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

**PRODUCT ASSESSMENT REPORT OF A BIOCIDAL PRODUCT FOR NATIONAL AUTHORISATION APPLICATIONS**



APAISYL REPULSIF MOUSTIQUES LOTION

Product type 19

Ethyl butylacetylaminopropionate   
(Further referred to as IR3535®)

Case Number in R4BP: BC-XN054054-24

Evaluating Competent Authority: France

Date: February 2020

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**Note to the reader**

This consolidated PAR for the minor change application of the APAISYL REPULSIF MOUSTIQUES LOTION product authorisation is based on the PAR of the reference product INSECT REPELLENT PUMP SPRAY IR3535 20% evaluated by the Belgium Competent Authority, in which all necessary addenda have been included.

The SPC (in section 2.1 of the PAR) corresponds to the authorised uses in the frame of the minor application 2020.

In the following assessment report of this consolidated PAR, each section contains the initial assessment and the subsequent successive assessments (minor change, major change, post-authorisation data…). The assessments related to the minor change 2019 of the product are at the end of each concerned section and are highlighted in grey.

History of the dossier

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Application type** | **Ref MS** | **Case number in the ref MS** | **Decision date** | **Assessment carried out (i.e. first authorisation / amendment /renewal)** |
| NA-APP | BE | BC-UW020009-14 | 16/05/2019 | Initial assessment of the reference product : Insect Repellent Pump Spray IR3535 20% |
| NA-BBS | FR | BC-RQ020406-27 | 07/05/2019 | National authorisation of same biocidal product APAISYL REPULSIF MOUSTIQUES LOTION |
| NA-ADC | FR | BC-XH052019-32 | 19/06/2020 | Change in holder name |
| NA-MIC | FR | BC-XN054054-24 | 19/06/2020 | National application for major change :   * Change in the shelf life from 18 to 24 months |

# Conclusion

The biocidal product SPRAY REPULSIF MOUSTIQUE LOTION is a as a ready-to-use leave-on repellent (PT19) to be applied on clean and dried human hair, the nape of the neck and behind ears. It is intended to be used to repel human head-lice (*Pediculus humanus capitis*) only after a pediculicidal treatment.

This minor change application consists in the increase of the shelf-life from 18 to 24 months.

Therefore, the conclusion of efficacy, human health and environment has not been revised.

***Conclusion of the physico-chemical and technical properties***

The extension of the shelf life of the product APAISYL REPULSIF MOUSTIQUE LOTION (same of Insect Repellent Pump Spray IR3535® 20%) to 24 months at ambient temperature is acceptable based on physico-chemical properties provided in the new long-term storage stability study.

# Assessment Report

## Summary of the product ASSESSMENT - MINOR CHANGE 2019

### Administrative information

#### Identifier of the product

| **Identifier[[1]](#footnote-1)** | **Country (if relevant)** |
| --- | --- |
| APAISYL REPULSIF MOUSTIQUES LOTION | France |

#### Authorisation holder

|  |  |  |
| --- | --- | --- |
| **Name and address of the authorisation holder** | **Name** | P&G HEALTH FRANCE |
| **Address** | 18C BD WINSTON CHURCHILL – BP 77035  21000 DIJON  FRANCE |
| **Authorisation number** | **FR-2019-0042** | |
| **Date of the authorisation** | **19/06/2020** | |
| **Expiry date of the authorisation** | **16/05/2027** | |

#### Manufacturer(s) of the products

|  |  |
| --- | --- |
| **Name of manufacturer** | FCA Fabrication Chimique Ardéchoise |
| **Address of manufacturer** | Les îles Ferays, 07300 Tournon-sur-Rhône France |
| **Location of manufacturing sites** | Les îles Ferays, 07300 Tournon-sur-Rhône France |

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

|  |  |
| --- | --- |
| **Active substance** | Ethyl butylacetylaminopropionate |
| **Name of manufacturer** | Merck S.L.U. |
| **Address of manufacturer** | Calle Maria de Molina, 40, 28006 Madrid Spain |
| **Location of manufacturing sites** | Polígono Merck, 08100 Mollet de Vallés, Barcelone Spain |

|  |  |
| --- | --- |
| **Active substance** | Ethyl butylacetylaminopropionate |
| **Name of manufacturer** | Merck KGaA |
| **Address of manufacturer** | Frankfurter Straße 250, 64293 Darmstadt Germany |
| **Location of manufacturing sites** | Polígono Merck, 08100 Mollet del Vallés, Barcelone Spain |

### Product composition and formulation

NB: the full composition of the product according to Annex III Title 1 should be provided in the confidential annex.

Does the product have the same identity and composition as the product evaluated in connection with the approval for listing of the active substance(s) on the Union list of approved active substances under Regulation No. 528/2012?

Yes

No

#### Identity of the active substance

|  |  |
| --- | --- |
| **Main constituent(s)** | |
| **ISO name** | IR3535 |
| **IUPAC or EC name** | ethyl 3-[N-acetyl-N-butyl] aminopropionate |
| **EC number** | 257-835-0 |
| **CAS number** | 52304-36-6 |
| **Index number in Annex VI of CLP** |  |
| **Minimum purity / content** | ≥ 99 % w/w |
| **Structural formula** | ir3535 |

#### Candidate(s) for substitution

The active substance IR3535® is not a candidate for substitution.

#### Qualitative and quantitative information on the composition of the biocidal product[[2]](#footnote-2)

| **Common name** | **IUPAC name** | **Function** | **CAS number** | **EC number** | **Content (%)** |
| --- | --- | --- | --- | --- | --- |
| IR3535® | Ethyl 3-[N-acetyl-N-butyl] aminopropionate | Active substance | 52304-36-6 | 257-835-0 | 20  purity: ≥99% |
| Ethanol 96% | Ethanol | solvent | 64-17-5 | 200-578-6 | 35 |

#### Information on technical equivalence

Not needed, since the manufacturer is the same as included in the Union list of approved active substances.

#### Information on the substance(s) of concern

* **Initial Assessment of the reference product Insect Repellent Pump Spray IR3535® 20%- 2019**

During the referral discussions concerning this product, it was decided that ethanol should be considered as a substance of concern (SoC).

According to the definition in the BPR (Article (3)(f)), a SoC is a substance which has an inherent capacity to cause an adverse effect. In this product, ethanol is the cause for the classification as a flammable liquid and during the referral discussions it was agreed that flammability can be considered as a cause to provoke an adverse effect and, therefore, ethanol should be considered as a SoC.

Due to the lack of guidance in relation to physical-chemical endpoints, the methodology described in the guidance for human health assessment of SoC, can be applied by analogy. Accordingly, the label of the product should include the corresponding H/P statements but a qualitative/quantitative risk assessment is not necessary. Ethanol will be indicated in the SPC Section 2.1.

Related to the submission of the analytical method for determining the concentration of the SoC, Article 21 of the BPR is applicable and waiving of the data requirements is allowed and accepted.

Please see the confidential annex for further details.

#### Assessment of endocrine disruption (ED) properties of the biocidal product

#### Type of formulation

|  |
| --- |
| AL- Any other liquid |

### Hazard and precautionary statements

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

| **Classification** | |
| --- | --- |
| Hazard category | Flammable liquid, category 3  Eye irritation, category 2 |
| Hazard statement | H226: Flammable liquid and vapour  H319: Causes serious eye irritation |
|  | |
| Labelling | |
| Signal words | Warning |
| Hazard statements | H226: Flammable liquid and vapour  H319: Causes serious eye irritation |
| Precautionary statements | P101 If medical advice is needed, have product container or label at hand  P102 Keep out of reach of children.  P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking  P264 Wash hands thoroughly after handling  P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  P501 Dispose of contents/container in accordance with local/regional/national/international regulations |
|  | |
| Note |  |

### Authorised use(s)

#### Use description

Table 1. Use # 1 – Skin application

|  |  |
| --- | --- |
| **Product Type** | PT19 - Repellents and attractants (Pest control) |
| **Where relevant, an exact description of the authorised use** | Repellent |
| **Target organism (including development stage)** | *Culex spp.* - House mosquitoe – Adults *Aedes spp -* Aedes mosquitoes - Adults *Anopheles spp -* Anopheles mosquitoes - Adults *Ixodes ricinus -* Hard ticks - Adults and nymphs *Ixodes scapularis* - Hard ticks - Adults and nymphs |
| **Field of use** | Indoor Outdoor |
| **Application method(s)** | Spraying  Apply by spraying on exposed skin, and spread on the skin with the hand. |
| **Application rate(s) and frequency** | Mosquitoes : 0,00067 g/cm² of skin Protection time : 8 hours  Ticks: 0,00067 g/cm² of skin Protection time : 12 hours |
| **Category(ies) of users** | General public (non-professional) |
| **Pack sizes and packaging material** | HDPE bottle, from 25 to 750 mL |

#### Use-specific instructions for use

|  |
| --- |
| - |

#### Use-specific risk mitigation measures

|  |
| --- |
| - |

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

|  |
| --- |
| - |

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

|  |
| --- |
| - |

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

|  |
| --- |
| - |

### General directions for use

#### Instructions for use

|  |
| --- |
| * Efficacy in tropical conditions has not been verified. * Respect the recommended application doses. * Always read the label or leaflet before use and follow all the instructions provided. * The user should inform the registration holder if the treatment is ineffective. * The use of the product with other repellent products is not recommended. * In case of a concomitant use of the product with sunscreen, first apply the sunscreen and wait 20 minutes before the application of the product. * The protection time is only indicative. Environmental factors (e.g. high temperature, wind velocity) can lower it. |

#### Risk mitigation measures

|  |
| --- |
| * Keep out of reach of children * Avoid breathing vapors/aerosols * Only use outdoor or in a well ventilated area * Apply only on exposed skin, not protected by clothes * Do not apply directly on the face, spray the product in the hand and then spread it onto the face. * For adults and children from 6 years old: maximum 2 applications per day * For children between 1 and 5 years old : maximum 1 application per day * Do not apply the product on the hands of children * For children, the product must be applied by an adult * Wash hands before handling food. * Do not use the product near food and surfaces that may come into contact with food and feed or drinks for human consumption |

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

|  |
| --- |
| * Eye contact: Immediately flush with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses if easy to do. Continue to rinse with tepid water for at least 10 minutes. Get medical attention if irritation or vision impairment occurs. * Skin contact: In case of skin lesions, redness or persistent pain after application, consult a doctor. * Inhalation of large quantities: keep at rest in a half-sitting position. Seek medical advice immediately if symptoms occur. * Mouth contact: Wash out mouth with water. Contact poison treatment specialist immediately if symptoms occur and/or in case of mouth contact with large quantities. * Do not give fluids or induce vomiting in case of impaired consciousness; place in recovery position and seek medical advice immediately. |

#### Instructions for safe disposal of the product and its packaging

|  |
| --- |
| - Do not discharge unused product on the ground, into water courses, into pipes (sink, toilets…) nor down the drains.  - Dispose of unused product, its packaging and all other waste, in accordance with local regulations. |

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

|  |
| --- |
| * Keep container tightly closed * Store in a dry and well-ventilated place * Store at a temperature below 40°C * Shelf-life : 24 months |

### Other information

|  |
| --- |
| -   In case of inefficacy, the authorisation holder should inform the competent authority. |

### Packaging of the biocidal product

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Type of packaging** | **Size/volume of the packaging** | **Material of the packaging** | **Type and material of closure(s)** | **Intended user (e.g. professional, non-professional)** | **Compatibility of the product with the proposed packaging materials (Yes/No)** |
| Bottle | ≥25 - ≤750 mL | plastic: HDPE | pump head covered by a cap | non-professional | Yes |

### Documentation

#### Data submitted in relation to product application

Please see §3.1 list of studies for the biocidal product.

#### Access to documentation

The applicant of this product is the same as the review programme participant for the active substance and is thus the owner of all data on the active substance.

## Assessment of the biocidal product

### Intended use(s) as applied for by the applicant

|  |  |
| --- | --- |
| **Table 2. Use # 1 – Application to skin** | |
| **Product Type** | PT19 – Repellents and attractants (Pest control) |
| **Where relevant, an exact description of the authorised use** | Insect repellent pump spray IR3535® 20% is a ready to use product. The repellent is sprayed onto the skin. 3g product is sufficient for the application to approximately 50% of the body surface (face, hands, arms and legs as assessed in the CAR for IR3535®). 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.  Relevant codes: VI.1.1 and VI.9 (manual distribution over skin) |
| **Target organism (including development stage)** | |  |  |  | | --- | --- | --- | | **Scientific name** | **Common name** | **Development stage** | | Culicidae | Mosquitoes | Adults | | Ixodidae | Ticks | Nymphs | | Ixodidae | Ticks | Adults | |
| **Field of use** | Other  use in well ventilated areas |
| **Application method(s)** | Spraying: The ready to use product is a pump spray which is sprayed directly onto the exposed skin |
| **Application rate(s) and frequency** | Dose: 3.0 g  Insect Repellent Pump Spray IR3535® 20% is intended to be used in summer when insects are frequent. It is usually applied once a day depending on outdoor activities, weather and presence of insects. The application can be repeated when necessary (noticeable reduction in repellence). The pump spray can be applied up to 3 times per day for adults, up to 2 times for children between the age of 3 and 10 years and maximally 1 time per day for children below 3 years. |
| **Category(ies) of users** | General public |
| **Pack sizes and packaging material** | |  |  |  | | --- | --- | --- | | **Type** | **Material** | **Size** | | Bottle | Plastic: HDPE | >25.0 - < 750.0 mL |   Due to a technical issue with SPC-editor and IUCLID, the applicant wasn’t able to include the ≥ and ≤ symbols. The applied packaging should have been ‘larger or equal to 25 mL to smaller or equal to 750 mL’. |

### Clarification on product composition and compositions tested

In the studies submitted several test materials were used. Below, the differences to the product Insect Repellent Pump Spray IR3535® 20% are described, whereas the full composition of the test materials is provided in the confidential part of the PAR.

* **Insect Repellent Pump Spray IR3535® 20%**
* **Insect Repellent Pump Spray IR3535® 20% without Bitrex**
* **US Pump Spray Formulation:** In the US EPA formulation, ethanol denatured with Bitrex and tertbutanol (final concentrations 0.0002% and 0.042 %, respectively) is used, whereas in the EU formulation (Insect Repellent Pump Spray IR3535® 20%) a final concentration of 0.0011% Bitrex is present. Other components are identical in both formulations and only the water content was adjusted to compensate for the slight differences in composition.
* **Insect Repellent Pump Spray Lice IR3535® 20% without Bitrex:** Slightly higher concentration emollient, no film forming substance present, and no Bitrex present.
* **TMT-003** (efficacy test against *Aedes albopictus*): Similar to the Insect Repellent Pump Spray IR3535® 20% once dried on the skin. The 2-propanol and water will have evaporated and the remaining substances are present in the same concentration as the pump spray. The main difference is that TMT-003 also contains butylene glycol.

