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 MINOR CHANGE APPLICATION OF NATIONAL AUTHORISATION APPLICATIONS**



SANIFAR

Product type 14

[Brodifacoum as included in the Union list of approved active substances]

NA-MIC Case Number in R4BP: BC-EL055178-34

Evaluating Competent Authority: [France]

Date: February 2023

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**Note to the reader:**

**Disclaimer regarding general information**

Please note that the biocidal product SANIFAR is the same of the product FANGA RONGEUR PRO.

This consolidated PAR for minor change of the product authorisation of SANIFAR is based on the PAR of the first authorisation of FANGA RONGEUR PRO granted by FR on 31/08/2015, in which all addenda for SANIFAR have been included.

In part 1 and 2 of this consolidated PAR:

- Each section contains the initial assessment and the subsequent successive assessments (minor change, major change and post authorisation data…) in a chronological order. These assessments are pointed out with specific titles corresponding to the type of application and the year at which it was delivered.

- The assessments related to the last minor change of the product are at the end of each section and are highlighted in grey.

In part 3 of the consolidated PAR, the summary of product characteristics corresponds to the decision for the minor change application.

**Disclaimer regarding user category**

For the risk assessment of PT14, two user categories have been addressed depending on the quantity of manipulated product and the possibility of using PPE: non-professional users and professional users.

In France, any professional user needs a dedicated national certificate, hence it is expected that he/she has the required competence to access to biocidal products that are authorized for professional users they are thus considered as « trained professional users ».

Consequently, in the SPC for renewal in Part 3, uses for “professionals” are mentioned according to the agreed standard SPC, but they are not relevant in France. It is proposed that each cMS adapts the conditions of authorization of the product according to its own legislation.

# History of the dossier (updated PAR – 2022)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Application type** | **refMS** | **Case number in the refMS** | **Decision date** | **Assessment carried out (i.e. first authorisation / amendment /renewal)** |
| NA-APP |  | BC-US010406-22 | 31/08/2015 | Initial assessment  FANGA RONGEUR PRO |
| NA-MAC  and post-authorisation requirement | FR | BC-CY019780-17 | 03/05/2016 | FANGA RONGEUR PRO: Addition of   * general public user; * targets organisms: mice; * packaging: loose and new secondary packaging size; * trade name; * manufacturers of the product.   Post-authorisation data :   * additional physico-chemical properties; * black rat efficacy data. |
| NA-BBS | FR | BC-RE025067-46 | 05/07/2017 | Same product authorisation : SANIFAR |
| NA-RNL | FR | BC-VW037867-86 | 12/06/2018 | Renewal of the authorisation |
| NA-MIC | FR | BC-EL055178-34 | 17/02/2022 | *Minor change:*  *-Upgrade of shelf-life from 12 to 24 months.*  *- Addition of packagings.* |

**Authorised uses (0.005 % of brodifacoum) (Renewal, 2018)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Users** | **Target organisms** | **Application rate** | **Field of use** | **Packagings** |
| Trained professional and professionals users | Rat (*Rattus norvegicus and rattus rattus*) | 180-200 g of product /bait station separated to 5-10 m meters | In and around buildings  Open areas  Waste dumps and landfills | Sachet in PE  Bulk  Minimim pack 5 kg |
| Mice (*Mus musculus*) | 30-40 g of product / bait station at separated to 1-2 m meters |

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# General information about the product application – PAR 2014

## Information about the biocidal product

### Information on active substance

|  |  |
| --- | --- |
| **Active substance chemical name:** | Brodifacoum |
| **CAS No:** | 56073-10-0 |
| **EC No:** | 259-980-5 |
| **Purity (minimum, g/kg or g/l):** | 950 g/kg |
| **Inclusion directive:** | 2010/10/CE |
| **Date of inclusion:** | 9 February 2010 |
| **Is the active substance equivalent to the active substance listed in Annex I to 98/8/EC (yes/no):** | Yes |

**Renewal 2017**

**COMPARATIVE ASSESSMENT**

Brodifacoum does meet the exclusion criteria laid down in Article 5(1)(c) of Regulation (EU) No 528/2012. Brodifacoum does meet the conditions laid down in Article 10(1)(a) and (e) of Regulation (EU) No 528/2012 if approved, and is therefore considered as a candidate for substitution.

A comparative assessment has been carried out at the European level. According to Article 1 of Commission Implementing Decision (EU) 2017/1532 of 7 September 2017 addressing questions regarding the comparative assessment of anticoagulant rodenticides in accordance with Article 23(5) of Regulation (EU) No 528/2012 of the European Parliament and of the Council. In the absence of anticoagulant rodenticides, the use of rodenticides containing other active substances would lead to an inadequate chemical diversity to minimize the occurrence of resistance in the target harmful organisms.

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

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

There is no substance of concern.

* **Renewal 2017**

FANGA RONGEUR PRO does not contain any substance of concern according to the Guidance on the BPR Volume III Humana Health – Part B Risk Assessment[[1]](#footnote-1).

## Documentation

### Data submitted in relation to product application

**Identity, physico-chemical and analytical method data**

Physico-chemical properties studies and analytical methods on the biocidal product FANGA RONGEUR PRO were provided by TRIPLAN.

* **Minor change application for SANIFAR - 2022:**

New data related to storage stability have been provided by TRIPLAN for FANGA RONGEUR PRO to support the extension of the the shelf life. The product SANIFAR has the same composition as FANGA RONGEUR PRO and a letter of access has been provided by TRIPLAN and allows France to use these data for the product SANIFAR.

**Efficacy data**

The following efficacy studies were submitted:

* A free-choice laboratory test was carried out with mice (***Mus musculus***) and brown rats (***Rattusnorvegicus***), with exposure to **FANGA RONGEUR PRO** (0.005 % w/w brodifacoum) for 20 days.
* A free-choice laboratory test was carried out with rats (***Rattus norvegicus***), with exposure to **FANGA RONGEUR PRO** (0.005 % w/w brodifacoum) for 4 days.
* A field test was carried out with rats (***Rattus norvegicus***), with exposure to **FANGA RONGEUR PRO** (0.005 % w/w brodifacoum).
* **Major change 2016**

Efficacy studies submitted following post authorisation requirements:

* A field test was carried out with black rats (*Rattus rattus*), with exposure to FANGA B+ RONGEUR (0.001 % w/w brodifacoum).
* A free choice laboratory test was carried out with black rats (*Rattus rattus*), with exposure to FANGA RONGEUR PRO (0.005 % w/w brodifacoum).
* A free choice laboratory test was carried out with black rats (*Rattus rattus*), with exposure to FANGA B+ RONGEUR (0.001 % w/w brodifacoum).

For the major application change, a field test (Italy) was carried out with house mice (*Mus musculus*), with exposure to aged bait FANGA RONGEUR PRO (0.005 % brodifacoum wheat bait).

* **Renewal 2017**: no new efficacy study was submitted.
* **Minor change for SANIFAR- 2022:**

The following efficacy studies were submitted:

* A field test was carried out with rats (*Rattus norvegicus*), with exposure to 4 years and 11 months aged formulation of FANGA B+ RONGEUR (0.001 % brodifacoum).
* A field test was carried out with rats (*Rattus rattus*), with exposure to 4 years and 11 months aged formulation of FANGA B+ RONGEUR (0.001 % brodifacoum).

**Toxicology data**

The applicant submitted new toxicological data on active substance and studies for the product (see corresponding sections). A new percutaneous absorption study (*in vitro*) has been submitted by TRIPLAN for difenacoum and results were extrapolated to brodifacoum.

**Residue data**

No new study has been submitted for the biocidal product authorisation.

**Ecotoxicology data**

No new study has been submitted for the biocidal product authorisation.

* **Renewal 2017:** no additional data submitted for the efficacy, toxicology, residue and Ecotoxicology sections.

### Access to documentation

As stated in the letter of access granted by Activa to Triplan:

*Activa S.r.l, (via Feltre 32, Milano-ltaly), as Notifier and having rights on all the data included in the Dossier for Brodifacoum (CAS No: 56073-10-0) presented by The Activa/Pelgar Brodifacoum and Difenacoum Task Force (composed by: Activa/Tezza S.r.l and Pelgar International Ltd) for Annex I listing to RMS ltaly* ***authorises*** *the France competent authorities to use these data for authorisation purpose TRIPLAN (BP 258 Poste Francaise - AD500 Andorre la Vieille - PRINCIPAT D'ANDORRA) for the product* ***FANGA RONGEUR PRO*** *(PT14).*

Please refer to the LoA for the complete list of studies for which access has been granted.

* **Renewal 2017**

For the renewal, no additional LOA has been submitted.

* **Minor change application - 2022:**

A letter of access from Activa to SOFAR allows France to use data submitted in the dossier of the active substance brodifacoum for the registration of the product SANIFAR.

SANIFAR is identical to the product FANGA RONGEUR PRO belonging to TRIPLAN. Two letters of access from TRIPLAN allows France to use the data submitted in the dossier of the product FANGA RONGEUR PRO and data on the biocidal product FANGA B+ RONGEUR, to support the efficacy against rats and mice at the minimum application doses, for the registration of the product SANIFAR. Please refer to efficacy section (Minor change application for SANIFAR – 2022) for more details.

# Summary of the product assessment

The product is to be used in tamper-resistant bait boxes or covered bait stations.

”Tamper-resistant bait boxes” are meant to be tamper-resistant devices, that prevent the access to the baits for children and non-target animals, and that protect the baits from bad weather.

”Covered bait stations” are meant to be devices with the same level of security for the human beings and the environment than the security provided by tamper-resistant bait boxes, fastened to prevent any removal, made in order to avoid direct contact of the bait with the environment. This device must be designed to keep baits out of reach of the general public and non-target animals, and to protect the bait from bad weather

It is considered that professional users only (on the contrary to the general public) are able to design such covered bait stations.

## Identity related issues- PAR - 2014

The source of the active substance used in the biocidal product FANGA RONGEUR PRO is not the same as the source used for annex I inclusion. The technical equivalence has been evaluated by Italy CA, and the source claimed for this product is considered as equivalent to the source used for annex I inclusion. Refer to the technical equivalence report from the Italian CA for more details.

* **Major change application 2016**

The source of the active substance used in the biocidal product FANGA RONGEUR PRO is not the same as the source used for annex I inclusion. The technical equivalence has been evaluated and accepted by IT.

* **Minor change application - 2022**

The new packagings are acceptable.

The new data and justification on the ambient storage stabilty to extend the shelf life from 12 months to 24 months has been provided and found acceptable. However, some aspects (variations higher than 20% after 24 months but below 10% after 79 months) remain unexplained by the applicant. Consequenlty, in order to confirm the stability of the product during storage, a new shelf life study in accordance with the current guideline should be provided at the renewal of the product FANGA RONGEUR PRO.

## Classification, labelling and packaging

### Harmonised classification of the active substance

|  |  |  |
| --- | --- | --- |
| **Classification - Directive 67/548/EEC** | | |
| Class of danger | T+ | |
| N | |
| R phrases | R27/28 | Very toxic in contact with skin and if swallowed. |
| R48/24/25 | Toxic: danger of serious damage to health by prolonged exposure in contact with skin and if swallowed. |
| R50/53 | Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. |

|  |  |
| --- | --- |
| Specific limit concentrations for the environment: | |
| 1 % ≤ C <2.5 %N; R50/53  C ≥ 2.5 % | N; R51/53 |
| 0.5 % ≤ C< 1 % | N; R51/53 |
| 0.25 % ≤ C< 0.5 % | N; R51/53 |
| 0.025 % ≤ C< 0.25 % | R52/53 |
|  |  |

The classification for the environment, under Directive 67/548/EEC, was agreed in April 2006 by the Technical Committee on Classification and Labelling (TC C&L) of Dangerous Substances.

|  |  |  |
| --- | --- | --- |
| **Classification - Regulation (EC) 1272/2008** | | |
| Hazard statement | Acute Tox. 1 | |
| Acute Tox. 2 | |
| STOT RE 1 | |
| Aquatic Acute 1 | |
| Aquatic Chronic 1 | |
| Precautionary statements | H310 | Fatal in contact with skin. |
| H300 | Fatal if swallowed. |
|  |  |
| H372 | Causes damage to organs through prolonged or repeated exposure. |
| H400 | Very toxic to aquatic life. |
| H410 | Very toxic to aquatic life with long lasting effects. |

* **Renewal 2017**

For the renewal, the classification of the active substance according to the CLP is the following

|  |  |  |
| --- | --- | --- |
| **Classification - Regulation (EC) 1272/2008** | | |
| Hazard category | Acute Tox. 1 | |
| STOT RE 1 | |
| Repr.1A | |
| Aquatic Acute 1 | |
| Aquatic Chronic 1 | |
| Hazard statements | H310 | Fatal in contact with skin. |
| H300 | Fatal if swallowed. |
| H330 | Fatal if inhaled |
| H372 | Causes damage to organs (blood) through prolonged or repeated exposure. |
| H360D | May damage the unborn child |
| H400 | Very toxic to aquatic life. M-factor = 10 |
| H410 | Very toxic to aquatic life with long lasting effects. M-factor = 10 |
| Specific Concentration Limits | Repr. 1A; H360D: C ≥ 0,003 %  STOT RE 1; H372: C ≥ 0,02 % STOT RE 2; H373: 0,002 % ≤ C < 0,02 % | |

### Classification of the biocidal product

|  |  |
| --- | --- |
| Classification - Directive 67/548/EEC | |
| R phrasesNone  Class of danger | None |
| S phrases | None |
|  |  |

|  |  |
| --- | --- |
| **Classification - Regulation (EC) 1272/2008** | |
| Hazard statement | None |
| Precautionary statements | None |

* **Renewal 2017**

For the renewal, the classification of the product according to the CLP is the following

|  |  |
| --- | --- |
| **Classification - Regulation (EC) 1272/2008** | |
| Hazard category | STOT RE 2  Repr. 1A |
| Hazard statements | H373: May cause damage to organs (blood) through prolonged or repeated exposure  H360D: May damage the unborn child |
| Precautionnary statements | P201: Obtain special instructions before use.  P202: Do not handle until all safety precautions have been read and understood.  P260: Do not breathe dust/fumes/gas/mist/vapours/spray  P280: Wear protective gloves/protective clothing/eye protection/face protection  P308 + 313: IF exposed or concerned: Get medical advice/attention.  P314: Get medical advice/attention if you feel unwell  P405: Store locked up  P501: Dispose of contents/container to … [… in accordance with local/regional/national/international regulation (to be specified)]. |

### Labelling of the biocidal product

|  |  |
| --- | --- |
| **Labelling - Directive 67/548/EEC** | |
| Symbols: | None |
| Indications of danger: | None |
| Risk phrases: | None |
| Safety phrases: | None |

|  |  |
| --- | --- |
| **Labelling - Regulation (EC) 1272/2008** | |
| Pictograms: | None |
| Signal words: | None |
| Hazard statements: | None |

* **Renewal 2017**

For the renewal, the labelling of the product according to the CLP is the following

|  |  |
| --- | --- |
| **Labelling - Regulation (EC) 1272/2008** | |
| Pictograms: |  |
| Signal words: | Danger |
| Hazard statements: | H373: May cause damage to organs (blood) through prolonged or repeated exposure  H360D: May damage the unborn child |

### Packaging of the biocidal product

FANGA RONGEUR PRO is supplied in:

* 25; 50; 100 and 200g polyethylene sachets for rats;
* 25 and 50g polyethylene sachets for mice.

Sachets are packed in:

* Polypropylene bucket (5; 10; 15; 18 and 20kg);
* Carton (5; 10 and 20kg);
* Paper bag (20 and 25kg).
* **Major change 2016**

For the major application change, new packaging and uses below were proposed by the applicant:

**Professionals**

For professional users, FANGA RONGEUR PRO is supplied in 20-25-30-40-50-100-200 g polyethylene sachets and packed in:

* Bag (paper bags, several layers with one or without plastic film in polyethylene; 5-10-15-20-25kg)
* Polyethylene bucket (5-10-15-18-20kg)
* Carton box (5-10-12-15-20-50kg)

The product is also sold in loose in:

* Sachets made of polyethylene or polypropylene (100-200-300-400-500-600-700-800-900-1000 g) and packed in carton box (5-10-12-15-18-20 kg)
* Bag (paper bags, several layers with one or without plastic film in polyethylene; 5-10-15-20-25 kg)
* Polyethylene bucket (5-10-15-18-20-25 kg)
* Carton box (5-10-12-15-20-25-50 kg)

*Please note that in France, according to national legislation, the minimum packaging size for professional user is 5 kg*

**Non professionals**

For non-professionals users, FANGA RONGEUR PRO is supplied in 20-25-30-40-50-100-200 g polyethylene sachets and packed in:

* Polyethylene bucket, carton box, metal box without lacquer or HDPE containers (0,1 ; 0,2 ; 0,3 ; 0,4 ; 0,5 ; 0,6 ; 0,7 ; 0,8 ; 0,9 ; 1 ; 1,2 ; 1,3 ; 1,4 ; 1,5 kg)

Bait box made of polyethylene terephthalate/polypropylene/polyethylene/polychloride vinyl with a capacity of 40 g for mice and 200 g for rats.

* **Renewal 2017**

For the renewal, only the packaging claimed for the professional users will be considered.

**For professional users,**

FANGA RONGEUR PRO is supplied in 20-25-30-40-50-100-200 g polyethylene sachets and packed in:

* Bag (paper bags, several layers with one or without plastic film in polyethylene; 5-10 kg)
* Polyethylene bucket (5-10kg)
* Carton box (5-10kg)

The product is also sold in loose in:

* Sachets made of polyethylene or polypropylene (100-200-300-400-500-600-700-800-900-1000 g) and packed in carton box (5-10kg)
* Bag (paper bags, several layers with one or without plastic film in polyethylene; 5-10kg)
* Polyethylene bucket (5-10kg)
* Carton box (5-10 kg)

Minimum pack size: 3 kg*.*

*In France only: minimum Minimum pack size of 5 kg*

Package is restricted to separately packed bags with a maximum of 10 kg per packed bag.

