time against mosquitoes (*Aedes aegypti*, *Culex pipiens* and *Anopheles gambiae*) found in tropical areas.

- An arm-in-cage study conducted with 5 human volunteers with the product Mouskito Tropical Spray (new formula) 50% DEET on one biting fly species (*Stomoxys calcitrans*)

The duration of efficacy of the product *Mouskito Tropical Spray (new formula) 50% DEET* was tested according to an "arm-in-cage" simulated-use test (Report 1832b2-MTROSNF/0914R). The test system was based on MS 1497 (2000) and WHO/HTM/NTD/WHOPES/2009.4 methods. The test is conducted in a testing chamber (30 m^3 with 30 m^3/h-smooth ventilation) under "tropical" climatic conditions (+30°C ±1°C ; 80±5% rH) with 5 volunteers against mixed sex adults of *Stomoxys calcitrans*.
The product was sprayed at the dose of 1 g *Mouskito Tropical Spray (new formula) 50% DEET* /600 cm^2 on the forearm. The trial began 30 minutes after the product had been applied. The control forearm was inserted into the cage, and after validation of this control (10 landings), the treated forearm was inserted into the cage for 3 minutes every hour until 8 hours or inefficacy considered as the first bite followed by a second one within 30 minutes.
According to this test, the product *Mouskito Tropical Spray (new formula) 50% DEET* when used at a dose of 1g/600 cm^2 provides up to 8 hours protection time against biting flies found in tropical areas.

Conclusion of the efficacy expert : BE CA decided to accept this test (reliability 1)
Please note that no agreed efficacy test protocols are available for products with a repellent effect against flies.
The product *Mouskito Tropical Spray (new formula) 50% DEET* when used at a dose of 1g/600 cm^2 provides up to 8 hours protection time against biting flies (*Stomoxys calcitrans*) found in tropical areas.

- A laboratory study conducted with the product Mouskito Tropical Spray (new formula) 50% DEET on one tropical tick specie (*Hyalomma marginatum*).

The duration of efficacy of the product *Mouskito Tropical Spray (new formula) 50% DEET* is assessed by a "Tube choice-test", using the comparison of the ticks' distributions among volumes with and without product (Report 1832i-MTROSNF/0914R).

A known number of ticks is released in a climatic controlled conditions test device which is composed of two glass cylinders communicating by a tube under "tropical" climatic conditions (+30°C ±1°C ; 80±5% rH) with mice against mixed sex adults of *Hyalomma marginatum.*
The product was sprayed at the dose of 1 g *Mouskito Tropical Spray (new formula) 50% DEET* /600 cm^2.
The number of ticks on the bite target is recording during a 15 minutes exposure time.
According to this test, the product *Mouskito Tropical Spray (new formula) 50% DEET* when used at a dose of 1g/600 cm^2 provides up to 8 hours protection time against biting flies found in temperate areas.

Conclusion of the efficacy expert : BE CA decided to accept this test (reliability 1)
The product *Mouskito Tropical Spray (new formula) 50% DEET* when used at a dose of 1g/600 cm^2 provides up to 8 hours protection time against ticks (*Hyalomma marginatum*) found in tropical areas.

2.5.6 Occurrence of resistance

For repellents, resistance is not considered to be relevant.

2.5.7 Final conclusion

According to the product claim, all the submitted data are acceptable, they meet the data requirements as set out in the TNsG on Product Evaluation, Appendices to Chapter 7 (page 187 to 200), Product Type 18.

The product Mouskito Tropical Spray (new formula) 50% DEET when used at a dose of 1g/600 cm^2 (0,83 mg DEET/cm^2) does provide 10 hours protection against mosquitoes (*Aedes aegypti*, *Culex pipiens* and *Anopheles gambiae*) and 8 hours protection time against ticks (*Hyalomma marginatum*) and biting flies (*Stomoxys calcitrans*) under tropical conditions.

Known limitations:
- Contact with the eyes, mouth and mucosae should be avoided.
- For application on the face, the product should be sprayed on the hands and then applied on the face.

Evaluation of the label claims:
- The applicant must mention on the label that the skin must be dried off before use
- The applicant must mention on the label that protection time can be lowered by excessive sweating, water wash off, rubbing, wind velocity or by applying a sun cream.

2.6 Exposure assessment

2.6.1 Description of the intended use(s)

Mouskito Tropical Spray is sold in 100 ml Spray flask with a sealed Spray attachment and can only be applied twice a day. It cannot be used for children younger than two years old. For children between 2 and 12 years old use should be restricted to one application a day.

MG/PT	Field of uses envisaged	Likely concentrations at which a.s. will be used
19	Insect repellent against mosquitoes and flies	**DEET: 50%**

2.6.2 Assessment of exposure to humans and the environment

2.6.2.1 Environmental exposure assessment

Mouskito Tropical Spray is used as an insect repellent (PT19) that is applied on uncovered human skin. The product can be expected to be used both indoors and outdoors at a maximum application rate of 2 applications per day.

Mouskito Tropical Spray contains 50 % (500 g/kg) N,N-Diethyl-*m*-toluamide, a.k.a. DEET, as active substance. None of its other components are considered relevant for the environmental exposure assessment or have an influence on the environmental classification and labelling.

The main route into the environment of insect repellents used on human skin is assumed to be indirect. It results from the showering and bathing of the end-user after application of the product, washing away residual product down the drain, via the STP, to the surface water.
An additional route of exposure identified for repellents is the direct release to surface waters as a result of swimming. However, as no generally approved scenario was available at the time this PAR was made, this was not assessed.
For the full exposure assessment, please refer to section 2.8.3 below.

2.6.2.2 Human exposure assessment

Mouskito Tropical Spray is intended for consumer application, where the route of exposure is mainly dermal and is applied directly on human skin. The inhalation exposure is considered to be negligible (TNsG 2002 part 2 p. 272), due to the use outdoors, and because use indoors only takes place in the summer where there is a high ventilation rate.)

Oral exposure by hand-to-mouth transfer is not considered to be a significant route of exposure because the smell and taste of DEET acts as a self-deterrent against this type of activity. More importantly, Mouskito Tropical Spray contains an ingredient that acts as a strong deterrent for ingestion (Bitrex). Based on the reverse dose calculations on mouthing of the substance in children of the CAR from DEET, an age limit of 2 years is proposed together with recommendations that the product should not be applied to the hands of children <12 years old. (p. 93 document IIC CAR DEET)

Exposure path	Industrial use	Professional use	General public	*via* the environment
Inhalation	Negligible	Not applicable	Negligible	Negligible
Dermal	Negligible	Not applicable	Main route of exposure	Negligible
Oral	Negligible	Not applicable	Negligible	Negligible

2.7 Risk assessment for human health

2.7.1 Hazard potential

2.7.1.1 Toxicology of the active substance

Absorption, distribution, metabolism and excretion studies showed that more than 80% of N,N-diethyl-meta-toluamide (DEET) given orally to rats is absorbed and excreted in the urine. DEET showed no evidence for accumulation. When applied dermally to rats, 74-78% is absorbed and excreted in the urine. The dermal absorption of DEET occurred at a slower rate than oral absorption. As much as 74-91% of the administered radioactivity was excreted via urine and about 3-7% was excreted via the faeces. DEET was metabolised completely in all oral and dermal treatment groups with little or no parent compound excreted in the urine. DEET is extensively metabolised to 2 major metabolites, namely m-[(N,N-diethylamino)carbonyl]-benzoic acid and m-[(ethylamino)carbonyl]-benzoic acid. DEET is absorbed slowly, metabolised completely and excreted rapidly when applied to human skin. Less than 20% of a dermally applied dose of DEET, either as a 15% solution in ethanol or as the undiluted technical grade material, is absorbed through the skin during an 8h exposure period.

Acute toxicity studies show that the oral LD50 for DEET warrants a classification as Xn and R22 (harmful if swallowed). The rabbit acute dermal LD50 of DEET is greater than 2000 mg/kg body weight and the rodent acute dermal LD50 is above 5000 mg/kg body weight. The acute inhalation LD50 of DEET is greater than 2.02 mg/L, the highest concentration tested which is lower than the upper European classification limit, acute toxicity category 4 according to GHS and recommended highest dose according to the OECD guideline. Even if no mortality was observed at the limit dose tested (2.02 mg/L/4h), it cannot be fully ensured that the LC50 would be above 5 mg/L/4h.

DEET is slightly irritating to the skin. Dermal repeated dose studies in pigs and rats showed that repeated dermal dosing resulted in dermal irritation at all doses tested and remained at the end of the study. A classification as R36 (irritating to eyes) is not warranted based on the results of the eye irritation test. However, the mean score for corneal opacity is 1 for 3 animals at 24h, 48h and 72h, and warrants a classification as eye irritation class 2/H319 according to the GHS.

DEET did not result in a skin sensitisation response in the Bühler test.

Several repeated dose toxicity studies for the oral and dermal route were submitted for DEET. Male rats were the most sensitive gender to DEET for repeated dose effects. Male rats developed α2u-globulin nephropathy that is considered gender-specific and species-specific. Other studies were submitted to support the conclusion that the kidney effects observed in rats were species-specific. This effect was not considered relevant for risk assessment. Clinical signs of neurotoxicity also occurred in dogs shortly after oral dosing. In both rats and dogs, decreased body weights were observed after oral dosing with DEET. Dermal application of DEET to rats and minipigs resulted mainly in skin irritations, but no systemic toxicity or pathological findings.

DEET showed no genotoxic potential in a battery of in vitro tests in bacteria and mammalian cells. DEET did not result in an increase in tumours in rats and mice and was not considered oncogenic in the carcinogenicity studies.