### Physical, chemical and technical properties

* **Initial Assessment of the reference product Insect Repellent Pump Spray IR3535® 20%- 2019 (BE CA)**

| **Property** | **Guideline and Method** | **Purity of the test substance (% (w/w)** | **Results** | **Reference** |
| --- | --- | --- | --- | --- |
| Physical state at 25 °C and 101.3 kPa | OPPTS 830.6317 Storage Stability | US Pump Spray Formulation | Liquid | Study no 245-003, Meinerling M., 2009 |
| Colour at 25 °C and 101.3 kPa | OPPTS 830.6317 Storage Stability / Organoleptic | US Pump Spray Formulation | Slightly yellowish to colourless | Study no 245-003, Meinerling M., 2009 |
| Odour at 25 °C and 101.3 kPa | OPPTS 830.6317 Storage Stability / Organoleptic | US Pump Spray Formulation | Mild, slightly alcoholic | Study no 245-003, Meinerling M., 2009 |
| Acidity / alkalinity | CIPAC MT75  At 20°C | US Pump Spray Formulation | Undiluted: between 4.4 and 5  At 1% : between 3.8 and 4.6 | Study no 245-003, Meinerling M., 2009 |
| Relative density / bulk density | OECD Guideline 109 | US Pump Spray Formulation | Relative density D420 = 0.955 | Study no 213-002, Fieseler A., 2011 |
| Storage stability test – accelerated storage | CIPAC MT 46.3, under GLP regulation – HPLC method and Organoleptic | READ ACROSS  Insect Repellent Pump Spray Lice IR3535® 20% without Bitrex | 8 weeks at 40±2°C. Humidity 30-65%.  Packaging: HDPE pump spray bottle – 150 mL  - No change in colour, odour, or clarity.  - No change in packaging appearance.  -19.3% to 18.8%: this corresponds to a variation of 2.59% of active substance content  - Free acid content: <0.5 % w/w before and after storage | 31232204, Meinerling, M., 2009. Institut für Biologische Analytik und Consulting IBACON GmbH |
| Storage stability test – long term storage at ambient temperature | OPPTS 830.6317 Storage Stability | US Pump Spray Formulation | Packaging: commercial packaging: white HDPE flask with white pump stopper and clear cap  - No change in colour or clarity of the tested item.  - No change in packaging appearance: no indication of corrosion or decomposition, no alteration of label  -pH values (20°C):  Undiluted formulation: 5.0 at the beginning of the test; 4.4 at the end of the test  1% dilution; 4.6 at the beginning of the test; 3.8 at the end of the test  -Active substance content:  24 months at 25° :  20.1% to 17.9%: this corresponds to a variation of 10.9% of active substance content  At 18 month : 20.1% to 19.1%: this corresponds to a variation of 5% of active substance content  🡪 results not acceptable for storage of 2 years but acceptable for 18 months.  -Free acid content: At the beginning 0.1 % w/w; after 18 months of storage: 1.3% w/w; after 24 months of storage: 2.1%w/w | Study no 245-003, Meinerling M., 2009 |
| Storage stability test – low temperature stability test for liquids | CIPAC MT 39.3 | Insect Repellent Pump Spray IR3535® 20% without Bitrex | 0°C during 1 week: colourless clear homogenous liquid with a slight alcoholic odour before and after. | Study no 245-010, Meinerling M., 2011 |
| Effects on content of the active substance and technical characteristics of the biocidal product - light | - | US Pump Spray Formulation | The product is stored in lightproof plastic flasks 🡪 waived | Study no 245-003, Meinerling M., 2009 |
| Effects on content of the active substance and technical characteristics of the biocidal product – temperature and humidity | organoleptic | US Pump Spray Formulation | Since the product is tightly closed there are no effects due to humidity.  Effects of temperature have been studied (see above). The product should not be stored for prolonged times (more than 8 weeks) at temperatures >40°C. | Study no 245-003, Meinerling M., 2009 |
| Effects on content of the active substance and technical characteristics of the biocidal product - reactivity towards container material | organoleptic | US Pump Spray Formulation | No indication of corrosion or decomposition was observed. | Study no 245-003, Meinerling M., 2009 |
| Wettability | Waived | - | the product is liquid | - |
| Suspensibility, spontaneity and dispersion stability | Waived | - | the product is not intended to be diluted | - |
| Wet sieve analysis and dry sieve test | Waived | - | the product is not intended to be diluted and  the product is liquid | - |
| Emulsifiability, re-emulsifiability and emulsion stability | Waived | - | the product is not intended to be diluted and is not an emulsion | - |
| Disintegration time | Waived | - | the product is not a tablet to be desintegrated | - |
| Particle size distribution, content of dust/fines, attrition, friability | Waived | - | the product is not a powder nor a granule | - |
| Persistent foaming | Waived | - | the product is not intended to be diluted | - |
| Flowability/Pourability/Dustability | Waived | - | the product is not a powder, a granule nor an emulsion | - |
| Burning rate — smoke generators | Waived | - | the product is not a smoke generator | - |
| Burning completeness — smoke generators | Waived | - | the product is not a smoke generator | - |
| Composition of smoke — smoke generators | Waived | - | the product is not a smoke generator | - |
| Spraying pattern | Waived | - | the product is not an aerosol |  |
|  | Particle size distribution  [Laser light diffraction, technical compliance to the requirements of | Insect Repellent Pump Spray IR3535® 20% | Fraction of particles <5µm: <0.6 %.  Range (n=50): 0.28 - 0.68 microns, with a mean of 0.45 % < 5.23 microns.  Fraction of particles <50µm: 51.79<x<60.27 %  Range (n=50): 47.78 – 54.86 microns, with respective means of 59.95 % and 51.46 %.  [Malvern SprayTec Spectrometer, Distance nozzle to beam center: 3cm, Focal length: 200mm, Test time 200ms, Data recording rate: 1000Hz, Optical parameters: 1.34/0/1, Laser wave length: 670nm]  Fraction of particles <10µm: ~1.5 %.  Range (n=12): 0.98 – 1.95%, with an average of 1.495 % <10 microns.  [Malvern SprayTec Spectrometer, Focal length: 300mm, Test time 400ms, Data recording rate: 2.5kHz, Laser wave length: 632.8nm] | Study no 2016\_04\_26, B. Batz, 2016 |
| Physical compatibility | Waived | - | the product is not intended to be used in combination with other products | - |
| Chemical compatibility | Waived | - | the product is not intended to be used in combination with other products | - |
| Degree of dissolution and dilution stability | Waived | - | the product is not a tablet and is not intended to be diluted | - |
| Surface tension | OECD 115 | Insect Repellent Pump Spray IR3535® 20% | Surface tension of undiluted product = 29.581 mN/m (at 20°C) | Study no 009093, J. zur Lage, 2016 |
| Viscosity | OECD 114 (rotational viscosimeter) | Insect Repellent Pump Spray IR3535® 20% | Viscosity (20°C)  = 6.8 mPa.s  Viscosity(40°C)  = 3.46 mPa.s | Study no 009093, J. zur Lage, 2016  Lab investigation 009093 – PM-PFC-RT, zur Lage (04.07.2016) : IR3535\_Ref Formulations Surface tension Viscosity\_reg.Aff |

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| **Conclusion on the physical, chemical and technical properties of the product** |
| The Insect Repellent Pump Spray IR3535® 20% is a colourless clear liquid with characteristic mild slight alcoholic odour. The pH of the undiluted ready-to-use product is between 4.4 and 5. The relative density is D420 = 0.955. At ambient temperature the product has a long term stability for 18 months and is stable under cold and accelerated storage conditions. Light influence is avoided by using a lightproof packaging. There are no humidity effects expected in that closed package. The product should not be stored for prolonged times at temperatures >40°C. At 20°C the surface tension is 29.581 mN/m and the viscosity 6.8 mPa.s. At 40°C the viscosity is 3.46 mPa.s. Physical and chemical compatibility with other products are not relevant. |

* **MINOR CHANGE FOR APAISYL REPULSIF MOUSTIQUE LOTION – 2019 (FR CA)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Property** | **Guideline and Method** | **Purity of the test substance (% (w/w)** | **Results** | **Reference** |
| Storage stability test – accelerated storage | CIPAC MT 46.3, under GLP regulation – HPLC method and Organoleptic | APAISYL Répulsif moustiques Lotion Protection quotidienne (NCO018587) | | **Test** | **At initial time** | **After 24 months at 20°C** | | --- | --- | --- | | **Appearance of the commercial packaging** | White plastic bottles (HDPE) | White plastic bottles (HDPE), no indication of corrosion or decomposition, no alteration of label | | **Appearance of the test item** | Colourless liquid with characteristic odour | Colourless liquid with characteristic odour | | **Difference of weight of the commercial packaging (%)** | / | - 0.29 % | | **Content of IR 3535®**  **(g/L)** | 185.5 | 187.2 (+ 0.92 % *vs.* the value at initial time) | | **pH of a 1% w/v suspension** | 6.2 at 20°C | 5.2 at 20°C | | **pH (undiluted)** | 6.2 at 20°C | 5.4 at 20°C | | **Viscosity (capillary viscometer)** | 7.63 mm²/s at 20°C  4.04 mm²/s at 40°C | 7.67 mm²/s at 20°C  4.25 mm²/s at 40°C | | Study n° 120012204, Fieseler, A., 2018. Institut für Biologische Analytik und Consulting IBACON GmbH |
| Storage stability test – long term storage at ambient temperature | OPPTS 830.6317 Storage Stability | APAISYL Répulsif moustiques Lotion Protection quotidienne (NCO018587) | | **Test** | **At initial time** | **After 24 months at 20°C** | | --- | --- | --- | | **Appearance of the commercial packaging** | White plastic bottles (HDPE) | White plastic bottles (HDPE), no indication of corrosion or decomposition, no alteration of label | | **Appearance of the test item** | Colourless liquid with characteristic odour | Colourless liquid with characteristic odour | | **Difference of weight of the commercial packaging (%)** | / | - 0.46 % | | **Content of IR 3535®**  **(g/L)** | 185.5 (19.4 % w/w) | 192.9 (20.2 % w/w) (+ 4 % *vs.* the value at initial time) | | **pH of a 1% w/v suspension** | 6.2 at 20°C | 4.6 at 20°C | | **pH (undiluted)** | 6.2 at 20°C | 5.0 at 20°C | | **Viscosity (capillary viscometer)** | 7.63 mm²/s at 20°C  4.04 mm²/s at 40°C | 7.69 mm²/s at 20°C  4.10 mm²/s at 40°C | | Study n° 120011204, Fieseler, A., 2019. Institut für Biologische Analytik und Consulting IBACON GmbH |

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| **Conclusion on the physical, chemical and technical properties of the product** |
| The extension of the shelf life of the product APAISYL REPULSIF MOUSTIQUE LOTION (Insect Repellent Pump Spray IR3535® 20%) to 24 months at ambient temperature is acceptable based on physico-chemical properties provided in the new long-term storage stability study. |

### Physical hazards and respective characteristics

| **Property** | **Guideline and Method** | **Purity of the test substance (% (w/w)** | **Results** | **Reference** |
| --- | --- | --- | --- | --- |
| Explosives | Waived | - | none of ingredients are classified as explosive substances | - |
| Flammable gases | Waived | - | the product is liquid | - |
| Flammable aerosols | Waived | - | the product is liquid | - |
| Oxidising gases | Waived | - | the product is liquid | - |
| Gases under pressure | Waived | - | the product is liquid | - |
| Flammable liquids | Closed cup flashpoint tester | Insect Repellent Pump Spray IR3535® 20% without Bitrex | Flash point : 28.7°C +-2°🡪 Classification in Flam Liq 3 | Study no 242-005, Fieseler A., 2011 |
| Flammable solids | Waived | - | the product is liquid | - |
| Self-reactive substances and mixtures | Waived | - | none of ingredients are classified as self-reactive substances | - |
| Pyrophoric liquids | Waived | - | none of ingredients are classified as pyrophoric substances | - |
| Pyrophoric solids | Waived | - | the product is liquid | - |
| Self-heating substances and mixtures | Waived | - | none of ingredients are classified as self-heating substances | - |
| Substances and mixtures which in contact with water emit flammable gases | Waived | - | none of ingredients are classified as able to emit flammable gases in contact with water | - |
| Oxidising liquids | Waived | - | none of ingredients are classified as oxidising substances | - |
| Oxidising solids | Waived | - | the product is liquid | - |
| Organic peroxides | Waived | - | none of ingredients are classified as organic peroxides | - |
| Corrosive to metals | Waived | - | none of ingredients are classified as corrosive to metals | - |
| Auto-ignition temperatures of products (liquids and gases) | EC A15 auto-ignition temperature (l & g) | Insect Repellent Pump Spray IR3535® 20% without Bitrex | Auto-ignition temperature = 440°C | Study no 242-002, Dornhagen J., 2011 |
| Relative self-ignition temperature for solids | Waived | - | the product is liquid | - |
| Dust explosion hazard | Waived | - | the product is liquid | - |

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| **Conclusion on the physical hazards and respective characteristics of the product** |
| The auto-ignition temperature of the solution is 440°C and the flashpoint of the solution is 28.7°C. The product has no self-reacting properties and does not react with air and is not self-heating since it is a liquid at room temperature. It is not able to react with metals and is not corrosive. The product is not oxidizing nor explosive but must be classified as flammable liquid, category 3 (H226). |

### Methods for detection and identification

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Analytical methods for the analysis of the product as such including the active substance, impurities and residues** | | | | | | | | | |
| **Analyte (type of analyte e.g. active substance)** | **Analytical method** | **Fortification range / Number of measurements** | **Linearity** | **Specificity** | **Recovery rate (%)** | | | **Limit of quantification (LOQ) or other limits** | **Reference** |
| Range | Mean | RSD |
| *IR3535* | HPLC method & UV-visible spectroscopy. The identity of IR3535 was established by comparison of the retention time and by comparison of the UV spectra obtained from sample solution and reference material. | 1%/5  (1% IR3535 – 5% hydrolysis product)  5%/5  (5% IR3535 – 5% hydrolysis product)  10%/10  (10% IR3535 – 1% hydrolysis product)  30%/ 10  (30% IR3535 – 1% hydrolysis product)  Validated concentration range 1 – 30% IR3535 | Correlation of the peak area of different standard solutions with their corresponding concentrations resulted in a linear regression with regression coefficient of at least 0.999.  Concentration range = from 25 to 1750 mg/L, Number of calibration points = 9 | The retention time of the analyte IR3535 in the samples solution did not differ by more than 1% from the standard solution. In addition, the identity of the analyte was confirmed by comparison of the UV spectrum of the test item with the UV-spectrum of the fortified sample solution. | 1%  94 – 110  5%  97-101  10%  97 – 101  30%  97 – 101 | 110  100  100  98 | 2.3  2.1  5.1  2.1 | LOD = 7 mg/L  LOQ = 250 mg/L (corresponding to 5% w/w) | Study no 421-001, Meinerling M., 2007  1st Final Report Amendement from 14th of June 2016 |
| *Hydrolysis product of IR3535:*  *3-(N-n-butyl-n-acetyl)aminopropionic acid* | HPLC method & UV-visible spectroscopy. The identity of hydrolysis product was established by comparison of the retention time and by comparison of the UV spectra obtained from sample solution and reference material. | 1%/10  (10% IR3535 – 1% hydrolysis product)  1%/10  (30% IR3535 – 1% hydrolysis product)  5%/5  (1% IR3535 – 5% hydrolysis product)  5%/5  (5% IR3535 – 5% hydrolysis product)  Validated concentration range 0.1 – 5% hydrolysis product.The lowest concentration comes from report 98322204 with 10% IR3535 solution (READ ACROSS from IR3535 Lotion). | Correlation of the peak area of different standard solutions with their corresponding concentrations resulted in a linear regression with regression coefficient of at least 0.999.  Concentration range = from 25 to 300 mg/L, number of Calibration points = 9 | The retention time of the analyte hydrolysis product in the samples solution did not differ by more than 1% from the standard solution. In addition, the identity of the analyte was confirmed by comparison of the UV spectrum of the test item with the UV-spectrum of the fortified sample solution. | 1%  99 – 104  5%  99-104 | 103  99 | <2.2%  <2.7% | LOD = 3 mg/L  LOQ = 50 mg/L (corresponding to 1% w/w) | Study no 421-001, Meinerling M., 2007  Statement Ibacon, 2016  Study no 98322204, Fieseler,2015 |

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| **Conclusion on the methods for detection and identification of the product** |
| IR3535® and its metabolite IR3535® free acid (hydrolysis product) can both be determined in the product Insect Repellent Pump Spray IR3535® 20% with an HPLC-Diode Array Detector/UV-VIS detector (at 220nm) and a RP18 (250\*4 mm) column.  The identity of the analyte is confirmed by comparison of the retention times. The standard regression is linear. The method is repeatable. The mean recovery rates at each spiking level are in the range of 92 – 104%. Repeated injection of the samples resulted in a coefficient of variation which was less than 2.7 %. The limit of quantification (LOQ) is 5% for IR3535® corresponding to 250 mg/L and the limit of detection (LOD) is 7 mg/L for IR3535®. The limit of quantification (LOQ) is 0.1% for IR3535® free acid corresponding to 5 mg/L and the limit of detection (LOD) is 3 mg/L for IR3535® free acid. The overall mean recovery rate for IR3535® and IR3535® free acid was ≥ 94%.  For other analytical methods refer to the CAR of active substance. |

### Efficacy against target organisms

#### Function and field of use

Main Group 03 : Pest Control

Product Type 19 : Repellents and attractants

According to the concept label submitted by Merck (please note that Merck does not market these products):

The product ***Insect Repellent Pump Spray IR3535® 20%*** is presented as a ready-to-use pump spray to be applied on uncovered human skin (to face, arms, hands, legs and feet only) and on clothes.