* **Minor change application - 2022**

For the minor application change, new packagings below were proposed by the applicant:

For professional users;

* The product FANGA RONGEUR PRO is supplied in individual PE/PP sachets (Rats : 10-20-25-30-40-50-60-90-100-200g) (Mice : 10-20-25-30-40g) wrapped in :
* Buckets-Barrel PP/PE (5-10-15-18-20-25-30kg)
* paper bags with or without plastic film PE/PP inside (5-10-15-20-25-30kg)
* PE/PP bags-film (5-10-15-20-25kg)
* Metal box (5-10-15-20-25kg)
* Cardboard box (5-10-12-15-20-25-30-50kg)
* Bait station PET/PP/PE/PVC

The product FANGA RONGEUR PRO is supplied in bulk in:

* Buckets-Barrel PP/PE (5-10kg)
* paper bags with or without plastic film PE/PP inside (5-10kg)
* PE/PP bags-film (5-10kg)
* Metal box (5-10kg)
* Carton box (5-10kg)
* Bait station PET/PP/PE/PVC

The packagings are covered by the previous assessment and are considered acceptable.

## Physico/chemical properties and analytical methods

### Active ingredient

### Identity, origin of active ingredient-PAR - 2014

The source of the active substance used in the biocidal product FANGA RONGEUR PRO is not the same as the source used for annex I inclusion. The technical equivalence has been evaluated by Italy CA, and the source claimed for this product is considered as equivalent to the source used for annex I inclusion. Refer to the technical equivalence report from the Italian CA for more details.

* **Major change application 2016**

The source of the active substance used in the biocidal product FANGA PATE PRO is not the same as the source used for annex I inclusion. The technical equivalence has been evaluated and accepted by IT.

A letter of access to brodifacoum data from Activa has been provided.

#### Physico-chemical properties -PAR - 2014

Physical and chemical properties of the active substance have already been evaluated at EU level and are presented in the CAR of the active substance brodifacoum (2010). The applicant TRIPLAN has a letter of access to these data.

**Source CAR 2010 (Document I):**

Brodifacoum is an off-white powder at 20°C and atmospheric pressure, with a relative density of 1.53. It was observed to darken and decompose at 235.8°C, whereas no decomposition or transformation occurred below 150°C.

Brodifacoum is non-volatile, with a Henry’s Law Constant value of 2.35E-18 Pa.m3.mol-1. It is essentially insoluble in water at pH 5, but its solubility proved to increase with pH, due to the variation of the ionisation degree of the 4-hydroxycoumarin group in pH range under investigation (5-9). Brodifacoum also turned out to be soluble in organic solvents; results showed that solubility did not vary with temperature, except for dichloromethane.

Brodifacoum dissociation constant was estimated to be 4.50. Log Pow was found to be 4.92 at pH 7 and 20°C. As expected, Log Pow decreased with higher temperature and pH.

Brodifacoum is not highly flammable. Besides, it does not show explosive or oxidising properties. Reaction with container materials (mild steel) has not been observed, either. All results considered, it can be concluded that Brodifacoum does not exhibit hazardous physical-chemical properties.

#### Analytical method for determination of active ingredient and impurities in the technical active ingredient-PAR 2014

Analytical method for the determination of pure active substance brodifacoum in the technical active substance as manufactured has already been performed and validated at EU level in the CAR of brodifacoum (2010). The applicant TRIPLAN has a letter of access to these data.

Summary: (source AR November 2010)

|  |  |
| --- | --- |
|  | **Principle of method** |
| Technical active substance as manufactured: | Brodifacoum is analysed in the technical material by reversed-phased HPLC/UV (254nm)  Purity : 96.2-99.4% w/w (mean: 98.1 % w/w) |

#### Analytical method for determining relevant components and/or residues in different matrices

Analytical methods for the determination of residues of the active substance brodifacoum in the different matrices (plants, soil, drinking, ground and surface water, human and animal body fluids and tissues) have already been performed and validated at EU level in the CAR of brodifacoum (2010). No method in air is required since the active substance is non volatile.

Analytical methods are presented in Annex 3 of this document.

The applicant TRIPLAN has a letter of access to these data.

### Biocidal product

#### Identity, composition of the biocidal product, packaging-PAR 2014

The biocidal product is not the same as the one assessed for the inclusion of the active substance in annex I of directive 98/8/EC.

Trade name: *FANGA RONGEUR PRO*

Type of product: PT14, bait ready to use

Type of formulation: grain bait

The composition of the product is confidential and is presented in a confidential annex. There is no substance of concern.

#### Physico-chemical properties PAR 2014

The tested product is FANGA RONGEUR PRO. Some properties have already been described for FANGA RAT-DICAL TECH (oxidizing, explosive properties). Read across of the two compositions allow to accept this justification. Brodifacoum content in tested product is 0.0049% w/w. It is in the range of the FAO tolerance (15%).

The product does not contain hydrocarbon compounds.

Table 1:Physico-chemical properties of the biocidal product (PAR 2014)

| Subsection (Annex Point IIB. 3/TNsG) | **Method** | **Purity/ Specification** | **Results[[2]](#footnote-2)** | **Remarks/ Justification** | **GLP (Y/N)** | **Reliability** | **Reference** | **Evaluation FR** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3.1 Appearance (IIB3.1/Pt. I-B3.1) |  | 0.049 g/kg  Brodifacoum |  |  | Y | 1 | 11-920010-025[[3]](#footnote-3) | Report N°11-920010-025 not provided |
| 3.1.1 Physical state and nature | Visual examination | Grains of wheat |  |
| 3.1.2 Colour |  | Blue/green/purple grains of wheat in white opaque plastic bucket |  |
| 3.1.3 Odour | Not determinated | | | An odour should only be recorded it is very apparent |
| 3.2 Explosive properties (IIB3.2/Pt. I-B3.2)  Determination of exothermic reactions | Internal method  Differential Scanning Calorimetry method (DSC) | FANGA RONGEUR PRO  0.049 g/kg  Brodifacoum  Batch 22/11 | One exothermic peak was observed at 249.5°C with an enthalpic difference of 487.7 J/g which is lower than the limit enthalpy difference of 500 J/g indicated in the Regulation EC n° 1272/2008 of the European Parliament and of the Council on classification, labeling and packaging of substances and mixtures.  During the third phase, neitherendothermic nor exothermic peak was observed up to 500 °C under our experimental  Conditions.  This thermodynamic information allows knowing that a test on explosive properties with EC A14 method should be required.  The test item was not considered to have explosive properties. |  | Y | 1 | 11-920010-024[[4]](#footnote-4) | Acceptable. The product is not expected to have explosive properties. |
| Literature survey on explosive properties and oxidizing properties of the ingredients of the product FANGA RAT-DICAL TECH. | 0.025 g/kg  Brodifacoum  FANGA RAT DICAL TECH  Batch 24/11 | According to the composition, the product is not expected to have explosive properties.  In addition, The DSC graph shows an exothermic effect with decomposition energy lower than 500 J/g which confirms that the product FANGA RONGEUR PRO is not likely to be explosive. | The study has been conducted on FANGA RAT-DICAL TECH. |  |  | 11-920010-28[[5]](#footnote-5) | Justification for non explosive properties have already been provided for the product FANGA RAT-DICAL TECH. Read across ot the two compositions allow to accept this justification. |
| 3.3 Oxidising properties (IIB3.3/Pt. I-B3.3) | Literature survey on explosive properties and oxidizing properties of the ingredients of the product FANGA RAT-DICAL TECH. | 0.025 g/kg  Brodifacoum  FANGA RAT DICAL TECH  Batch 24/11 | Based on most recent approach of structural formulas, none of the ingredients has any potential for oxidizing properties.  Accordingly, the product FANGA RONGEUR PRO is not expected to present a significant hazard, and testing is considered as unnecessary. | The study has been conducted on FANGA RAT-DICAL TECH. |  | 1 | 11-920010-028 | Acceptable  Justification for non oxidizing properties have already been provided for the product FANGA RAT-DICAL TECH. Read accross of the two compositions allow to accept this justification. |
| **3.4 Flash-point and other indications of flammability or spontaneous ignition (IIB3.4/Pt. I-B3.4)** | | | | | | | | |
| Flammability | EC A10 method (2008) | FANGA RONGEUR PRO  0.049 g/kg  Brodifacoum  Batch 22/11 | Humidity About 24%  Room temperature About 22 °C  Atmospheric pressure 99.8 kPa  Preliminary test  Assay 1 observations: the test item ignited and reddened at the contact of the burner’s flame but no propagation of the flame was observed.  Assay 2 observations: Same observations as for assay 1  Main test  Taking in account the results obtained during the preliminary test, no main test was performed.  The test item was not considered as highly flammable under the experimental conditions*.* |  | Y | 1 | 11-920010-024 | Acceptable. The product is not highly flammable |
| Self ignition temperature of solids | **EC** A16 method (2008) | FANGA RONGEUR PRO  0.049 g/kg  Brodifacoum  Batch 22/11 | No self ignition temperature of the test item was observed up to 400 °C (corrected value). |  | Y | 1 | 11-920010-024 | Acceptable. The product is not auto-flammable |
| 3.5Acidity/Alkalinity (IIB3.5/Pt. I-B3.5) | CIPAC MT 75.3  CIPAC Handbook J (2000) | 0.049 g/kg  brodifacoum | The pH mean value of the test item at 1% w/v in standard water was:  6.46 at 21.4 °C after 1 min.  6.46 at 21.4°C after 2 min |  | Y | 1 | 11-920010-25 | Study not provided |
| 3.6 Bulk density (IIB3.6/Pt. I-B3.6) | CIPAC MT 186  CIPAC Handbook K (2003) | FANGA RONGEUR PRO  0.049 g/kg  Brodifacoum  Batch 22/11 | The mean pour density of the test item was 0.731 ± 0.002 g/ml  The mean tap density of the test item was 0.765 ± 0.002 g/ml. |  | Y | 1 | 11-920010-024 | Acceptable |
| 3.7 Storage stability - 14 days at 54 ± 2°C | CIPAC MT46  CIPAC Handbook J (2000) | 0.049 g/kg  Brodifacoum | Test item: 25g PE bags in plastic bukcet  Aspect:  Before accelerated storage procedure for 14 days at 54±2°C: Blue/green/purple grains of wheat in white opaque plastic bucket hermetically closed.  Weight: Wbucket: 1166.4 g  After accelerated storage procedure for 14 days at 54±2°C: Blue/green/purple grains of wheat in white opaque plastic bucket hermetically closed.  Weight :Wbucket: 1164.6 g  DW = - 0.2%  The aspect of the test item was considered to be stable after an accelerated storage procedure for 14 days at 54 ± 2 °C, no significant change of weight was observed.  The packaging material was considered to be stable after an accelerated storage procedure for 14 days at 54 ± 2 °C. |  | Y | 1 | 11-920010-025 | Acceptable. The variation of active substance content can be due to the adsorption of the active substance on the matrice and to the heterogeneity of the lots. |
|  |  | Analytical quantification of brodifacoum  Before accelerated storage procedure for 14 days at 54±2°C:  The content of brodifacoum was 0.0049%  After accelerated storage procedure for 14 days at 54±2°C:  The content of brodifacoum was 0.0034%  For brodifacoum, a significant change was observed in the content in FANGA RONGEUR PRO (-30.6% deviation from T=0 value) after the accelerated storage procedure for 14 days at 54 ± 2°C | Efficacy of the product has been demonstrated with aged bait (one year). |  |  |  | Variation of active substance after storage: -30.6%. This variation can be due to the heterogeneity of the lot and the adsoption of the active substance on the grain.  Another test at 40°C is also in progress (see below).  The product is stable for 1 year. |
| CIPAC MT 75.3  CIPAC Handbook J (2000) |  | pH  Before accelerated storage procedure for 14 days at 54±2°C, the pH mean value of the test item at 1% w/v in standard water was:  6.46 at 21.4 °C after 1 min.  6.46 at 21.4°C after 2 min  After accelerated storage procedure for 14 days at 54±2°C, the pH mean value of the test item at 1% w/v in standard water was:  5.72 at 19.2 °C after 1 min.  6.24 at 19.6°C after 10 min. |  |  |  |  | Acceptable. pH is stable after accelerated storage. |
| Storage stability : 8 weeks at 40°C ± 2°C | MT 46.3 method (1995) | FANGA RONGEUR PRO  Bodifacoum  0.049 g/kg  Batch 22/11 | **Test item: PE bags**  **Aspect and packaging**  Before the accelerated storage procedure at 40°C for 8 weeks:  Blue/green/purple wheat grains  Polyethylene bags  Weight:  Wbag 8: 54.8 g  Wbag 10: 112.5 g  Wbag 11: 108.3 g  After the accelerated storage procedure at 40°C for 8 weeks:  Blue/green/purple wheat grains  Polyethylene bags  Weight:  Wbag 8: 52.3 g  Wbag 10: 107.1 g  Wbad 11: 102.9 g  Difference of weight:  DWbag 8 = -4.6%  DWbag 11 = -4.8%  DWbag 12 = -5.0% |  | Y | 1 | 12-920010-008[[6]](#footnote-6) | Acceptable |
| The aspect of the test item was considered to be stable after an accelerated storage procedure for 8 weeks at 40 ± 2 °C, no significant change of weight was observed.  The packaging material was considered to be stable after an accelerated storage procedure for 8 weeks at 40 ± 2 °C. |  | Acceptable. The packaging is stable after storage at 40°C for 8weeks. |
| **Quantitative analysis of brodifacoum**  Before accelerated storage procedure: 0.0044% w/w  After the accelerated storage procedure:  0.0038%w/w  Variation: -13.6% | In progress | Acceptable. The variations of active substance content can be due to the adsoption of the active substance on the matrice and to the heterogeneity of the lots. |
| MT 59.4 method (1995) | FANGA RONGEUR PRO  Bodifacoum  0.049 g/kg  Batch 22/11 | Before the accelerated storage procedure:   |  |  | | --- | --- | | **Test sieve** | **Mass of residue (g)** | | **250µm** | **100.0** | | **125µm** | **<0.1** | | **Collecting pan** | **<0.1** |   The dust content was lower than 0.1%.   |  |  | | --- | --- | | **Test sieves** | **% or residue** | | **5.6mm** | **<0.1** | | **4.0mm** | **1.4** | | **2.8mm** | **90.2** | | **2.0mm** | **7.8** | | **Collectin pan** | **0.6** |   The majority of the particles (90.2%) of the test item were between 2 mm and 2.8 mm.  After the accelerated storage procedure   |  |  | | --- | --- | | **Test sieve** | **Mass of residue (g)** | | **250µm** | **100.0** | | **125µm** | **<0.1** | | **Collecting pan** | **<0.1** |   The dust content was lower than 0.1%.   |  |  | | --- | --- | | **Test sieves** | **% or residue** | | **5.6mm** | **<0.1** | | **4.0mm** | **0.8** | | **2.8mm** | **89.4** | | **9.5** | **7.8** | | **Collectin pan** | **0.8** |   The majority of the particles (90.2%) of the test item were between 2 mm and 2.8 mm. |  | Y | 1 | 12-920010.008 | Acceptable. |
| MT 171 method (1995) | FANGA RONGEUR PRO  Bodifacoum  0.049 g/kg  Batch 22/11 | **Dustiness**  Before the acceleratedstorage procedure:  Mass of the test item: 30.0g  Gravimetric collected dust: 0.5mg (two essays)  The category of the test item was: 1 (nearly dust-free)  After the accelerated storage procedure:  Mass of the test item: 30.0g  Gravimetric collected dust: 0.4mg  The category of the test item was: 1 (nearly dust-free) |  | Y | 1 | 12-920010.008 | Acceptable |
| Shelf life (IIB3.7/Pt. I-B3.7) |  |  | In progress |  |  |  |  | Data required. Test started on October 2011 |
| Effect of light |  |  |  |  |  |  |  | No data provided |
| Effect of low temperature |  |  |  |  |  |  |  | No data provided |
| 3.8 Technical characteristics  (IIB3.8/Pt. I-B3.8) | | | | | | | | |
| Wettability/ Suspensibility |  |  |  | Only solid preparations |  |  |  | Not applicable |
| Wet sieve analysis |  |  |  | For WPs, SCs, granules, tablets |  |  |  | Not applicable |
| Emulsifiability |  |  |  | Only forECs and ready for use emulsions |  |  |  | Not applicable |
| Disintegration time |  |  |  | Only for tablets |  |  |  | Not applicable |
| Friability of granules; integrity of tablets |  |  |  |  |  |  |  | Data required for granulars products |
| Persistence of foaming |  |  |  |  |  |  |  | Not applicable |
| Flowability/Pourability |  |  |  | Flowability only for granular preparations, pourability only for suspensions |  |  |  | Not required since the product is ready to use and not sold as loose bait |
| Dustiness | MT 171 method (1995) | FANGA RONGEUR PRO  Bodifacoum  0.049 g/kg  Batch 22/11 | Mass of the test item: 30.0g  Gravimetric collected dust: 0.5mg (two essays)  The category of the test item was: 1 (nearly dust-free) |  | Y | 1 | 12-920010-008 | Acceptable. The product is nearly dust free |
| 3.9Compatibility with other products (IIB3.9/Pt. I-B3.9) |  |  |  |  |  |  |  | Not applicable |
| 3.10 Surface tension (Pt. I-B3.10) |  |  |  |  |  |  |  | Not applicable |
| 3.11 Viscosity (Pt. I-B3.10) |  |  |  |  |  |  |  | Not applicable |
| **3.12 Particle size distribution (Pt. I-B3.11)** | MT 59.4 method (1995) | FANGA RONGEUR PRO  Bodifacoum  0.049 g/kg  Batch 22/11 | |  |  | | --- | --- | | **Test sieve** | **Mass of residue (g)** | | **250µm** | **100.0** | | **125µm** | **<0.1** | | **Collecting pan** | **<0.1** |   The dust content was lower than 0.1%.   |  |  | | --- | --- | | **Test sieves** | **% or residue** | | **5.6mm** | **<0.1** | | **4.0mm** | **1.4** | | **2.8mm** | **90.2** | | **2.0mm** | **7.8** | | **Collectin pan** | **0.6** |   The majority of the particles (90.2%) of the test item were between 2 mm and 2.8 mm. |  | Y | 1 | 12-920010-008 | Acceptable |

**Conclusion (PAR 2014):**

The product FANGA RONGEUR PRO is a ready to use grain bait for mice and rats. The product is not flammable and not auto-flammable (temperature of auto-flammability above 400°C). It has no explosive or oxidizing properties. The pH of the product at 1%w/v in water after 2 min at 21.4°C is 6.46. The density of the product is 0.731g/mL and the tap density is 0.765g/mL. The product is nearly dust free, as less than 10mg of dust was determined with the gravimetric method.