The teratogenicity of DEET was investigated in 2 species, namely rat and rabbit. The studies were performed according to the OECD guideline No. 414 and both studies were preceded by dose finding studies. However, these studies were performed prior to the revision of the OECD guideline in 2001 and has therefore some discrepancies compared to the current guideline. The mothers were treated only during organogenesis and not to scheduled sacrifice. The studies therefore have some limitations in assessing potential effects during later stages of embryonal development. However, given that the 2-generation study in rats gave no further indications of embryotoxic or teratogenic effects at comparable doses, these studies are considered acceptable for risk assessment purposes. There were no teratogenic effects observed in the studies up to maternally toxic doses. Embryotoxicity was only expressed as decreased foetal body weights in rat. There were no effects on reproduction in a 2-generation study in rats. Parental males were the most sensitive gender based on kidney effects that were considered species-specific and irrelevant for risk assessment to man. There were no effects on reproduction. The effects observed in mothers and offspring were reduced body weights and in offspring during later parts of the lactation period. The study was performed in 1989 and shows some discrepancies compared to the current OECD guideline No. 416. The 2-generation study was considered suitable for risk assessment despite deviations from the current OECD guideline No. 416.

No studies were submitted that specifically investigated neurotoxicity after dermal application. However, neurotoxicity of DEET was investigated in an acute oral delayed neurotoxicity study and in a delayed neurotoxicity study following multigenerational exposure in rats. In the acute neurotoxicity study, an increased response time to heat stimulus and decreased rearing activity at 1h postdose was observed in the high dose group. The multigenerational exposure resulted in a transient increase in locomotor activity in the high dose group. The multigenerational neurotoxicity study has some limitations in assessing the risk for exposure to the developing brain in children, since there was no information on exposure to pups during lactation and no functional tests were performed on young animals.

2.7.1.2 Toxicology of the substance(s) of concern

The biocidal product contains the following substances of concern:

- DEET.

A new formula has been submitted by the applicant (major change). None of new non-active ingredients was considered to be a substance of concern.

2.7.1.3 Toxicology of the biocidal product

The basis for the health assessment of the biocidal product is laid out in Annex 5 ”Toxicology – biocidal product”

2.7.1.3.1 Introduction

A number of full-length toxicological studies with Mouskito Tropical Spray were provided by the applicant, all which will be discussed hereafter:

- Acute oral toxicity.
- Acute dermal toxicity.
- Skin irritation.
- Eye irritation.
- Skin sensitisation.
- Dermal absorption.

2.7.1.3.2 Acute oral toxicity

Test item Mouskito Tropical Spray was administered by gavage to a group of 6 females SD rats at single dose of 2000 mg/kg bw, and then to a group of 6 female Sprague Dawley rat at the single dose of 300 mg/kg bw. The test has been performed according the to the official method as defined in the OECD guideline N°423.
Please see the confidential version of the PAR for more details

In conclusion of the study, the LD_{50} of Mouskito tropical spray is higher than 300 mg/kg and lower than 2000 mg/kg bw by oral route in the rat.
In accordance with the Regulation EC N° 1272/2008, the test item must be classified in category 4. The signal word ”warning” and hazard statement H302 ”Harmful if swallowed” are required.

Reference:

S. Colas. (2011) Mouskito Tropical Spray Evaluation of Acute Oral toxicity in rats- acute toxic class method. TAO423-PH-11/0475.

2.7.1.3.3 Acute dermal toxicity

The test item Mouskito Tropical Spray was applied onto the intact skin of 10 Sprague Dawley rats (5m and 5f) at the single dose of 2000 mg/kg bw. The experimental protocol was performed according the OECD guideline N°402.
Please see the confidential version of the PAR for more details

In conclusion, the LD_{50} of the test item Mouskito tropical spray is higher than 2000 mg/kg body weight by dermal route in the rat.
In accordance with the Regulation EC N° 1272/2008, the test item must not be classified. No signal word or hazard statement is required.

S. Colas. (2011) Mouskito Tropical Spray Evaluation of Acute dermal toxicity in rats. TAD-PH-11/0475.

2.7.1.3.4 Skin irritation

Test item Mouskito tropical spray was applied, as supplied, at the dose of 0.5 mL, under semi-occlusive dressing during 4 hours on an undamaged skin area of 3 rabbits. The test was performed under the protocol OECD Guidelines N°404.

Please see the confidential version of the PAR for more details

In accordance with the Regulation (EC) N° 1272/2008, the test item must not be classified.

S. Colas. (2011) Mouskito Tropical Spray Assessment of acute dermal irritation. IC-OCDE-PH-11/0475.

2.7.1.3.5 Eye irritation

The active ingredient DEET is labelled R36/H319 (See MSDS of DEET). Because DEET is present in the formula at a concentration of 50%, according to European Directive 1999/45/EC and 1272/2008/EEC it can be expected that the biocidal product itself is also irritating for the eyes. According to the TNsG, it is not necessary to perform a test on eye irritation test if it can be expected that the formula is irritating. Therefore, to avoid the additional use of test animals no test for eye irritation was performed and the product was labelled R36/H319. A warning is added to avoid contact with the eyes.

2.7.1.3.6 Skin sensitisation

The applicant has provided a OECD N°406 in skin sensitization in Guinea pigs.
The test item was used freshly prepared in isotonic sodium chloride for the intradermal injection and in distilled water for the topical applications.
Please see the confidential version of the PAR for more details

Main Study

5 females were used for the negative control group. 10 females were used for the treated group and 3 served as the positive control group.

- Intradermal induction:

For the Induction phase three pairs of intradermal injections of 0.1 mL were performed.
Group 1 (negative control):

- 2ID: Freund's complete adjuvant diluted at 50% in isotonic sodium chloride.
- 2ID: Olive oil
- 2ID: a mixture with equal volumes v/v:

Group 2 (Treated):

- 2ID: Freund's Complete Adjuvant diluted by 50% in isotonic sodium chloride,
- 2ID: test item at 6.25% in olive oil.
- 2ID a test mixture in equal volumes v/v:
- Freund's Complete Adjuvant at 50% and the test item at 12.5% in olive oil.

- Topical induction

A solution of sodium lauryl sulphate at 10% in thick Vaseline was applied in order to create a local irritation.
0.5 ml of water or test item was applied under occlusive dressing for 48 hrs on the injection sites of each animal from the control and test group respectively.

- Rest phase

10 days

- Challenge phase:

Experimental procedure of this phase was identical for both groups. An occlusive dressing was applied during 24 hours at 100% test item (MNIC) and diluted at 50% (1/2 MNIC).
Please see the confidential version of the PAR for more details

In accordance with the Regulation EC N° 1272/2008 on classification, labelling and packaging of substances and mixtures, the test item **must not be classified**.

S. Colas. (2011) Mouskito Tropical Spray Assessment of sensitising properties on albino guinea pigs Maximisation test according to Magnusson and Kligman. SMK-PH-11/0475.

2.7.1.3.7 Dermal absorption

The dermal absorption of DEET in Mouskito Tropical Spray was investigated in a GLP study using human skin *in vitro.* The study was performed according to OECD guidelines N°428.
Human skin was placed into flow-through cells and exposed to DEET for 8 hours under non-occluded conditions. The receptor fluid was collected at various time points. At the end of the experiments the amount of radioactivity was determined at the donor site, in the skin (tape-strips and total skin) and in the receptor fluid. Prior to determination of the dermal absorption of DEET, the skin integrity was checked by determination of the permeation of tritiated water.
The mean recovery percentage for Mouskito Tropical Spray is 109± 4%. The *in-vitro* dermal absorption of DEET in Mouskito Tropical Spray is 1±0.4%.

S.F.M. Krebbers. (2014) Determination of the dermal absorption of N,N-Diethyl-M-Toluamide (DEET) in different formulations through human skin In-Vitro.

2.7.2 Exposure

The biocidal product contains DEET (500 g/kg).

2.7.2.1 Exposure of professional users

Not relevant since DEET is intended for use as an insect repellent in consumer products directly applied to the skin and clothing.

2.7.2.2 Exposure of non-professional users and the general public

The representative DEET product is intended for consumer application, where the route of exposure is mainly dermal.

2.7.2.2.1 Direct exposure

The exposure is calculated, like suggested in the CAR of DEET, based on 75th percentile of the data of a mail survey and usage study from Boomsma, JC and Parthasarathy, M (1990) Human Use and Exposure to Insect Repellants Containing DEET.

The 75th percentile of human dermal exposure per application is estimated to be 1.5 g a.s.for males (70 kg), 1.0 g a.s. for females (60 kg), 1.66 g a.s. for children > 12 years (62.5 kg) and 1.42 g a.s. for children < 12 (25.5 kg) (CAR DEET Doc II P62).This is an underestimation of dermal exposure for the representative product since in the usage study the average percentage of DEET in product was 26.1% and the concentration of product is 50 % DEET.

The systemic exposure to DEET following dermal application of Mouskito Tropical Spray is calculated using the following formula:

Systemic exposure = Cf / Cr x Q x F x R x DA / BW

With parameters:
Cf = concentration of DEET in the final product (50 %)
Cr = concentration of DEET in the usage study (26.1%)
Q = quantity of the final product for each application
F = frequency of applications = 2 applications per day
R = retention factor
DA = dermal absorption (1%)
BW = body weight (p. 63 doc II CAR DEET)

Subject	**Systemic exposure**
Child < 12 years (25.5 kg)	2.13 mg/kg bw/day
Child > 12 years (62.8 kg)	1.01 mg/ kg bw/day
Adult woman (60 kg)	0.64 mg/ kg bw/day
Adult man (70 kg)	0.82 mg/ kg bw/day

2.7.2.2.2 Indirect exposure

The degree of indirect exposure is considered negligible as the primary route of exposure is direct application to the skin.

In Annex 7 “Safety for non-professional operators and the general public”, the results of the exposure calculations for the active substance and the substance of concern for the non-professional user and the general public are laid out.