The product is intended to be used by general public (children from 1 year old and adults) in temperate and tropical areas. An adult should apply this product to children under 10 years of age.

For an adult 3 gram product suffice.

#### Organisms to be controlled and products, organisms or objects to be protected

According to the use claimed by the applicant :

* The product ***Insect Repellent Pump Spray IR3535® 20%*** is intended to be used to repel arthropods on skin and clothes.
* The target organisms to be controlled are mainly mosquitoes and ticks. This product is also intended to repel biting flies (stable flies, black flies, sand flies), deer flies, biting midges, house flies, wasps and bees from treated skin and clothing preventing respective consequences.
* The organisms to be protected are humans.

#### Effects on target organisms, including unacceptable suffering

The applicant submitted 4 studies. Please see the summary (and comments) of all the studies submitted in the table section 2.2.6.5.

#### Mode of action, including time delay

The mode of action of IR3535® is not a passive masking of an attracting odour of a victim, but an active repellent effect as insects avoid entering regions with IR3535® vapours. The exact biochemical mode of action of IR3535® on insects is not well known yet, but it is most self-evident to assume that IR3535® has an olfactory-based effect.

#### Efficacy data

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Experimental data on the efficacy of the biocidal product against target organism(s)** | | | | | | | |
| **Function** | **Field of use envisaged** | **Test substance** | **Test organism(s)** | **Test method** | **Test system / concentrations applied / exposure time** | **Test results: effects** | **Reference** |
| ***PT19***  ***Repellent*** | - RTU pump spray  - Applied on uncovered human skin  - For consumers  - In temperate and tropical areas | **US Pump Spray Formulation**  Hydroalcoholic solution | **TICKS**  *Ixodes scapularis* (US deer ticks) nymphs  Given the information provided by DE eCA (Büchel et al. - 2015 - “Repellent efficacy of  DEET, Icaridin, and EBAAP against Ixodes ricinus and Ixodes scapularis nymphs (Acari, Ixodidae).”) during the commenting phase, no significant differences in repellent efficacy were found between the two species tested (when compared the repellent efficacy of 10% EBAAP =IR3535).” | Lab test | - with 10 volunteers  - 0.00067 g BP/cm2 on the lower arm  - Exposure started 15 minutes after application  - 3 min exposure time, every 15 min until 14 hours  - “normal” climatic conditions for temperate areas (+19-26°C ; 31-52% rH) | 12 hours complete protection  In temperate areas only | **Doc N° 336-1918/2006**  **Reliability 1 Key study** |
| ***1PT19***  ***Repellent*** | - RTU spray  - Applied on uncovered human skin  - For consumers  - In temperate and tropical areas | **US Pump Spray Formulation**  Hydroalcoholic solution | **MOSQUITOES**  *Aedes melanimon* (predominant species*), Culex erythrothorax, Culex tarsalis, Culiseta incidens, Anopheles freeborni and Aedes vexans*  With very high mosquito pressure | Field test  on 2 different sites  (Forest and Marsh/Pasture) | - with 20 volunteers  - 0.00067 g/cm2 for legs (and 0.00051 g/cm2 for arms).  - Exposure started 2h (Forest) or 3h (Marsh/Pasture) after application  - 1 min exposure time, every 15 min until 14 hours  - “normal” climatic conditions for temperate areas (+19-25°C ; 24-39% rH) | 8 hours complete protection  In temperate areas only | **Doc N° 336-1919/2006**  **Reliability 1**  **Key study** |
| ***PT19***  ***Repellent*** | - RTU spray  - Applied on uncovered human skin  - For consumers  - In temperate and tropical areas | **Insect Repellent Pump spray (15% IR3535)** | **TICKS**  *Ixodes ricinus* (EU sheep ticks) nymphs | Lab test | - with 11 volunteers  - 1 g BP/600 cm2 on the forearm  - Exposure started immediately after application  - 5 min exposure time, every 15 min  - “normal” climatic conditions for temperate areas (+23.2-25.4°C ; 24.2±3.7% rH) | 8 hours complete protection  In temperate areas only | **Doc N° 336-1921/2006**  **Supportive study** |
| ***PT19***  ***Repellent*** | - RTU spray  - Applied on uncovered human skin  - For consumers  - In temperate and tropical areas | **The composition of the product tested is not reported**  **TMT-003** | **MOSQUITOES**  *Aedes albopictus* | “Arm-in-cage” simulated-use test | ND | ND | **Doc N° 336-1922/2006**  **Reliability 4** |

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| **Conclusion on the efficacy of the product** |
| The product ***Insect Repellent Pump Spray IR3535® 20%*** (hydroalcoholic solution, 20% IR3535) when used at a dose of 0.00067 g/cm2 provides up to 12 hours complete protection time against ticks found in temperate areas.  The product ***Insect Repellent Pump Spray IR3535® 20%*** (hydroalcoholic solution, 20% IR3535) when used at a dose of 0.00067 g/cm2 for legs (and 0.00051 g/cm2 for arms) provides up to 8 hours complete protection time against mosquitoes found in temperate areas. |

#### Occurrence of resistance and resistance management

There are no reported cases of resistance developing in the literature so far.

#### Known limitations

* As stated by the applicant, the product is intended to be used in tropical areas. But, due to the absence of efficacy tests on tropical species (at more than +30°C), the use of this product in tropical areas hasn’t been authorized.
* As stated by the applicant, the product is intended to be used on skin against black flies, horse-flies, wasps and bees. But, due to the absence of relevant efficacy tests, these uses of the product haven’t been authorized.
* As stated by the applicant, the product is intended to be used on clothes. But, due to the absence of efficacy tests and good results on clothes, this use of the product hasn’t been authorized.

#### Evaluation of the label claims

According to the label, the product ***Insect Repellent Pump Spray IR3535®*** (hydroalcoholic solution, 20% IR3535) does provide a good protection against ticks and mosquitoes during 8 hours in temperate and tropical areas.

Based on the efficacy tests submitted and validated, this claim is partially supported i.e. only for a use in temperate areas.

For products claiming protection against mosquitoes & ticks such as the product ***Insect Repellent Pump Spray IR3535®*** (hydroalcoholic solution, 20% IR3535), the protection time against mosquitoes & ticks found in temperate areas would be of 8h when used at 0.00067 g/cm2, based on the efficacy tests submitted and validated.

For products claiming protection against mosquitoes only, the protection time against mosquitoes found in temperate areas would be of 8h when used at 0.00067 g/cm2 for legs (and 0.00051 g/cm2 for arms), based on the efficacy tests submitted and validated.

For products claiming protection against ticks only, the protection time against ticks found in temperate areas would be of 12h when used at 0.00067 g/cm2, based on the efficacy tests submitted and validated.

Remark : Mentioning on the label application rate (such as 0.00167 g product/cm2) is not easy to observe and useless for the consumer. Therefore, the efficacy expert is of the opinion to put on the label more friendly consumer use instructions such as “Apply sparingly to uniformly cover uncovered parts of the body (face, hands, arms, legs and feet only)”.

* References related to intended uses under tropical conditions must be removed from the label
* References related to intended uses on clothes must be removed from the label
* All references related to target organisms other than ticks and mosquitoes must be removed from the label.
* All the warnings such as “Applying sun care products or cosmetic formulations after repellent use will decrease the efficacy of the repellent considerably”, “Do not apply over cuts, wounds, freshly shaven or irritated skin” and “Mechanical protection (clothing, mosquito nets) is to be preferred” must be mentioned on the label.

#### Relevant information if the product is intended to be authorised for use with other biocidal product(s)

N.D.

### Risk assessment for human health

#### Assessment of effects on Human Health

Acute dermal toxicity, skin and eye irritation and sensitising properties were assessed using formula EUS26-15 Insect Repellent Spray (US Pump Spray Formulation). The test substance can be regarded as representative for the product under evaluation. The main difference between the 2 formulas is the presence (EUS26-15) / absence (product under evaluation) of a small amount of denaturant. The harmonized classification of the substance in question indicates that it will not affect the results of the properties tested. For details, see section 2.2.2 and confidential part of the PAR.

##### Skin corrosion and irritation

New data for this section are due to differences in product composition.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Summary table of animal studies on skin corrosion /irritation** | | | | | |
| **Method, Guideline,**  **GLP status, Reliability** | **Species, Strain, Sex, No/group** | **Test substance, Vehicle, Dose levels,  Duration of exposure** | **Results**  *Average score* *(24, 48, 72h)/*  *observations and time point of onset, reversibility; other adverse local / systemic effects, histopathological*  *findings* | **Remarks *(e.g. major deviations)*** | **Reference** |
| OPPTS 870.2500  OECD 404  EU 92/69 Annex V, B4  GLP=yes  Rel=1 | Albino rabbit  New Zealand White  2♂, 1♀  1 test group, 3 animals | EUS26-15 Insect Repellent Spray  No vehicle  0.5 ml / 2.5 cm x 2.5 cm  4h | Erythema:  24h: 1.0  48h: 0.6  72h: 1.0  Edema:  24h: 1.0  48h: 0.6  72h: 0.3  Very slight erythema and edema.  Max score erythema 1, earliest onset 0.5-1h; max score edema 1, earliest onset 0.5-1h. Very slight erythema persisted for 2 animals through study termination.  No deaths, no remarkable bw changes | US Pump Spray Formulation | Hurley,J.M. 2006 (a) |

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| --- |
| **Individual and mean dermal scores for erythema and edema (Hurley, J.M., 2006 (a))** |
|  |

There were no deaths or remarkable body weight changes noted during the study. Dermal findings for the 4-hour exposure sites consisted of very slight erythema and edema (grade 1). Very slight erythema persisted for two animals through study termination. Based on the evaluation according to EU criteria, the mean scores at 24-72 hours for erythema and edema were calculated to be 0.89 and 0.67, respectively.

The mean scores determined for erythema (0.89) and edema (0.67) do not require a classification according to the EU and GHS classification and labelling system.

Although erythema grade 1 (very slight erythema, barely perceptible, area of edges not well defined) persisted in two out of three animals until the end of the 14-day post-observation period, a classification as a potential skin irritant is not required. According to EU Directive 2001/59/EC or Regulation (EC) No. 1272/2008 (CLP), a classification as a skin irritant should be considered when hyperplasia, hyperkeratosis, scaling, discoloration, fissures, scabs or alopecia persist in two or more animals at the end of the observation period which has not been observed in the skin irritation study with Insect Repellent Pump Spray IR3535® 20 %.

No *in vitro* or human data are available for skin corrosion/irritation.

|  |  |
| --- | --- |
| **Conclusion used in Risk Assessment – Skin corrosion and irritation** | |
| Value/conclusion | Biocidal product not classified for skin corrosion/irritation according to (EU) nr. 1272/2008 |
| Justification for the value/conclusion | Mean scores for erythema and edema do not trigger a classification. Severity of skin reactions that persisted to the end of the observation period was limited (erythema grade 1). |
| Classification of the product according to CLP and DSD | none |

##### Eye Irritation

New data for this section are due to differences in product composition.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Summary table of animal studies on serious eye damage and eye irritation** | | | | | |
| **Method, Guideline,**  **GLP status, Reliability** | **Species, Strain, Sex, No/group** | **Test substance,Dose levels, Duration of exposure** | **Results**  ***Average score (24, 48, 72h)/***  ***observations and time point of onset, reversibility*** | **Remarks *(e.g. major deviations)*** | **Reference** |
| OPPTS 870.2400  OECD 405  EU 92/69 Annex V, B5  GLP=yes  Rel=1 | Albino rabbit  New Zealand White  2♂, 1♀  1 test group, 3 animals | EUS26-15 Insect Repellent Spray  No vehicle  0.1ml  1 single unwashed exposure | Cornea:  24h: 2.0  48h: 1.3  72h: 1.0  Iris:  24h: 0.0  48h: 0.0  72h: 0.0  Conjunctiva; redness:  24h: 3.0  48h: 3.0  72h: 2.3  Conjunctiva; chemosis:  24h: 2.3  48h: 2.3  72h: 2.0  Reversibility: Yes  Earliest onset for all symptoms: 1h  Max scores: cornea 2, conjunctiva, redness 3, conjunctiva, chemosis 4  Reversible at d14  2 out of 3 animals: average corneal opacity ≥1, average conjunctival redness ≥2 | US Pump Spray Formulation | Hurley, J.M. (2006) (b) |

|  |
| --- |
| **Individual Total Scores and for Ocular Irritation (Hurley, J.M., 2006 (b))** |
|  |

There were no deaths or remarkable body weight changes noted during the study. Positive corneal and conjunctival irritations were noted for all animals. Corneal irritation subsided by study day 10 and conjunctival irritation subsided by study day 14. The left (control) eyes were free of evidence of ocular irritation and other findings for the duration of the study. According to EU and CLP criteria, the mean scores for corneal reactions, iritis, conjunctival redness and chemosis were 1.44, 0, 2.8 and 2.2, respectively, resulting in a classification as a potential eye irritant (EU criteria: Xi, R36; GHS criteria: Eye Irrit. 2, H319).

Based on the results obtained in the eye irritation study with EUS26-15 Insect Repellent Spray in rabbits, the biocidal product is a potential eye irritant and needs to be classified with respect to eye irritancy (EU criteria: Xi, R36; GHS criteria: Eye Irrit. 2, H319).

No *in vitro* or human data are available for eye corrosion/irritation.

|  |  |
| --- | --- |
| **Conclusion used in Risk Assessment – Eye irritation** | |
| Value/conclusion | the biocidal product has to be classified as a potential eye irritant according to (EU) nr. 1272/2008 (Eye Irrit. 2, H319) |
| Justification for the value/conclusion | average score was ≥ 1 for corneal opacity and ≥ 2 for conjunctival redness and chemosis in 2 out of 3 animals |
| Classification of the product according to CLP and DSD | Eye damage/irritation cat 2, H319 |

##### Respiratory tract irritation

|  |  |
| --- | --- |
| **Conclusion used in the Risk Assessment – Respiratory tract irritation** | |
| Justification for the conclusion | Neither the active ingredient nor one of the other relevant ingredients of the biocidal product are classified with respect to respiratory tract irritation.  Insect Repellent Pump Spray IR3535® 20 % does not pose a respiratory tract irritation hazard. |
| Classification of the product according to CLP and DSD | There is no indication that a classification with respect to respiratory tract irritation is necessary for Insect Repellent Pump Spray IR3535® 20 %. |

##### Skin sensitization

| **Summary table of animal studies on skin sensitisation** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **Method, Guideline, GLP status, . Reliability** | **Species, Strain, Sex, No/group** | **Test substance, Vehicle,**  **Dose levels,  duration of exposure Route of exposure** *(topical/intradermal, if relevant)* | **Results**  *(EC3-value or amount of sensitised animals at induction dose); evidence for local or systemic toxicity (time course of onset)* | **Remarks**  ***(e.g. major deviations)*** | **Reference** |
| OECD 406  OPPTS 870.2600  EU 92/69 Annex V, B6  GLP=yes  Rel=1 | Guinea pig  Hartley [Crl: HA]  10 ♂ and 10 ♀/ test group  5 ♂ and 5 ♀/ naïve control group | EUS26-15 Insect Repellent Spray  No vehicle  Undiluted  0.3 ml/site  6h exposure  Epicutaneous, occlusive | No positive dermal reactions in the test or the naive control groups  No deaths, no test article related clinical findings, no remarkable bw changes | US Pump Spray Formulation | Hurley, J.M. (2006) (c) |

|  |
| --- |
| **Dermal Observations and Severity Indices (Hurley, J.M., 2006 (c))** |
|  |

The skin sensitisation potential of EUS26-15 Insect Repellent Spray was evaluated using the modified Buehler test method.