After storage at 54°C for 14 days and at 40°C for 8 weeks in 25g PE bag, the content of active substance decreased respectively up to 30.6% and 13.6%. It can be due to the heterogenity of the lot and the adsorption of the active substance on the grain.. Data have been provided for other phyisco-chemical properties: pH before and after storage at 54°C and stability of PE bags, dust content, sieve test,dustiness before and after storage at 40°C. No change in the physico-chemical properties has been observed. Friability of the product has not been provided and is required post-registration according to CIPAC MT 178 before and after accelerated storage.

As the product is still efficacious after 1 year, Anses grants a provisionnal shelf life of 1 year. The long term storage stability study (1 year) is required post-registration.

**Data requirement:**

Friability of the product has not been provided and is required post-registration according to CIPAC MT 178 before and after accelerated storage.

The long term storage stability study (1 year) is also required post-registration.

* **Assessement of post-authorisation and the major change application -2016**

The shelf life study at ambient temperature was required in post authorization. The study was received and assessed.

Table 2: Physico-chemical properties of the biocidal product (evaluated in the addendum to the PAR 2017)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Property** | **Guideline and Method** | **Purity of the test substance (% (w/w)** | **Results** | **Reference** |
| Storage stability test – **long term storage at ambient temperature** | CIPAC 46.3  2-years storage stability | FANGA RONGEUR PRO  (0.005% w/w of brodifacoum)  Batch N° 22/11 | Determination of physico-chemical properties and storage stability test packed in PE film bag:   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | Initial | After 6 months at rt | After 12 months at rt | After 24 months at rt | | Appearance | Blue/Green/Purple wheat grains | Blue/Green/Purple wheat grains | Blue/Green/Purple wheat grains | Blue/Green/Purple wheat grains | | Appearance of packaging | Transparent PE bags | Transparent PE bags | Transparent PE bags | Transparent PE bags | | Content of AS | 0.0049% | 0.0046% | 0.0045% | 0.0039% | | Variation of AS (%) | - | -6.1% | -8.2% | -20.4% | | Difference of weight (%) |  | -2.3% | -2.5% | -3.8% | | pH value (CIPAC 75.3) | 6.46 |  |  | 7.97 |   Quantification of AS has been done by HPLC UV detection with the method evaluated in the PAR.  Conclusion:After storage at rt for 2 years in PE bag, the content of active substance decreased up to 20.4%. In addition, there is an increase of pH value and a reduction in the weight of the test item. The studies of stability allow to consider that the product is not stable in these various packaging (PE film bag) and these conditions. | CHAGAR, S. (2014), Study N° 11-920010-026 |
| Particle size distribution, content of dust | CIPAC 94.6  CIPAC MT171 | FANGA RONGEUR PRO  (0.005% w/w of brodifacoum)  Batch N° 22/11 | Particle size distribution (by dry sieving) after 24 months:   |  |  | | --- | --- | | Test sieves | % of residues | | 4.0 mm | 2.7 | | 2.8 mm | 91.4 | | 2.0 mm | 5.7 | | 1.4 mm | 0.0 | | Pan | 0.0 |   Dust content:   |  |  | | --- | --- | | Test sieves | % of residues | | 250 µm | 99.9 | | 125 µm | 0.1 | | Pan | <0.1 |   Conclusion: 91.4 % of the test item have a size between 2.0 mm and 4.0 mm. The dust content of the test item represents less than 0.1%. When the product is supplied in bulk, eCA recommends wearing protecting gloves and a respiratory protection equipment during decanting. | CHAGAR, S. (2014), Study N° 11-920010-026 |
| Flowability | CIPAC MT 172 | FANGA RONGEUR PRO  (0.005% w/w of brodifacoum)  Batch N° 22/11 | Mass of the test item: 50g  The test item did not dropped spontaneously through the 5-mm sieve.  After a 14 days storage at 54°C, the mean percentage of test item retained on the 5-mm sieve after 5 liftings was:  0.0% w/w on assay n°1 and 0.2% on assay n°2 | GREVIN, S. (2015), Study N° 12-920010-007 |
| Attrition resistance (friability) | CIPAC MT 178 | FANGA RONGEUR PRO  (0.005% w/w of brodifacoum)  Batch N° 22/11 | The attrition resistance of the test item was 99.8% before storage. | GREVIN, S. (2015), Study N° 12-920010-007 |

Packaging tested during the storage stability studies: Polyethylene bags.

Since the product is a solid, FANGA RONGEUR PRO is compatible with all claimed packaging

* + - **Minor change application - 2022**

The applicant has submitted a minor change application in order to extend the shelf life from 12 to 24 months. Data previously assessed for the product FANGA RONGEUR PRO can be used for the assessment of the minor change of the product SANIFAR.

In the renewal assessment, eCA has granted a shelf life of 12 months since above the time point, decrease of a.i content was higher than 10% (-20.4%) and no justification during the renewal assessment was provided to explain such variations.

The applicant of FANGA RONGEUR PRO has provided the following statement in the frame of this minor change application:

“A storage stability test - long term storage at ambient temperature was provided to the authorities to obtain a shelf-life of 24 months for the product FANGA RONGEUR PRO[[7]](#footnote-7). Because the variations of the active substance (brodifacoum) in the product after 24 months was above the tolerance of 10 % (deviation of -20.4% / T0), authorities have not accepted to deliver an authorization for the product FANGA RONGEUR PRO with a shelf-life of 24 months. By receiving the new authorization after the renewal time, TRIPLAN has decided to analyze a sample of product FANGA RONGEUR PRO, aged of 79 months and stored at room temperature. After an extraction of the active substance (brodifacoum) by a BPL laboratory, the deviation was only - 6.1 % / T0. That proves the stability of the product FANGA RONGEUR PRO during 79 months[[8]](#footnote-8). With this result and because the shelf-life of 79 months was proved, we can thus conclude the shelf-life of 24 months for the product FANGA RONGEUR PRO.”

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Property** | **Guideline and Method** | **Purity of the test substance (% (w/w)** | **Results** | **Reference** |
| Storage stability test – **long term storage at ambient temperature** | CIPAC 46.3  2-years storage stability | FANGA RONGEUR PRO  (0.005% w/w of brodifacoum)  Batch N° 22/11 | Determination of physico-chemical properties and storage stability test packed in PE film bag:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | Initial | After 6 months | After 12 months | After 24 months at rt | After 79 months | | Appearance | Blue/Green/Purple wheat grains | Blue/Green/Purple wheat grains | Blue/Green/Purple wheat grains | Blue/Green/Purple wheat grains | / | | Appearance of packaging | Transparent PE bags | Transparent PE bags | Transparent PE bags | Transparent PE bags | / | | Content of AS | 0.0049% | 0.0046% | 0.0045% | 0.0039% | 0.0046% | | Variation of AS (%) | - | -6.1% | -8.2% | -20.4% | -6.1% | | Difference of weight (%) |  | -2.3% | -2.5% | -3.8% | / | | pH value (CIPAC 75.3) | 6.46 |  |  | 7.97 | / |   Additional applicant explanation:  Quantification of AS has been done by HPLC UV detection with the method evaluated in the PAR.  The samples are t=0 and T=79 months are identical and the analytical method used for the determination of a.i content in the product is the same at all intermediate time points. Variations on storage are due to the heterogeneity of the product and consequently it cannot be read as a degradation of active substance. | B. Demangel, 07 May 2018, report N° 11-920010-026 amended |

New data after storage 79 months at ambient temperature have been submitted. Applicant has specified that samples tested at t= 0 and t=79 months are the same samples and that the analytical method used for the quantification remains unchanged.

Based on FR experience with other AVK products, FR considers explanation based on heterogenoity of product are not acceptable but more likely due to a binding of the substance after storage and the extraction of sample at 79 months was performed more deeply. However, to cover any potential issue, several aspects based on the fate of degradation products and on efficacy results may have to be taken into account:

* + Efficacy results have been submitted and allow to support a shelf life of 2 years, meaning that if there was a loss of active ingredient content, efficacy would not be altered.
  + Regarding toxicological/ecotoxicological issue, it has to be noted that the active substance carries the most severe hazard classification for Acute Mammalian Toxicity (Category 1), Toxic to Reproduction (Category 1), STOT RE (Category 1), Acute Aquatic Toxic (Category 1) and Chronic Aquatic Toxicity (Category 1). If the decrease in measured concentration of active substance during storage were to represent chemical degradation rather than increased binding to the matrix, it is clear that any degradation products could not carry a higher hazard classification than the active substance itself. Moreover as the risk assessments for the active substance in the product identified unacceptable risks for human health and for the environment such that the product could only be authorised with risk mitigation measures to minimise human and environmental exposure, conversion of the active substance to degradation products would not be expected to result in more severe outcomes for the risk assessments. Additionally, no relevant impurity occuring from a degradation of active ingredient has been reported in the CAR of the active substance and regulation 2017/1380. The temperature of decomposition for bromadiolone is also higher than 200°C, meaning that an issue on degradation can be excluded.

On this basis, eCA accepts to increase the shelf life from one to two years with a requirement that for renewal of the product, a complete acceptable shelf life study need to be submitted.

**Post authorization:** A new shelf life study in accordance with the current guideline should be provided at the renewal of the product SANIFAR in order to confirm the results provided with this dossier.

### Analytical methods for detection and identification

#### Analytical method for determining the active substance and relevant component in the biocidal product – PAR- 2014

Analytical method for the determination of brodifacoum in the product has been provided.

Principle of the method: brodifacoum is analyzed after extraction from the product with methanol, filtered and quantified by reverse phase HPLC-UV.

Chromatographic conditions:

Colum: Zorbax SB Phenyl, length: 25cm, internal diameter: 3.0mm, granulometry: 5.0µm, Agilent.

Detector: UV, 265nm.

Mobile phase: Eluent A acetonitrile, Eluent B water/acetic acid 34/1.

|  |  |  |  |
| --- | --- | --- | --- |
| **Time (min)** | **Eluent% A** | **Eluent %B** | **Rate (mL/min)** |
| 0  15 | 70  70 | 30  30 | 1.0  1.0 |

Rate: 1(mL/min).

Oven temperature: 30°C.

Volume injected: 20µL.

Retention times (min): 4.9 for brodifacoum I and 5.4 for brodifacoum II.

Linearity was performed with 5 calibration standards, prepared in methanol, from 0.51 to 1.50mg/L. The same linearity was used for the determination of active substance in the product FANGA RONGEUR PRO and FANGA BLOC SP PRO.

Precision was performed by analyzing twice five samples of FANGA BLOC SP PRO. The extraction is the same as for FANGA RONGEUR PRO.

Specificity and accuracy were performed with the formulation FANGA RONGEUR PRO:

Test item: FANGA RONGEUR PRO, Batch 22/11.

Blank formulation (FANGA RONGEUR PRO): Batch 27/11.

Reference item: brodifacoum, purity 99.3%, batch SZB8324XV (supplier: SIGMA Aldrich).

Results are summarized in the following table.

Table3: Analytical method for the determination of brodifacoum (reverse phase HPLC-UV)-PAR - 2014

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample** | **Test substance** | **Analytical method** | **Fortification range/ number of measurements** | **Linearity** | **Specificity** | **Recovery rate (%)** | | | **Repeatability** | **Reference** |
| **range** | **Mean** | **St dev.** |
| FANGA RONGEUR PRO  Batch 22/11  Blank formulation  Batch 27/11 | brodifacoum | reverse phase HPLC-UV | Fortification levels: reconstituted sample at 1 concentration level (0.005%, 1mg/L in solution after dilution).  Two samples prepared and analysed in duplicate. | 0.51-1.50mg/L  Y= 1.4717x -0.09  R2=0.9965 | No interference observed in solvent blank and formulation blank. | 100-101%  2 reconstituted sample at 0.005% of brodifacoum in duplicate (1mg/L). | 100.5% | SD: 0.58  RSD: 0.57% | 5 samples (FANGA BLOC PRO) in duplicate  Mean: 0.0045% (w/w)  SD:0.0001  RSD: 2.90%  Horwitz value: 6.04 | RICAU hélène, report No. 11-920010-015, May 2012  RICAU Hélène, report No. 11-920010-031, February 2012 |

Chromatograms were provided for the formulation blank, reference item and test item (at 0.005% w/w of active substance). No interference has been observed at the retention time of brodifacoum. Specificity of the method is acceptable.

Linearity has been demonstrated with 5 calibration standards.

According to Sanco/3030/99 rev.4, recoveries should be between 80-120% for active substances with nominal content below 0.01%. Accuracy is acceptable.

RSD is below Horwitz value. Repeatability is acceptable.

It is concluded that the provided method is validated and acceptable for the product FANGA RONGEUR PRO.

#### Analytical methods for determining relevant components and/or residues in different matrices - PAR - 2014

The analytical methods for determination of residues of active substance in different matrices (soil, air, drinking and surface water, body fluids and tissues, in food and feedstuff) provided in the CAR of the active substance are presented in annex 3 of this document.

Since there is no risk of contact with alimentation, no analytical method is required for the determination of brodifacoum residues in food and feedstuff.

* **Renewal 2017**

For the renewal, no additional information has been provided

## Risk assessment for Physico-chemical properties

FANGA RONGEUR PRO is a ready-to-use grain bait. The product is not highly flammable, not auto-flammable (up to 400°C), not explosive and does not have oxidizing properties,

The variation of the active substance after storage at 54°C in 25 g PE bags is above 5 %. It can be due to the heterogeneity of the lot and the adsorption of the active substance on the grain. Efficacy of the product has also been demonstrated with aged bait.

***Risk mitigation measures linked to assessment of physico-chemical properties***

* Store away from light.
* **Renewal 2017**

**General conclusion on the physical, chemical and technical properties of the product for renewal of national authorisation applications.**

The product FANGA RONGEUR PROis a ready to use grain bait formulation. All studies have been performed in accordance with the current requirements. It is not explosive and has no oxidising properties. The product is not flammable.

The appearance of the product Blue/Green/Purple wheat grains. The biocidal product is stable 1 year at ambient temperature with PE sachet.

Considering that the product is a solid and it is compatible with PE sachet, compatibility with other claimed packagings is considered acceptable.

eCA recommends to store away from light due to the sensitivity of the active substance to light.

Its technical characteristics are acceptable for a ready to use grain bait formulation.

Analytical methods are acceptable

## Effectiveness against target organisms

### Function

MG 03: Pest Control.

Product Type 14: Rodenticide.

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

According to the uses claimed by the applicant during the first authorisation, the product FANGA RONGEUR PRO is intended to be used to control rats and mice. The target organisms to be controlled are *Mus musculus*, *Rattus norvegicusand Rattus rattus*.

FANGA RONGEUR PRO is used indoor by professional users.The products, organisms or objects to be protected arepublic and private buildings, and farms.

The application rates recommended by the applicant are the following (see also Annex 0a):

Rats: 180-200 g grains/secured bait point separated by 5-10 m.

Mice: 50 g grains/secured bait point separated by 1-2 m.

### Effect on target organisms and efficacy

Brodifacoum is a second-generation single dose anticoagulant which prevents blood clotting in the target.

Clinical signs are progressive and occur three days after the ingestion of a toxic dose, leading to the death of target animal within 4 to 7 days after, according to the laboratory tests performed.

The applicant submitted the following studies:

* Study n°: ROD 2012 03: laboratory study:

For brown rats (*Rattus norvegicus*), the mean palatability percentage is very low with 11 % and the mortality percentage is 90%.

For house mice (*Mus musculus*), the mean palatability percentage is 35 % and the mortality percentage of 90%.

No efficacy test with *Rattus rattus* has been carried out in this dossier

Considering the results obtained in these trials, efficacy of the product FANGA RONGEUR PRO is not proved.

New efficacy studies on *Rattus norvegicus*, reported below, have been performed by the applicant to complete the efficacy dossier.

* Study n° 12 TOX24-10: laboratory study

For brown rats (*Rattus norvegicus*), the mean palatability percentage is 68 % and the mortality percentage is 90%.

* Study n°12 TOX24-17: field study

For brown rats (*Rattus norvegicus*), the assessed bait has been very well accepted and the efficacy is estimated at 96.20%.

French competent authorities (FR CA) consider that the elements presented in the dossier are not sufficient to demonstrate the efficacy of the product against mice (*Mus musculus*). Indeed, according to the TNsG[[9]](#footnote-9), field tests should have been performed to confirmed the efficacy of the product FANGA RONGEUR PRO for *Mus musculus*. This view has been shared by other member states during a European consultation.

French competent authorities (FR CA) consider that the elements presented in the dossier are sufficient to demonstrate the efficacy of the product against *Rattus norvegicus*. However FR CA also consider that for the claim ”use against rats”, efficacy must be shown on both species *R. Norvegicus* and *R. Rattus*. Considering that no supporting data on *Rattus rattus* were provided, suitable information (such as a field test) demonstrating the efficacy of FANGA RONGEUR PRO against black rat, will need to be provided in support of the authorisation.

* **Post authorisation requirements – 2016**

Following the post authorisation requirements, the following studies were submitted:

* Study n° 14TOX015, laboratory study with aged bait:

For black rats (*Rattus rattus*), the mean palatability percentage of FANGA RONGEUR PRO (0.005 % brodifacoum wheat bait) was 41 % and the mortality percentage was 100 %.

* Study n° 15TOX054, laboratory study with aged bait:

For black rats (*Rattus rattus*), the mean palatability percentage of FANGA B+ RONGEUR (0.001 % brodifacoum wheat bait), aged of 2 years, was 41 % and the mortality percentage was 90 % (from day 5 to day 7).

* Study n°2009.BCD.SAG13 :

For black rats (*Rattus rattus*),FANGA B+ RONGEUR (0.001 % brodifacoum wheat bait) the assessment of the bait (2 years) has been very well accepted and the estimated efficacy is 100%.

The laboratory tests presented confirm that the palatabilty of the both formulation FANGA B+ RONGEUR and FANGA RONGEUR PRO are indentical for black rats then a read accross between both formaulations is acceptable.

French competent authorities (FR CA) consider that the elements presented in the dossier are sufficient to demonstrate the efficacy of the product FANGA RONGEUR PRO against *Rattus norvegicus, Rattus rattus* and *Mus musculus*. Furthermore, the studies performed with aged baits confirmed that the product remains effective 2 years after production.

All efficacy studies are presented in annex 9.