2.7.2.3 Exposure to residues in food

The application of the DEET products does not result in residues to which consumers might become exposed.

2.7.3 Risk Characterisation

The active substance concentration has not changed in the new formula.
Thus Risk characterisation is similar than with the previous composition.

With proper use in accordance with regulations harmful effects on the health of users and third parties are not expected. The estimated exposures for the intended use are compared to the respective systemic AEL.

2.7.3.1 Risk for Professional Users

Because automated equipment is used to add the formulation ingredients and to fill the product in the respective vessels and because the workers are trained professionals wearing personal protective equipment like gloves, the exposure during the formulation task can be seen as negligible. Consequently, the risk for professional users is also considered negligible.

2.7.3.2 Risk for non-professional users and the general public

Dermal exposure is the main pathway of contact for non-professional users and the general public.
The exposure is calculated, like suggested in the CAR of DEET, based on 75th percentile of the data of a mail survey and usage study from Boomsma, JC and Parthasarathy, M (1990) Human Use and Exposure to Insect Repellants Containing DEET.

The 75th percentile of human dermal exposure per application is estimated to be 1.5 g a.s.for males (70 kg), 1.0 g a.s. for females (60 kg), 1.66 g a.s. for children > 12 years (62.5 kg) and 1.42 g a.s. for children < 12 (25.5 kg) (CAR DEET Doc II p.62).This is an underestimation of dermal exposure for the representative product since in the usage study mentioned above the average percentage of DEET in product was 26.1% and the concentration of product Mouskito Tropical Spray is 50 % DEET.

The systemic exposure to DEET following dermal application of Mouskito Tropical Spray is calculated using the following formula:

Systemic exposure = Cf / Cr x Q x F x R x DA / BW
With parameters:
Cf = concentration of DEET in the final product (50 %)
Cr = concentration of DEET in the usage study (26.1%)
Q = quantity of the final product for each application
F = frequency of applications
R = retention factor
DA = dermal absorption (1%)
BW = body weight (p. 63 doc II CAR DEET)

Subject	Systemic exposure
Child < 12 years (25.5 kg)	2.13 mg/kg bw/day
Child > 12 years (62.8 kg)	1.01 mg/ kg bw/day
Adult woman (60 kg)	0.64 mg/ kg bw/day
Adult man (70 kg)	0.82 mg/ kg bw/day

A first strategy for risk characterisation is through calculation of the margin of exposure (MoE). For this purpose, the NOAEL value of 1000 mg/kg body weight/day derived from the 90-day dermal study in rat is used as a reference. The MoE is calculated as the ratio of this NOAEL value over the systemic exposure. Calculations of the MoE for Mouskito Tropical Spray for the different subject types are presented in Table 1.2.2.2.-1.

Table 2.7.3-1: Risk characterisation of Mouskito Tropical Spray for non-professional users based upon the calculation of the MoE.

Subject	Systemic exposure	MoE
Child < 12 years (25.5 kg)	2.13 mg/body weight/day	469
Child > 12 years (50 kg)	1.01 mg/body weight/day	987
Adult woman (60 kg)	0.64 mg/body weight/day	1566
Adult man (70 kg)	0.82 mg/body weight/day	1218

MoE values above 100 and systemic exposure/$AEL_{chronic}$ ratios below 1 (100%) are considered to reflect safe use. For adults and children > 12 years this is the case. Therefore, no harmful effects to human health are to be expected for these groups of population when applying Mouskito Tropical Spray under reasonable conditions of use (i.e. 2 applications per day). MOE for children < 12 years is above 100, but in accordance with the Inclusion Directive of DEET, the use of the product should be limited in children between 2 and 12 years old to one application per day.

2.7.3.3 Risk for consumers via residues

Human exposure *via* food is not considered to be relevant, because DEET is not used for and/or during food production or in rooms where food is produced, processed or stored. Taking into account the use pattern of the product, exposure *via* drinking water can be seen as negligible. The degree of indirect exposure *via* the environment as a result of use of the active substance in the final product is considered negligible, as the primary route of exposure is direct application to the skin. The environmental risk assessment has shown that little direct transfer occurs of the active substance to the environment during use of the final product.

2.8 Risk assessment for the environment

The major change requested for Mouskito Tropical Spray is a change in composition of non-active substances. This change has no influence on the concentration of active substance in the product; nor are any of the non-active substances in the new composition a substance of concern for the environment.
Additionally, a change is requested in the target organisms to include ticks. This does not have an influence on the use instructions for the product.
Therefore, the environmental risk assessment performed for the original product still holds for the product after the requested changes. This risk assessment is copied below in the paragraphs 2.8.1 to 2.8.4.

2.8.1 Fate and distribution of the active substance in the environment

No new data on the fate and behaviour of the active substance in the environment was submitted, nor was data submitted for the product itself. The data available in the CAR of DEET is acceptable and deemed sufficient for the evaluation of this product. Mouskito Tropical Spray is not the reference product in the DEET CAR, but its use-pattern is fairly similar to that of the reference product assessed.

In the CAR, fate and effect data are only provided for the parent structure. DEET is considered to be ready biodegradable and no major transformation products (> 10 %) were formed in the studies for hydrolysis and aquatic phototransformation. DEET is extensively metabolised and excreted through the urine in all assessed mammals, and because the parent structure is ready biodegradable, and the metabolite structures found in urine do not differ significantly from the parent structure it is likely that they are also ready biodegradable.

DEET is moderately volatile and absorbs UV in the region 200-250 nm. The substance is predicted to have an atmospheric half-life of 0.63 days (15.2 hours). Thus an extensive accumulation of DEET in air and long range transport is unlikely.

DEET is a liquid at room temperature, and it has a water solubility of 11.2 g/L and its log P_{ow} is 2.4. It is hydrolytically stable under acidic, basic and neutral conditions, and photolytically stable in sterile distilled water.

According to the submitted study reports in the CAR, DEET is ready biodegradable and causes only minor inhibitory effects on (STP) microbial activity.

Because the substance will primarily end up in sewage treatment plants before any major release to the environment, final environmental exposure will to a large extent depend on whether households are connected to STPs equipped with at least secondary (biological) treatment.

Based on the calculated BCFs for aquatic and terrestrial organisms in the CAR, DEET is considered to have very little or no potential to bioaccumulate.
DEET has a K_{oc} of 43.3, suggesting that it is very mobile in soil and therefore could leach to the groundwater. However, DEET will not be directly emitted to soil and exposure is expected to be negligible.

2.8.2 Effects assessment

No new ecotoxicity data for DEET was submitted for the product authorisation dossier of Mouskito Tropical Spray. The PNECs calculated in the CAR, based on the submitted data for Annex I inclusion, are still valid to be used in the assessment of Mouskito Tropical Spray.

Table 2.8.2-1: Summary of PNEC values for DEET as agreed upon in the CAR

Compartment	Critical endpoint	AF	PNEC
Freshwater	$EC_{50\ algae}$ = 43 mg/L	1000	0.043 mg/L
Saltwater	$EC_{50\ algae}$ = 43 mg/L	10 000	0.0043 mg/L
STP micro-organisms	EC_{50} > 1000 mg/L	100	> 10 mg/L
Sediment, freshwater	EPM	/	0.0741 mg/kg_{ww}
Soil	EPM	/	0.0379 mg/kg_{ww}

2.8.3 Exposure assessment

For all PT19 DEET-repellents, including Mouskito Tropical Spray, the main route of exposure to the environment results from showering and bathing of the users, washing away residual product from the skin down the drain, via the STP, to the surface water. There, emissions primarily remain in the water compartment due to the physiochemical properties of DEET, supported by level III fugacity modelling. Therefore, the most relevant environmental compartment of concern for DEET is the aquatic compartment.

In the following paragraphs, PECs are estimated by two different approaches:

- Exposure modelling through EUSES, based on tonnage data.
- Exposure assessment based on the Emission Scenario Document (ESD) for PT1 and the TGD

2.8.3.1 EUSES model based on tonnage information

2.8.3.1.1 EUSES model based on tonnage of DEET placed on the EU market (cfr. DEET CAR – RMS SE)

In the CAR for DEET, written by the Swedish CA, environmental exposure calculations were done, based on submitted information on tonnage of DEET placed on the EU market. In the calculations, made through EUSES, it was assumed that the entire EU tonnage would be consumed over a peak period of 3 months (91 days).
As this is a general assessment for all DEET-containing repellents and not based on any specific use-product, these calculated PECs can be considered to remain valid for the assessment of Mouskito Tropical Spray.
However, it has to be borne in mind that these calculations are highly subjective to the specific tonnage consumed and should be revised when it comes to the attention that the tonnage of DEET placed on the EU market has been significantly augmented throughout the years.

Table 2.8.3-1: Summary of the PEC values calculated in the DEET CAR, based on European tonnage information

Compartment	**PEC**
STP micro-organisms	0.0322 mg/L
Freshwater	$3.3x10^{-3}$ mg/L
Sediment, freshwater	$5,7x10^{-3}$ mg/kg_{ww}
Saltwater	$2.56x10^{-3}$ mg/L
Sediment, saltwater	$4.42x10^{-3}$ mg/kg_{ww}
Air, annual average	$2.02x10^{-6}$ mg/m^3
Agricultural soil, 30-d average	$2.74x10^{-3}$ mg/kg_{ww}
Pore/ground water of agric soil	$9.88x10^{-4}$ mg/L

2.8.3.1.2 EUSES model based on yearly tonnage of Mouskito Tropical Spray placed on the Belgian market

The applicant for Mouskito Tropical Spray also submitted real sales volumes for the years 2011 and 2012 for Mouskito Tropical Spray, specifically sold on the Belgian market. Using this information, a EUSES simulation can be run again, assuming this tonnage information to be the regional volume.

Mouskito Tropical Spray, yearly volume on the Belgian market see confidential information in annex 9.