Animal welfare benefits and scientific advantages make the LLNA the preferred test for sensitization. However, existing data of good quality derived from a Buehler test should be acceptable as they preclude the need for further in vivo testing. As none of the cosmetic ingredients in the formulation have a sensitizing potential and as the active substance is not considered as sensitizing (Buehler test and Photoallergenicity maximisation test), the Buehler test was regarded as acceptable.

There were no deaths, nor were there any test article-related clinical findings or remarkable body weight changes during the study period. Following challenge dosing with EUS26-15 Insect Repellent Spray, there were no positive dermal reactions (score ≥ 1) in the test or the naive control groups. The Incidence Index for the test group with a score ≥ 1 was 0 % (0/20) following challenge dosing.

In the positive control experiments which were performed as a separate study, the positive control substance HCA was a sensitizer when administered as both a 10 % concentration in 70/30 (v/v) in acetone/PEG 400 and a 20 % concentration in 70/30 (v/v) in acetone/PEG 400 under the conditions of the study. The mean incidence indices for the positive controls were 20 % and 60 % at a concentration of 10 % and 20 %, respectively. This confirms the reliability of the test system as indicated by the dose-response relationship.

EUS26-15 Insect Repellent induced no skin sensitisation reactions in albino guinea pigs when using the modified Buehler test method. A classification with respect to skin sensitisation is not required.

No *in vitro* or human data are available for skin sensitisation.

|  |  |
| --- | --- |
| **Conclusion used in Risk Assessment – Skin sensitisation** | |
| Value/conclusion | Biocidal product not classified for skin sensitisation according to (EU) nr. 1272/2008 |
| Justification for the value/conclusion | Following challenge dosing with EUS26-15 Insect Repellent Spray, there were no positive dermal reactions (score ≥ 1) in the test or the naive control groups. The Incidence Index for the test group with a score ≥ 1 was 0 % (0/20) following challenge dosing. |
| Classification of the product according to CLP and DSD | none |

##### Respiratory sensitization (ADS)

|  |  |
| --- | --- |
| **Conclusion used in Risk Assessment – Respiratory sensitisation** | |
| Value/conclusion |  |
| Justification for the value/conclusion | None of the ingredients of the product is known to be sensitizing to the respiratory tract. Moreover, from tests in guinea pigs the product was proven not to exert any skin sensitizing properties. In addition, the active ingredient IR3535® did not show a sensitizing or photosensitizing potential from tests in guinea pigs. Finally, IR3535® products are on the market for more than 40 years and there are no indications for any sensitizing potential neither to the skin nor to the respiratory tract.  Based on all this data it is thus concluded that the product is not sensitizing to the respiratory tract. |
| Classification of the product according to CLP and DSD | none |

##### Acute toxicity

###### Acute toxicity by oral route

|  |  |
| --- | --- |
| **Value used in the Risk Assessment – Acute oral toxicity** | |
| Value | Biocidal product not classified for acute oral toxicity according to (EU) nr. 1272/2008 |
| Justification for the selected value | Neither the active ingredient nor one of the other relevant ingredients of the biocidal product are classified with respect to acute oral toxicity. Thus, Insect Repellent Pump Spray IR3535® 20 % has no potential for an acute oral toxicity hazard and no classification with respect to acute oral toxicity is required.  No human data are available for acute oral toxicity. |
| Classification of the product according to CLP and DSD | none |

|  |  |
| --- | --- |
| **Data waiving** | |
| Information requirement | Acute oral toxicity: Study scientifically unjustified |
| Justification | Since the acute oral toxicity of Insect Repellent Pump Spray IR3535® 20 % can be assessed on the basis of the properties of the ingredients, the performance of an acute oral toxicity study with the biocidal product is scientifically not justified. See IUCLID data point 8.5.1 Endpoint study record: Acute toxicity: oral.001.  There are valid data available on each of the components in the mixture sufficient to allow classification of the mixture according to the rules laid down in Regulation (EC) No 1272/2008 (CLP), and synergistic effects between any of the components are not expected. |

###### Acute toxicity by inhalation

No human data are available for acute inhalation toxicity.

|  |  |
| --- | --- |
| **Value used in the Risk Assessment – Acute inhalation toxicity** | |
| Value | Biocidal product not classified for acute toxicity (inhalation) according to (EU) nr. 1272/2008 |
| Justification for the selected value | None of the components of the biocide are classified for acute inhalation toxicity according to (EU) nr. 1272/2008. |
| Classification of the product according to CLP and DSD | none |

|  |  |
| --- | --- |
| **Data waiving** | |
| Information requirement | Acute inhalation toxicity: Study scientifically unjustified |
| Justification | Since the acute inhalation toxicity of Insect Repellent Pump Spray IR3535® 20 % can be assessed on the basis of the properties of the ingredients, the performance of an acute inhalation toxicity study with the biocidal product is scientifically not justified. See IUCLID data point 8.5.2 Endpoint study record: Acute toxicity: inhalation.001.  There are valid data available on each of the components in the mixture sufficient to allow classification of the mixture according to the rules laid down in Regulation (EC) No 1272/2008 (CLP), and synergistic effects between any of the components are not expected. |

###### Acute toxicity by dermal route

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Summary table of animal studies on acute dermal toxicity** | | | | | | |
| **Method, Guideline,**  **GLP status,**  **Reliability** | **Species, strain, Sex, No/group** | **Test substance, Vehicle, Dose levels, Surface area** | **Signs of toxicity** *(nature, onset, duration, severity, reversibility)* | **LD50** | **Remarks** *(e.g. major deviations)* | **Reference** |
| OECD 402  EU 92/69 Annex V, B.3  EPA OPPTS 870.1200  GLP=yes  Rel=1 | Rat  Crl:CD(SD)  5♀, 5♂/dose | EUS26-15  Undiluted  5000 mg/kg bw  10% of body area  Semiocclusive | See below | >5000 mg/kg bw | US Pump Spray Formulation | Hurley, J.M. (2006) (d) |

There were no deaths, remarkable body weight changes or macroscopic findings at the scheduled necropsy. Clinical findings noted persisted until day 1 post-dosing and included abnormal excretion, and various discoloured areas due to discharges/excretions which were observed. Dermal findings noted during the study consisted of very slight erythema (grade 1) and pinpoint scabbing at the dose sites. Very slight erythema (grade 1) persisted until study termination on day 14.

Based on the results of this study, the LD50 of EUS26-15 Insect Repellent Spray was greater than 5000 mg/kg bw when administered once for 24 hours to the clipped, unabraded skin of male and female albino rats. A classification of the biocidal product with respect to acute dermal toxicity is not required.

No human data are available for acute dermal toxicity.

|  |  |
| --- | --- |
| **Value used in the Risk Assessment – Acute dermal toxicity** | |
| Value | Biocidal product not classified for acute dermal toxicity according to (EU) nr. 1272/2008 |
| Justification for the selected value | In an acute dermal toxicity study, the LD50 of EUS26-15 Insect Repellent Spray was greater than 5000 mg/kg bw. |
| Classification of the product according to CLP and DSD | none |

##### Information on dermal absorption

In a dermal toxicokinetics/metabolism study with 5 male and 5 female human volunteers, the dermal absorption of the active substance IR3535® from a pump spray containing 20% IR3535® has been determined in parallel (Dekant, 2010). In this study, approx. 3 grams of the formulation were applied once to hands, arms, legs, feet, face and neck of each volunteer (ca. 64% of total body area). The total amount of IR3535® and its metabolite IR3535®-free acid excreted with the urine over a period of 48 hours presented 13.3% of the dermal dose of IR3535® applied. Since IR3535® is rapidly and extensively metabolized and as IR3535®-free acid has a low molecular weight and high water solubility, it is expected that urinary excretion of IR3535®-free acid and IR3535® represents the total extent of absorption of IR3535® in humans and a distribution to organs and tissues is considered to be negligible. The results of this study have been summarized in in the active substance dossier and were assessed for the approval of IR3535®.

The assessment of this study resulted in an overall dermal penetration of 14% IR3535®.

Since the composition of Insect Repellent Pump Spray IR3535® 20 % and the concentration of IR3535® is identical to the product tested in the dermal toxicokinetics/metabolism study, a separate skin absorption study with the biocidal product can be waived. Instead, the skin absorption of 14% for IR3535® can be applied to Insect Repellent Pump Spray IR3535® 20%. A dermal penetration of 14% will be used in the human exposure assessments for the intended use of the biocidal product.

See IUCLID datapoint 8.6 Dermal absorption Endpoint study record: Dermal absorption.001.

|  |  |  |  |
| --- | --- | --- | --- |
| **Value(s) used in the Risk Assessment – Dermal absorption** | | | |
| Substance | Insect Repellent Pump Spray IR3535® 20% |  |  |
| Value(s)\* | 14% dermal absorption for 20% IR3535 lotion/ cream formulations |  |  |
| Justification for the selected value(s) | human volunteer study on a water/ethanol-based 20 % IR3535® formulation (Dekant, 2010) |  |  |

|  |  |
| --- | --- |
| **Data waiving** | |
| Information requirement | Skin absorption study |
| Justification | Human volunteer study on a water/ethanol-based 20 % IR3535® formulation |

##### Available toxicological data relating to non active substance(s) (i.e. substance(s) of concern)

There are valid data available on each of the components in the mixture sufficient to allow classification of the mixture according to the rules laid down in Directive 1999/45/EC and Regulation (EC) No 1272/2008 (CLP), and synergistic effects between any of the components are not expected.

##### Available toxicological data relating to a mixture

Available toxicological data relating to a mixture that a substance(s) of concern is a component of

There are valid data available on each of the components in the mixture sufficient to allow classification of the mixture according to the rules laid down in Directive 1999/45/EC and Regulation (EC) No 1272/2008 (CLP), and synergistic effects between any of the components are not expected.

##### Other

Not applicable.

#### Exposure assessment

The active substance contained in the product Insect Repellent Pump Spray IR3535® 20 % is the same as evaluated in the CAR for IR3535®  and therefore no new data/information on the active substance is required.

The composition of the representative product from the CAR is not identical to that of Insect Repellent Pump Spray IR3535® 20 %. However, the intended use is identical as well as the amount of active substance in both products. It does not contain substances of toxicological concern apart IR3535®.

Following the referral conclusions for this product, it has been decided that Ethanol should be considered as a substance of concern, since it is responsible for the classification of the biocidal product as a flammable liquid.

However, from a toxicological point of view, ethanol is not considered relevant. Based on its harmonized classification, ethanol is not classified for any human health hazard. Considering the fact that there is currently no guidance of how to treat physico-chemical hazard, it was agreed that the application of P-sentences and H-sentences will cover the risk, based on an analogy with the Human Health document CA-Nov14-Doc 5.11 when substances are classified in band A.

Consequently, no risk assessment was performed for ethanol. Identification of main paths of human exposure towards active substance(s) and substances of concern from its use in biocidal product

| **Summary table: relevant paths of human exposure** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Exposure path** | **Primary (direct) exposure** | | | **Secondary (indirect) exposure** | | | |
| **Industrial use** | **Professional use** | **Non-professional use** | **Industrial use** | **Professional use** | **General public** | **Via food** |
| Inhalation | n.a. | n.a. | Yes | n.a. | n.a. | Yes | n.a. |
| Dermal | yes | n.a. | Yes | n.a. | n.a. | Yes | n.a. |
| Oral | n.a. | n.a. | n.a. | n.a. | n.a. | Yes | n.a. |

For primary exposure, the most relevant route of exposure is the dermal route. During the application phase, inhalation exposure is possible resulting from respiring aerosols after spraying. It was considered that the respirable particles will be absorbed via the lower airways and that the non-respirable particles will precipitate in the upper airways and be taken in orally. Direct oral exposure is not considered to be relevant because of the repellent taste (bad palatability) of the active substance and because the biocidal product is not intended to be applied by children younger than 11 years.

For secondary exposure, dermal exposure is possible for adults treating or handling children. However this scenario is fully covered by primary adult dermal exposure. Hand to mouth transfer is also possible for adults and children; nonetheless, the biocidal product is not intended to be applied on children’s hands which reduces potential oral uptake of the dermally applied active substance. For inhalative exposure, the inhalation of volatilized residues after application is also relevant.

##### General information

###### General default values for exposure assessment

| **Default value considering age groups1** | | | |
| --- | --- | --- | --- |
| **Age groups** | **Body weight**  **[kg]** | **Respiration rate**  **[m³/air/hour]** | **Total body surface area**  **[cm²]** |
| **ADULT**  irrespective of gender  (based on female 30 to <40 years old) | 60 | 1.25 | 16600 |
| **CHILD** 6 to < 12 years old irrespective of gender  (based on female 6 to <11 years old) | 23.9 | 1.32 | 9200 |
| **CHILD** 2 to < 6 years old irrespective of gender (based on data from female 2 to <6 years old) | 15.6 | 1.26 | 6800 |
| **TODDLER** 1 to <2 years old  irrespective of gender  (based on female 1 to <2 years old) | 10 | 1.26 | 4800 |
| **INFANT** < 1 year old  irrespective of gender  (based on female 6 to <12 months old) | 8 | 0.84 | 4100 |

1 Recommendation no. 14 of the BPC Ad hoc Working Group on Human Exposure Default human factor values for use in exposure assessments for biocidal products (revision of HEEG opinion 17 agreed at the Human Health Working Group III on 12 June 2017)

###### Treated surface, applied amount of biocidal product and number of application per day:

Treated surface:

The treated surface is assumed to be the uncovered parts of the body. According Recommendation no. 11 of the BPC Ad hoc Working Group on Human Exposure : Proposal for harmonising the assessment of human exposure to repellents (PT19) (Version 2.1 agreed at Human Health Working Group V on 22 November 2017), the uncovered body surface area corresponds to 55% of the total body surface.

Amount of biocidal product:

Following the efficacy assessment for this product, the efficacious application rate is : 0.00067 g product/cm² skin against ticks and 0.00067 g/cm2 for legs (and 0.00051 g/cm2 for arms) against mosquitoes.

Therefore, the application rate is considered to be **0.67 mg/cm2.**

Number of application per day:

The applicant proposes that : “*Insect Repellent Pump Spray IR3535® 20% is intended to be used in summer when insects are frequent. It is usually applied once a day depending on outdoor activities, weather and presence of insects. The application can be repeated when necessary (noticeable reduction in repellence). The pump spray can be applied up to 3 times per day for adults, up to 2 times for children between the age of 3 and 10 years and maximally 1 time per day for children below 3 years.*”

| **Summary : Amount of product used per application for the different age groups, treated surface and number of application per day** | | | |
| --- | --- | --- | --- |
| **Age groups** | **Amount of**  **product used**  **per application**  **[g]** | **Treated surface**  **[cm²]** | **number of**  **applications**  **per day** |
| **ADULT**  irrespective of gender  (based on female 30 to <40 years old) | 6.1171 | 9130 | 3 applications/day |
| **CHILD** 6 to < 12 years old irrespective of gender  (based on female 6 to <11 years old) | 3.3902 | 5060 | 2 applications/day |
| **CHILD** 2 to < 6 years old irrespective of gender (based on data from female 2 to <6 years old) | 2.5058 | 3740 | 2 applications/day |
| **TODDLER** 1 to <2 years old  irrespective of gender  (based on female 1 to <2 years old) | 1.7688 | 2640 | 1 application/day |
| **INFANT** < 1 year old  irrespective of gender  (based on female 6 to <12 months old) | 1.51085 | 2255 | 1 application/day |

###### Dermal, inhalatory and oral absorption:

* Inhalatory absorption : 100 %
* Dermal absorption : 14 %
* Oral absorption : 100 %

##### List of scenarios

Insect Repellent Pump Spray IR3535® 20 % is used by the general public. The primary route of exposure is dermal.

Oral exposure by hand-to-mouth transfer is not considered to be a significant route of primary exposure, because of the repellent taste (bad palatability) of the active substance, thus, preventing repeated mouthing of IR3535® by children and infants. Furthermore, the biocidal product is not intended to be applied by children younger than 11 years which makes an oral uptake of the dermally applied active substance inconsiderable.