* **Major change application 2016**

For the major change claimed by the applicant in 2016, FANGA RONGEUR PRO is intended to be used to control rats and mice in and around buildings, open areas by professional and non-professional users and in waste dumps for professional users only. The target organisms to be controlled are *Mus musculus*, *Rattus norvegicus* and *Rattus rattus*.The products, organisms or objects to be protected arepublic and private buildings, and farms and public health.

The application rates recommended by the applicant are the following:

In and around buildings, open areas and waste dumps

Rats: 180-200 g per baiting point separated by 5 -10 m.

Mice: 30-40 g per baiting point separated by 1 - 2 m.

* For the major application change, the applicant required an authorization for use against mice.

New field study was conducted with FANGA RONGEUR PRO, on *Mus musculus*, with aged bait, to confirm the efficacy of the biocidal product for this species with aged bait.

Study n°2011.BCD.SAG15, field study with aged bait

For house mice (*Mus musculus*), FANGA RONGEUR PRO(0.005 % brodifacoum wheat bait) aged of 2 years showed a high acceptance level and efficacy was estimated at 100 % against the population present across the trial site.

French competent authorities (FR CA) consider that the new elements presented in the dossier are sufficient to demonstrate the efficacy of the product FANGA RONGEUR PRO against *Mus musculus*.

So, French competent authorities (FR CA) consider that the elements presented in the dossier are sufficient to demonstrate the efficacy of the product FANGA RONGEUR PRO against *Rattus norvegicus, Rattus rattus* and *Mus musculus*.

The efficacy study for the major change is presented in annex 9b.

* **Renewal 2017:**

For the renewal of the product FANGA RONGEUR PRO (0.005 % w/w brodifacoum), no change in the composition has been declared. The efficacy evaluation is based on the efficacy studies submitted by the applicant for the post authorisation requirements and the major application change.

Consequently, the product FANGA RONGEUR PRO (0.005 % w/w brodifacoum) has shown a sufficient efficacy and can be used for the control of rats (*Rattus norvegicus* and *Rattus rattus*) and house mice (*Mus musculus*) at doses claimed.

Uses and doses validated for FANGA RONGEUR PRO are the following:

|  |  |  |  |
| --- | --- | --- | --- |
| **Product** | **Target organisms** | **Application rate and intervals** | **Use area** |
| FANGA RONGEUR PRO  Bait containing 0.005% w/w of brodifacoum. | Rats (*Rattus norvegicus* and *Rattus rattus)* | 180-200 g / bait point separated by 5 - 10 meters | In and around buildings, open areas, waste dumps and landfills |
| Mice (*Mus musculus*) | 30-40 g / bait point separated by 1 - 2 meters | In and around buildings, open areas, waste dumps and landfills |

* + - **Minor change application for SANIFAR - 2022**

The product SANIFAR(0.005 % w/w brodifacoum), same of the product FANGA RONGEUR PRO, was initially authorized for use against *Mus musculus*, *Rattus norvegicus* and *Rattus rattus*, in and around buildings, open areas, waste dumps and landfills by professional users, with a shelf life of 1 year.

The initial validated application rates were the following:

* Rats (brown rats, black rats): 180- 200 g bait/secured bait point separated by 5-10 m.
* Mice (house mice): 30-40 g bait/secured bait point separated by 1-2 m.

Now the applicant requires a longer shelf-life up to 24 months at the same rates.

The evaluation is based on the efficacy studies submitted by the applicant for the first authorisation, the major change and the renewal applications of FANGA RONGEUR PRO and efficacy test on the biocidal product FANGA B+ RONGEUR for which a letter of access has been provided by TRIPLAN.

The main difference between both products is the concentration of active substance: FANGA B+ RONGEUR contains 0.001 % w/w of brodifacoum and SANIFAR contains 0.005% w/w of brodifacoum, other components are the same to nearly the same concentrations. Therefore efficacy studies conducted with FANGA B+ RONGEUR are acceptable to demonstrate the efficacy of SANIFAR.

- Study n°2074.BCD.SAG17 :

For brown rats (*Rattus norvegicus*), the assessment of the bait (59 months aged FANGA B+ RONGEUR) has been very well accepted and the estimated efficacy is 100%.

- Study n°2075.BCD.SAG17 :

For black rats (*Rattus rattus*), the assessment of the bait (58 months aged FANGA B+ RONGEUR) has been very well accepted and the estimated efficacy is 100%.

- Study n°2011.BCD.SAG15 :

For black rats (*Rattus rattus*), the assessment of the bait (24 months aged FANGA RONGEUR PRO) has been very well accepted and the estimated efficacy is 100%.

Submitted efficacy data are compliant with the requirements of the guidance ECHA, volume II parts (B+C) and the results of these tests are respecting the criteria of the guidance ECHA, volume II parts (B+C).

The product SANIFAR (0.005 % w/w brodifacoum) has shown a sufficient efficacy and can be used for the control of rats (Rattus norvegicus and Rattus rattus) and house mice (Mus musculus) at doses following :

* Rats: 180- 200 g grains/secured bait point separated by 5-10 m.
* Mice: 40 g grains/secured bait point separated by 1-2 m.

As for mice, no new field test with aged bait has been submitted in frame of this NA-MIC at the minimum dose level claimed, the range 30-40 g cannot be accepted and only the maximum dose of 40 g is validated.

French competent authorities (FR CA) consider that the elements presented in the dossier are sufficient to demonstrate the efficacy of the product SANIFAR against *Rattus norvegicus*, *Rattus rattus* and *Mus musculus* in and around buildings, open areas, waste dumps and landfills by professional users with a shelf-life of two years.

All efficacy studies are presented in annex 9b and the compositions of all tested products are presented in the confidential part of the PAR.

### Mode of action including time delay -PAR - 2014

Brodifacoum acts as a vitamin K antagonist. It interferes with the regeneration of prothrombin disturbing the normal blood clotting mechanisms and increasing tendency to bleed.

The main site of its action is the liver, where several of the blood coagulation precursors under vitamin-K dependent post translation processing take place before they are converted into the respective procoagulant zymogens.

Brodifacoum works by blocking the regeneration of vitamin K 2,3-epoxide to vitamin K hydroquinone. Since the amount of vitamin K in the body is finite, the progressive block of the regeneration of vitamin K will lead to an increasing probability of a fatal haemorrhage.

Death of target animal occurs 4 to 7 days after ingestion.

### Occurrence of resistance - resistance management / Unacceptable effect

* **For the first authorisation 2014**

Resistance to the first generation anticoagulants has been widely reported in both *Rattus norvegicus* and *Mus domesticus* since the late 1950's. The incidence of resistance to first generation anticoagulants in areas in which it is established is commonly 25-85%. Some degree of resistance to difenacoum has been reported in the UK, Denmark, France and Germany but this is usually found in certain populations of rodents highly resistant to first generation anti-coagulants (Greaves et al., 1982[[10]](#footnote-10); Lund, 1984[[11]](#footnote-11); Pelz et al. 1995[[12]](#footnote-12)). The resistance factor tells how much the anticoagulant dose has to be multiplied to kill resistant individuals compared to sensitive ones. The resistant factors for difenacoum in the brown rats ranged from 1.1 to 8.6 (Greaves and Cullen-Ayres 1988[[13]](#footnote-13)). The study included rats resistant to warfarin and difenacoum. Resistance factors for warfarin ranged from approx. 50 to 2300. Greaves et al. (1982) reported a fivefold difenacoum dose needed to kill difenacoum resistant rats. Considerable doubt exists as to the significance of reports in UK of resistance to second-generation anticoagulants and in the UK control failures with the second-generation products are increasingly being attributed to baiting problems rather than physiological resistance (Greaves and Cullen Ayres, 1988; Quy et al. 1992a,b[[14]](#footnote-14)).

Recent studies carried out in different European countries, in the UK more particularly (Kerins *et al*, 2001; see annex 1) revealed the occasional occurrence of cross-resistances to second-generation anticoagulants, such as difenacoum and bromadiolone on resistant brown rats (*Rattus norvegicus*) populations to coumafene. Moreover, a recent publication (Baer *et al*., 2012) has demonstrated that the majority (91%) of warfarin resistant rat trapped in East and West parts of Belgium were also resistant to bromadiolone. The rats trapped in the region of Flanders (Northern Belgium) carried mutation Y139F. This mutation is found extensively in France where it also confers resistance to bromadionone (Grandemange *et al*., 2009). More recently, the same mutation was also found in UK (Prescott *et al*., 2011) where applications of bromadiolone had been unsuccessful. Difenacoum is also thought to be partially resisted by rats which carry Y139F. So, resistance to second generation anticoagulant rodenticides should not be minimized.

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

*Resistance management strategies*

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

CropLife International has published a strategy for resistant management of rodenticides (RRAC 2003). The habitat management is addressed in the strategy in addition to chemical control. The access of rodents should be restricted by physical barriers and no food should be available for rodents. Rotation between different anticoagulants is not a reliable means of managing the anticoagulant resistance, as all anticoagulants have the same mode of action and the nature of resistance is also similar. The resistant individuals can be identified by conducting a blood clotting response (BCR) test (Gill et al. 1993, RRAC 2003). The problem with the BCR test is that it has proven difficult to standardize and it produces both false positives and negatives (Pelz et al. 2005). In order to follow the occurrence and spread of difenacoum resistance, wild rats should be continuously monitored for resistance in the rodent controlled area. The recommendations of CropLife International are quoted below.

**To avoid the development of resistance in susceptible rodent populations:**

* When anticoagulant rodenticide is used, ensure that all baiting points are inspected weekly and old bait replaced where necessary.
* Undertake treatment according to the label until the infestation is completely cleared.
* On completion of the treatment remove all unused baits.
* Do not use anticoagulant rodenticides as permanent baits routinely. Use permanent baits only where there is a clear and identified risk of immigration or introduction or where protection is afforded to high-risk areas.
* Monitoring of rodent activity should be undertaken using visual survey, through the use of non-toxic placebo monitors or by other effective means.
* Record details of treatment.
* Where rodent activity persists due to problems other than resistance, use alternative baits or baiting strategies, extend the baiting programme or apply alternative control techniques to eliminate the residual infestation (acute or sub-acute rodenticides, gassing or trapping).
* Ensure that complete elimination of the infestation is achieved.
* As appropriate during the rodenticide treatment, apply effective Integrated Pest Management measures (remove alternative food sources, water sources and harbourage and, proof susceptible areas against rodent access).

**Treatment of rodent infestations containing resistant individuals:**

* Where rodent infestations containing resistant individuals are identified, immediately use an alternative anticoagulant of higher potency. If in doubt, seek expert advice on the local circumstances.
* Alternatively use an acute or sub-acute but non-anticoagulant rodenticide.
* In both cases it is essential that complete elimination of the rodent population is achieved. Where residual activity is identified apply intensive trapping to eliminate remaining rodents. Gassing or fumigation may be useful in specific situations.
* Apply thorough Integrated Pest Management procedures (environmental hygiene, proofing and exclusion).
* Do not use anticoagulant rodenticides as permanent baits as routine. Use permanent baits only where there is a clear and identified risk of immigration or introduction or where protection is afforded to high risk areas.
* Record details of treatment.

**Application of rodent control in area or block to eliminate resistance:**

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

The authorisation holder should report any observed resistance incidents to the Competent Authorities (CA) or other appointed bodies involved in resistance management every two years.

* **Renewal 2017**

Resistance to the first generation anticoagulants has been widely reported in both Rattus norvegicus and Mus domesticus since the late 1950's. The incidence of resistance to first generation anticoagulants in areas in which it is established is commonly 25-85%.

The enzyme vitamin K 2, 3 epoxide reductase (VKOR) is the target for anticoagulants. Modifications in the protein structure due to polymorphisms on the gene coding the VKOR may induce anticoagulant resistance. Most resistant strains are characterised by one single nucleotide polymorphism (SNP). These SNPs cause the exchange of one amino acid in the VKOR enzyme. The biochemical mechanism of anticoagulant resistance has been studied in several geographic strains/VKORC1-variants of the Norway rat. Amino acid substitutions in the VKOR seem to alter its structure and function, resulting in decreased sensitivity to anticoagulant inhibition, depending on strain characteristics.

For house mice, a dominant autosomal warfarin-resistance gene was determined on chromosome 7 in house mice. Three VKORC1 sequence variants mediating resistance to anticoagulants seem to be widely distributed. House Mice carrying the homozygous of one of these variants (Y139C) were found highly resistant to warfarin and bromadiolone.

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

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

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

House mice carrying the homozygous Y139C sequence variant were found to be highly resistant to warfarin and bromadiolone.

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

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

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

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

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

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

* **Minor change applicationfor SANIFAR - 2022**

**Post authorization:** In France only: The authorisation holder has to monitor the resistance phenomenon of rodent populations toward the active substance brodifacoum. Results of the resistance monitoring must be submitted at the renewal of the product.)

### Evaluation of the label claim

For first authorisation, French competent authorities (FR CA) assessed that the product FANGA RONGEUR PRO has shown a sufficient efficacy for the control of *Rattus norvegicus*. But for the claim ”use against rats”, efficacy must be also shown on *R. Rattus*. So, in the absence of supporting data on *Rattus rattus*, suitable information (such as a field test) demonstrating the efficacy of FANGA RONGEUR PRO against black rat will need to be provided in support of the authorisation.

The application rates validated are the following

Rats (Rattus norvegicus and Rattus rattus): 180-200 g grains/secured bait point separated by 5-10 m.

The product FANGA RONGEUR PRO is supplied in sachets of different amounts. The applicant has to adapt the sachets sizes to the efficient doses. The amount of bait per bait station or bait points must not exceed the recommended application rates.

Bait points should be controlled 3 days after the first application then once a week.

* **Major change application 2016**

Regarding the major change, French competent authorities (FR CA) assessed that the product FANGA RONGEUR PRO has shown a sufficient efficacy for the control of *Rattus norvegicus, Rattus rattus and Mus musculus*.

The application rates validated are the following:

House mice: 30-40 g baiting point separated by 1-2 m

Rats: 180-200 g per baiting point separated by 5 -10 m.

* **Renewal application 2017**

Regarding the renewal, French competent authorities (FR CA) assessed that the product FANGA RONGEUR PRO has shown a sufficient efficacy for the control of mice (*Mus musculus*) and rats (*Rattus norvegicus and Rattus rattus*) in and around buildings, in open areas by professional and non professional users, and in waste dumps and landfills by professional users only.

The application rates validated are the following:

House mice (Mus musculus): 30 - 40 g baiting point separated by 1-2 m.

Rats (Rattus norvegicus and Rattus rattus): 180 - 200 g baiting point separated by 5-10 m

* **Minor change applicationfor SANIFAR - 2022**

French competent authorities (FR CA) consider that the elements presented in the dossier are sufficient to demonstrate the efficacy of the product SANIFAR against *Rattus norvegicus*, *Rattus rattus* and *Mus musculus,*in and around buildings, open areas, waste dumps and landfills by professional users with a shelf-life of two years.

The application rates validated are the following:

* Rats (*Rattus norvegicus* and *Rattus rattus*): 180-200 g bait point separated by 5-10 m.
* Mice (*Mus musculus*): 40 g / bait point separated by 1-2 m.

As for mice, no field test with aged bait has been submitted at the minimum dose level claimed, the range 30-40 g cannot be accepted and only the maximum dose of 40 g is validated.

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

**Post authorization:** In France only: The authorisation holder has to monitor the resistance phenomenon of rodent populations toward the active substance brodifacoum. Results of the resistance monitoring must be submitted at the renewal of the product.)

### Conclusion of the efficacy assessment

* **For the first authorisation 2014**

The product FANGA RONGEUR PRO has shown a sufficient efficacy and can be used for the control of rats (Rattus norvegicus and Rattus rattus) indoor.

French competent authorities (FR CA) assessed that the product FANGA RONGEUR PRO has shown a sufficient efficacy for the control of Rattus norvegicus. But for the claim ”use against rats”, efficacy must be also shown on R. Rattus. Consequently, in the absence of supporting data on Rattus rattus, suitable information (such as a field test) demonstrating the efficacy against black rat of FANGA RONGEUR PRO will need to be provided in support of the authorisation.

The authorisation holder should report any observed resistance incidents to the Competent Authorities (CA) or other appointed bodies involved in resistance management every two years.

***Conditions of use linked to efficacy assessment***

***For professional user***

* Adapt the number of bait points to the infestation level.
* Inspect and resupply the bait points, 3 days after application then once a week as long as the bait is consumed.
* Remove all bait points after the end of treatment.
* The amount of bait per bait point and distances between bait points must be respected. Products have always to be used in accordance with the label.

The users should inform is the treatment is ineffective and report straightforward to the registration holder any alarming signals which could be assumed to be resistance development.To avoid resistance, professional users must:

* use the treatment alternately with other kinds of active substances having different modes of action;
* adopt integrated pest management methods such as the combination of chemical, physical control methods and other public health measures;
* monitor the level of efficacy (periodic check), and investigate the case of reduced efficacy for possible evidence of resistance;
* not use the product in areas where resistance is suspected or established.

***Recommendations to be taken into account by the applicant***

* Adapt the amount of bait per bait point to the validated effective dose.
* Adapt the sachets sizes to the efficient doses.
* The product label has to contain information on resistance management for rodenticides.

***Required information linked to efficacy assessment***

* The authorisation holder has to monitor the resistance phenomenon of rodent populations toward the active substance brodifacoum, and resistance strategies management must be put in place. Results of the resistance monitoring must be submitted to the Competent Authorities (CA) or other appointed bodies involved in resistance management every 2 years.
* A field test demonstrating the efficacy of FANGA RONGEUR PRO against black rat (Rattus rattus), performed with a 1 years old product, must be submitted.
* **For the major change application 2016**

Following the submission of new efficacy data in post authorisation procedure, French competent authorities (FR CA) assessed that the product FANGA RONGEUR PRO has shown a sufficient efficacy for the control of rats (*Rattus norvegicus and Rattus rattus*).

For the major change, French competent authorities (FR CA) assessed that the product FANGA RONGEUR PRO has shown a sufficient efficacy for the control of Rattus norvegicus, Rattus rattus and Mus musculus.

The application rates validated are the following:

House mice: 30-40 g baiting point separated by 1-2 m

Rats: 180-200 g per baiting point separated by 5 -10 m.

***Conditions of use linked to efficacy assessment***

**For professionnals users**

The conditions of use linked to efficacy assessment for the professional users remain unchanged.