All other EUSES parameters were the same as for the EUSES simulation in the CAR.

Table 2.8.3-2: Summary of the PEC values calculated based on specific tonnage information for the Belgian market

Compartment	**PEC**
STP micro-organisms	$3.51x10^{-3}$ mg/L
Freshwater	$3.51x10^{-4}$ mg/L
Sediment, freshwater	$6.06x10^{-4}$ mg/kg_{ww}

Saltwater	$2.84x10^{-4}$ mg/L
Sediment, saltwater	$4.9x10^{-4}$ mg/kg_{ww}
Air, annual average	$3.01x10^{-8}$ mg/m^3
Agricultural soil, 30-d average	$2.83x10^{-4}$ mg/kg_{ww}
Pore/ground water of agric soil	$8.96x10^{-5}$ mg/L

2.8.3.2 Specific product calculations using ESD for PT1

2.8.3.2.1 Local emissions to wastewater

Specific emissions for the product at hand can be calculated using the Emission Scenario Document (ESD) for PT1 (human hygiene products) and input data consisting of data on the average consumption.
In the CAR for DEET, a survey by Boomsma & Parathasarathy is presented as a source for some DEET-specific input data (Doc.IIIB6.6(2)):

- **Finh**: The survey describes that a fraction of 37 % of the inhabitants use an insect repellent
- **$Qform_{appl}$:** The 75th percentile of dermal exposure presented in the DEET CAR is as follows:

Table 2.8.3-3: 75th percentile of dermal exposure

	75th percentile DEET (a.i.) applied [g]	**Average concentration in DEET-products [%]**	**75th percentile of product applied [g]**
adult male	1.5	26.11	5.74
adult female	1	26.11	3.83
Child > 12y	1.66	26.11	6.36
Child < 12y	1.42	26.11	5.44

The worst case exposure is the one for children older than 12 years, with an application rate of 6.36 g product per application. This will be used as $Qform_{appl}$ for the worst case calculations of the local emissions.

- **Fpenetr:** According to the survey, the market share is 0.28 as opposed to the default of 0.5

For the other values, defaults or product label-data are used.
A deviation from the CAR was made for the fraction released to wastewater. In the CAR, it is considered that a fraction of the applied product is lost through evaporation and through dermal absorption. However for the calculations in this PAR a worst case release of 100 % is assumed, because it was shown that the dermally absorbed fraction will eventually still be released to wastewater through excretion via the urine.

Table 2.8.3-4: Calculation of the local emission to wastewater for Mouskito Tropical Spray

$$Elocal_{water} = Nlocal \times Nappl \times Finh \times Fwater \times Qform_{appl} \times Cform_{weight} \times Fpenetr \times 10^{-6}$$

Variable/Parameter	**Symbol**	**Unit**	**Value**	**Source**
INPUT:				
Number of inhabitants feeding one	Nlocal	inh	10 000	Default TGD

STP				
Number of applications per day	Nappl	appl/day	2	Label applicant, worst case
Fraction of inhabitants using product	Finh	[-]	0.37	CAR DEET, III-B-6.6(2); DEET specific survey
Fraction released to wastewater	Fwater	[-]	1	Worst case assumption
Consumption per application	$Qform_{appl}$	g/appl	6.36	CAR DEET, III-B-6.6(2); worst case application rate
Amount of active substance in product	$Cform_{weight}$	g/kg	500	Applicant data
Market share of products applied for this purpose	Fpenetr	[-]	0.28	CAR DEET, III-B-6.6(2); DEET specific survey
OUTPUT:				
Local emission to wastewater due to showering/bathing	**$Elocal_{water}$**	**kg/d**	**6.59**	**Formula ESD PT1**

This local emission is considered to be emitted directly to a sewage treatment plant (STP). Predicted Environment Concentrations (PECs) can then be calculated based on the equations and values presented in the appropriate paragraphs of the EU TGD (Chapter 3: Environmental Risk Assessment).

2.8.3.2.2 PEC for the STP micro-organisms

The concentration in the influent of the STP, i.e. the untreated wastewater, can be calculated from the local emission to wastewater and the influent flow to the STP. This influent flow is equal to the effluent discharge, which is based on an average wastewater flow of 200 L per day per capita for a population of 10 000, resulting in an effluent discharge of 2 000 000 L per day.

In the STP, a part of the active ingredients will be removed, in the case for DEET mainly through degradation. The fraction removed from the influent concentration is estimated through the Simple Treat model, presented in the TGD Appendix II (pages 278 to 283). Assuming ready biodegradability passing the 10-day window, a log H of -2 (-2.40) and a log P_{ow} of 2 (2.4) a degradation of 87 % is reached, leaving 13 % of the active ingredient in the water.

Table 2.8.3-5: Caclulations for STP influent and effluent

$$Clocal_{inf} = \frac{Elocal_{water} \times 10^6}{EFFLUENT_{STP}}$$ ***(TGD Eq.32)***

$$Clocal_{eff} = Clocal_{inf} \times Fstp_{water}$$ *(TGD Eq.33)*

Variable/parameter	Symbol	Unit	Value	S/D/O/P*
Input:				
Local emission to wastewater	$Elocal_{water}$	kg/d	6.59	O
Influent flow = Effluent discharge rate	$EFFLUENT_{STP}$	L/d	2000000	D
Fraction of emission directed to water by STP	$Fstp_{water}$	[-]	0.13	P
Output:				
Local concentration of STP influent	$Clocal_{inf}$	mg/L	**3.29**	O
Concentration of substance in the STP effluent	$Clocal_{eff}$	mg/L	**$4.28x10^{-1}$**	O

* S/D/O/P: Set, Default, Output, Pick-list value

In the CAR, a discussion is included to evaluate which of the above calculated concentrations should be considered as the $PEC_{micro\text{-}organisms}$.
When a product is used during a specific period of the year, emissions to the environment for this product will be intermittent. Due to intermittent release, the bacteria in the STP could become deadapted, which would result in a $PEC_{micro\text{-}organisms}$ close to the influent concentration. If continuous release is envisioned, the $PEC_{micro\text{-}organisms}$ will correspond more to the effluent concentration.
Insect repellent are mostly used during peak periods, where the insect population peaks. This means that the actual PEC values can vary substantially depending on the time of the year. Worst case $PEC_{micro\text{-}organisms}$ can therefore be assumed to be equal to the above calculated $Clocal_{inf}$. However, in the CAR is was decided to consider the $Clocal_{eff}$ as the actual $PEC_{micro\text{-}organisms}$, because if intermittent release is assumed, the calculated emissions would be smaller than considered in the ESD PT1 calculations.
$PEC_{micro\text{-}organisms}$ = 0.428 mg/L

2.8.3.2.3 PEC for the surface water

Table 2.8.3-6: Calculation of $PEC_{surface\ water}$

$$Kp_{susp} = Foc_{susp} \times Koc$$ *(TGD Eq.23)*

$$Clocal_{water} = \frac{Clocal_{eff}}{\left(1+Kp_{susp} \times SUSP_{water} \times 10^{-6}\right) \times DILUTION}$$ *(TGD Eq45)*

Variable/parameter (units)	Symbol	Unit	Value	S/D/O/P*
Input:				
Concentration of substance in the STP effluent	$Clocal_{eff}$	mg/L	0.428	O
Partition coefficient organic carbon-water	Koc	L/kg	43.3	S
Weight fraction of organic carbon in the suspended solids	Foc_{susp}	[-]	0.1	D
Solids-water partitioning coefficient of suspended matter	Kp_{susp}	L/kg	4.33	O
Concentration of suspended matter in river	$SUSP_{water}$	mg/L	15	D
Dilution factor	DILUTION	[-]	10	D
Output:				

Local concentration in surface water	$Clocal_{water}$	mg/L	**$4.28x10^{-2}$**	O

* S/D/O/P: Set, Default, Output, Pick-list value

$Clocal_{water}$ can be regarded as the $PEC_{surface\ water}$.

$PEC_{surface\ water}$ = 0.0428 mg/L

2.8.3.3 Exposure monitoring and additional thoughts

2.8.3.3.1 DEET in the aquatic compartment

According to the applicant, the release of DEET to groundwater and surface water is insignificant due to the use-pattern of the repellent product.

At the contrary, DEET is systematically detected in waters[2].

In a pan-European study on groundwater contaminants in 23 European countries (Loos et al. (2010)), DEET was classified among the most relevant compounds in terms of both frequency of detection and maximum concentrations detected (up to 0.454 µg/L).

Quednow & Püttmann (2009) identified DEET levels in freshwater up to 1.3 µg/L in summer in Germany.

Similar findings have been observed in other transnational and national studies with a high prevalence of DEET in both surface waters and ground waters in USA and Australia.

A recent study for Swedish EPA (2010) confirmed also that DEET is common in both incoming and outgoing waste water in STPs and is very prevalent in watercourses downstream of STPs.

Weigel et al (2002) demonstrated the ubiquity if DEET in the North Sea, with pollution gradients related to the dominant water currents and concentrations up to 1.1 ng/L.

Such data strengthen the suggestion made at the 2009 meeting, as cited in DEET CAR, that a monitoring method is needed for DEET, and specific provisions are recommended.