A potential inhalation exposure is only possible during the application phase via spraying. After application, no inhalation exposure risk is anticipated due to the low vapour pressure of IR3535®. Moreover, it has to be taken into account that the exposure time to the spray is extremely short and that it is not recommended to spray the biocidal product directly onto the face.

Dermal secondary exposure is possible for adults treating or handling children. However, this scenario is fully covered by primary adult dermal exposure. A parent applying (spraying) the product on children and herself/himself has been taken into account for inhalative secondary exposure.

Hand to mouth transfer has been developed consistently with the DEET dossier. It was proposed to use a reverse scenario to estimate this exposure.

Inhalation of volatilized residues after application is relevant based on the HEEG opinion on Assessment of Inhalation Exposure of Volatilized Biocide Active Substance. The exposure to volatilised residues indoors was calculated using ConsExpo model..

| **Summary table: scenarios** | | | |
| --- | --- | --- | --- |
| **Scenario**  **number** | **Scenario**  (e.g. mixing/  loading) | **Primary or secondary exposure**  **Description of scenario** | **Exposed group**  (e.g. professionals, non-  professionals, bystanders) |
| 1. | Application phase | Primary exposure: Dermal exposure assessment for adults, children, toddlers and infants. | Non-professionals |
| 2. | Application phase | Primary exposure: Inhalation exposure assessment for adults, children, toddlers and infants. | Non-professionals |
| 3. | Post-application phase | Secondary exposure (indirect exposure as a result of use): Hand-mouth transfer reverse reference scenario (oral exposure) | Non-professionals |
| 4. | Post-application phase | Parent treating two children and himself/herself (spraying) (combined inhalative and oral exposure) | Non-professionals |
| 5. | Post-application phase | Inhalation of volatilised residues after application (inhalative exposure) | Non-professionals |
| 6. | Exposure during production | Mixing and Loading model – worst case for the production, formulation and disposal of the biocidal product | Professionals |

##### Industrial exposure

There is no concern about industrial exposure because of the intend of use apart for the production/formulation and disposal of the biocidal product. This exposure is addressed under a point below (scenario 6).

##### Professional exposure

Not relevant since the product Insect Repellent Pump Spray IR3535® 20 % is intended to be used by general public.

##### Non-professional exposure

###### Scenario 1: Primary exposure: Dermal exposure assessment for adults, children, toddlers and infants.

| **Description of Scenario 1** | | |
| --- | --- | --- |
| This scenario is based on the one available in the CAR of IR3535®. It has been updated with the document : Biocide Human Health Exposure Methodology (Oct 2015). | | |
| **Dermal exposure:**  Number of application/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 absorption1 | 14% |
| % of active substance in biocidal product1 | 20% |
| Tier 1- Adult | Number of application / day1 | 3 |
| Body weight1 | 60 kg |
| Amount of biocidal product/ application1 | 6.12 g |
| Tier 1- Child 6 to < 12 years old | Number of application / day1 | 2 |
| Body weight1 | 23.9 kg |
| Amount of biocidal product/ application1 | 3.39 g |
| Tier 1- Child 2 to < 6 years old | Number of application / day1 | 2 |
| Body weight1 | 15.6 kg |
| Amount of biocidal product/ application1 | 2.51 g |
| Tier 1- Toddler | Number of application / day1 | 1 |
| Body weight1 | 10 kg |
| Amount of biocidal product/ application1 | 1.77 g |
| Tier 1- Infant | Number of application / day1 | 1 |
| Body weight1 | 8 kg |
| Amount of biocidal product/ application1 | 1.51 g |
| Tier 2- Adult | Number of application / day2 | 2 |
| Tier 2- Child 6 to < 12 years old | Number of application / day2 | 1 |
| Tier 2- Child 2 to < 6 years old | Number of application / day2 | 1 |
| Tier 3- Adult | Number of application / day2 | 1 |

1 General information, see justification above

2 Limitation of the exposure

Calculations for scenario 1

| **Summary table: estimated exposure for Dermal Primary exposure** | | |
| --- | --- | --- |
| **Exposure scenario** | **Tier/PPE** | **Estimated dermal uptake** |
| Scenario 1 – ADULT  3 applications/day | Tier 1 /  no PPE | 8.56 mg/kg bw/day |
| Scenario 1 – CHILD (6-12)  2 applications/day | Tier 1 /  no PPE | 7.94 mg/kg bw/day |
| Scenario 1 – CHILD (2-6)  2 applications/day | Tier 1 /  no PPE | 8.99 mg/kg bw/day |
| Scenario 1 – TODDLER  1 application/day | Tier 1 /  no PPE | 4.95 mg/kg bw/day |
| Scenario 1 – INFANT  1 application/day | Tier 1 /  no PPE | 5.29 mg/kg bw/day |
| Scenario 1 – ADULT  2 applications/day | Tier 2 /  no PPE | 5.71 mg/kg bw/day |
| Scenario 1 – CHILD (6-12)  1 application/day | Tier 2 /  no PPE | 3.97 mg/kg bw/day |
| Scenario 1 – CHILD (2-6)  1 application/day | Tier 2 /  no PPE | 4.50 mg/kg bw/day |
| Scenario 1 – ADULT  1 application/day | Tier 3 /  no PPE | 2.85 mg/kg bw/day |

###### Scenario 2: Primary exposure: Inhalation exposure assessment for adults, children, toddlers and infants.

| **Description of Scenario 2** | | |
| --- | --- | --- |
| This scenario is based on the one available in the CAR of IR3535®. It has been adapted with the documents : Biocide Human Health Exposure Methodology (Oct 2015) and Guidance on the biocidal products Regulation (volume III Human Health – Part B Risk Assessment, Oct 2015). | | |
| **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 application/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 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.  The applicant provided a study for the distribution of particles and their size. 11.21 %(V) of the released biocidal product has a diameter below 15.81 µm(V). The rest is regarded as non-respirable and is assumed to be taken in orally.  **Inhalation systemic exposure:**  11.21 % x inhaled a.s. x inhalation absorption / body weight  **Oral systemic exposure:**  88.79 % x inhaled a.s. x oral absorption / body weight | | |
|  | **Parameters** | **Value** |
| For All categories | Inhalation absorption1 | 100% |
| Oral absorption1 | 100% |
| % of active substance in biocidal product1 | 20% |
| Indicative value for inhalation2 | 10.5 mg/m3 |
| Spray duration3 | 4 minutes |
| Tier 1- Adult | Number of application / day1 | 3 |
| Body weight1 | 60 kg |
| Respiration rate [m3/air/hour] 1 | 1.25 m³/h |
| Tier 1- Child 6 to < 12 years old | Number of application / day1 | 2 |
| Body weight1 | 23.9 kg |
| Respiration rate [m3/air/hour] 1 | 1.32 m³/h |
| Tier 1- Child 2 to < 6 years old | Number of application / day1 | 2 |
| Body weight1 | 15.6 kg |
| Respiration rate [m3/air/hour] 1 | 1.26 m³/h |
| Tier 1- Toddler | Number of application / day1 | 1 |
| Body weight1 | 10 kg |
| Respiration rate [m3/air/hour] 1 | 1.26 m³/h |
| Tier 1- Infant | Number of application / day1 | 1 |
| Body weight1 | 8 kg |
| Respiration rate [m3/air/hour] 1 | 0.84 m³/h |
| Tier 2- Adult | Number of application / day4 | 2 |
| Tier 2- Child 6 to < 12 years old | Number of application / day4 | 1 |
| Tier 2- Child 2 to < 6 years old | Number of application / day4 | 1 |
| Tier 3- Adult | Number of application / day4 | 1 |

1 General information, see justification above

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

3 CAR of IR3535® (expert judgement)

4 Limitation of the exposure

Calculations for scenario 2

| **Summary table: estimated exposure for Inhalation Primary exposure** | | | |
| --- | --- | --- | --- |
| **Exposure scenario** | **Tier/PPE** | **Estimated inhalation uptake** | **Estimated oral uptake** |
| Scenario 2 – ADULT  3 applications/day | Tier 1 /  no PPE | 0.000981 mg/kg bw | 0.00777 mg/kg bw |
| Scenario 2 – CHILD (6-12)  2 applications/day | Tier 1 /  no PPE | 0.00173 mg/kg bw | 0.0137 mg/kg bw |
| Scenario 2 – CHILD (2-6)  2 applications/day | Tier 1 /  no PPE | 0.00253 mg/kg bw | 0.0201 mg/kg bw |
| Scenario 2 – TODDLER  1 application/day | Tier 1 /  no PPE | 0.00198 mg/kg bw | 0.0157 mg/kg bw |
| Scenario 2 – INFANT  1 application/day | Tier 1 /  no PPE | 0.00165 mg/kg bw | 0.0131 mg/kg bw |
| Scenario 2 – ADULT  2 applications/day | Tier 2 /  no PPE | 0.000654 mg/kg bw | 0.0052 mg/kg bw |
| Scenario 2 – CHILD (6-12)  1 application/day | Tier 2 /  no PPE | 0.000867 mg/kg bw | 0.0069 mg/kg bw |
| Scenario 2 – CHILD (2-6)  1 application/day | Tier 2 /  no PPE | 0.000127 mg/kg bw | 0.0100 mg/kg bw |
| Scenario 2 – ADULT  1 application/day | Tier 3 /  no PPE | 0.000327 mg/kg bw | 0.0026 mg/kg bw |

###### Scenario 3: Secondary exposure (indirect exposure as a result of use): Hand-mouth transfer reverse reference scenario (oral exposure)

| **Description of Scenario 3** | | |
| --- | --- | --- |
| This scenario is based on the one available in the CAR of IR3535®. It has been updated with the document : Biocide Human Health Exposure Methodology (Oct 2015). | | |
| Hand to mouth transfer might be possible for small children. However this scenario is not considered to be a significant route of exposure because of bad palatability (bitterness) preventing repeated mouthing by small children and you may not apply to children’s hand.  At TM IV 2010, it was agreed to develop the scenario “hand-mouth transfer” consistently with the DEET dossier evaluated by SE and to be discussed with HEEG and TM agreed not to sum up the two routes (oral and dermal) in small children.  Reverse reference scenario is included to show how much IR3535® anyone can be exposed to, after oral exposure without exceeding reference dose (AEL for IR3535® is 5 mg/kg bw/d).  **External dermal amount of a.s. per application**:  Amount of b.p./application x percent of a.s. in b.p. / body weight  **Oral systemic exposure via hand-mouth transfer is:**  External dermal amount of a.s. per application x Factor for oral intake by hand-mouth transfer x oral absorption  **Number of time of application b.p. before exceeding the AEL via hand-mouth transfer :**  AEL / Oral systemic exposure via hand-mouth transfer | | |
|  | **Parameters** | **Value** |
| For All categories | Oral absorption1 | 100 % |
| % of active substance in biocidal product1 | 20 % |
| Tier 1- Adult | Factor for oral intake by hand-mouth transfer2 | 4 % |
| Body weight1 | 60 kg |
| Amount of biocidal product/ application1 | 6.12 g |
| Tier 1- Child 6 to < 12 years old | Factor for oral intake by hand-mouth transfer2 | 8 % |
| Body weight1 | 23.9 kg |
| Amount of biocidal product/ application1 | 3.39 g |
| Tier 1- Child 2 to < 6 years old | Factor for oral intake by hand-mouth transfer2 | 8 % |
| Body weight1 | 15.6 kg |
| Amount of biocidal product/ application1 | 2.51 g |
| Tier 1- Toddler | Factor for oral intake by hand-mouth transfer2 | 8 % |
| Body weight1 | 10 kg |
| Amount of biocidal product/ application1 | 1.77 g |
| Tier 1- Infant | Factor for oral intake by hand-mouth transfer2 | 8 % |
| Body weight1 | 8 kg |
| Amount of biocidal product/ application1 | 1.51 g |

1 General information, see justification above

2 4% is the factor of the total treated body surface (Head, hands, arms, legs and feet) reported to the surface area of the fingers. 8% is the factor of the total treated body surface (Head, hands, arms, legs and feet) reported to the surface area of the hands. They are default values currently discuss for a harmonisation of human exposure scenarios for PT19.

Calculations for scenario 3

| **Summary table: estimated exposure for Hand-mouth transfer reverse reference scenario (oral exposure)** | | |
| --- | --- | --- |
| **Exposure scenario** | **Tier/PPE** | **Calculated exposure to IR3535®** |
| Scenario 3 – ADULT | Tier 1 /  no PPE | Adult up to 6.13 applications |
| Scenario 3 – CHILD (6-12) | Tier 1 /  no PPE | Child (6-12) up to 2.20 applications |
| Scenario 3 – CHILD (2-6) | Tier 1 /  no PPE | Child (2-6) up to 1.94 applications |
| Scenario 3 – TODDLER | Tier 1 /  no PPE | Toddler up to 1.77 applications |
| Scenario 3 – INFANT | Tier 1 /  no PPE | Infant up to 1.65 applications |

###### Scenario 4: Parent treating two children and himself/herself (spraying) (combined inhalative and oral exposure)

| **Description of Scenario 4** | | |
| --- | --- | --- |
| Worst case: a parent applying (spraying) the product on two children and herself/himself  **Model used:** it’s the same model than the one used to do the scenario 2.  Remark: the secondary dermal exposure were not assessed. It is covered by the primary dermal use exposure of the adult. The product would probably be rubbing on the child skin and the layer will not exceed the amount the adult will put on himself. So, BE has decided to follow the CAR which supposes that the dermal secondary exposure will be covered by the primary dermal exposure. Only inhalation exposure is relevant in this case. | | |
|  | **Parameters** | **Value** |
| For All categories | Inhalation absorption1 | 100 % |
| Oral absorption1 | 100 % |
| % of active substance in biocidal product1 | 20 % |
| Indicative value for inhalation2 | 10.5 mg/m³ |
| Body weight1 | 60 kg |
| Respiration rate [m3/air/hour]1 | 1.25 m³/h |
| Spray duration3 | 4 minutes |
| Tier 1- Adult | Number of application / day1 | 7 (3 appl/d for adult and  2 appl/d for each of the 2 children) |

1 General information, see justification above

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

3 CAR of IR3535® (expert judgement)

Calculations for scenario 4

| **Summary table: estimated exposure for treating two children and himself/herself** | | | | |
| --- | --- | --- | --- | --- |
| **Exposure scenario** | **Tier/PPE** | **Estimated inhalation uptake** | **Estimated oral uptake** | **Estimated total uptake** |
| Scenario 4 – ADULT  (2 appl/child and 3 appl/himself) | Tier 1 / no PPE | 0.00229 mg/kg bw | 0.0181 mg/kg bw | 0.0204 mg/kg bw |

###### Scenario 5: Inhalation of volatilised residues after application (inhalative exposure)

| **Description of Scenario 5** | | |
| --- | --- | --- |
| This scenario is not based on the one available in the CAR of IR3535® because it’s has been demonstrated that the SVC could exceed 1% in a number of cases. Considering HEEG opinion 13 (Assessment of Inhalation Exposure of Volatilized Biocide Active Substance), the inhalation of volatilised residues after application has to be taken into account for this product.  The scenario is based on ConsExpo : inhalation of vapour, instantaneous release as a worst case and based on the document: Biocide Human Health Exposure Methodology (Oct 2015). | | |
| Inhalation of volatilized residues after application is relevant considering the HEEG opinion on Assessment of Inhalation Exposure of Volatilized Biocide Active Substance:  The result of this equation is superior to 1 which means that the inhalation exposure couldn’t be considered as negligible.  So this exposure was assessed using ConsExpo – exposure to vapour – instantaneous release.  **General inputs to the model :**  Exposure duration: 24 hours (all day)  Product amount: calculated dependant of the amount applied per day and per age categories  Weight fraction compound: 20% (biocidal product information)  Room volume: 20m3 (default value of ConsExpo)  Ventilation rate: 0.6 /h (default value of ConsExpo)  Vapour pressure: 0.15 Pa (at 20 °C) (active substance information)  Molecular weight: 215.29 g/mol (active substance information)  Temperature : 25°c (ambient temperature) | | |
|  | **Parameters** | **Value** |
| Tier 1- Adult | Product amount1 | 6.12 g |
| Body weight2 | 60 kg |
| Respiration rate [m3/air/hour]2 | 1.25 m³/h |
| Tier 1- Child 6 to < 12 years old | Product amount1 | 3.39 g |
| Body weight2 | 23.9 kg |
| Respiration rate [m3/air/hour]2 | 1.32 m³/h |
| Tier 1- Child 2 to < 6 years old | Product amount1 | 2.51 g |
| Body weight2 | 15.6 kg |
| Respiration rate [m3/air/hour]2 | 1.26 m³/h |
| Tier 1- Toddler | Product amount1 | 1.77 g |
| Body weight2 | 10 kg |
| Respiration rate [m3/air/hour]2 | 1.26 m³/h |
| Tier 1- Infant | Product amount1 | 1.51 g |
| Body weight2 | 8 kg |
| Respiration rate [m3/air/hour]2 | 0.84 m³/h |

1 According the primary exposure, only one application per day can be authorized. Therefore, the product amount corresponds to 1 application/day.