**For non professional users**

* Adapt the number of bait points to the infestation level.
* Inspect and resupply the bait points, 3 days after application then once a week as long as the bait is consumed.
* Remove all bait points after the end of treatment.
* The amount of bait per bait point and distances between bait points must be respected. Products have always to be used in accordance with the label.
* The users should inform is the treatment is ineffective and report straightforward to the registration holder any alarming signals which could be assumed to be resistance development.
* **Renewal 2017**

Regarding the renewal of the authorisation, French competent authorities (FR CA) assessed that the product FANGA RONEGUR PRO has shown a sufficient efficacy for the control of mice (*Mus musculus*) and rats (*Rattus norvegicus* and *Rattus rattus*) in and around buildings, in open areas in waste dumps and landfills by professional users only.

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

* **Minor change application for SANIFAR - 2022**

French competent authorities (FR CA) considers that the elements presented in the dossier confirm the efficacy of the product SANIFAR against rats (*Rattus rattus and Rattus norvegicus*) and mice (*Mus musculus*) for use in and around buildings, open areas, waste dumps and landfills by professional with a shelf-life of two years.

## Description of the intended use

* **First authorisation 2014**

The product FANGA RONGEUR PRO is intended to be used for the control of rodents indoor by professional users. The target species claimed by the applicant are mice and rats.

**Efficacy against rats (Rattus norvegicus and Rattus rattus) only has been validated: 180-200 g grains/secured bait point separated by 5-10 m.**

Nevertheless, the risk assessment for human health and the environment was conducted according to the initial claim:

Rats: 180-200 g grains/secured bait point separated by 5-10 m.

Mice: 50 g grains/secured bait point separated by 1-2 m.

The product is a ready-to-use grain bait with no dilution nor other substances added for application. The mode of application claimed by the applicant is a manual application by professional users in secured bait point (bait stations).

* **Major change application 2016**

According to the major application change, FANGA RONGEUR PRO is intended to be used to control rats and mice in and around buildings, open areas for professional and non-professional users and in waste dumps for professional users. The target organisms to be controlled are *Mus musculus*, *Rattus norvegicus* and *Rattus rattus*.The products, organisms or objects to be protected arepublic and private buildings, and farms and public health.

The application rates validated are the following:

In and around buildings, open areas and waste dumps

Rats: 180-200 g per baiting point separated by 5 -10 m.

Mice: 30-40 g per baiting point separated by 1 - 2 m.

* **Renewal 2017**

In the frame of the renewal of the authorisation, the product FANGA RONEGUR PRO is intended to be used for the control of rodents in and around buildings and in open areas , in waste dumps and landfills by professional users only. The target species claimed by the applicant are mice and rats.

**Efficacy is demonstrated at the following dosage:**

**Rats: 180 - 200 g /secured bait point separated by 5-10 m**

**House mice: 30 - 40 g /secured bait point separated by 1-2 m**

The product is a ready-to-use grain bait with no dilution nor other substances added for application. The mode of application claimed by the applicant is a manual application by professional users in secured bait point (bait stations).

* **Minor change application for SANIFAR - 2022**

The product SANIFAR is intended to be used against black rats (*Rattus rattus*), brown rats (*R*a*ttus norvegicus*) and mice (*Mus musculus*) for use in and around buildings, open areas, waste dumps andlandfillsby professionalwith a shelf-life of two years.

Efficacy is demonstrated at the following dosage:

* Rats: 180-200 g grains/secured bait point separated by 5-10 m.
* Mice: 40 g grains/secured bait point separated by 1-2 m.

## Risk assessment for human health

### Hazard potential

#### Toxicology of the active substance –initial PAR – 2014 updated 2017

The toxicology of the active substance was examined extensively according to standard requirements.

The results of this toxicological assessment can be found in the **combined Assessment Report**. Brodifacoum (CAS no. 56073-10-0) was notified as an existing active substance, by Syngenta Limited and Activa / Pelgar Brodifacoum and Difenacoum Task Force[[15]](#footnote-15), hereafter referred to as the “AS applicants”, in product-type 14. A combined assessment report was available on December 2010.

The following corresponds to the summary of the effect assessment available in the combined assessment report of brodifacoum.

* **Toxicokinetics**

***Data from Syngenta:***

*Brodifacoum* (0.21 mg/kg bw) administered orally to rats was rapidly absorbed (Tmax =8h; Cmax 16.1 ng/ml whole blood). The levels declined slowly and about 10% (1.3 ng/ml) was still present at 10 days after dosing. Almost all (82.5 %) the radioactivity in whole blood was found to be associated with the plasma. Based on the radioactivity still associated to the animal tissues, 10 days after the treatment, the **oral absorptionwas > 75%.** After a single oral dose of 10 mg/kg of *Brodifacoum* about 64.0% was absorbed and could be accounted for in the liver, carcass and bile 48h after dosing. The rest was recovered in the faeces, as unabsorbed material.

After absorption the product was widely distributed.10 days after dosing the proportion of the retained dose was highest in the liver (22.8 %), followed by the pancreas (2.3 %), and then the kidney (0.8 %), heart (0.1 %) and spleen (0.2 %). The remainder of the dose (50%) was in the carcass and skin.

*Brodifacoum* was only partially metabolised. 31.3% and 19.6% of the residues in the carcass and liver, respectively, was unchanged *Brodifacoum*. Two more polar metabolites were detected in the bile, the major one being identified as the glucuronide.

*Brodifacoum* shows a high potential for bioaccumulation: in all studies undertaken and at all dose levels tested, the liver retained the largest % of the dose, even very long time after dosing.

Analyses of the rat livers from the 90 day feeding study, indicate a non-linear accumulation of *Brodifacoum* vs dose and time.

A small amount (11 – 14%) of the radioactivity was slowly eliminated in urine and faeces over 10 days following a single oral dose of 0.25 mg/kg. Biliary and renal routes are of equal significance in the elimination of *Brodifacoum*. The rate of elimination as given by the biological half-life, was calculated to be 150 – 200 days.

The elimination from the liver was biphasic at higher doses. There was a rapid phase (days 1-4) which also corresponded to a reduction in clotting factor synthesis, followed by a slower terminal phase (days 28-84) during which blood clotting function was normal. The half-life of elimination from the liver during the rapid and the slow phase was 4 and 128 days, respectively. At low dose levels, clotting factor synthesis was unaffected indicating that probably only the slow elimination phase was present in the liver. The half-life of *Brodifacoum* in the liver was calculated in the range of 282-350 days.

Dermal absorption was assessed by using a formulation (ready-for-use pellet bait) containing 0.0048% *Brodifacoum* w/w tested in vitro test on human skin samples. Over the entire 24 h exposure *Brodifacoum* (determined by LC-MS-MS) was found below the LOQ in the receptor fluid (<3.53% of the applied dose) and in the epidermis (<1.64%), after tape stripping. The applied dose was readily removed by mild skin washing and recovered (108 6.25%) in the washing fluid. **A ‘surrogate value’ of 5% dermal absorption was calculated** by summing up the amount in the receptor fluid and in the epidermis after tape stripping, which can be considered as systemically available material. This value has been taken forward to the risk characterization as the worst case, also taking into account that the exposure period exceeds the usual time (*i.e.* 8 hours) of professional handling.

***Data from Activa/PelGar*:**

Read across to data from some related 2nd generation anticoagulants (*i.e.Difenacoum*, *Flocoumafen*) is requested for ADME data, including dermal absorption, and has been applied for other end-points by the RMS.

Beside the similar mode of action, the read across is supported by bridging studies demonstrating the similarity in physico-chemical and toxicological properties of these substances which are presented up-front to Doc. IIA- Section 3.

Anticoagulant rodenticides including *Brodifacoum* are rapidly absorbed via the gastro-intestinal tract and oral absorption is assumed to be 100%, on the basis of amount of radioactivity recovered in the excreta and retained in the tissues. The major route of elimination after oral administration is via the faeces, both as polar metabolites and parent compound. *Brodifacoum* is widely distributed and bioaccumulates in the liver with minor concentrations in the kidney.

Elimination processes are very slow with 50-75% of the administered dose being retained in the liver (t1/2 for hepatic residues more than 200 days).

The metabolism of *Brodifacoum* is limited, although in repeated dose studies evidence of induction of metabolism was reported, with increasing levels of radioactivity associated to polar metabolites recovered in the urine. The toxicologically relevant chemical species is the parent compound.

No study on dermal absorption of *Brodifacoum* has been presented. *Brodifacoum* is expected to be slowly absorbed through the skin, due to the lipophylicity of the molecule, allowing passive transport through the membrane. The read across principle can be applied, based on the close structural relationship, the similar physico-chemical properties and the same mode of action displayed by *Brodifacoum* towards other 2nd generation anticoagulants, such as *Difethialone* and *Difenacoum*. A dermal absorption value =4% has been adopted for *Difethialone*, whereas in the case of *Difenacoum* twodifferent values have been used for risk characterisation depending on the type of formulation, that is 3% (pellets and grains) or 0.047% (wax block bait).

In the CAR, by applying the read across from data on a structurally related 2nd generation anticoagulant *Difenacoum*, a 3% dermal absorption value was adopted for the exposure calculation. This value was calculated from a dermal absorption study testing a pellet formulation containing *Difenacoum* as active substance.

***Conclusion on toxicokinetics:***

An almost complete oral absorption can be considered, on the basis of amount of radioactivity recovered in the excreta and retained in the tissues. *Brodifacoum* is widely distributed and bioaccumulates mainly in the liver with lower concentrations in the kidney. Hepatic bioaccumulation of *Brodifacoum* is a non-linear *vs* dose and time. The elimination kinetic from the liver was biphasic, with an half-life in the range of 282-350 days. The excretion after oral administration is very slow (11 – 14% in 10 days), occurring via the urine and the bile, both as polar metabolites (glucuronide) and parent compound. The metabolism of *Brodifacoum* is limited and the toxicologically relevant chemical species is the parent compound.

Concerning the dermal absorption value to be used in the risk characterisation for wax block bait, in the Combined Assessment Report for *Difenacoum* (September 2009) a value of 0.047% was proposed. Therefore, on the basis of the available study and reading across from data on other 2nd generation anticoagulant rodenticides, two different values should be used for risk characterisation depending on the type of formulation: 5% (pellets and grains) or 0.047% (wax block bait).

* **Acute effects**

***Data from Syngenta:***

*Brodifacoum* was very toxic to rats and mice with similar oral LD50 of about 0.4 mg/kg bw to the male rat and mouse. *Brodifacoum* is also acutely toxic by the dermal and inhalation routes. Death was the result of internal haemorrhage.

*Brodifacoum* does not fulfil the EU criteria for classification as a skin or eye irritant, but is able to cause skin sensitization in guinea pig and fulfils the EU criteria for classification as a skin sensitizer.

***Data from Activa/PelGar*:**

*Brodifacoum* is very toxic if swallow (oral LD50<5 mg/kg bw) or in contact with skin (dermal LD50= 7.48 mg/kg bw in rat females; even lower in males).

The waiving for the inhalation toxicity study has been accepted due to low vapour pressure of *Brodifacoum* and data on dustiness and particle size, indicating that the potential for inhalation is limited in addition to ethical and animal welfare reasons. However, based on data with structurally related compounds with the same mechanism of action (*i.e.* 2nd generation anticoagulants), it is expected that the substance is also highly toxic after inhalation.

*Brodifacoum* is not irritant to the skin or eyes of rabbits and showed no sensitizing potential in a LLNA study in mice.

***Conclusion on acute effects:***

*Brodifacoum* is very toxic after oral administration and also via the dermal and inhalation routes. Death was the result of internal haemorrhage. Classification with T+; R26/27/28; ‘Very toxic by inhalation, in contact with skin and if swallowed’ is warranted.

*Brodifacoum* does not fulfil the EU criteria for classification as a skin or eye irritant. Although showed no sensitizing potential in a LLNA study in mice, it was able to cause skin sensitization in guinea pig and fulfils the EU criteria for classification as a skin sensitizer.

* + - * **Repeated Dose Effects**

***Data from Syngenta:***

Repeated dose oral studies show that in the rat and in the dog, the clinical signs, haematological and post mortem data were consistent with the known pharmacological action of *Brodifacoum*: impairment of the clotting cascade and increased prevalence of haemorrhage leading to death. There were no indications of other secondary toxicities: any of the other parameters including histopathological analysis revealed no treatment related alterations.

The subchronic 90-day oral toxicity allowed the derivation of the lowest repeated toxicity NOEL= 0.001 mg/kg bw/day. In this study, no treatment related effects on haematological parameters were evidenced at any dose, after 45 days, but statistically significant increases in both the kaolin-cephalin time (KCT) and the prothrombin time (PT) were measured at the highest dose level, 0.004 mg/kg bw/day after 90 days. Based upon this effect on prothrombin times and based on haemorrhagic changes seen at necropsy, the NOEL was set at the next lowest dose, 0.001 mg/kg bw/day.

Classification with T; R48/23/24/25 “Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed” is warranted based on these data plus extrapolation from the acute data for the dermal and inhalation route of exposure.

***Data from Activa/PelGar*:**

Repeated oral exposure to *Brodifacoum* resulted in clinical signs and toxicity consistent with the mode of action of the rodenticide and its properties of anti-coagulant agent (lethal haemorrhages). The overall NOAEL for subchronic oral toxicity is 0.04 mg/kg/day.

No data have been submitted on dermal repeated toxicity On the basis of both physico-chemical properties and *Brodifacoum*mode of action it can be anticipated that subchronic effect due to prolonged skin contact should not be disregarded.

No data on repeated inhalation toxicity have been submitted. As indicated by the low vapour pressure, dustiness and particle size, the potential for inhalation is low and the request for a repeated dose inhalation toxicity study is not considered justified also based on ethical and animal welfare reasons.

However, based on the results of the acute dermal and inhalation toxicity studies, route-to-route extrapolation, consistently with the decision adopted for *Difenacoum* (being the read across accepted for other end-points), it is justified to assume a similar concern for serious damage to health by prolonged exposure through dermal and inhalation routes also.

* + - * **Genotoxicity**

***Data from Syngenta:***

*Brodifacoum* was tested in *Salmonella typhimurium* strains TA 1535, TA 1537,TA 98, TA 100, TA 1538. with and without S9-mix, up to 5000 mg/plate, with negative results. No clastogenic activity was observed in the *in-vitro* cytogenetic assay in human lymphocytes, performed with and without metabolic activation, up to cytotoxic doses. The *in vitro* mammalian cell mutation assay in mouse lymphoma L5178Y cells also resulted negative, with and without S9-mix, while cytotoxic effects was observed at the highest doses. The AS applicant submitted also an *in vitro* UDS test and in an *in vitro* cell transformation assay, but because of several methodological and reporting shortcomings, they were considered of limited scientific significance. An *in vivo* mouse micronucleus test gave negative results. The studies submitted were rather dated, therefore they were not always compliant with the current guidelines. However a genotoxic potential of the active substance can be reliably ruled out.

***Data from Activa/PelGar*:**

*Brodifacoum* was tested for genotoxic activity in the bacterial reverse mutation test in *Salmonella thyphimurium* in strains TA 98, TA 100, TA 102, TA 1535 and TA 1537, up to 5000 g/plate, with and without metabolic activation (S9-mix). No genotoxic activity was observed in any bacterial strain. The substance resulted negative up to cytotoxic concentration also in the gene mutations assay in L5178Y mouse lymphoma cells, with and without S9-mix, and in the *in vitro* mammalian chromosome aberration test in human lymphocytes (50% mitotic inhibition at the maximum dosage tested).

* + - * **Carcinogenicity/chronic toxicity**

Carcinogenicity and long-term toxicity studies were waived as infeasible and unnecessary.

* + - * **Reproductive and developmental toxicity**

***Data from Syngenta:***

*Brodifacoum* did not induce developmental effects in two adequate prenatal toxicity studies

in the rat and rabbit, respectively.

In particular, in the rat studies maternal hemorrhages were observed at dose levels > 0.01 mg/kg bw (NOEL 0.001 mg/kg bw) whereas no effects on conceptuses were detected up to the top dose level of 0.02 mg/kg bw. In the rabbit study, the top dose of 0.005 mg/kg b.w caused a high proportion of maternal deaths, whereas no significant effects on litters were observed. In spite of these findings, a provisional decision has been made at the Technical Meeting of Classification and Labelling that [R61] should be applied to all anticoagulant active substances on the basis of analogy to *Warfarin*.

***Data from Activa/PelGar*:**

There was no evidence of developmental toxicity effects up to the dose levels of 0.04 and 0.004 mg/kg bw in rats and rabbits, respectively. In rabbit dams an increase in kaolin-cephalin and prothrombin time was present at 0.004 mg/kg bw (NOAEL 0.002 mg/kg).

Whereas it is suggested that two-generation studies may not be need for anticoagulant rodenticides, a two-generation study on rat was submitted: findings confirmed those of developmental toxicity, both qualitatively (parental toxicity with haemorrhages, no reproductive or developmentakl effects in the absence of general toxicity) and quantitatively (NOAEL: 0.001 mg/kg bw).

Since the conventional OECD Guideline 414 may have limitations in the detection of possible developmental effects of coumarin related compounds, and in spite of these findings, a provisional decision has been made at the Technical Meeting of Classification and Labelling that [R61] should be applied to all anticoagulant active substances on the basis of analogy to *Warfarin.*

* + - * **Neurotoxicity**

***Data from Syngenta:***

None of the acute or subchronic performed tests gave any indication for a potential neurotoxic effect of *Brodifacoum*

***Data from Activa/PelGar*:**

The toxicological studies do not indicate any neurotoxic effects.

***Conclusion on repeated dose effects:***

Repeated oral exposure to *Brodifacoum* resulted in clinical signs and toxicity consistent with the mode of action of the rodenticide and its properties of anti-coagulant agent (lethal haemorrhages). The NOEL for subchronic oral toxicity is in the range 0.04 -0.001 mg/kg/day (the lowest values identified with sensitive end-points, such as increases in both the kaolin-cephalin time and the prothrombin time). Based on results from the acute dermal and inhalation toxicity studies, route-to-route extrapolation, consistently with the decision adopted for *Difenacoum*, it is justified to assume serious damages associated to prolonged exposure through dermal and inhalation routes also. Therefore, classification with T; R48/23/24/25 “Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed” is warranted.