[2] Mark W. Sandstrom, Dana W. Kolpin, E. Michael Thurman, And Steven D. Zaugg (2005). Widespread Detection Of N,N-Diethyl-M-Toluamide In U.S. Streams: Comparison With Concentrations Of Pesticides, Personal Care Products, And Other Organic Wastewater Compounds . Environmental Toxicology And Chemistry; Vol. 24, No. 5, p. 1029–1034. Setac (Printed USA)

Kristin Quednow and Wilhelm Püttmann (2009) Temporal concentration changes of DEET, TCEP, terbutryn, and nonylphenols in freshwater streams of Hesse, Germany: possible influence of mandatory regulations and voluntary environmental agreements. Environ Sci Pollut Res.; Vol. 16, p 630–640; DOI 10.1007/s11356-009-0169-6

Stefan Weigel, Jan Kuhlmann, Heinrich Hu¨hnerfuss (2002). Drugs and personal care products as ubiquitous pollutants: occurrence and distribution of clofibric acid, caffeine and DEET in the North Sea. Sci Total Env.. Vol 295; p 131–141

Sweco Environment (2011). Screening of N,N-dietyl-m-toluamid (DEET) Report to Swedish Environmental Protection Agency. SWECO Environment Screening, 29 p

Robert Loos, Giovanni Locoro, Sara Comero, Serafino Contini, David Schwesig, Friedrich Werres, Peter Balsaa, Oliver Gans, Stefan Weiss, Ludek Blaha,Monica Bolchi, Bernd Manfred Gawlik (2010). Pan-European survey on the occurrence of selected polar organic persistent pollutants in ground water. Water Research, Vol 44; p 4115-4126.

Additionally, when reviewing the available aquatic ecotoxicity data for DEET, only acute data is available.

Acute toxicity of DEET to fish, daphnia and algae is low, but studying effects of long term, chronic, exposure appears relevant, given the widespread distribution of DEET in fresh and marine waters and possible uptake. For example, DEET might facilitate the passage of organophosphorus pesticides through the blood–brain barrier and raise effects of these compounds which are present in many parts of the North Sea, in marine organisms.

Nevertheless, as was the case for the monitoring data evaluated in the CAR, the noted peak maximum measured concentrations in waters (fresh, salt, and ground) were all in the range of, or below the estimated values, indicating that the calculated PECs do represent a realistic worst case exposure.

2.8.3.3.2 DEET in the atmosphere

According to the assessment report, emission to air due to Spraying product does not need consideration, given the use pattern, vapour pressure and Henry's law constant.

However, DEET concentration has been measured in the PM2.5 faction in traffic-tunnel exit, in urban parks and rural sites in Canada, indicating widespread of DEET with relation both to summer consumer use and Spraying livestock 3.

2.8.4 Risk Characterisation

In order to evaluate if the intended use of the product Mouskito Tropical Spray, containing 50 % DEET as active substance, poses unacceptable risks for the environment, the ecotoxicity of DEET is compared with the exposure estimates by dividing the latter by the former. This ratio is also known as the RCR of risk characterisation ratio.

2.8.4.1 Aquatic compartiment (incl. sediment)

In the tables below, the exposure estimates for the aquatic compartment for each of the calculated scenarios are compared to their respective PNEC value.

Table 2.8.4-1: Aquatic risk characterisation for the EUtonnage based scenario (cfr. DEET CAR)

Compartment		**PEC**	**PNEC**	**RCR**
STP micro-organisms	[mg/L]	0.0322	> 10	< 0.0032
Freshwater	[mg/L]	$3.3x10^{-3}$	0.043	0.077
Sediment, freshwater	[mg/kg_{ww}]	$5,7x10^{-3}$	0.0741	0.077
Saltwater	[mg/L]	$2.56x10^{-3}$	0.0043	0.60

All calculated RCRs, based on the exposure estimates from the estimated EU tonnage for DEET, are below 1.

3 Cheng Y, Li S-M, Leithead A. (2006). Chemical characteristics and origins on nitrogen containing organic compounds in the Lower Fraser Valley. Environ Sci Technol vol 40, p:5846–5852.

As mentioned before, care has to be taken when reusing these calculations in the future that the tonnage of DEET placed on the EU market has not been significantly augmented throughout the years.

Table 2.8.4-2: Aquatic risk characterisation for the BE tonnage based scenario

Compartment		**PEC**	**PNEC**	**RCR**
STP micro-organisms	[mg/L]	$3.51x10^{-3}$	> 10	$< 3.51x10^{-4}$
Freshwater	[mg/L]	$3.51x10^{-4}$	0.043	$8.17x10^{-3}$
Sediment, freshwater	[mg/kg_{ww}]	$6.06x10^{-4}$	0.0741	$8.17x10^{-3}$
Saltwater	[mg/L]	$2.84x10^{-4}$	0.0043	0.0661

All calculated RCRs, based on the exposure estimates from the worst case annual sales volume of Mouskito Tropical Spray in Belgium for the years 2011 and 2012, are below 1.

Table 2.8.4-3: Aquatic risk characterisation for the exposure estimates based on the PT1 scenario

Compartment		**PEC**	**PNEC**	**RCR**
STP micro-organisms	[mg/L]	0.428	> 10	0.04
Freshwater	[mg/L]	0.0428	0.043	0.996

The RCR calculated for the STP micro-organisms is well below 1, while the one calculated for the freshwater organisms is borderline below 1. However, one should keep in mind that the exposure estimates calculated in this scenario are based on worst case information. For instance, it was assumed that all users of the product would apply the product according to the worst case application rate and that each would apply the product twice every day. Thus it is safe to assume that the actual exposure would be below the one calculated through this scenario.

Overall conclusion for the aquatic compartment

Non of the calculated emission rates exceeded their respective PNECs. Therefore it can be concluded that no risks for the aquatic compartment are expected when using Mouskito Tropical Spray as intended.

2.8.4.2 Terrestrial compartment

None of the calculated PEC/PNEC ratios exceed 1.

Table 2.8.4-4: Terrestrial risk characterisatio

Scenario		**PEC**	**PNEC**	**RCR**
EUSES EU tonnage	[mg/kg_{ww}]	$2.74x10^{-3}$	0.0379	0.073
EUSES BE tonnage	[mg/kg_{ww}]	$2.83x10^{-4}$	0.0379	$7.47x10^{-3}$

Overall conclusion for the terrestrial compartment

No risks for the terrestrial compartment are expected when using Mouskito Tropical Spray as intended.

2.9 Measures to protect man, animals and the environment

The instructions for use must contain the following indications:

Mouskito Tropical Spray should only be applied to children older than 2 years.
The use of the repellent for children between 2 and 12 years should be restricted to one application per day.

To prevent children from ingestion of the product via hand to mouth the label should indicate that the product should not be applied to the hands of children younger than 12 years old.

The repellent activity against *Glossina sp.*, has not yet been proven. The applicant should place a warning on the label.

There are no specific instructions with regard to transport of the product.

The instructions for use contain the following indications with regard to first aid measures:

- In case of inhalation: Remove victim to fresh air and keep at rest, if experiencing respiratory symptoms: call a physician.
- In case of ingestion : rinse the mouth. Call the Antipoison Centre to ask if it is recommended to drink an active coal suspension. Call 112, a hospitalization could be necessary. Show the label, the packaging or the notice.
- In case of contact with the eyes : rinse abundantly with water during 10 minutes. Rinse in the direction away from the non-affected eye. In case of contact lenses : if they are easy to remove, remove the lenses before rinsing. Consult a physician. Show him the label, the packaging or the notice.
- In case of dermal irritation the use of the product should be terminated immediately and a physician should be consulted.

These instructions and safety measures are compliant with relevant legislation and appropriately cover potential hazards and risks related to the product.

3 Proposal for decision

The assessment presented in this report has shown that the ready-to-use product, Mouskito Tropical Spray (new formula) formulated by Laboratoria QUALIPHAR N.V./S.A. with the active substance DEET, at a level of 50 % w/w, may be authorised for use as a repellent (product-type 19) against mosquitoes, biting flies and tropical ticks under certain conditions as will be discussed hereafter.

This authorisation of the product Mouskito Tropical Spray (new formula) has duly taken in to consideration the conclusions and recommendations of both the Swedish Assessment Report for the active substance, DEET and Commission Directive 2010/51/EU including DEET in Annex I of Directive 98/8/EC.

Regarding the physico-chemical properties the Mouskito Tropical Spray (new formula) is considered to have a shelf life of three years. A test on stability at ambient temperature conditions is on-going and a protocol for 60 months study was submitted. Submission of the results at 4 and 5 years within a deadline of, the 1st of September of 2018 and 2019 will be a condition for obtaining an authorisation with the corresponding shelf-life for the biocidal product.

Furthermore, based on the physic-chemical evaluation, the product Mouskito Tropical Spray is classified as flammable.

The product Mouskito Tropical Spray (new formula) 50% DEET was shown to be efficacious against the intended target organisms. The product when used at a dose of 1g/600 cm^2 (0,83 mg DEET/cm^2) does provide 10 hours protection time against mosquitoes (*Aedes aegypti*, *Culex pipiens* and *Anopheles gambiae*) and 8 hours protection time against ticks (*Hyalomma marginatum*), and biting flies (*Stomoxys calcitrans*) under tropical conditions.

The repellent activity against *Glossina sp.,* has not been proven. The applicant will place a warning on the label.

Regarding the toxicology the product Mouskito Tropical Spray has to be classified as harmful if swallowed and irritating to the eyes. Safety phrases and precautionary statements are proposed.

The exposure assessment shows when applying Mouskito Tropical Spray under reasonable conditions of use (i.e. 2 applications per day), no harmful effects to human health are to be expected for adults and children > 12 years. The product should only be applied to children older than 2 years. For children between 2 and 12 years the use of the product should be restricted to one application per day. Exposure is still acceptable but restriction in accordance with CAR.

The environmental assessment shows that no risks for the aquatic or terrestrial compartment are expected when using Mouskito Tropical Spray as intended.

Annex:

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

Annex 1: Summary of product characteristics

See Separate SPC

Annex 2: List of studies reviewed

List of <u>new data</u>[4] submitted in support of the evaluation of the active substance

No new data submitted.