2 General information, see justification above

Calculations for scenario 5

| **Summary table: estimated exposure for inhalation of volatilised residues after application (inhalative exposure)** | | |
| --- | --- | --- |
| **Exposure scenario** | **Tier/PPE** | **Estimated inhalation uptake of volatilised residues after application** |
| Scenario 5 – ADULT | Tier 1 /  no PPE | 2.12 mg/kg bw/day |
| Scenario 5 – CHILD (6-12) | Tier 1 /  no PPE | 3.12 mg/kg bw/day |
| Scenario 5 – CHILD (2-6) | Tier 1 /  no PPE | 3.37 mg/kg bw/day |
| Scenario 5 – TODDLER | Tier 1 /  no PPE | 3.71 mg/kg bw/day |
| Scenario 5 – INFANT | Tier 1 /  no PPE | 2.64 mg/kg bw/day |

###### Combined scenarios : Total primary exposure, combination of scenario 1 and 2

| **Summary table: estimated exposure for combined scenarios 1+2** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **Exposure scenario** | **Tier /**  **PPE** | **Estimated dermal**  **uptake**  **[mg/kg bw/day]** | **Estimated**  **inhalation**  **uptake**  **[mg/kg bw]** | **Estimated**  **oral**  **uptake**  **[mg/kg bw]** | **Estimated**  **total acute**  **uptake for**  **primary use**  **[mg/kg bw]** |
| Scenario 1+2 – ADULT  3 applications/day | Tier 1 /  no PPE | 8.56 | 0.000981 | 0.00777 | 8.57 |
| Scenario 1+2 – CHILD (6-12)  2 applications/day | Tier 1 /  no PPE | 7.94 | 0.00173 | 0.0137 | 7.96 |
| Scenario 1+2 – CHILD (2-6)  2 applications/day | Tier 1 /  no PPE | 8.99 | 0.00253 | 0.0201 | 9.02 |
| Scenario 1+2 – TODDLER  1 application/day | Tier 1 /  no PPE | 4.95 | 0.00198 | 0.0157 | 4.97 |
| Scenario 1+2 – INFANT  1 application/day | Tier 1 /  no PPE | 5.29 | 0.00165 | 0.0131 | 5.30 |
| Scenario 1+2 – ADULT  2 applications/day | Tier 2 /  no PPE | 5.71 | 0.000654 | 0.0052 | 5.71 |
| Scenario 1+2 – CHILD (6-12)  1 application/day | Tier 2 /  no PPE | 3.97 | 0.000867 | 0.0069 | 3.98 |
| Scenario 1+2 – CHILD (2-6)  1 application/day | Tier 2 /  no PPE | 4.50 | 0.000127 | 0.0100 | 4.51 |
| Scenario 1+2 – ADULT  1 application/day | Tier 3 /  no PPE | 2.85 | 0.000327 | 0.0026 | 2.86 |

The exposure of inhalation of volatilized residues after application and the combined inhalative and oral exposure of a parent treating two children are negligible compared to primary (dermal) exposure.

##### Exposure of the general public

Exposure of the general public is covered by the secondary exposure of non-professional.

##### Monitoring data

Not applicable.

##### Dietary exposure

Considering the scenario 3 (hand to mouth transfer), considering that the amount in scenario 3 will be superior to the amount on the fingers of the hands (possible contact surface for transfer of residue to food) and finally considering that the biocidal product is not used for and/or during food production, or in rooms where food is produced processed or stored, the dietary risk would be covered by the scenario 3.

However, Belgium is of advice that the restriction measures (Wash hands thoroughly after handling., do not use on children’s hands) must stay to avoid any misuse of the product.

##### Exposure associated with production, formulation and disposal of the biocidal product

In modern formulation plants typically automated equipment is used to add the formulation ingredients and to fill the formulated product into the respective vessels (closed systems). The workers (trained professionals) usually wear personal protective equipment (e.g. gloves). Thus the exposure can occur during the mixing and loading and have been calculated as a worst case.

###### Scenario 6 : Mixing and Loading model – worst case for the production, formulation and disposal of the biocidal product

| **Description of Scenario 6** | | |
| --- | --- | --- |
| For a worst case situation, it was estimated that the more sustainable model for industrial exposure production, formulation and disposal is : RISKOFDERM Dermal model (loading liquid, automated or semi-automated) from HEEG opinion 1 (2008).  **Dermal exposure via clothing:**  default potential exposure rates on clothing x Purity of the active substance x Duration of task x Number of events per day (x (1-Factor of protection for clothing))  **Dermal exposure via hands:**  default potential exposure rates on hands x Purity of the active substance x Duration of task x Number of events per day (x (1-Factor of protection for gloves))  **Dermal systemic exposure:**  (Dermal exposure via clothing + Dermal exposure via hands) x percent of dermal absorption / body weight  **Inhalation exposure:**  Inhalation is no relevant for this model and is not taken into account  **Systemic exposure:**  Dermal systemic exposure + 0 (inhalation exposure n.r.) | | |
|  | **Parameters1** | **Value** |
| Tier 1 | Purity of the active substance1 | 99 % |
| Dermal absorption1 | 50 % |
| default potential exposure rates on clothing2 | 101 mg/min |
| default potential exposure rates on hand2 | 2.02 mg/min |
| default potential exposure rates for inhalation2 | n.r. mg/m³ (and the substance has a low vapour pressure) |
| Bodyweight3 | 60 kg |
| Number of events per day | 1/day |
| Duration of task | 10 min |
| Tier 2 | Factor of protection for Uncoated cotton coverall3 | 75 % |
| Tier 3 | Factor of protection for gloves3 | 90 % |

1 CAR (doc IIA)

General information, see justification above

2 RISKOFDERM Dermal model: loading liquid, automated or semi-automated (HEEG opinion 1, 2008)

3 Biocide Human Health Exposure Methodology (Oct 2015)

Calculations for Scenario 6

| **Summary table: systemic exposure associated with production, formulation, and disposal** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **Exposure scenario** | **Tier/PPE** | **Estimated inhalation uptake** | **Estimated dermal uptake**  **[mg/kg bw/d]** | **Estimated oral uptake** | **Estimated total uptake**  **[mg/kg bw/d]** |
| Scenario 6 | Tier 1/ no PPE | n.r. | 8.5 | n.r. | 8.5 |
| Scenario 6 | Tier 2/ Uncoated cotton coverall | n.r. | 2.25 | n.r. | 2.25 |
| Scenario 6 | Tier 3/ Uncoated cotton coverall and gloves | n.r. | 2.1 | n.r. | 2.1 |

##### Aggregated exposure

Not applicable.

##### Summary of exposure assessment

| **Scenarios and values to be used in risk assessment** | | | |
| --- | --- | --- | --- |
| **Scenario number** | **Exposed group**  **(e.g. professionals, non-professionals, bystanders)** | **Tier/PPE** | **Estimated total uptake** |
| 1. | Non-professionals, adult | Tier 1, no PPE, dermal, 3 applications/day | 8.56 mg/kg bw/day |
| Non-professionals, child (6-12) | Tier 1, no PPE, dermal, 2 applications/day | 7.94 mg/kg bw/day |
| Non-professionals, child (2-6) | Tier 1, no PPE, dermal, 2 applications/day | 8.99 mg/kg bw/day |
| Non-professionals, toddler | Tier 1, no PPE, dermal, 1 application/day | 4.95 mg/kg bw/day |
| Non-professionals, infant | Tier 1, no PPE, dermal, 1 application/day | 5.29 mg/kg bw/day |
| Non-professionals, adult | Tier 2, no PPE, dermal, 2 applications/day | 5.71 mg/kg bw/day |
| Non-professionals, child (6-12) | Tier 2, no PPE, dermal, 1 application/day | 3.97 mg/kg bw/day |
| Non-professionals, child (2-6) | Tier 2, no PPE, dermal, 1 application/day | 4.50 mg/kg bw/day |
| Non-professionals, adult | Tier 3, no PPE, dermal, 1 application/day | 2.85 mg/kg bw/day |
| 2. | Non-professionals, adult | Tier 1, no PPE, inhalation, 3 applications/day | 0.00875 mg/kg bw |
| Non-professionals, child (6-12) | Tier 1, no PPE, inhalation, 2 applications/day | 0.015646 mg/kg bw |
| Non-professionals, child (2-6) | Tier 1, no PPE, inhalation, 2 applications/day | 0.022615 mg/kg bw |
| Non-professionals, toddler | Tier 1, no PPE, inhalation, 1 application/day | 0.01764 mg/kg bw |
| Non-professionals, infant | Tier 1, no PPE, inhalation, 1 application/day | 0.0147 mg/kg bw |
| Non-professionals, adult | Tier 2, no PPE, inhalation, 2 applications/day | 0.005833 mg/kg bw |
| Non-professionals, child (6-12) | Tier 2, no PPE, inhalation, 1 application/day | 0.007732 mg/kg bw |
| Non-professionals, child (2-6) | Tier 2, no PPE, inhalation, 1 application/day | 0.011308 mg/kg bw |
| Non-professionals, adult | Tier 3, no PPE, inhalation, 1 application/day | 0.002917 mg/kg bw |
| 3. | Non-professionals, adult | Tier 1, no PPE, Hand-mouth transfer reverse reference scenario, oral | Up to 6.13 applications |
| Non-professionals, child (6-12) | Tier 1, no PPE, Hand-mouth transfer reverse reference scenario, oral | Up to 2.20 applications |
| Non-professionals, child (2-6) | Tier 1, no PPE, Hand-mouth transfer reverse reference scenario, oral | Up to 1.94 applications |
| Non-professionals, toddler | Tier 1, no PPE, Hand-mouth transfer reverse reference scenario, oral | Up to 1.77 applications |
| Non-professionals, infant | Tier 1, no PPE, Hand-mouth transfer reverse reference scenario, oral | Up to 1.65 applications |
| 4. | Non-professionals, adult | Tier 1, no PPE, inhal+oral, 7 appl/d | 0.0204 mg/kg bw |
| 5. | Non-professionals, adult | Tier 1 / no PPE | 2.12 mg/kg bw/day |
| Non-professionals, child (6-12) | Tier 1 / no PPE | 3.12 mg/kg bw/day |
| Non-professionals, child (2-6) | Tier 1 / no PPE | 3.37 mg/kg bw/day |
| Non-professionals, toddler | Tier 1 / no PPE | 3.71 mg/kg bw/day |
| Non-professionals, infant | Tier 1 / no PPE | 2.64 mg/kg bw/day |
| 6. | Professionals | Tier 1 / no PPE | 8.5 mg/kg bw/d |
| Professionals | Tier 2/ Uncoated cotton coverall | 2.25 mg/kg bw/d |
| Professionals | Tier 3/ Uncoated cotton coverall and gloves | 2.1 mg/kg bw/d |

#### Risk characterisation for human health

##### Reference values to be used in Risk Characterisation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Reference** | **Study** | **NOAEL (LOAEL)** | **AF1** | **Correction for oral absorption** | **Value** |
| AELshort-term | Rabbit, oral, 28-days toxicity study  Rabbit, oral, developmental study | 500 (1500) mg/kg bw/d  300 (600) mg/kg bw/d | 100 | 100% | 5 mg/kg bw/d |
| AELmedium-term | Rabbit, oral, 28-days toxicity study  Rabbit, oral, developmental study | 500 (1500) mg/kg bw/d  300 (600) mg/kg bw/d | 100 | 100% | 5 mg/kg bw/d |
| AELlong-term | Rabbit, oral, 28-days toxicity study  Rabbit, oral, developmental study | 500 (1500) mg/kg bw/d  300 (600) mg/kg bw/d | 100 | 100% | 5 mg/kg bw/d  (not applicable here, maximum number of applications is 28 days per year) |
| ARfD | n.a. | n.a. |  |  | not applicable, no residues in food or feed occur |
| ADI | n.a. | n.a. |  |  | not applicable, no residues in food or feed occur |

1 reason for assessment factor: factor 10 for both intra-species and interspecies differences. No extrapolation factor for duration is needed, as the overall NOAEL is derived from a repeated 28d-oral toxicity study and a teratogenicity study.

##### Risk for industrial 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 6, mixing & loading, professional | 1 | 500 mg/kg bw/d | 5 mg/kg bw/d | 8.5 mg/kg bw/d | 170% | no |
| Scenario 6, mixing & loading, professional | 2 | 500 mg/kg bw/d | 5 mg/kg bw/d | 2.25 mg/kg bw/d | 45% | yes |
| Scenario 6, mixing & loading, professional | 3 | 500 mg/kg bw/d | 5 mg/kg bw/d | 2.1 mg/kg bw/d | 42% | yes |

###### Combined scenarios

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Scenarios combined** | **Tier** | **Systemic NOAEL**  **mg/kg bw/d** | **AEL**  **mg/kg bw/d** | **Estimated uptake**  **mg/kg bw/d** | **Estimated uptake/ AEL**  **(%)** | **Acceptable**  **(yes/no)** |
| n.a. |  |  |  |  |  |  |

###### Local effects

The biocidal product is classified as eye damage/irritation cat 2, H319. However, appropriate risk mitigation measures are assumed to be taken by professionals during production, formulation and disposal. Consequently, there is no need to consider local effects separately.

###### Conclusion

There is no concern for professionals working with Insect Repellent Pump Spray IR3535® 20% during production, formulation and disposal when using appropriate PPE (minimum PPE required: uncoated cotton coverall).

##### Risk for 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)** |
| n.a. |  |  |  |  |  |  |

###### Combined scenarios

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Scenarios combined** | **Tier** | **Systemic NOAEL**  **mg/kg bw/d** | **AEL**  **mg/kg bw/d** | **Estimated uptake**  **mg/kg bw/d** | **Estimated uptake/ AEL**  **(%)** | **Acceptable**  **(yes/no)** |
| n.a. |  |  |  |  |  |  |

###### Local effects

n.a.

###### Conclusion

n.a.