***Conclusion on Genotoxicity and Carcinogenicity:***

*Brodifacoum* displayed no mutagenic activity in a standard range of genotoxicity tests. No long-term carcinogenicity study was submitted by the two AS applicants. In fact, chronic toxicity studies were not considered to be technically feasible due to the specific action of the active substance on the test/target species. However, the anticoagulant action is apparently the only pharmacological action of *Brodifacoum*. The active substance has no structural alerts for carcinogenicity and no concern about possible non-genotoxic carcinogenic potential can be derived from the toxicological studies. Therefore the justifications of both AS applicants for not-submission of carcinogenicity data was considered acceptable.

***Conclusion on Reproductive toxicity:***

Reproductive and developmental toxicity studies on *Brodifacoum* did not reveal any specific effects. General toxicity effects were consistent with the mode of action of the rodenticide and its properties of anti-coagulant agent. The lowest NOAELs for rabbits and rats were 0.002 and 0.001 mg/kg bw.

In spite of these findings, a provisional decision has been made at the Technical Meeting of Classification and Labelling that [R61] should be applied to all anticoagulant active substances on the basis of analogy to *Warfarin*.

None of the acute or subchronic performed tests gave any indication for a potential neurotoxic effect of *Brodifacoum*.

The harmonised classification of the active substance is the following:

|  |  |
| --- | --- |
| **Classification under directive 67/548/EEC** | **Classification under regulation (EC) 1272/2008** |
| T+ R27/28  T ; R48/24/25  No specific limit concentrations. | Acute Tox 1 H310  Acute Tox 2 H300  STOT RE Cat 1 H372  No specific limit concentrations. |

* **Renewal 2017**

The harmonised classification of the active substance is the following:

|  |  |  |
| --- | --- | --- |
| **Classification - Regulation (EC) 1272/2008** | | |
| Hazard category | Acute Tox. 1 | |
| STOT RE 1 | |
| Repr.1A | |
| Aquatic Acute 1 | |
| Aquatic Chronic 1 | |
| Hazard statements | H310 | Fatal in contact with skin. |
| H300 | Fatal if swallowed. |
| H330 | Fatal if inhaled |
| H372 | Causes damage to organs (blood) through prolonged or repeated exposure. |
| H360D | May damage the unborn child |
| H400 | Very toxic to aquatic life. M-factor = 10 |
| H410 |  |
| Specific Concentration Limits | Repr. 1A; H360D: C ≥ 0,003 %  STOT RE 1; H372: C ≥ 0,02 % STOT RE 2; H373: 0,002 % ≤ C < 0,02 % | |

The following corresponds to the summary of the derivation of the AELs from the combined Assessment Report of brodifacoum:

***Data from Syngenta:***

The Acceptable Exposure Level for acute exposure (AELacute) was based on the maternal NOEL from developmental study of 0.001 mg/kg bw/day (rat, maternal effect). A safety factor of 300 (10 for intra-species variability x 10 for inter-species variability x 3 additional factor for severity of effects). The AELacute results to be of 3.3 x 10-6 mg/kg/day.

The Acceptable Exposure Level for repeated exposure (AELchr) was based on a subchronic NOEL from a 90-day oral rat study of 0.001 mg/kg bw/day. A safety factor of 300 (10 for intra-species variability x 10 for inter-species variability x 3 additional factor for severity of effects). The AELchr results to be of 3.3 x 10-6  mg/kg/day.

***Data from Activa/PelGar*:**

The Acceptable Exposure Level for acute exposure (AELacute) was based on NOAEL from a developmental study (female rabbit) of 0.002 mg/kg bw/day. A safety factor of 300 (10 for intra-species variability x 10 for inter-species variability x 3 additional factor for severity of effects). The AELacute results to be of 6.7 x 10-6  mg/kg bw/d.

The Acceptable Exposure Level for repeated exposure (AELchr) was based on NOAEL for females from the reproductive 2-generation study in rat of 0.001 mg/kg bw/day. A safety factor of 300 (10 for intra-species variability x 10 for inter-species variability x 3 additional factor for severity of effects). The AELchr results to be of 3.3 x 10-6  mg/kg bw/day.

TMIII09 agreed to derive AELmedium term consistently with what decided for the other AVK rodenticides. Therefore, AELmedium term was calculated from the NOAEL of 0.002 mg/kg bw/day (developmental oral toxicity study in rabbit) divided by an Assessment Factor of 300 (10 for interspecies x 10 for intraspecies x 3 additional factor for severity of effects). The AELmedium term results to be of 6.7 x 10-6 mg/kg bw/day.

***Conclusions****:*

The following AELs should be considered in the risk characterization for *Brodifacoum*:

* AELacute of 3.3 x 10-6 mg/kg/day based on the maternal NOEL from a teratogenicity study of 0.001 mg/kg bw/day (rat, maternal effect)
* AELmedium term of 6.7 x 10-6 mg/kg bw/day based on the NOAEL from a developmental study (female rabbit) of 0.002 mg/kg bw/day
* AELchr of 3.3 x 10-6 mg/kg bw/day based on the NOAEL for females from the reproductive 2-generation study in rat of 0.001 mg/kg bw/day

#### Toxicology of the substance(s) of concern

Considering the following definition of a substance of concern set in the TNsG on data requirement chapter 4 (2000), “*the substance is regarded as a substance of concern if [...] it is classified as dangerous and its concentration in the product exceeds the classification limit set in the Council Directive 88/379/EEC, as amended by Directive 1999/45/EC, for a particular dangerous property or the other classification limit indicated for the substance in a preparation set in Annex I of Council Directive 67/548/EEC or causes that the overall sum of the concentrations of dangerous substances in the product exceeds the limit for classification of the preparation set in Council Directive 88/379/EEC, as amended by Directive 1999/45/EC, for a particular dangerous property*”, the biocidal product FANGA RONGEUR PRO contains no substance of concern.

* **Renewal 2017**

Considering the definition of a substance of concern set in the Guidance on the BPR Volume III Humana Health – Part B Risk Assessment, FANGA RONGEUR PRO does not contain any substance of concern.

#### Toxicology of the biocidal product

The toxicology of the biocidal product was examined appropriately according to standard requirements. The product was a dummy product in the EU- review program for inclusion of the active substance in Annex I of Directive 98/8/EC.

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

Acute oral and dermal toxicity, skin and eye irritation and skin sensitisation studies have been performed with the product FANGA BLOC SP PRO, a block formulation containing 0.005% of brodifacoum. The compositions of FANGA BLOC SP PRO and FANGA RONGEUR PRO are considered similar.

##### Percutaneous absorption

A new study of percutaneous absorption has been submitted by TRIPLAN. A percutaneous absorption value of 0.647% has been set for the difenacoum based on this *in vitro* study realised on human skin with pellets containing 0.005% difenacoum. It has been considered that this dermal absorption value could be extrapolated to FANGA RONGEUR PRO.

* **Renewal 2017**

The dermal absorption of difenacoum formulated as pellet bait (containing 0.005% difenacoum) was investigated *in vitro* using human skin. The measured samples were below the limit of detection or quantification, but as a worst case, the corresponding validated LOQ value was used for the calculations of dermal absorption. The percentage of absorbed difenacoum was 0.647% (receptor fluid + epidermis + dermis + stratum corneum). The total recovery of difenacoum was 97.3% when skin discs were exposed to 5 mg/cm2 of the product (equivalent to 250 ng a.s./cm2) for 24 hours.

This study has been evaluated according to the EFSA guidance on dermal absorption and is considered valid.

##### Acute toxicity

*Oral route*

No mortality occurred during the study (daily examination during 14 days).

No clinical signs related to the administration of the test item were observed.

The body weight evolution of the animals remained normal throughout the study.

The macroscopically examination of the animals at the end of the study did not reveal treatment-related changes.

LD50 of the test item is higher than 2000 mg/kg/bw.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Route** | **Method** | **Species** | **Dose level** | **LD50** |
| Oral | OECD 423 | Rat 3 males and 3 females | 2000mg/kg bw | >2000 mg/kg bw |

*Dermal route*

No mortality occurred during the study.

The body weight evolution of the animals remained normal throughout the study.

Neither cutaneous reactions nor systemic clinical signs related to the administration of the test item were observed.

The macroscopically examination of the animals at the end of the study did not reveal treatment-related changes.

LD50 of the test item is higher than 2000 mg/kg/bw.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Route** | **Method** | **Species** | **Dose level** | **LD50** |
| Dermal | OCDE 402 | Rat 5 males and 5 females | 2000 mg/kg bw | >2000 mg/kg bw |

Based on the above-mentioned results, no classification is required for FANGA RONGEUR PRO.

##### Irritation and corrosivity

Based on the results of the irritation assays on rabbit’s skin and eye, no classification is required for FANGA RONGEUR PRO.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Route** | **Method** | **Species** | **Dose level** |  |
| Skin | OECD 404 | Rabbit NZ  3 females | 0.5 g | Not irritant |
| Eye | OCDE 405 | Rabbit NZ  3 females | 0.1 g | Not irritant |

##### Sensitisation

Based on the results of the irritation assays on rabbit’s skin and eye (LLNA), no classification is required for FANGA RONGEUR PRO.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Route** | **Method** | **Species** | **Dose level** |  |
| Skin | OECD 429 | Mice16 (12 for the treated groups) | Topical way of induction:  5, 10, 25% of the test item | Not skin sensitizing |

##### Other studies

No other studies are performed on FANGA RONGEUR PRO.

### Human exposure assessment - PAR 2014

FANGA RONGEUR PRO (PT14) is a ready-to-use rodenticide containing 0.005 % of brodifacoum (pure: 950 g/kg). Baits are packaged in sachet for professional users.The baits are placed in bait stations (tamper-resistant bait boxes or covered bait stations) out of reach of children and domestic animals.

No new human exposure studies have been submitted.

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

The potential for exposure to brodifacoum grain baits is summarised in the table below:

Table 4: Main paths of human exposure

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Exposure path** | **Industrial use** | **Professional use** | **General public** | ***via* the environment** |
| Inhalation | Not relevant | Potentially significant | Negligible | Negligible |
| Dermal | Not relevant | Potentially significant | Potentially significant | Negligible |
| Oral | Not relevant | Negligible | Potentially significan | Negligible |

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

##### Exposure of professional users

In Annex 6 „Safety for professional operators“, the results of the exposure calculations for the active substance and the substance of concern for the professional user are laid out.

FANGA RONGEUR PRO is used for the control of rats and mice for use indoors, with the purpose of protecting human food and animal feedstuffs, and for human hygiene.

As the product is only supplied in sachets, exposure during decanting and loading phases is considered as negligible.

Only dermal exposure during cleaning phase is taken into account.

In the dossier, TRIPLAN assessed the human exposure based on the TNsG on human exposure, section 7.2 of part 3 – June 2002. This document only contains a series of examples for human exposure assessment and should not be considered as reference data. Therefore, since TRIPLAN provided a letter of access for the unpublished CEFIC study “*Chambers J.G. and Snowdon P.J. Study to determine potential exposure to operators during simulated use of anticoagulant rodenticide baits*”, the FR CA decided to base the human exposure assessment for professionals on this study as done by the RMS (Italy) of the active substance in the Assessment report on brodifacoum. This study examined the inhalation and dermal exposures associated with all activities involved in using a grain bait (decanting material from a large container to a pail, filling and placing bait points, and clean-up and disposal of bait points). The used grain bait containing coumatetralyl was selected as a worst case representative product of all cereal-based rodenticide baits. In this study, 10 replicates were performed at 1, 5 and 10 manipulations. Therefore, the FR CA decided to use the exposure estimations issued from the CEFIC study for the assessment of FANGA RONGEUR PRO.

Additionally, the HEEG opinion on harmonising the number of manipulations in the assessment of rodenticides (anticoagulant), agreed at TMIII 2010 and the HEEG opinion on an harmonised approach for the assessment of rodenticides (anticoagulants) agreed at TMII 2011 were taken into account for the estimation of exposure for professionals.

Based on the CEFIC study and taking into account the HEEG opinion on an harmonised approach for the assessment of rodenticides (anticoagulants) agreed at TMII 2011, the amount of product on fingers/hands **during the cleaning** was 3.79 mg product/manipulation for the assessment of more than 4 manipulations per day (the agreed number is 16 cleanings in professional use based on the HEEG opinion on harmonising the number of manipulations in the assessment of rodenticides (anticoagulant) agreed at TMIII 2010).

Thefollowing parameters were taken into account:

* active substance in product: 0,005 % (w/w) ;
* dermal absorption: 0,647 % ;
* body weight: 60 kg.

Therefore, considering 16 cleanings per day, the systemic dose of brodifacoum on fingers/hands during loading is 3.3x10-7 mg/kg bw/day for the control of both rats and mice because the amount of disposed bait is not taken into account during cleaning.

**In conclusion, the total systemic dermal exposure is set at 3.3x10-7 mg/kg bw/day without PPE for the control of rats and mice.**

##### Exposure of non-professional users

The product is for professional use only.

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

***Handling of dead rodents (adult, child, infant) – acute scenario***

Exposure can occur during handling of dead rodents by professionnal and general public. However, this scenario is excluded and considered of low relevance due to unrealistic assumptions (TNsG on human exposure (2007)). Gloves are recommended to help prevent rodent-borne disease, therefore exposure due to this senario is considered negligible.

***Oral exposure by ingesting bait (infant) – acute scenario***

Besides, exposure of non users can occur during ingestion of poison baits. For the scenario “*oral exposure by ingesting bait*”, a reverse scenario was calculated. Based on the acute AEL of 3.3 x 10-6 mg a.s/kg bw/day, a body weight of 10 kg and an oral absorption of 75% (as stated in the Assessment report of brodifacoum), ingestion of more than 0.88 mg of product per day by an infant is needed to exceed the AEL.

#### Exposure to residues in food

The intended uses description of the product FANGA RONGEUR PRO indicates that these uses are not relevant in terms of residues in food and feed. The product is to be used as rodenticide and does not come in direct or indirect contact with food and feedstuff. No further data are required concerning the residue behaviour.

#### Combined exposure

Not relevant.

### Risk assessment for human health –PAR- 2014

The estimated exposures for the professional users are compared to the systemic AEL of brodifacoum set in the Assessment Report (3.3x10-6 mg/kg bw/day for short-term and long-term exposures).

#### Risk for direct exposure

##### Professional users

Based on the risk assessment of the active substance, the risk for professional users resulting from the intended use is acceptable for FANGA RONGEUR PRO, even if gloves are not worn (%AEL at 9.9% for the control of rats and mice).

Gloves are anyway recommended to help prevent rodent-borne disease. Moreover, the mention “do not open the sachet” has to be added in the label of the product.

Table 5:Summary of risk characterisation for professionals for the control of rats and mice

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Scenario** | **AEL**  (mg/kg bw/d) | **Exposure**  (mg/kg bw/d) | **%AEL** | **Risk** |
| **Sachet formulation (exposure during cleaning phase)** | | | | |
| Professionnal (without gloves) | 3.3x10-6 | 3.3x10-7 | 9.9 | Acceptable |

##### Non-professional users

The product is for professional use only.

#### Risk for indirect exposure

Based on a reverse scenario, more than 0.88 mg of product per day should be ingested by an infant to exceed the AEL. This indicates that infants are at significant risk of poisoning. Therefore, even if the product FANGA RONGEUR PRO contains a bittering agent which reduces the likelihood of ingestion, the baits should be unattainable for children.

Product label (“do not open the sachet”) and good practice advise users to prevent access to bait by children and infants.

#### Risk for consumers via residues

Considering the intended uses, no dietary risk assessment is necessary.

#### Risk for combined exposure

Not relevant.

#### Conclusion on human health risk assessment –PAR- 2014

Based on the risk assessment of the active substance, the risk for professional users resulting from the intended use is acceptable for FANGA RONGEUR PRO for the control of rats and mice.

Risk of secondary poisoning to infants and children is considered as relevant. Therefore, even if the product FANGA RONGEUR PRO contains a bittering agent which reduces the likelihood of ingestion, the baits should be unattainable for children.Product label (“do not open the sachet”) and good practice advise users to prevent access to bait by children and infants.

The intended uses description of the product FANGA RONGEUR PRO indicates that these uses are not relevant in terms of residues in food and feed. The product is to be used as rodenticide and does not come in direct or indirect contact with food and feedstuff.

***Risk mitigation measures linked to risk assessment for human health***

* Gloves have to be worn to help prevention against rodent-borne disease.
* Do not open the sachets.
* Apply strict hygiene measures: do not eat, drink or smoke during handling of the product and wash hands after use of the product.
* Use in tamper-resistant bait boxes or in covered bait stations.
* Tamper-resistant bait boxes should be clearly marked to show that they contain rodenticides and that they should not contain other products than rodenticides.
* Covered bait stations must be placed only in areas not accessible to the general public and non-target animals.
* Baits must be unattainable to children, pets or other non-target animals in order to minimize the risk of poisoning.
* Do not place tamper-resistant bait boxes and covered bait stations on surfaces in contact with food, feed or drinks and beverages.
* Collect uneaten bait, bait fragments dragged away from the tamper-resistant bait boxes or covered bait stations and dead rodents, during and after treatment.
* Remove all bait points after the end of treatment.

***Emergency*** *(information provided in the product Safety Data Sheet)*

* If exposed, contact immediately a poisoning control center or a doctor and describe the situation (give information on the label and assess the exposition rate)
* If inhalated: breathe fresh air and keep at rest.
* If a contact occurs with skin: Remove contaminated clothes and wash skin with soap and rinse copiously with water. Do not use solvents or thinners.
* If a contact occurs with eyes: Wash copiously under a trickle of water (tepid if possible) for several minutes, keeping eyelids open under the trickle of water.
* If swallowed, seek medical advice immediately and show this container or label. Do not induce vomiting. Whatever the quantity of the product ingested, do not eat and do not drink. In case of emergency, contact 112.
* Note to doctor: the product FANGA RONGEUR PRO contains an anticoagulant-rodenticide; treatment with vitamin K1 could be needed for a long time.

***Disposal considerations***

* Collect uneaten bait, bait fragments dragged away from the tamper-resistant bait boxes or covered bait stations and dead rodents, during and after treatment.
* Remove all bait points after the end of treatment.

***Required information linked to risk assessment for human health***

None.

* **Major change application -2016**

### Human exposure assessment (revised human exposure assessment section during the major change 2016

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

The potential for exposure to brodifacoum grain baits is summarised in the table below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Exposure path** | **Industrial use** | **Professional use** | **General public (1)** | ***via* the environment** |
| Inhalation | Not relevant | Potentially significant | Negligible | Negligible |
| Dermal | Not relevant | Potentially significant | Potentially significant | Negligible |
| Oral | Not relevant | Negligible | Potentially significant | Negligible |

Professional users may be potentially exposed by inhalation during decanting of grain bait when the product is supplied as loose grains.