List of <u>new data</u> submitted in support of the evaluation of the biocidal product

Concerning toxicology:

Section No	Reference No	Author	Year	Title	Owner of data	Letter of Access	Data protection claimed
IIIB annex 5a	TAO423-PH-12/0173	F. Richeux	2012	Mouskito Tropical Spray: evaluation of acute oral toxicity in rats - acute toxic class method	Laboratoria Qualiphar N.V./S.A.	No	Yes
IIIB annex 5b	TAD-PH-12/0173	F. Richeux	2012	Mouskito Tropical Spray: evaluation of acute dermal toxicity in rats	Laboratoria Qualiphar N.V./S.A.	No	Yes
IIIB annex 5c	Dermscan 12E1818	M. Ammar	2012	Evaluation of the acute cutaneous tolerance of a cosmetic product of adult subjects: single patch test method under dermatological control	Laboratoria Qualiphar N.V./S.A.	No	Yes

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

Section No	**Reference No**	**Author**	**Year**	**Title**	**Owner of data**	**Letter of Access**	**Data protection claimed**
IIIB annex 5d	SMK-PH-12/0173	F. Richeux	2012	Mouskito Tropical Spray: assessment of sensitising properties on albino guinea pigs - maximisation test according to Magnusson and Kligman	Laboratoria Qualiphar N.V./S.A.	Not specified	Yes
IIIB annex 5e	NOTOX 500039	I.A.T.M. Meerts	2012	Determination of the dermal absorption of *N,N*-diethyl-m-toluamide (DEET) in different formulations through human skin *in vitro*	Laboratoria Qualiphar N.V./S.A.	Not specified	Yes

Concerning efficacy:

Section No	Reference No	Author	Year	Title	Owner of data	Letter of Access	Data protection claimed
IIIB Section 5.10	1639h-PIR/0713	Bruno Serrano	2013	Laboratory assessment of a personal skin repellent against mosquitoes	Laboratoria Qualiphar N.V./S.A.	No	Yes
IIIB Section 5.10	1639g-PIR/0713	Bruno Serrano	2013	Laboratory assessment of a personal skin repellent against stomoxys biting flies	Laboratoria Qualiphar N.V./S.A.	No	Yes
IIIB Section 5.10	1477b2-PIR/1211	Bruno Serrano	2012	Laboratory assessment of a personal skin repellent against mosquitoes	Laboratoria Qualiphar N.V./S.A.	No	Yes
IIIB Section 5.10	1477-PIR/1211	Bruno Serrano	2011	Laboratory assessment of a personal skin repellent against mosquitoes	Laboratoria Qualiphar N.V./S.A.	No	Yes

IIIB Section 5.10	1832b2-MTROSNF/0914R	Bruno Serrano	2014	LABORATORY ASSESSMENT OF A PERSONAL SKIN REPELLENT AGAINST STOMOXYS BITING FLIES Trial in tropical climatic conditions	Laboratoria Qualiphar N.V./S.A.	No	Yes
IIIB Section 5.10	1832i-MTROSNF/0914R	Bruno Serrano	2014	LABORATORY ASSESSMENT OF A PERSONAL SKIN REPELLENT AGAINST THE TROPICAL TICK Hyalomma marginatum	Laboratoria Qualiphar N.V./S.A.	No	Yes
IIIB Section 5.10	1832b-MTROSNF/0914R	Bruno Serrano	2014	LABORATORY ASSESSMENT OF A PERSONAL SKIN REPELLENT AGAINST MOSQUITOES - Aedes + Culex + Anopheles Trial in tropical climatic conditions	Laboratoria Qualiphar N.V./S.A.	No	Yes

Annex 3: Analytical methods residues – active substance

***N,N*- diethylmetatoluamide (DEET)**

Not relevant

Analytical methods for the determination of DEET in relevant environmental media (soil, air, water), residues in animal/human body fluids/tissues and in/on food or feedstuffs have not been submitted for the biocidal product. These points have been covered by the data set for the active substance, which can be found in the DEET CAR, Document II-A, section 1.3.3, and the DEET Assessment Report, section 2.1.1. Because Mouskito Tropical Spray shows similarities to the reference product OFF! AEROSOL from the DEET CAR, the BE CA could agree with non submission of a method for air.

Annex 4: Toxicology and metabolism – DEET

N,N- diethylmetatoluamide (DEET)

Threshold Limits and other Values for Human Health Risk Assessment

Date: 18.02.2013

Summary

	Value	Study	Safety factor
AEL_{acute}	0.75 mg/kg body weight/day	8-week oral study in dog (NOAEL: 75 mg/kg body weight/day)	100
$AEL_{chronic}$	8.2 mg/kg body weight/day	90-day dermal study in rat (NOAEL: 1000 mg/kg body weight/day; 82% absorption)	100

Inhalative absorption	No data submitted
Oral absorption	> 80% (rat)
Dermal absorption	82% (rat) and < 20% (human)

Classification

with regard to toxicological data (according to the criteria in Dir. 67/548/EEC)	-  (Xn; Harmful) - R22 (Harmful if swallowed) -  (Xi; Irritating) - R36/38 (Irritating to eyes and skin) - R52-53 (Harmful to aquatic organisms; May cause long-term adverse effects in the aquatic environment)
with regard to toxicological data (according to the criteria in Reg. 1272/2008)	* Hazard class and category codes - Acute Toxicity category 4 - Eye Irritation category 2 - Skin Irritation category 2 - Aquatic Chronic category 3 * Hazard statement codes - H302 (Harmful if swallowed) - H315 (Causes skin irritation)

Classification	
	- H319 (Causes serious eye irritation) - H412 (Harmful to aquatic life with long lasting effects)

Annex 5: Toxicology – biocidal product

Mouskito Tropical Spray	
Date: 18.02.2013	
General information	
Formulation Type	Spray
Active substance(s) (incl. content)	*N,N*- diethyl-meta-toluamide 50 w/w %
Category	Product-Type 19

Acute toxicity, irritancy and skin sensitisation of the preparation (Annex IIIB, point 6.1, 6.2, 6.3)	
Rat LD_{50} oral (OECD 423)	500 mg/kg body weight
Rat LD_{50} dermal (OECD 402)	> 2000 mg/kg body weight
Rat LC_{50} inhalation (OECD 403)	No data submitted
Skin irritation	Considered irritating to skin
Eye irritation (OECD 405)	Considered irritating to eyes
Skin sensitisation (OECD 406)	No skin sensitising properties

Additional toxicological information (e.g. Annex IIIB, point 6.5, 6.7)	
Short-term toxicity studies	No additional data submitted
Toxicological data on active substance	- LD_{50} dermal: > 2000 mg/kg body weight (rabbit) and > 5000 mg/kg body weight (rat) - LD_{50} inhalation: > 2.02 mg/L - Slightly irritating to skin - Not skin sensitising - Not genotoxic - Not carcinogenic - Not embryotoxic or teratogenic - Not toxic to reproductive system - Rat-specific nephrotoxic - Ambivalent data on neurotoxicity - NOAEL (90-day dermal toxicity study in rat): 1000 mg/kg body weight/day - NOAEL (8-week study in dog): 75 mg/kg body weight/day
Toxicological data on non-active substances	No data submitted
Further toxicological information	No data submitted

Classification and labelling proposed for the preparation with regard to toxicological properties (Annex IIIB, point 9)	
Directive 1999/45/EC	-  (Xn; Harmful) - R22 (Harmful if swallowed) - R36 (Irritating to eyes)
Regulation 1272/2008/EC	Regulation 1272/2008/EC GHS07 - Wng (Warning) - Acute tox 4, H302 (Harmful if swallowed) - Eye Irrit. 2, H319 (Causes serious eye irritation)

Labelling of the 100 ml bottle with a sealed Spray attachment bottle proposed for the preparation with regard to toxicological properties (Annex IIIB, point 9)	
Directive 1999/45/EC	-  (Xn; Harmful) - R22 (Harmful if swallowed) - S2 : Keep out of the reach of children - S13 : Keep away from food, drink and animal foodstuffs - S23 : Do not breathe Spray - S46 : If swallowed, seek medical advice immediately and show this container or label
Regulation 1272/2008/EC	 - Wng (Warning) - Acute tox 4, H302 (Harmful if swallowed) - P102 Keep out of reach of children - P260 Do not breathe spray - P264 Wash hands thoroughly after handling - P270 Do not eat, drink or smoke when using this product - P301+P312IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell P330 Rinse mouth

Annex 6: Safety for professional operators

Not relevant since DEET is intended for use as an insect repellent in consumer products directly applied to the skin and clothing

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

Mouskito Tropical Spray

Date:18.02.2013

General information	
Formulation Type	Liquid, Spray.
Active substance(s) (incl. content)	DEET 50%
Category	PT19

Data base for exposure estimation	
tobased on Users study - Boomsma, JC and Parthasarathy, M (1990) Human Use and Exposure to Insect Repellants Containing DEET, TNsG	Appendix: Toxicology and metabolism – active substance/CAR

Exposure scenarios for intended uses (Annex IIIB, point 6.6)	
Primary exposure	Non-professional users (consumers, adults and children)
Secondary exposure, acute	Not relevant
Secondary exposure, chronic	Not relevant

Conclusion:
Exposure of non-professionals and the general public to the biocidal product containing DEET as active substance is considered acceptable, if the biocidal product is used as intended and all safety advices are followed.
Details for the exposure estimates:

Mouskito Tropical Spray — adult man

	Value	Unit	
Remark :			
Concentration a.s. in used product	500	g / kg	DEET
User :	general public		

Dermal exposure

Amount of DEET from a 26.1% DEET repellent	1500	mg	Users study[5]
Total deposit of product	5747	mg	
Total deposit of active substance	2874	mg	
Exposure to active substance via the skin	2874	mg / event	
Number of events per day	2	/ d	
Bodyweight	70	kg	
External Dermal exposure on contact day	**82**	**mg / kg bw**	
Dermal Absorption	**1**	**%**	
Internal Dermal exposure on contact day	**4.11**	**mg / kg bw**	
Number of contact days per year	27	/ year	
Year averaged internal dermal exposure	**0.30**	**mg / kg bw / d**	