##### 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 | 500 | 5 | 8.56 | 171.28 | No |
| Scenario 1, dermal, child (6-12) | 1 | 500 | 5 | 7.94 | 158.87 | No |
| Scenario 1, dermal, child (2-6) | 1 | 500 | 5 | 8.99 | 179.90 | No |
| Scenario 1, dermal, toddler | 1 | 500 | 5 | 4.95 | 99.05 | Yes |
| Scenario 1, dermal, infant | 1 | 500 | 5 | 5.29 | 105.76 | No |
| Scenario 1, dermal, adult | 2 | 500 | 5 | 5.71 | 114.19 | No |
| Scenario 1, dermal, child (6-12) | 2 | 500 | 5 | 3.97 | 79.43 | Yes |
| Scenario 1, dermal, child (2-6) | 2 | 500 | 5 | 4.50 | 89.95 | Yes |
| Scenario 1, dermal, adult | 3 | 500 | 5 | 2.85 | 57.09 | Yes |
| Scenario 2, inhal +oral, adult | 1 | 500 | 5 | 0.00875 | 0.175 | Yes |
| Scenario 2, inhal +oral, child (6-12) | 1 | 500 | 5 | 0.015646 | 0.31 | Yes |
| Scenario 2, inhal +oral, child (2-6) | 1 | 500 | 5 | 0.022615 | 0.45 | Yes |
| Scenario 2, inhal +oral, toddler | 1 | 500 | 5 | 0.01764 | 0.35 | Yes |
| Scenario 2, inhal +oral, infant | 1 | 500 | 5 | 0.0147 | 0.29 | Yes |
| Scenario 2, inhal +oral, adult | 2 | 500 | 5 | 0.005833 | 0.12 | Yes |
| Scenario 2, inhal +oral, child (6-12) | 2 | 500 | 5 | 0.007732 | 0.15 | Yes |
| Scenario 2, inhal +oral, child (2-6) | 2 | 500 | 5 | 0.011308 | 0.22 | Yes |
| Scenario 2, inhal +oral, adult | 3 | 500 | 5 | 0.002917 | 0.06 | Yes |
| Scenario 3, hand-mouth transfer, adult | 1 | 500 | 5 | Up to 6.13 applications | n.a. | Reverse  reference  scenario |
| Scenario 3, hand-mouth transfer, child (6-12) | 1 | 500 | 5 | Up to 2.20 applications | n.a. | Reverse  reference  scenario |
| Scenario 3, hand-mouth transfer, child (2-6) | 1 | 500 | 5 | Up to 1.94 applications | n.a. | Reverse  reference  scenario |
| Scenario 3, hand-mouth transfer, toddler | 1 | 500 | 5 | Up to 1.77 applications | n.a. | Reverse  reference  scenario |
| Scenario 3, hand-mouth transfer, infant | 1 | 500 | 5 | Up to 1.65 applications | n.a. | Reverse  reference  scenario |
| Scenario 4, inhal+oral, adult | 1 | 500 | 5 | 0.0204 | 0.4 | Yes |
| Scenario 5, inhal, adult | 1 | 500 | 5 | 2.12 | 42.4 | Yes |
| Scenario 5, inhal, child | 1 | 500 | 5 | 3.12 | 62.4 | Yes |
| Scenario 5, inhal, child | 1 | 500 | 5 | 3.37 | 67.4 | Yes |
| Scenario 5, inhal, toddler | 1 | 500 | 5 | 3.71 | 74.2 | Yes |
| Scenario 5, inhal, infant | 1 | 500 | 5 | 2.64 | 52.8 | Yes |

###### Combined scenarios

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Scenarios combined** | **Tier** | **Systemic**  **NOAEL**  **[mg/kg bw/d]** | **AEL**  **[mg/kg bw/d]** | **Estimated**  **uptake**  **[mg/kg bw]** | **Estimated**  **uptake/ AEL**  **(%)** | **Acceptable**  **(yes/no)** |
| Scenario 1+2, adult,  3 appl/d | 1 | 500 | 5 | 8.57 | 171.45 | No |
| Scenario 1+2, child (6-12),  2 appl/d | 1 | 500 | 5 | 7.96 | 159.18 | No |
| Scenario 1+2, child (2-6),  2 appl/d | 1 | 500 | 5 | 9.02 | 180.36 | No |
| Scenario 1+2, toddler,  1 appl/d | 1 | 500 | 5 | 4.97 | 99.40 | Yes |
| Scenario 1+2, infant,  1 appl/d | 1 | 500 | 5 | 5.30 | 106.05 | No |
| Scenario 1+2, adult,  2 appl/d | 2 | 500 | 5 | 5.71 | 114.30 | No |
| Scenario 1+2, child (6-12),  1 appl/d | 2 | 500 | 5 | 3.98 | 79.59 | Yes |
| Scenario 1+2, child (2-6),  1 appl/d | 2 | 500 | 5 | 4.51 | 90.18 | Yes |
| Scenario 1+2, adult,  1 appl/d | 3 | 500 | 5 | 2.86 | 57.15 | 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, Insect Repellent Pump Spray IR3535® 20% :

* for adult, children and toddler when the product is applied **once per day**.
* There is **no safe use for infants.** The product should not be applied on child below 1 year old.

There is no concern for indirect secondary exposure for adults, children and infants from the use of the biocidal product as a Repellent Subtype PT19.01. Exposure via hand-to-mouth transfer is of minor concern when the product is used as intended (not to be applied to children’s hands), and inhalation of volatilized residues after application is limited. Secondary exposure for a parent applying (spraying) the product on children and herself/himself is minor compared to primary dermal exposure.

Proper use, i.e. use in compliance with correct and complete conditions on the label, of Insect Repellent Pump Spray IR3535® 20% is considered safe for adults and children.

The following RMM are required:

* Use repellent safely. Always read the label and product information before use.
* Suitable for children older than 1 year. 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. An adult should apply the product to children below 12 years of age. Do not use on children’s hands. Do not apply over cuts, wounds, freshly shaven or irritated skin. Do not use under clothing.
* Maximum number of applications per day: once for adults and children above 1 year old. Product can be used only for children older than 1 year.
* Avoid contact with synthetic materials. Synthetic materials should be protected during spraying and the compatibility with textiles should be tested on a non-visible part of clothes before use.
* Applying sun care products or cosmetic formulations after repellent use will decrease the efficacy of the repellent considerably.

##### Risk for the general public

###### 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)** |
| n.a. |  |  |  |  |  |  |

###### Combined scenarios

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Scenarios combined** | **Tier** | **Systemic NOAEL**  **mg/kg bw/d** | **AEL**  **mg/kg bw/d** | **Estimated uptake**  **mg/kg bw/d** | **Estimated uptake/ AEL**  **(%)** | **Acceptable**  **(yes/no)** |
| n.a. |  |  |  |  |  |  |

###### Local effects

n.a.

###### Conclusion

n.a.

##### Risk for consumers via residues in food

Not applicable.

##### Risk characterisation from combined exposure to several active substances or substances of concern within a biocidal product

Not applicable.

### Risk assessment for animal health

Not applicable.

### Risk assessment for the environment

For the product Insect Repellent Pump Spray IR3535® 20 % no new studies or additional information for the environment have been provided. The active substance contained in this product is the same as evaluated in the CAR for IR3535® and therefore no new data/information on the active substance is required.

The composition of the representative product from the CAR is not identical to that of Insect Repellent Pump Spray IR3535® 20 %. However, the intended use is identical as well as the amount of active substance in both products. Only the active substance is of relevance for the environmental exposure assessment of this product.

#### Effects assessment on the environment

All data used for the effect assessment of Insect Repellent Pump Spray IR3535® 20% is based on the available information on the active substance IR3535®, such as it is presented in its respective CAR.

No new data relevant for the environmental evaluation, nor on the product, nor on the active substance, have been submitted. Apart from the active substance, the product does not contain any formulants that are of ecotoxicological concern.

Following the referral conclusions for this product, it has been decided that Ethanol should be considered as a substance of concern, since it is responsible for the classification of the biocidal product as a flammable liquid.

However, from an ecotoxicological point of view, ethanol is not considered relevant. Based on its harmonized classification, ethanol is not classified for any environmental hazards. Therefore, ethanol was not considered during the environmental risk assessment.

An overview of the environmental fate and behaviour for the active substance, taken from the EU CAR, is presented in the first two titles below.

##### Environmental fate and behavior of the active substance

IR3535® is used in insect repellents (PT19) that are applied on uncovered human skin. Products containing IR3535® will be used indoors and outdoors. However the main emission pathway to the environment is assumed to be indirect due to bathing and showering of treated people. Based on the physico-chemical properties it is expected that the emissions primarily will affect the aquatic compartment.

IR3535® is not ready biodegradable according to two screening tests, but in a Sewage Treatment Plant (STP) simulation test 99 % elimination was measured. In an aerobic water/sediment degradation study, IR3535® was shown to remain mainly in the water phase. There it was first rapidly degraded to its free acid, after which this metabolite ultimately degraded after a lag phase.

No photolysis was observed in water and hydrolysis only occurred slowly under alkaline conditions (DT50 = 176.5 h at 25 °C and pH 9 or 866.13 h at 12 °C). Under acidic and neutral conditions IR3535® is hydrolytically stable.

The vapour pressure of IR3535® is low (0.15 Pa at 20 °C) which results in low exposure to the atmosphere. The half-life of IR3535® in air was calculated to be about 0.5482 days or 13.16 hours due to reaction with OH-radicals (24-hr day). Thus, accumulation of IR3535® in air and long range transport is unlikely.

IR3535® is a liquid at room temperature and the solubility in water is 70 g/L (at 20 °C). The log Pow is 1.7 (at 23-24 °C) indicating that IR3535® has a low potential for bioaccumulation.

Based on the adsorption/desorption test a mean (arithmetic) Koc form 475.25 L/kg was registered.

##### Effect assessment of the active substance

No toxic effects where observed during the acute toxicity studies on fish (*Brachydanio rerio*), *Daphnia magna* and algae (*Desmodesmus subspicatus*) (LC50 >100 mg/L). Therefore IR3535® is considered as not toxic for the aquatic environment.

The effect on aerobic biological sewage treatment processes was assessed by determining inhibition of respiration of the micro-organisms present in activated sludge following 3 hours contact. No inhibitory effect on aquatic microbial activity was registered for IR3535® (EC50 > 1000 mg/L).

Long term aquatic tests were not required because no acute toxicity was observed for the aquatic environment and the substance is primarily emitted to the STP before reaching the aquatic environment. Besides the Sewage Treatment Plant (STP) simulation test showed an elimination of 99 % in the STP.

No marine species were tested based on the presence of studies performed on freshwater species, all suggesting low toxicity and because no major emissions to the marine environment are expected.

In the absence of any long-term toxicity endpoints and marine data, the TGD on Risk Assessment prescribes an assessment factor of 1000 for the freshwater environment and 10000 for the marine environment.

For the sediment compartment, there are also no toxicity data available. The PNECsediment was calculated based on equilibrium partitioning method and PNECwater.

No terrestrial toxicity tests were performed for IR3535®. Due to the method of application directly on the skin only limited and very local emissions to the soil are expected. IR3535® is not likely to become accumulated in the soil in large amounts. PNECsoil has been calculated based on the equilibrium partitioning method.

The physicochemical properties of IR3535® do not suggest that this substance will pose a risk to the atmospheric environment. Therefore no PNECs where calculated for this compartment.

The low BCF values suggest that IR3535® has a low bioaccumulation potential. Therefore the risk of secondary poisoning via ingestion of contaminated food (eg. earthworms or fish) by birds or mammals is also low and no avian dietary tests were required.

|  |  |
| --- | --- |
| **Summary of PNEC values for the active substance** | |
| **Compartment** | **PNEC value** |
| PNECaquatic | > 0.1 mg/l |
| PNECsediment | > 1.11 mg/kg wwt |
| PNECmicro-organisms (STP) | 100 mg/l |
| PNECsoil | > 0.85 mg/kg wwt |
| PNECsaltwater | > 0.01 mg/l |
| PNECmarine-sediment | > 0.111 mg/kg wwt |

##### Information relating to the ecotoxicity of the biocidal product which is sufficient to enable a decision to be made concerning the classification of the product is required

The product does not contain any substance at such a concentration that it has an effect on the environmental classification of the product. No additional information on the biocidal product is required.

|  |
| --- |
| **Conclusion on the environmental classification and labelling of the product** |
| Insect Repellent Pump Spray IR3535® 20% does not require any environmental classification or labelling. |

##### Further Ecotoxicological studies

The assessment of the active substance in the CAR showed that there is no concern for the aquatic and terrestrial environment and thus no further ecotoxicological studies are required according to the CAR.

For this particular product, there is no direct exposure to the environment and the product does not contain formulants other than the active substance that could be of ecotoxicological concern, thus the data on the active substance are sufficient for the evaluation of the ecotoxicological effects of the biocidal product.

##### Effects on any other specific, non-target organisms (flora and fauna) believed to be at risk (ADS)

No further data is available.

##### Supervised trials to assess risks to non-target organisms under field conditions

The product is not in the form of bait or granules, so nonesuch data is required.

##### Studies on acceptance by ingestion of the biocidal product by any non-target organisms thought to be at risk

The product is not in the form of bait or granules, so nonesuch data is required.

##### Secondary ecological effect e.g. when a large proportion of a specific habitat type is treated (ADS)

Not relevant.

##### Foreseeable routes of entry into the environment on the basis of the use envisaged

The foreseeable routes of entry into the environment have been described in the CAR for the active substance and are also valid for this product.

Direct release to soil is not considered relevant, whereas direct release to surface water (swimming lake scenario) is considered relevant, but was not yet assessed in the CAR due to the lack of an endorsed scenario.

Secondary release via wastewater and STP through showering and bathing is also a relevant route of emission.

##### Further studies on fate and behaviour in the environment (ADS)

No new data was submitted or is required. Information on the active substance suffices for the environmental risk assessment of the product. Moreover, the product does not contain any other substances relevant for the environment apart from the active substance.

##### Leaching behaviour (ADS)

Not relevant.

##### Testing for distribution and dissipation in soil (ADS)

Since there is no direct release to soil and the soil compartment is not envisioned as a compartment of interest in the evaluation of this product, none such additional data is submitted or required.

##### Testing for distribution and dissipation in water and sediment (ADS)

No new data was submitted or is required.

##### Testing for distribution and dissipation in air (ADS)

No new data was submitted or is required.

##### If the biocidal product is to be sprayed near to surface waters then an overspray study may be required to assess risks to aquatic organisms or plants under field conditions (ADS)

No new data was submitted or is required.

##### If the biocidal product is to be sprayed outside or if potential for large scale formation of dust is given then data on overspray behaviour may be required to assess risks to bees and non-target arthropods under field conditions (ADS)

No new data was submitted or is required.

#### Exposure assessment

Insect Repellent Pump Spray IR3535® 20% is not exactly the same product as the representative product in the CAR, however for all intends and purposes of an environmental exposure assessment it can be seen as the same. This is because the proposed use of the product and the amount of active substance in the product is identical to that presented the environmental exposure assessment of the CAR and the only component of the product possibly affecting the risk to the environment is the active substance itself.

However, since the finalisation of the CAR for IR3535® a new ESD for PT19 biocides has been endorsed and published, which contains scenarios which were not yet assessed during the evaluation of the active substance, such as direct emissions to surface water by swimmers, which is named as an element to be taken into account at product authorisation stage in the assessment report of the active substance.

Therefore the evaluation presented below will be based on this new ESD.

##### General information

|  |  |
| --- | --- |
| Assessed PT | PT 19 |
| Assessed scenarios | Scenario 1: Removal via showering and bathing of humans (ESD PT19, May 2015, §3.1.4.1)  Scenario 2: Release to surface water bodies via swimming (ESD PT19, May 2015, §3.1.4.2) |
| ESD(s) used | Emission Scenario Document for Product Type 19: Repellents and attractants, May 2015 (ECHA-15-B-10-EN) |
| Approach | Scenario 1: Average consumption Scenario 2: Average consumption |
| Distribution in the environment | Calculated based on TGD 2003 |
| Groundwater simulation | Not applicable |
| Confidential Annexes | None |
| Life cycle steps assessed | Scenario 1: Showering & bathing   * Production: No * Formulation: No * Use: Yes * Service life: No   Scenario 2: Swimming   * Production: No * Formulation: No * Use: Yes * Service life: No |
| Remarks | / |

##### Emission estimation

###### Scenario 1: Removal via showering and bathing

Consumption based scenario

For estimating the emission for products applied on human skin following showering or bathing one could either use a tonnage based scenario or a consumption based scenario.

Tonnage based approaches are mostly only appropriate for assessing an active substance for approval and not so much for the authorisation of biocidal products. Therefore only the consumption based approach is assessed here.

However, the tonnage based approach was calculated in the IR3535® CAR and can be consulted in the confidential annex of said CAR. Anyway when considering the break-even tonnage, the consumption based scenario is deemed to be the most appropriate scenario.

Amount of product per application (Qformappl)

The most important input parameter for the consumption based scenario is the amount of product that will be used per application (Qformappl). As a default value in the ESD 0.6 mg product/cm² skin is proposed.

However, the ESD also mentions that the value for Qformappl must coincide with the efficacy of the product and must be adapted accordingly.