#### Professional and non-professional users may be potentially exposed by skin contact either when dispensing the product or when cleaning-up and disposing of unused product.

#### Oral exposure of non users can occur during ingestion of poison baits.

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

FANGA RONGEUR PRO is used for the control of rats and mice for use indoors and outdoors by professional (in and around buildings, open areas, waste dumps) and non-professional users (in and around buildings, open areas), with the purpose of protecting human food and animal feedstuffs, and for human hygiene.

* For non-professional users, as the product is supplied only as grains in sachets, exposure during decanting and loading phases is considered as negligible.

Only dermal exposure during cleaning phase is taken into account.

* For professional users, the product is supplied as loose grains and grains in sachets.

For loose grains, professional users are exposed during decanting of the product in buckets, loading and cleaning of bait stations. Dermal and inhalation exposure are taken into account.

- For grains in sachets, professional users are exposed only during the cleaning of bait stations. This latest case has been evaluated in the initial PAR, so please refer to it.

#### Exposure of professional users

**For professional users of loose grains:**

As a worst case, exposure has been assessed considering FANGA RONGEUR PRO at the maximum recommended dose of 200 g for the use against rats. This approach also covers human exposure during the control of mice.

* **Decanting phase for loose grains**

Based on the CEFIC study and taking into account the *HEEG opinion on an harmonised approach for the assessment of rodenticides (anticoagulants)* agreed at TMII 2011, **for professional users** manipulating the product **in bulk**, the amount of product on fingers/hands **during the decanting of 3 kg of grain** was 52.3 mg of biocidal product for 3 kg of grain corresponding to 219.66 mg of biocidal product during the decanting phase for 12.6 kg of grain manipulated per day.

The systemic dose of brodifacoum on fingers/hands during decanting is 1.18x10-6 mg/kg bw/d.

The product being packaged in bulk, professional users may be potentially exposed by inhalation during decanting of grain bait. Considering an exposure of 3 minutes for 3 kg of biocidal product, 13 minutes should be taken into account for 12.6 rounded at 13 kg of product, an air concentration of 9.62 mg/m3, an inhalation rate of 1.25 m3/hour and inhalation absorption of 100%, inhalation exposure product is 2.61 mg of biocidal product per day. This is corresponding to a potential systemic dose of brodifacoum in the air during decanting of 2.17x10-6 mg/kg bw/d.

In conclusion, for professional users manipulating the biocidal product in bulk, the total systemic inhalation exposure is set at 2.17x10-6 mg/kg bw/d without PPE and 2.17x10-7 mg/kg bw/d with respiratory protection equipment.

* **Loading phase for loose grains**

**During the loading phase,** the amount of product on fingers/hands was 2.04 mg bp/loading. For the assessment of 63 loadings per day (agreed number of loading in professional use based on the HEEG opinion on harmonising the number of manipulations in the assessment of rodenticides (anticoagulant) agreed at TMIII 2010), the amount of biocidal product on fingers/hands was 128.52 mg bp/day. The corresponding systemic dose of brodifacoum on fingers/hands during loading phase is 6.93x10-7 mg/kg bw/d.

* **Cleaning phase for loose grains**

**During the cleaning phase,** the amount of product on fingers/hands was 3.79 mg bp/cleaning. For the assessment of 16 cleanings per day (agreed number of cleaning in professional use based on the HEEG opinion on harmonising the number of manipulations in the assessment of rodenticides (anticoagulant) agreed at TMIII 2010), the amount of biocidal product on fingers/hands was 60.64 mg bp/day. The corresponding systemic dose of brodifacoum on fingers/hands during cleaning phase is 3.27x10-7 mg/kg bw/d.

* **Total exposure for loose grains:**

In conclusion, the total systemic dermal exposure is set at 2.20x10-6 mg/kg bw/day without PPE and 1.10x10-7 mg/kg bw/day with gloves for the control of rats.

The total systemic exposure resulting from inhalation is set at 2.17x10-6 mg/kg bw/d without PPE and 2.17x10-7 mg/kg bw/d with respiratory protection equipment.

Therefore, the combined total exposure (inhalation + dermal) is set at 4.38x10-6 mg/kg bw/d without any individual protective equipment.

Considering respiratory protection during decanting and no gloves during decanting loading and cleaning phases, the total systemic exposure is 2.42 x 10-6 mg/kg bw/day.

Considering the protection of respiratory equipment during decanting and PPE during total application phase, the total systemic exposure is 3.27 x 10-7 mg/kg bw/day for the control of rats and mice.

*In Annex 4 „Safety for professional operators“, the results of the exposure calculations for the active substance and the substance of concern for the professional user are laid out.*

| **Tier** | **Inhalation exposure** | **Dermal exposure** | **Total exposure** |
| --- | --- | --- | --- |
| PPE | Systemic dose | Systemic dose | Systemic dose |
| mg a.i. / kg bw /day | mg a.i. / kg bw /day | mg a.i. / kg bw /day |
| **Scenario (professionals)** | **Decanting phase (12.6 kg)**  **Loading phase: 63 manipulations per day**  **Cleaning phase: 16 manipulations per day** | | |
| **Loose grains** | | | |
| Tier 1:  Without PPE | 2.17 x 10-6 | 2.20 x 10-6 | 4.38 x 10-6 |
| Tier 2:  With respiratory protection  Without gloves | 2.17 x 10-7 | 2.20 x 10-6 | 2.42 x 10-6 |
| Tier 2:  With respiratory protection  With gloves | 2.17 x 10-7 | 1.10x 10-7 | 3.27 x 10-7 |

##### Exposure of non-professional users

**For non-professional users of grain in sachets:**

As a worst case, exposure has been assessed considering FANGA RONGEUR PRO at the maximum recommended dose of 200 g for the use against rats. This approach also covers human exposure during the control of mice.

Grains being in sachet PE, only exposure during cleaning is considered and therefore, exposure will be the same for treatment against rats and mice.

Based on the CEFIC study and taking into account the *HEEG opinion on an harmonised approach for the assessment of rodenticides (anticoagulants)* agreed at TMII 2011, the amount of product on fingers/hands **during the cleaning** was 4.52 mg/manipulation for the assessment of more than 4 manipulations per day (the agreed number is 5 cleanings for non-professional use based on the HEEG opinion on harmonising the number of manipulations in the assessment of rodenticides (anticoagulant) agreed at TMIII 2010).

Therefore, considering 5 cleanings per day, the systemic dose of brodifacoum on fingers/hands during cleaning is 1.22 x10-7 mg/kg bw/day without any protective equipment.

***Total exposure for grains in sachets***

Since grains are in sachets PE, exposure only occurs during cleaning and is estimated at 1.22 x 10-7 mg a.s/kg bw/day without any protective equipment.

*In Annex 5 “Safety for non-professional operators and the general public”, the results of the exposure calculations for the active substance and the substance of concern for the non-professional user and the general public are laid out.*

| **Tier** | **Inhalation exposure** | **Dermal exposure** | **Total exposure** |
| --- | --- | --- | --- |
| PPE | Systemic dose | Systemic dose | Systemic dose |
| mg a.i. / kg bw /day | mg a.i. / kg bw /day | mg a.i. / kg bw /day |
| **Sachet PE (exposure only during cleaning phase)** | | | |
| Tier 1:  Without PPE | na | 1.22 x 10-7 | 1.22 x 10-7 |

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

Please refer to the product assessment report related to FANGA RONGEUR PRO product authorisation under Regulation UE n° 528/2012.

#### Indirect exposure via residues in food

The biocidal product will not come into contact with food and it is not applied by spraying or dusting such that food or feeding stuffs could be contaminated. Therefore there is no requirement to assess potential residues on foodstuffs. Based on intended uses and proper baiting practices of the biocidal product, contamination of food/feedingstuffs is considered highly unlikely to occur.

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

#### Combined exposure

Not relevant.

### Risk assessment for human health (revised risk assessment for human health during the major change 2016)

#### Risk for direct exposure

##### Professional users

The estimated exposures for the professional users are compared to the systemic AEL of brodifacoum set in the Assessment Report (3,3 x 10-6 mg a.s/kg bw/day).

Based on the risk assessment of the active substance, the risk for professional users resulting from the intended use is acceptable only with respiratory protection during decanting for FANGA RONGEUR PRO supplied as loose grains (%AEL is set at 73%) and without any protection equipment for FANGA RONGEUR PRO supplied in sachet (%AEL is set at 10%) (see Annex 4 for detailed calculations).

However, gloves are recommended to help prevent rodent-borne disease.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Scénario** | **AEL (mg/kg bw/d)** | **Exposure (mg/kg bw/d)** | **%AEL** | **Risk** |
| **Loose grains (exposure during decanting, loading and cleaning phases)** | | | | |
| Professional  (without PPE) | 3.3 x10-6 | 4.38 x 10-6 | 133% | Unacceptable |
| Professional  (with respiratory protection during decanting, without gloves) | 3.3 x10-6 | 2.42 x 10-6 | 73% | Acceptable |
| Professional  (With respiratory protection  With gloves) | 3.3 x10-6 | 3.27 x 10-7 | 10% | acceptable |

##### Non-professional users

The estimated exposures for the non-professional users are compared to the systemic AEL of brodifacoum set in the Assessment Report (6.7x10-6 mg a.s/kg bw/day).

Based on the risk assessment of the active substance, the risk for non-professional users resulting from the intended use is acceptable without any personal protective equipment during handling for FANGA RONGEUR PRO (%AEL is set at 2%) (see Annex 5 for detailed calculations).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Scénario** | **AEL (mg/kg bw/d)** | **Exposure (mg/kg bw/d)** | **%AEL** | **Risk** |
| **Sachet PE (exposure only during cleaning phase)** | | | | |
| Non-professional  (without PPE) | 6.7 x10-6 | 1.22 x 10-7 | 2% | acceptable |

#### Risk for indirect exposure

#### The initial assessment remains unchanged. Risk for consumers via residues

The acute or chronic exposure to residues in food resulting from the intended uses is unlikely to cause a risk to consumers. Regarding consumer health protection, there are no objections against the intended uses.

#### Risk for combined exposure

Not relevant.

#### Summary of risks characterisation of the product for human health- Major application 2016

No unacceptable risk has been observed for professionals using FANGA RONGEUR PRO supplied as loose grains, and wearing a respiratory protection during, for the use against rats and, by extension, mice.

No unacceptable risk has been observed for non-professionals using FANGA RONGEUR PRO supplied in sachets (PE), without gloves, for the use against rats and, by extension, mice.

For the indirect scenario “Infant ingesting bait”, please refer to the initial PAR.

***Risk mitigation measures linked to risk assessment for human health***

**Conditions of use linked to human health (professional users)**

* Gloves have to be worn to help prevention against rodent-borne disease.
* Wear respiratory protection equipment (FFP2) during decanting of grains in bulk.
* Do not open the sachets.
* Use only in tamper-resistant boxes or covered bait stations. These stations must be placed only in areas not accessible to the general public and non-target animals.
* Tamper-resistant bait boxes should be clearly marked to show that they contain rodenticides and that they should not contain other products than rodenticides.
* Apply strict hygiene measures: do not eat, drink or smoke during handling of the product and wash hands after use of the product.
* Baits must be unattainable to children, pets or other non-target animals in order to minimize the risk of poisoning.
* Do not place tamper-resistant bait boxes and covered bait stations on surfaces in contact with food, feed or drinks and beverages.
* Collect uneaten bait, bait fragments dragged away from the tamper-resistant bait boxes or covered bait stations and dead rodents, during and after treatment.
* Remove all bait points after the end of treatment.

**Conditions of use linked to human health (non-professional users)**

* Do not open the sachets.
* Apply strict hygiene measures: do not eat, drink or smoke during handling of the product.
* Bait stations must be unattainable to children, pets or other non-target animals in order to minimize the risk of poisoning.
* Use only in tamper-resistant boxes. Tamper-resistant bait boxes should be clearly marked to show that they contain rodenticides and that they should not contain other products than rodenticides.
* Do not place tamper-resistant bait boxes on surfaces in contact with food, feed or drinks and beverages.
* Collect uneaten bait, bait fragments dragged away from the tamper-resistant bait boxes and dead rodents, during and after treatment.
* Remove all bait points after the end of treatment.

***Emergency*** *(information provided in the product Safety Data Sheet)*

* If exposed, contact immediately a poisoning control center or a doctor and describe the situation (give information on the label and assess the exposition rate)
* If inhalated: breathe fresh air and keep at rest.
* If a contact occurs with skin: Remove contaminated clothes and wash skin with soap and rinse copiously with water. Do not use solvents or thinners.
* If a contact occurs with eyes: Wash copiously under a trickle of water (tepid if possible) for several minutes, keeping eyelids open under the trickle of water.
* If swallowed, seek medical advice immediately and show this container or label. Do not induce vomiting. Whatever the quantity of the product ingested, do not eat and do not drink. In case of emergency, contact 112.
* Note to doctor: the product FANGA RONGEUR PRO contains an anticoagulant-rodenticide; treatment with vitamin K1 could be needed for a long time.

***Disposal considerations***

* Collect uneaten bait, bait fragments dragged away from the tamper-resistant bait boxes or covered bait stations and dead rodents, during and after treatment.
* Remove all bait points after the end of treatment.

***Required information linked to risk assessment for human health***

None.

* **Renewal 2017**

The uses claimed for the renewal are identical to the uses already assessed except the non professional users.

According to the 9th adaptation to the technical and scientific progress (ATP) of the CLP regulation related to the anticoagulant rodenticides classification and in accordance to the document CA-May16-Doc.4.1- the concentration of brodifacoum is above the specific concentration limit. In consequence, the use of FANGA RONGEUR PRO by non professional users should be withdrawn. It has not been claimed by the applicant.

The conclusions made for the professional users during the first authorization and the the major change remain unchanged.

***Emergency*** *(revised information -2017)*

* Ingestion: Wash out mouth with water. Contact poison treatment specialist. Seek medical advice immediately if symptoms occur and/or large quantities have been ingested.
* Skin contact: Wash contaminated skin with soap and water. Contact poison treatment specialist if symptoms occur.
* 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.
* Antidote: vitamin K1 (phytomedione). Contact poison treatment specialist for antidote dosage and INR (or PT) monitoring.
* Keep the container or label available.
* Hazardous to wildlife.

### Risk assessment for the environment

### Fate and distribution in the environment of the active substance brodifacoum

The summary of information about the active substance brodifacoum is carried out with the data from the combined AR of brodifacoum owned by Syngenta Limited and Activa / Pelgar Brodifacoum and Difenacoum Task Force48.

#### Degradation

##### Abiotic degradation

###### Hydrolysis in function of pH

Brodifacoum is considered stable to hydrolysis. It was concluded that the hydrolytic half-life (DT50) was above one year at environmentally relevant pH. The hydrolytic degradation is deemed negligible.

###### Photolysis in water

Brodifacoum photolytically degrades in aqueous solution with a half-life (DT50) < 1 day.Photolysis of brodifacoum was fast with 38 % of removal in the first hour of exposure.Greater than 89 % of photolysis has occurred by around three hours. No degradation products were detected.

###### Photolysis in soil

Not relevant for a use inside buildings of products containing Brodifacoum.

###### Photodegradation in air

The photo-oxidative degradation of brodifacoum in air was estimated by a structural activity relationship (QSAR) method using the Atmospheric Oxidation Program v1.90 (AOPWIN). Brodifacoum is predicted to undergo rapid indirect photolysis with OH radicals and ozone (DT50= approximately 2 hours). According to TGD the half-live has been recalculated considering COH = 0.5 \* 106 molec/cm3; corresponding to a DT50 of 0.217 days).There are no predicted effects on the atmosphere.

##### Biotic degradation

###### Aquatic compartment

* Ready biodegradation / inherent biodegradation

Brodifacoum is not readily biodegradable under OECD 301B Test (0% after 28 days). Brodifacoum is not inherently biodegradable under the conditions of the ‘Inherent – Concawe Test’ (OECD 302D) performed (0% after 56 days).

* Degradation in water/sediment system

No study on water/sediment system of the active substance has been submitted in the combined AR of brodifacoum.

Moreover it is not relevant for a use inside buildings of products containing brodifacoum.

###### Degradation in STP

No study on water/sediment system of the active substance has been submitted in the combined AR of brodifacoum.

Moreover it is not relevant for a use inside buildings of products containing brodifacoum.

###### Terrestrial compartment

Brodifacoum is persistent in soil with a DT50 value of 157 days (The Pesticide Manual 13th Edition).

Moreover it is not relevant for a use inside buildings of products containing brodifacoum.

#### Distribution

Based on literature data, the Koc value (50 000 L/kg, The Pesticide Manual 13th Edition) indicates that the active substance would not be mobile in soil and is not expected to contaminate groundwater. A laboratory study carried out by another applicant show that with Koc values which ranged from 17.8 (pH 8.46) to 426 579 (pH 3.29) with a Koc value of 9155 L/kg at pH7.1-7.6, brodifacoumcan be considered immobile in soil. Under basic conditions (high pH), Brodifacoumis not likely to be adsorbed onto soils or sewage sludge due to the ionisation of the molecule; whereas under acidic conditions (low pH), Brodifacoumis likely to be adsorbed onto soils or sewage sludge as the molecule is in its neutral or non-ionised form.

Brodifacoum is not expected to move from soil into water.

#### Accumulation

Brodifacoum has a log Kow > 6 (6.12) and is highly adsorptive; consequently these properties indicate that brodifacoum is likely to bioaccumulate in aquatic or terrestrial species.

The aquatic BCF has been estimated with calculation method for substances with a Kow> 6:

**BCFfish = 35 645 L/kg**(according to Equation 75; TGD).

The terrestrial BCF has been estimated with calculation method:

**BCFearthworm = 15 820 L/kg**(according to Equation 82d; TGD).

These BCF values confirm the high bioaccumulation of Brodifacoum in aquatic and terrestrial species.

#### Behaviour in air

The vapour pressure of brodifacoum has been determined to be << 1 x 10-6 Pa (OECD 104, EC methods A.4). Furthermore, Henry’s law constant for brodifacoum has been calculated to be << 2.18 x 10-3 Pa.m3.mol-1 at pH 7 (based on a water solubility of 0.24 mg/L). Based on these data brodifacoum is not expected to partition into atmosphere to a relevant extent.