[5] Boomsma, JC and Parthasarathy, M (1990) Human Use and Exposure to Insect Repellants Containing DEET

Mouskito Tropical Spray — adult woman

	Value	Unit	
Remark :			
Concentration a.s. in used product	500	g / kg	DEET
User :	general public		

Dermal exposure

Amount of DEET from a 26.1% DEET repellent	1000	mg	Users study
Total deposit of product	3831	mg	
Total deposit of active substance	1916	mg	
Exposure to active substance via the skin	1916	mg / event	
Number of events per day	2	/ d	
Bodyweight	60	kg	
External Dermal exposure on contact day	**64**	**mg / kg bw**	
Dermal Absorption	**1**	**%**	
Internal Dermal exposure on contact day	**3.19**	**mg / kg bw**	
Number of contact days per year	27	/ year	
Year averaged internal dermal exposure	**0.24**	**mg / kg bw / d**	

Mouskito Tropical Spray

	Child	> 12 years	
	Value	Unit	
Remark :			
Concentration a.s. in used product	500	g / kg	DEET
User :	general public		

Dermal exposure

Amount of DEET from a 26.1% DEET repellent	1660	mg	Users study
Total deposit of product	6360	mg	
Total deposit of active substance	3180	mg	
Exposure to active substance via the skin	3180	mg / event	
Number of events per day	2	/ d	
Bodyweight	62.8	kg	
External Dermal exposure on contact day	**101**	**mg / kg bw**	
Dermal Absorption	**1**	**%**	
Internal Dermal exposure on contact day	**5.06**	**mg / kg bw**	
Number of contact days per year	27	/ year	
Year averaged internal dermal exposure	**0.37**	**mg / kg bw / d**	

Mouskito Tropical Spray **Child** **< 12 years**

	Value	Unit	
Remark :			
Concentration a.s. in used product	500	g / kg	DEET
User :	general public		

Dermal exposure

Amount of DEET from a 26.1% DEET repellent	1420	mg	Users study
Total deposit of product	5441	mg	
Total deposit of active substance	2720	mg	
Exposure to active substance via the skin	2720	mg / event	
Number of events per day	2	/ d	
Bodyweight	25.5	kg	
External Dermal exposure on contact day	**213**	**mg / kg bw**	
Dermal Absorption	**1**	**%**	
Internal Dermal exposure on contact day	**10.67**	**mg / kg bw**	
Number of contact days per year	27	/ year	
Year averaged internal dermal exposure	**0.79**	**mg / kg bw / d**	

Annex 8: Residue behaviour

The exposure to residues in food resulting from the intended uses is unlikely to cause a risk to consumers.
The intended uses are not relevant in terms of consumer health protection

ADDENDUM : AMENDMENT (ART. 48)

RE-EVALUATION OF HUMAN EXPOSURE-EFFICACIOUS DOSE

Following the Art.36 decision of the Commission on the terms and conditions of the authorisations of biocidal products containing IR3535 (discrepancy Efficacy-HH), the exposure assessment of PT19 products containing DEET must be performed according to the validated efficacious dose.
BE was rMS for the product “Mouskito Tropical Spray” containing DEET. In the original PAR, the exposure assessment has not been performed using the validated efficacious source.
As a consequence of the Commission implementing decision (EU) 2018/1477 we have amended the authorization of the dossier taking into account the efficacious dose according to the provisions of art.48.

Conclusion

The general conclusions regarding the authorization of “Mouskito Tropical Spray” are not affected by the present amendment. This amendment affects only the application dose and number of authorized uses per age class.
Proper use, i.e. use in compliance with correct and complete conditions on the label, of Mouskito Tropical Spray is considered safe for adults and children when applied twice a day.
The product should not be applied on children younger than 2 years of age.

Summary of the product assessment

1.1.1 Administrative information

1.1.1.1 Identifier of the product

Identifier[6]	**Country (if relevant)**
Mouskito Tropical Spray	Belgium

1.1.1.2 Authorisation holder

Name and address of the authorisation holder	**Name**	Laboratoria QUALIPHAR N.V./S.A.
	Address	Rijksweg 9 – 2880 Bornem - Belgium

[6] Please fill in here the identifying product name from R4BP.

Authorisation number	BE2014-0027
Date of the authorisation	31/07/2014
Expiry date of the authorisation	31/07/2024

1.1.1.3 Manufacturers of the products

Name of manufacturer	Cosmade BVBA
Address of manufacturer	Impulsstraat 3A – 2220 Heist-op-den-Berg - Belgium
Location of manufacturing sites	Belcofill BVBA - Impulsstraat 7 – 2220 Heist-op-den-Berg - Belgium

1.1.1.4 Manufacturer of the active substance

Active substance	N,N-diéthyl-méta-toluamide
Name of manufacturer	Vertellus Chemicals SA (Acting for Vertellus Performance Materials Inc. (United States))
Address of manufacturer	Havenlaan 86c 204 BE 1000 Brussel Belgium
Location of manufacturing sites	High Point Road 2110 US-27403-2642 Greensboro, North Carolina États-Unis

1.1.1.5 Qualitative and quantitative information on the composition of the biocidal product[7]

Common name	IUPAC name	Function	CAS number	EC number	Content (%)
DEET	N,N-diethyl-m-toluamide	Active substance	134-62-3	205-149-7	50

1.1.1.6 Type of formulation

AL Any other liquid

[7] Please delete as appropriate.

1.1.2 Hazard and precautionary statements

Classification and labelling of the products of the family according to the Regulation (EC) 1272/2008

Classification	
Hazard category	Flammable liquid, category 3 Acute Tox, category 4 Eye irritation, category 2 Aquatic Chronic, category 3
Hazard statement	H226: Flammable liquid and vapour. H302: Harmful if swallowed. H319: Causes serious eye irritation. H412: Harmful to aquatic life with long lasting effects.
Precautionary statements	Keep out of reach of children Keep away from heat/sparks/open flames/hot surfaces – No smoking Do not eat, drink or smoke when using this product Use only outdoors or in a well-ventilated area Avoid release in the environment IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing Immediately call a POISON CENTER or doctor/physician Dispose of contents/container ... (in accordance with local/regional/national/international regulation (to be specified)).
Labelling	
labelling for the 75 and 100 ml packagings according to Regulation (EC) 1272/2008	
Signal words	Warning
Hazard statements	H302 H412
Precautionary statements	Keep out of reach of children Do not eat, drink or smoke when using this product IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Note	GHS02, GHS07
labelling for the 150 ml packaging according to Regulation (EC) 1272/2008	
Signal words	Warning
Hazard statements	H226 H302 H319 H412
Precautionary statements	Keep out of reach of children Keep away from heat/sparks/open flames/hot surfaces – No smoking Do not eat, drink or smoke when using this product Use only outdoors or in a well-ventilated area Avoid release in the environment IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing Immediately call a POISON CENTER or doctor/physician Dispose of contents/container ... (in accordance with local/regional/national/international regulation (to be specified)).
Note	GHS02, GHS07

1.1.3 Authorised use(s)

1.1.3.1 Use description[8]

Table 1. Use # 1 – Mouskito Tropical Spray is an insect repellent against flying insects such as mosquitoes, flies and ticks that is applied on the uncovered skin of non-professional	
Product Type	PT19 - Repellents and attractants (Pest control)
Where relevant, an exact description of the authorised use	Repellent
Target organism (including development stage)	*Ixodidae:-Hyalomma marginatum-all stadia* *Muscidae:-Stomoxys calcitrans-all stadia* *Culicidae:-Culex pipiens-all stadia* *Culicidae:-Aedes aegypti-all stadia* *Culicidae:-Anopheles gambiae-all stadia*
Field of use	Application on the skin
Application method(s)	Spraying - The product must be applied to dry skin. Be sure to observe an interval of 30 minutes at least between the application of the product and the application of other skin care products (e.g. sunscreen). Apply again after sport or swimming. The product should be applied with hands on the face.
Application rate(s) and frequency	Max. 2 applications per day. The product protects in tropical areas for 10 hours against mosquitoes and for 8 hours against flies and ticks. This product can be used by children from 2 years old and adults. The product must be applied to dry skin. The protection time will be reduced by: swimming, strong transpiration and an insufficient quantity applied to the body surface.
Category(ies) of users	General public (non-professional)
Pack sizes and packaging material	Bottle, polypropylene , 100 ml. Flask with sealed spray attachment. Bottle, polypropylene , 75 ml and 150 ml. Flask with spray pump.

1.1.3.2 Use-specific instructions for use[9]

Mouskito Tropical Spray has in tropical zones a protection time of 10 hours against mosquitoes and 8 hours against flies and ticks. Effective against *anopheles* (malaria carrier). Efficacy against tsetse fly (*Glossina sp*.) is not proven. Apply to unprotected skin.

[8] Copy this section as many times as necessary (one table per use, together with any instructions for use, risk mitigation measures and other directions for use that are use-specific. It has to be noted that in accordance with Document CA-May14-Doc.5.6 – Final, the SPC of a biocidal product presents the authorised uses as a number of pre-defined uses to which the product label shall have full correspondence.

[9] Describe the necessary instructions for use like for example: period of time needed for the biocidal effect; the interval to be observed between applications of the biocidal product or between application and the next use of the product treated, or the next access by humans or animals to the area where the biocidal product has been used, including particulars concerning decontamination means and measures and duration of necessary ventilation of treated areas; particulars for adequate cleaning of equipment; particulars concerning precautionary measures during transport; precautions to be taken to avoid the development of resistance.

1.1.3.3 Use-specific risk mitigation measures

Max. 2 applications per day.