The validated efficacious dose for the product ‘Insect Repellent Pump Spray IR3535 20%’ is 0.67 mg product per cm² of skin. This value will be considered in the environmental risk assessment instead of the default value from the ESD.

**Qformappl = 0.67 mg product/cm² skin**

Number of applications per day (Nappl)

Another important parameter is the number of applications per day (Nappl), which the ESD also links to the efficacy of the product.

The conclusion for efficacy of ‘Insect Repellent Pump Spray IR3535 20%’ is that the product will remain efficacious for 8 hours against mosquitoes, when used at the application rate of 0.67 mg/cm². Following the ESD Table 3-2, 2 applications per day will be used in the further assessment.

**Nappl = 2 d-1**

Treated area of human skin (AREAskin)

Following the agreement of the ENV WG-V-2018 to harmonise the value for the treated skin area with that of the Human Health assessment, a value of 55% of the total body surface area will be applied.

**AREAskin = 9130 cm²**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input parameters for calculating the local emission** | | | | |
| **Input** | **Nomenclature** | **Value** | **Unit** | **Remarks** |
| *Scenario: Release of repellents used on human skin based on the average consumption* | | | | |
| Number of inhabitants feeding one STP | Nlocal | 10 000 | cap | D |
| Active substance in product | (B) Cformweight | 200 | g/kg | (20 %) |
| Consumption per application | (D2) Qformappl | 0.67 | mg/cm² | (see above) |
| Number of applications per day | Nappl | 2 | d-1 | (see above) |
| Treated area of human skin | AREAskin | 9130 | cm² | (see above) |
| Fraction realeased to air | Fair | 0 | [-] | D |
| Fraction dermally absorbed | Fskin | 0 | [-] | D |
| Fraction released to wastewater | Fwater | 1 | [-] | D |
| Fraction of inhabitants using a repellent product | Finh | 0.2 | [-] | D |
| Market share of repellent | Fpenetr | 0.5 | [-] | D |
| Specific density of the product | RHOform | 1000 | kg/m³ | D |

Calculations for Scenario 1

🡪 B and D2

| **Resulting local emission to relevant environmental compartments** | | |
| --- | --- | --- |
| **Compartment** | **Local emission (Elocalcompartment) [kg/d]** | **Remarks** |
| Waste water | 2.45 | / |

###### Scenario 2: Release to surface water bodies via swimming

In the assessment report for IR3535®, in the paragraph on the elements to be taken into account when authorising products, it is mentioned that direct emissions to surface water by swimmers should be kept in mind and assessed. With this new scenario for the ESD for PT19, this requisite is taken into account.

Amount of product per application (Qformappl)

Similarly as with scenario 1, the most important input parameter for this scenario is the amount of product that will be used per application (Qformappl).

The same notes and thoughts can be applied as with scenario 1. Therefore, also here it is decided that the efficacious dose will be applied.

**Qformappl = 0.67 mg product/cm² skin**

Treated area of human skin (AREAskin)

Concerning the body surface to which the product is applied (AREAskin), according to the applicant the product should only be applied to the face, arms, hands and legs. However, when repellent products are used when swimming, one could assume the swimmer would apply it also to their feet and trunk. Therefore, for a worst case calculation, it is assumed the product is applied to the full body surface.

**AREAskin = 16600 cm²**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input parameters for calculating the local emission** | | | | |
| **Input** | **Nomenclature** | **Value** | **Unit** | **Remarks** |
| *Scenario: Release of repellents used on human skin due to swimming activities in surface water bodies* | | | | |
| Daily number of swimmers | Nswimmer | 1500 | [-] | D |
| Fraction of swimmers using repellent product | Fswim | 0.1 | [-] | P (worstcase) |
| Number of applications per day | Nappl | 1 | d-1 | D |
| Fraction released to surface water body | Fwaterbody | 1 | [-] | D |
| Active substance in the product | (B) Cformweight | 200 | g/kg | (20%) |
| Consumption per application | (D2) Qformappl | 0.67 | mg/cm² | (see above) |
| Treated area of human skin | AREAskin | 16600 | cm² | (see above) |
| Specific density of product | RHOform | 1000 | kg/m³ | D |

Intermediate calculation for Scenario 2

🡪 B and D2

| **Resulting local emission to relevant environmental compartments** | | |
| --- | --- | --- |
| **Compartment** | **Local emission (Elocalcompartment) [kg/d]** | **Remarks** |
| Surface water | 0.334 | / |

Final calculation for scenario 2

In the intermediate calculation a local daily emission to the surface water body due to swimmers treated with the repellent, was calculated. In order to assess the impact of this emission on the aquatic life in this waterbody, the actual concentration in active substance in this waterbody should be calculated.

As a first TIER evaluation concentrations are calculated for emission periods of 1 day and 91 days, without taking into account possible degradation progresses, which represents the worst-case.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input parameters for calculating surface water concentration** | | | | |
| **Input** | **Nomenclature** | **Value** | **Unit** | **Remarks** |
| *Scenario: Release of repellents used on human skin due to swimming activities in surface water bodies* | | | | |
| Local emission to surface water body | Elocalwater | 0.334 | kg/d | O (Intermediate calculation) |
| Volume of water body | Vwaterbody | 435 000 | m³ | D |
| Number of emission days TIER 1 | Temission, 1d | 1 | d | D |
| Number of emission days TIER 2 | Temission, 91d | 91 | d | D |
| Number of emission events | Nemission, 91d | 91 | [-] | D |

| **Resulting local concentrations in the waterbody** | | |
| --- | --- | --- |
| **Compartment** | **Local concentration**  **(Clocalcompartment) [kg/m³]** | **Remarks** |
| Surface water – after 1 day | 7.67x10-7 | / |
| Surface water – after 91 days | 6.98x10-5 | (without considering possible degradation) |

##### Fate and distribution in exposed environmental compartments

###### Scenario 1:

Applied product is removed from the body through showering or bathing. The wastewater from washing is then removed to the municipal waste water treatment plant, after which the effluent is emitted to the surface water where it can expose both fresh water and fresh water sediments.

Exposure to other compartments, such as soil and groundwater, is not considered relevant. The soil could be exposed through sludge application, but following the STP-distribution detailed in the third table below, sorption to sewage sludge is unlikely since IR3535 is almost completely degraded.

###### Scenario 2:

Applied product is removed from the body directly to the surface water through swimming, where it can expose both fresh water and fresh water sediments.

Exposure to other compartments is not considered relevant.

| **Identification of relevant receiving compartments based on the exposure pathway** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Fresh-water** | **Freshwater sediment** | **Sea-water** | **Seawater sediment** | **STP** | **Air** | **Soil** | **Ground-water** | **Other** |
| Scenario 1 | yes | yes | no | no | yes | no | no | no | no |
| Scenario 2 | yes | yes | no | no | no | no | no | no | no |

|  |  |  |  |
| --- | --- | --- | --- |
| **Input parameters (only set values) for calculating the fate and distribution in the environment** | | | |
| **Input** | **Value** | **Unit** | **Remarks** |
| Molecular weight | 215.29 | g/mol |  |
| Melting point | -90 | °C |  |
| Boiling point | 300 | °C |  |
| Vapour pressure (at 20 °C) | 0.15 | Pa |  |
| Water solubility (at 20 °C) | 70 000 | mg/l |  |
| Log Octanol/water partition coefficient | 1.7 | Log 10 |  |
| Organic carbon/water partition coefficient (Koc) | 475.25 | l/kg |  |
| Henry’s Law Constant (at 20 °C) | 4.613x10-4 | Pa.m3/mol |  |
| Biodegradability | Not readily biodegradable |  |  |

In the CAR for IR3535®, calculations according to EUSES are available for the distribution in the STP, which in this case is only relevant for scenario 1. As a worst-case assessment the distribution presented in the CAR is taken over for the assumption that there is no degradation. As a TIER 2 evaluation, 99% degradation in STP is taken into consideration.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Calculated fate and distribution in the STP** | | | | |
| **Compartment** | **Percentage [%]** | | | **Remarks** |
| **Scenario 1**  **TIER 1** | **Scenario 1**  **TIER 2** | **Scenario 2** |
| Air | 0 | 0 | Not relevant |  |
| Water | 99 | 1 |  |
| Sludge | 1 | 0 |  |
| Degraded in STP | 0 | 99 |  |

##### Calculated PEC values

Neither for scenario 1, nor for scenario 2, calculations were made for the sediment, since the PNECsediment was determined through the EPM-method. This means that the risk assessment for water is applicable for the sediment as well.

As mentioned before, for the scenario 2, possible degradation in surface water is not taken into account as a worst-case evaluation.

|  |  |  |  |
| --- | --- | --- | --- |
| **Summary table on calculated PEC values** | | | |
|  |  | **PECSTP** | **PECwater** |
| **[mg/l]** | **[mg/l]** |
| **Scenario 1** | TIER 1 | 1.21 | 0.121 |
| TIER 2 | 1.22x10-2 | 1.22x10-3 |
| **Scenario 2** | Day 1 | n/a | 7.67x10-4 |
| Day 91 | n/a | 6.98x10-2 |

##### Primary and secondary poisoning

###### Primary poisoning

Not applicable, since this product is a repellent and has no intention of killing.

###### Secondary poisoning

Not relevant, since no bioaccumulation is expected.

#### Risk characterisation

##### Atmosphere

Conclusion:

Only negligible exposure to the atmosphere is expected and no threat to the atmosphere is expected.

##### Sewage treatment plant (STP)

|  |  |  |
| --- | --- | --- |
| **Summary table on calculated PEC/PNEC values** | | |
|  |  | **PEC/PNECSTP** |
| Scenario 1 | TIER 1 | 1.21x10-2 |
| TIER 2 | 1.22x10-4 |
| Scenario 2 | Day 1 | Not relevant |
| Day 91 | Not relevant |

Conclusion:

No adverse effect for the STP is expected

##### Aquatic compartment

Neither for scenario 1, nor for scenario 2, calculations were made for the sediment, since the PNECsediment was determined through the EPM-method. This means that the risk assessment for water is applicable for the sediment as well.

For the scenario 2, possible degradation in surface water is not taken into account as a worst-case evaluation.

|  |  |  |
| --- | --- | --- |
| **Summary table on calculated PEC/PNEC values** | | |
|  |  | **PEC/PNECwater** |
| Scenario 1 | TIER 1 | **1.21** |
| TIER 2 | 1.22x10-2 |
| Scenario 2 | Day 1 | 7.67x10-3 |
| Day 91 | 6.98x10-1 |

For the scenario 1, when considering the worst-case assessment where no elimination from the STP is taken into account, then an adverse effect for the surface water is calculated. However when considering the TIER 2, where 99 % elimination from the STP is considered, no adverse effects are calculated.

For the scenario 2, no adverse effects are expected, neither at day 1 nor at day 91, without considering degradation in the surface water.

Conclusion:

No adverse effect for the aquatic compartment is expected

##### Terrestrial compartment

The terrestrial compartment is not considered a relevant receiving compartment (see point (III) above).

Exposure through sludge application is highly unlikely, since IR3535 almost completely degrades in the STP.

Conclusion

No adverse effects for the terrestrial compartment are expected

##### Groundwater

Since no exposure of the terrestrial compartment is expected, it follows that neither exposure to the groundwater is expected.

Conclusion

No adverse effects for the groundwater are expected.

##### Primary and secondary poisoning

Primary poisoning is not applicable, since this product is a repellent and has no intention of killing.

Secondary poisoning is not relevant, since no bioaccumulation is expected.

##### Mixture toxicity

Not relevant, since the product does not contain other components other than the active substance that could give a risk to the environment.

### Measures to protect man, animals and the environment

Please see §2.1.4 and §2.1.5 above.

### Assessment of a combination of biocidal products

Not applicable

### Comparative assessment

Not applicable

# Annexes

## List of studies for the biocidal product

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Author(s) | Year | Title | Report No. | Owner Company | Report date |
| Meinerling M. | 2009 | EUS26-15 INSECT REPELLENT SPRAY – DETERMINATION OF THE STORAGE STABILITY AT AMBIENT TEMPERATURES | 31232204 | Merck KGaA | 2009-05-27 |
| Meinerling M., Fieseler A. | 2016 | Statement to IBACON project | - | - | 2016-21-06 |
| Fieseler A. | 2015 | MDA-A-197-01 Verum 1: Accelerated Storage Stability | 98322204 | Merck KGaA | 2015-08-04 |
| Meinerling M. | 2007 | EUS26-15 INSECT REPELLENT SPRAY – DETERMINATION OF THE ACCELERATED STORAGE STABILITY | 31231204 | Merck KGaA | 2007-02-28 |
| Fieseler A. | 2011 | Determination of the Relative Density of Pump Spray IR 3535® 20 % | 63163182 | Merck KGaA | 2011-06-27 |
| Meinerling M. | 2011 | Determination of the Low Temperature Stability of Pump Spray IR 3535® 20 % | 63164204 | Merck KGaA | 2011-06-27 |
| Fieseler A. | 2011 | Determination of the Flash Point of Pump Spray IR 3535® 20 % | 63161189 | Merck KGaA | 2011-06-28 |
| Batz B. | 2016 | Bestimmung der Tröpfchengrößenverteilung per Laserbeugung Merck Prüfauftrag vom 30.03.2016 | 2016\_04\_26 | Merck KGaA | 2016-04-26 |
| Zur Lage J. | 2016 | IR3535\_Ref Formulations surface tension visco\_Reg.Aff | 009093 – PM – PFC - RT | Merck KGaA |  |
| Dornhagen J. | 2011 | FINAL REPORT (1st Original of 3) Pump Spray IR 3535® 20 % Batch No.: SM-0-1-1/090211 AUTO-IGNITION TEMPERATURE (LIQUIDS AND GASES) A.15 | 20110103.01 | Merck KGaA | 2011-07-04 |
| Meinerling M. | 2007 | IR3535® - VALIDATION OF AN ANALYTICAL METHOD FOR THE DETERMINATION OF IR3535® AND ITS HYDROLYSIS PRODUCT IN DIFFERENT FORMULATIONS | 31211101 | Merck KGaA | 2007-03-19 |
| Carroll, S.P. | 2006 | “Test of Personal Insect Repellents: Study EMD 003.2 -  Replacement for MRID 46979002 - Volume 11” | 336-1918 | Merck KGaA | 2006-11-08 |
| Carroll, S.P. | 2006 | “Test of Personal Insect Repellents: EMD 004.2 Replacement for MRID 46979004” | 336-1919 | Merck KGaA | 2006-11-06 |
| Dippel, C. and Dautel, H. | 2006 | “Evaluation of 6 products against the European Sheep Tick, Ixodes ricinus, on human volunteers according to the EPA guidelines” | 336-1921 | Merck KGaA | 2006-04-27 |
| Lüpkes, K.-H. | 2011 | “Repellent Efficacy of Six Repellent Formulations on Human Arms against Mosquitoes” | 336-1922 | Merck KGaA | 2011-07-04 |
| Hurley, J.M. (a) | 2006 | Acute dermal irritation study of EUS26-15 Insect Repellent Spray in albino rabbits. | WIL-  585006 | Merck  KGaA | 2006-09-15 |
| Hurley, J.M. (b) | 2006 | Acute Eye Irritation Study of  EUS26-15 Insect Repellent  Spray in albino rabbits. | WIL-  585007 | Merck  KGaA | 2006-09-08 |
| Hurley, J.M. (c) | 2006 | Skin Sensitisation Study of EUS26-15 Insect Repellent Spray in albino guinea  pigs (Modified Buehler Method). | WIL-  585008 | Merck  KGaA | 2006-09-08 |
| Hurley, J.M. (d) | 2006 | Acute dermal toxicity study of EUS26-15 Insect Repellent Spray in albino rats. | WIL-  585005 | Merck  KGaA | 2006-09-15 |

## Output tables from exposure assessment tools

### Human exposure calculations



## New information on the active substance

Not applicable.

## Residue behaviour

Not applicable.

## Summaries of the efficacy studies (B.5.10.1-xx)

Not relevant, IUCLID file available.

## Confidential annex

Yes, see seperate document.

## Other

Not applicable.

1. [↑](#footnote-ref-1)
2. Please delete as appropriate. [↑](#footnote-ref-2)