Apply the product to exposed skin. Moisturize the skin sufficiently with the product.
The product must be applied to dry skin. Ensure that there is a minimum interval of 30 minutes between applications of the product and the application of other skin care products (e.g. sunscreen).
Apply again after sport or swimming.
Avoid every contact with eyes, mouth an mucous membranes.

Use repellent safely. Always read the label and product information before use.
-Not suitable for children under 2 years of age. Keep out of reach of children. Avoid breathing vapours/spray. Use only outdoors or in a well-ventilated area.
-ONLY apply to uncovered parts of the arms, hands, legs, feet and face. For treatment of the face, spray the repellent solution onto the palm of the hand and distribute the solution over the skin of the face thereby taking care to protect the eyes. Do not spray into the eyes or apply to eye area. For children below 12 years of age: the repellent must be applied by adults. Do not use on children's hands. Do not use under clothing.
-Wash hands before handling food.
-Do not apply directly on or near food, feed or drinks, or on surfaces or utensils likely to be in direct contact with food, feed and drinks.
-To prevent contamination of food, avoid contact of treated skin with food.
- Maximum number of applications per day: twice a day.

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

Eye contact: Rinse immediately carefully and thoroughly with eye-bath or water. Remove contact lenses, if present and easy to do.
In case of inhalation: rest and fresh air, sides respiratory symptoms appear, get medical advice/attention.
Ingestion: Rinse mouth thoroughly with water. Get medical advice/attention.
Call the poison control centre to ask if it is recommended to drink a suspension of activated carbon.
Call 112, hospitalization may be necessary. Show the product label, packaging or instructions.

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

Dispose of contents/container in accordance with local/regional/national/international regulation.

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

The product is stable for 3 years.

1.1.4 General directions for use

1.1.4.1 Instructions for use

/

1.1.4.2 Risk mitigation measures

/

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

/

1.1.4.4 Instructions for safe disposal of the product and its packaging

/

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

/

1.1.5 Other information

Since the first authorization of the product, PhysChem guidance has evolved. In the latest version, it is stated that the MMAD must be determined for products that generate exposure to aerosols, particles or droplets. Therefore, MMAD data on fresh and aged products were requested These data would be provided on the next request for modification for this product.

Assessment of the product

According to Commission implementing decision (EU) 2018/1477 the amendment of the authorization only concerns the Efficacy and the Human exposure and risk characterization.

I. Efficacy:

Tests submitted by the applicant validate an application rate of 1 g product to be applied on 600 cm² of skin to ensure a CPT of 10 hours against mosquitoes (*Culex pipiens, Aedes aegypti* and *Anopheles gambiae*) and 8 hours against biting flies (*Stomoxys calcitrans*) and ticks (*Hyalomma marginatum*) in areas with tropical climate. The validated application rate remains 1 g of product for 600 cm², which corresponds to for 1.6 mg product/cm² (0.83 mg DEET/cm²). The efficacy conclusions remain valid.

II. Human exposure and risk characterisation:

1. Exposure of non-professional users and the general public

1.1. Scenario 1: Primary exposure: Dermal exposure assessment for adults, children

Description of Scenario 1		
Dermal exposure: Number of applications/day x amount b.p./application x percent of a.s. in b.p. **Systemic exposure:** Dermal exposure x percent of dermal absorption **Dermal systemic exposure:** Systemic exposure / body weight		
	Parameters	**Value**
For All categories	Dermal absorption	1.4%
	% of active substance in biocidal product	50%
Tier 1- Adult	Number of applications / day	2
	Body weight	60 kg
	Amount of biocidal product/ application	15.2 g
Tier 1- Child 6 to < 12 years old	Number of applications / day	2
	Body weight	23.9 kg
	Amount of biocidal product/ application	8.5 g
Tier 1- Child 2 to < 6 years old	Number of applications / day	2
	Body weight	15.6 kg
	Amount of biocidal product/ application	6.2 g

Summary table: estimated exposure for Dermal Primary exposure		
Exposure scenario	**Tier/PPE**	**Estimated dermal uptake**
Scenario 1 – ADULT 2 applications/day	Tier 1 / no PPE	3.4 mg/kg bw/day
Scenario 1 – CHILD (6-12) 2 applications/day	Tier 1 / no PPE	4.7 mg/kg bw/day
Scenario 1 – CHILD (2-6) 2 applications/day	Tier 1 / no PPE	5.4 mg/kg bw/day

1.2. **Scenario 2: Primary exposure: Inhalation exposure assessment for adults, children**

Description of Scenario 2

Model used: "Consumer spraying and dusting model 2 - Hand-held trigger spray" from Biocide Human Health Exposure Methodology, p. 220

Inhaled product =

Inhalation rate x number of applications/day x spray duration (min.) / 60 min. x indicative value for inhalation

Inhaled active substance =

inhaled product x percent of a.s. in the b.p.

Particle size distribution will determine the respirable fraction of the product released. Regarding the cut-off value for respirable droplet size, different sources are available. The BPR guidance III part B+C states that particles below 15 µm may reach the alveolar region of the respiratory tract. According to the Biocides Human Health Exposure Methodology, particles larger than 20 µm are all non-respirable and particles smaller than 5 µm are respirable for about 35 %. The draft Proposal for harmonising the assessment of human exposure to repellents (PT19) states that in general, the cut-off for the respirable fraction is 10 µm, and refers to ConsExpo 4.1 for the assessment of inhalation exposure. In ConsExpo 4.1, the default cut-off for the respirable fraction has been set at 15 µm. For the present assessment, a cut-off value of 15 µm for the respirable fraction has been chosen.

Inhalation systemic exposure:

15 % x inhaled a.s. x inhalation absorption / body weight

Oral systemic exposure:

85 % x inhaled a.s. x oral absorption / body weight

	Parameters	**Value**
For All categories	Inhalation absorption	100%
	Oral absorption	100%
	% of active substance in biocidal product	50%
	Indicative value for inhalation	10.5 mg/m^3
	Spray duration	4 minutes
Tier 1- Adult	Number of applications / day	2
	Body weight	60 kg

	Respiration rate [m³/air/hour]	1.25 m³/h
Tier 1- Child 6 to < 12 years old	Number of applications / day	2
	Body weight	23.9 kg
	Respiration rate [m³/air/hour]	1.32 m³/h
Tier 1- Child 2 to < 6 years old	Number of applications / day	2
	Body weight	15.6 kg
	Respiration rate [m³/air/hour]	1.26 m³/h

Summary table: estimated exposure for Inhalation Primary exposure

Exposure scenario	Tier/PPE	Estimated inhalation uptake	Estimated oral uptake
Scenario 2 – ADULT 2 applications/day	Tier 1 / no PPE	0.0022 mg/kg bw	0.012 mg/kg bw
Scenario 2 – CHILD (6-12) 2 applications/day	Tier 1 / no PPE	0.0058 mg/kg bw	0.033 mg/kg bw
Scenario 2 – CHILD (2-6) 2 applications/day	Tier 1 / no PPE	0.0085 mg/kg bw	0.048 mg/kg bw

2. Risk characterisation for human health

Reference values to be used in Risk Characterisation

Reference	Study	NOAEL (LOAEL)	AF	Correction for oral absorption	Value
AEL_{acute}	Dog, oral, 8-week toxicity study	75 mg/kg bw/d	100	100%	0.75 mg/kg bw/d
$AEL_{long\text{-}term}$	Rat, dermal, 90-days toxicity study	1000 mg/kg bw/d	100	82%	8.2 mg/kg bw/d

2.1 Risk for non-professional users

Systemic effects

Task/ Scenario	Tier	Systemic NOAEL [mg/kg bw/d]	AEL [mg/kg bw/d]	Estimated Uptake [mg/kg bw/d]	Estimated uptake/ AEL (%)	Acceptable (yes/no)
Scenario 1, dermal, adult	1	1000	8.2	3.4	41.6	yes
Scenario 1, dermal, child (6-12)	1	1000	8.2	4.7	57.8	Yes
Scenario 1, dermal, child (2-6)	1	1000	8.2	5.4	65.5	yes
Scenario 2, inhal +oral, adult	1	1000	8.2	0.015	0.18	yes

Scenario 2, inhal +oral, child (6-12)	1	1000	8.2	0.039	0.47	Yes
Scenario 2, inhal +oral, child (2-6)	1	1000	8.2	0.057	0.69	yes

Local effects

The biocidal product is classified as eye damage/irritation cat 2, H319. However, appropriate risk mitigation measures will be imposed and taken up on the label: 'Do not spray into the eyes or apply to eye area. An adult should apply the product to children below 12 years of age. Do not use on children's hands.' Consequently, there is no need to consider local effects separately.

Conclusion

Safe uses are identified for this product, Mouskito Tropical Spray :

- for adults, when the product is applied twice per day.
- For children when the product is applied twice a day.

The product should not be applied on children younger than 2 years of age.

Proper use, i.e. use in compliance with correct and complete conditions on the label, of Mouskito Tropical Spray is considered safe for adults and children when applied twice a day.
The product should not be applied on children younger than 2 years of age.

The following RMM are required:

- Use repellent safely. Always read the label and product information before use.
- Not suitable for children under 2 years of age. Keep out of reach of children. Avoid breathing vapours/spray. Use only outdoors or in a well-ventilated area.
- ONLY apply to uncovered parts of the arms, hands, legs, feet and face. For treatment of the face, spray the repellent solution onto the palm of the hand and distribute the solution over the skin of the face thereby taking care to protect the eyes. Do not spray into the eyes or apply to eye area. For children below 12 years of age: the repellent must be applied by adults. Do not use on children's hands. Do not use under clothing.
- Wash hands before handling food.
- Do not apply directly on or near food, feed or drinks, or on surfaces or utensils likely to be in direct contact with food, feed and drinks.
- To prevent contamination of food, avoid contact of treated skin with food.
- Maximum number of applications per day: twice a day.

Confidential annex

Please see the confidential annex of the PAR for more details.