In addition, brodifacoum is predicted to undergo rapid indirect photolysis with OH radicals and ozone (DT50= approximately 2 hours) and undergoes rapid direct photodegradation (DT50 = 0.217 days).

### Effects on environmental organisms for active substance brodifacoum

The summary of information about the active substance brodifacoum is carried out with the data from the combined AR of brodifacoum owned by Syngenta Limited and Activa / Pelgar Brodifacoum and Difenacoum Task Force.

#### Aquatic compartment (including water, sediment and STP)

##### Aquatic organisms

Based on the results of acute toxicity studies submitted in the combined AR by Activa / PelGar Brodifacoum and Difenacoum Task Force, brodifacoum is very acute toxic to aquatic organisms. No long-term tests have been performed. One study was performed on each of the two trophic levels (daphnia and algae) and two studies were performed on fish. *Selenastrum capricornutum* is the most sensitive species with a 72h ErC50 of 0.04 mg a.s./L.

Table 6: Toxicity to freshwater aquatic organisms

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Guideline / Test method** | **Species** | **Endpoint** | **Results(mg a.s./L)** | **Reference** |
| OECD 203 | *Oncorhynchus mykiss -* fish | LC50 – 96h | 0.042 | Activa / PelGar Brodifacoum and Difenacoum Task Force  CAR a.s.  Doc III‑A 7.4.1.1 |
| OECD 202 | *Daphnia magna -* invertebrate | EC50 – 48h | 0.25 | Activa / PelGar Brodifacoum and Difenacoum Task Force  CAR a.s.  Doc III‑A 7.4.1.2 |
| OECD 201 | *Selenastrum capricornutum* - algae | EbC50 – 72h  ErC50 – 72h | 0.016  0.04 | Activa / PelGar Brodifacoum and Difenacoum Task Force  CAR a.s.  Doc III‑A 7.4.1.3 |

All Concentrations are expressed on measured concentrations.

Justification of PNECwater:

According to the TGD, the PNECwater is derived from the 72h ErC50 value (0.04 mg a.s./L) for *Selenastrum capricornutum* divided by an assessment factor of 1000. Therefore,

**PNECwater = 0.04 µg a.s./L.**

##### Sediment dwelling organisms

No experimental data are available for sediment dwelling organisms. A PNECsediment (0.043 mg/kgwwt) is derived through the Equilibrium Partitioning Method. However, due to the absence of measured data for the determination of a PECsediment and according to the TGD a quantitative risk characterization cannot be carried out. Therefore the risk for the sediment compartment will be covered by the risk for the aquatic compartment.

According to the TGD and considering the log Kow > 5, the PEC/PNEC ratio for the aquatic compartment is increased by a factor of 10 to take into account the possible additional uptake via sediment ingestion.

##### STP micro-organisms

The toxicity to microorganisms in a sewage treatment plant (STP) was estimated by a respiration inhibition test (OECD 209) submitted by Activa / PelGar Brodifacoum and Difenacoum Task Force . No effects of Brodifacoum on aerobic biological sewage treatment processes was expected. Due to the lack of measured values of test substance concentration, the EC10 was conservatively set greater than Brodifacoum’ water solubility (0.058 mg a.s/L).

Table 7: Toxicity to STP microorganisms

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Guideline/Test method** | **Species / Inoculums** | **Endpoint / Type of test** | **Duration** | **Results [mg a.s/L]** | | | | **Reference** |
| **EC10** | **EC20** | **EC50** | **EC80** |
| OECD 209 | Activated sludge | Respiration Inhibition | 3h | > 0.058\* | | | | Activa / PelGar Brodifacoum and Difenacoum Task Force  CAR a.s.  Doc III‑A 7.1.4 |

\* corresponding to the water solubility at pH=7 and T=20°C

Justification of PNECmicororganisms:

According to TGD (2003) when an EC10 from a respiration inhibition test is used an assessment factor of 10 should be applied.

PNECSTP microorganisms > 0.0058 mg a.s/L

Additional endpoints:

According to the combined AR of brodifacoum owned by Syngenta Limited and Activa / Pelgar Brodifacoum and Difenacoum Task Force, a lower PNEC value for sewage treatment microorganisms is provided: **PNEC STP microorganisms > 0.0038 mg a.s/L**. Therefore, as the data set are considered equivalent, the worst case PNEC from the combined AR is used in the risk assessment.

#### Atmosphere

Brodifacoum has a low volatility and is not intended to be sprayed or fumigated. It is formulated into a non volatile solid consequently its occurrence in air is highly unlikely. Moreover, significant phototransformation in air due to hydroxyl radicals would be expected. Brodifacoum is not expected to contribute to global warming, ozone depletion in the stratosphere, or acidification on the basis of its physical or chemical properties.

#### Terrestrial compartment

No effects of brodifacoum, in soil concentration ranging up to 994 mg/kg dw, were found on earthworms in a test conducted according to the guideline OECD 207. LC50 was determined to be > 994 mg/kg dw, corresponding to a LC50 >879.6 mg/kg in wet weight.

Table 8:Toxicity to soil organisms

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Guideline / Test method** | **Species** | **Endpoint / Type of test** | **Exposure** | | **Results (mg a.s/kg wwt soil)** | | **Reference** |
| **design** | **duration** | **NOEC** | **LC50** |
| OECD 207 | *Eisenia foetida* | LC50 | soil exposure | 14days | 879.6 | >879.6 | Activa / PelGar Brodifacoum and Difenacoum Task Force  CAR a.s.  Doc IIIA 7.5.1.2 |

Justification of PNECsoil:

Since LC50 was determined to be >879 mg/kg ww, when corrected for soil humidity, an assessment factor of 1000 was used in accordance with TGD (2003).

**PNECsoil> 0.88 mg/kg wet weight**

As additional information, brodifacoum-based products are intended for indoor use only, no exposure to soil and groundwater is expected.

#### Non compartment specific effect relevant to the food chain

The exposure of brodifacoum directly to non-target birds and mammals (primary poisoning) and indirectly via target rodent carcasses (secondary poisoning) is considered in the risk assessment.

Table 9: Toxicity to birds and mammals (key studies)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Guideline / Test method** | **Species** | **Endpoint / Type of test / Duration** | **Results** | | **Reference** |
| **NOEC/NO(A)EL** | **LD50** |
| OPPTS 850.2100 | Japanese quail | LD50/ acute oral  Single dose followed by 14 days oservation |  | LD50 = 19 mg a.s/kg bw | Activa / PelGar Brodifacoum and Difenacoum Task Force  CAR a.s.  Doc IIIA 7.5.3.1.1 |
| OECD 416 | Rat Wistar | High dose F1: haemorrhagic diathesies  2-generation | NO(A)EL  Parental (females) = 0.001 mg/kg bw/day) |  | Morris, 1995 |

##### Primary poisoning

Acute/short-term qualitative assessment

Acute primary toxicity for birds and mammals is assessed only qualitatively in accordance with the decision from TMIII-06.

**For mammals** the acute toxicity to rat: a LD50 value =< 5 mg a.s. /kg bwis provided.

Additional endpoints:

According to the combined AR of brodifacoum, a lower **LD50** value of **0.4mg a.s. /kg bw** is provided by another applicant. Therefore, as the data set are considered equivalent, the worst case LD50 value from the combined AR is used in the qualitative assessment for comparisons with estimated daily uptakes of brodifacoum (ETE, mg a.s. /kg bw).

**For birds** the acute toxicity to Japanese quail: **LD50 = 19 mg a.s. /kg bw** is provided.

Additional endpoints:

According to the combined AR of brodifacoum, a lower LD50 value of **0.31mg a.s. /kg bw** is provided by another applicant. Therefore, as the data set are considered equivalent, the worst case LD50 value from the combined AR is used in the qualitative assessment for comparisons with estimated daily uptakes of brodifacoum (ETE, mg a.s. /kg bw).

Long-term quantitative assessment

For **mammals**, in a two-generation fertility study with rats, a NOAEL of 0.001 mg/kg bw/day was estimated. According to the TGD, the NOAEL is transformed into a NOEC using a conversion factor of 20, and the AForal of 90 is applied to this NOEC, which results in a

**PNECoral (mammal) = 0.001/90 = 1.1E-05 mg/kg bw/day**

**equivalent to**

**PNECoral (mammal) = 0.001\*20/90 = 2.22E-04 mg/kg food**

For **birds** the NOEC for Brodifacoum is based on the results of the chronic toxicity study with Difenacoum (with Japanese Quail), chosen as reference chemical for second generation anticoagulants (NOEC > 0.1 mg Difenacoum /kg diet). An extrapolation factor of 8.05 was applied to correct for differences in toxicitybased on the acute test results for Difenacoum (LD50 = 66 mg/kg, male and females) and Brodifacoum (LD50 = 19 mg/kg bw), both related to Japanese quail. Brodifacoum results very toxic to birds, with NOEC = 0.012 mg Brodifacoum/kg diet (obtained as NOEC > 0.1 mg Difenacoum /kg diet / 8.05) and NOEL = 0.0012 mg Brodifacoum/kg bw/d.

According to TGD, an assessment factor of 30 is applied to derive the PNEC:

PNECoral for birds (dose) = 0.0012/30 = 4E-05 mg/ kg bw/ day

equivalent to

PNECoral for birds (conc. In food) = 0.012/30 = 43E-04 mg/kg food

Additional endpoints: According to the combined AR of brodifacoum, a lower **PNECoral for birds** is provided by another applicant. The long-term toxicity was extrapolated by read across to reproduction toxicity of Difenacoum to Japanese Quail (NOEC > 0.1 mg Difenacoum /kg diet), selected as representative compound of the second generation anticoagulants. A factor of 26 was applied to take into account differences in toxicity between the two compounds, with the brodifacoum more toxic than difenacoum. ANOEC = 0.0038 mg Brodifacoum /kg/ diet and a NOEL = 3.85E-04 mg Brodifacoum/kg bw/d are derived.

According to TGD, an assessment factor of 30is applied to derive the PNEC:

**PNECoral for birds (dose) = 1.3E-05 mg/ kg bw/ day**

**equivalent to**

**PNECoral for birds (conc. In food) = 1.3E-04 mg/kg food**

Therefore, as the data set are considered equivalent, the worst case PNEC from the combined AR is used in the risk assessment.

##### Secondary poisoning

Acute/short-term qualitative assessment

Acute primary toxicity for birds and mammals is assessed only qualitatively in accordance with the decision from TMIII-06.

**For mammals** the acute toxicity to rat:LD50 = 0.4 mg a.s. /kg bw recalculated into **LC50 = 8 mg/kg food**, using the conversion factor bw/dfi of 20 from table 22 in the TGD II is the lowest value for the acute toxicity.

**For birds** a LD50 value of **0.72mg a.s. /kg food** is provided by another applicant in the combined AR. No data about the dietary toxicity to birds was submitted by Activa / PelGar Brodifacoum and Difenacoum Task Force in the combined AR.

Long-term quantitative assessment

For **mammals**, in a two-generation fertility study with rats, a NOAEL of 0.001 mg/kg bw/day was estimated. According to the TGD, the NOAEL is transformed into a NOEC using a conversion factor of 20, and the AForal of 90 is applied to this NOEC, which results in a

**PNECoral (mammal) = 0.001\*20/90 = 2.22E-04 mg/kg food**

**equivalent to**

**PNECoral (mammal) = 0.001/90 = 1.1E-05 mg/kg bw/day**

For **birds** the NOEC for Brodifacoum is based on the results of the chronic toxicity study with Difenacoum (with Japanese Quail), chosen as reference chemical for second generation anticoagulants (NOEC > 0.1 mg Difenacoum /kg diet). An extrapolation factor of 8.05 was applied to correct for differences in toxicitybased on the acute test results for Difenacoum (LD50 = 66 mg/kg, male and females) and Brodifacoum (LD50 = 19 mg/kg bw), both related to Japanese quail. Brodifacoum results very toxic to birds, with NOEC = 0.012 mg Brodifacoum/kg diet (obtained as NOEC > 0.1 mg Difenacoum /kg diet / 8.05) and NOEL = 0.0012 mg Brodifacoum/kg bw/d.

According to TGD, an assessment factor of 30 is applied to derive the PNEC:

PNECoral for birds (conc. In food) = 0.012/30 = 43E-04 mg/kg food

equivalent to

PNECoral for birds (dose) = 0.0012/30 = 4E-05 mg/ kg bw/ day

Additional endpoints: according to the combined AR of brodifacoum, a lower **PNECoral for birds** is provided by another applicant. The long-term toxicity was extrapolated by read across to reproduction toxicity of Difenacoum to Japanese Quail (NOEC > 0.1 mg Difenacoum /kg diet), selected as representative compound of the second generation anticoagulants. A factor of 26 was applied to take into account differences in toxicity between the two compounds, with the brodifacoum more toxic than difenacoum. ANOEC = 0.0038 mg Brodifacoum /kg/ diet and a NOEL = 3.85E-04 mg Brodifacoum/kg bw/d are derived.

According to TGD, an assessment factor of 30is applied to derive the PNEC:

**PNECoral for birds (conc. In food) = 1.3E-04 mg/kg food**

**equivalent to**

**PNECoral for birds (dose) = 1.3E-05 mg/ kg bw/ day**

Therefore, as the data set are considered equivalent, the worst case PNEC from the combined AR is used in the risk assessment.

#### Summary of PNECs of the active substance Brodifacoum

Table 10: Summary of the brodifacoum (a.s.) PNECs used for risk assessment

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Compartment** | | **Test Value** | **AF** | **PNEC** | **Source** |
| Aquatic | PNECwater | 72h ErC50 = 0.04 mg a.s./L | 1000 | 0.04 µg a.s./L | Combined AR |
| PNECSTP | EC10> 0.0038 mg a.s. /L | 100 | > 0.0038 mg a.s/L | combined AR |
| Terrestrial | PNECsoil | 14-d LC50> 879.6 mg a.s. /kg ww soil | 1000 | > 0.88 mg/kg wet weight | Combined AR |
| Primary and secondary poisoning | PNECoral for birds | NOEC = 0.0038 mg/kg food  NOEL = 3.85E-04 mg/kg bw/day | 30 | 1.3E-04 mg/kg food  1.3E-05 mg/ kg bw/ day | Combined AR |
| PNECoral for mammals | NO(A)EL=0.001mg a.s/kg bw/day  NOEC= (0.001\*20)=0.02 mg a.s/kg food | 90 | 1.1E-05 mg/kg bw/day  2.22E-04 mg/kg food | Combined AR |

PNEC values of other applicant of brodifacoum from the combined AR are indicated when they represent worst-case value in comparison with the PNEC values of Activa / PelGar Brodifacoum and Difenacoum Task Force presented in the combined AR.**The lowest PNEC values is used in the risk assessment.**

#### PBT Assessment

Persistence

According to results given in the combined AR, brodifacoum is not readily, inherently or anaerobically biodegradable. In addition, Brodifacoum resulted hydrolytically stable, but undergoes rapid photolysis in water. These results indicate according to screening criteria, that brodicaoum can be considered as potentially persistent (P) very persistent (vP).

Bioaccumulation

Based on log Kow = 6.12 and BCFfish = 35 645 L.Kg-1 (according to Equation 75; TGD), brodifacoum potentially fulfils the B criterion and vB criterion.

Toxicity

Brodifacoum is proposed to be classified as T+; R27/28, T; R48/24/25, N; R50/53. According to the TGD, brodifacoum fulfils the T criterion.

**Brodifacoum is considered a potential PBT, according to the TGD on Risk Assessment (2003)**.

### Effects on environmental organisms for biocidal product

It is important to notice that the applicant did not provide ecotoxicological data about the biocidal product FANGA RONGEUR PRO. Consequently, all the effects assessment is based on the data obtained from the active substance brodifacoum (Combined Assessment Report According to Directive 98/8EC, Active substance in Biocidal Products, Brodifacoum CAS 56073-10-0, Product Type 14 (Rodenticides), RMS Italy, Revision 2: November 2010).

Denatonium benzoate is used in the biocidal product as bittering agent. This substance is classified as “Toxicto aquatic organisms, may cause long-term adverse effects in the aquatic environment” in the frame of the Directive 91/414/EEC. Nevertheless at the concentration used in FANGA RONGEUR PRO, the substance does not contribute to the classification of the biocidal product.

No other substance used in the biocidal product is classified for the environment.

Therefore, considering that the product contains no substances of concern except brodifacoum, environmental effects following the use of FANGA RONGEUR PRO can be extrapolated from the environmental effects of the active substance brodifacoum only.

#### Aquatic compartment (including water, sediment and STP)

##### Aquatic organisms

Refers to section 2.8.2.1.

##### Sediment dwelling organisms

Refers to section 2.8.2.1

##### STP micro-organisms

Refers to section 2.8.2.1.

#### Atmosphere

Refers to section 2.8.2.2.

#### Terrestrial compartment

Refers to section 2.8.2.3.

#### Non compartment specific effect relevant to the food chain

Refers to section 2.8.2.4.

#### Summary of PNECs

Refers to section 2.8.2.5.

### Environmental exposure assessment - PAR - 2014

As the product contains no substances of concern except brodifacoum, it is considered that risks posed to environment following the use of the product FANGA RONGEUR PRO can adequately be assessed based on the evaluation conducted for the active substance. Therefore the exposure assessment is carried out with the data obtained from the active substance brodifacoum only.

The product FANGA RONGEUR PRO is a ready-to-use rodenticidal bait containing 0.005% brodifacoum (0.05 g/kg). The product is in the form of cereal grains supplied in sachet for professional users. The product is used at 50 g for mouse and 200 g for rat / bait point. According to the applicant, the sachets containing impregnated grains are placed in secured bait stations, inside domestic, industrial, and farm buildings. The secured bait points are refilled 4 times over 28 days. Dead rodents and unconsumed baits are removed each week.

As the product is applied indoor only, no environmental compartment is exposed to FANGA RONGEUR PRO. Nevertheless primary and secondary poisoning cannot be excluded. Indeed, pets living in treated buildings could be exposed directly to the product. Moreover even if the product is applied inside buildings, rats can live some days before dying. Therefore, they have the time to escape outside buildings and to be eaten by predators.

#### Aquatic compartment (surface water, sediment, STP)

Exposure of the aquatic compartment *via* the STP after the treatment with rodenticides is only relevant for indoor application of liquid poisons, residues from mixing and cleaning (ESD PT14). As FANGA RONGEUR PRO is a solid form and is intended to be used indoor only, indirect or direct exposure of the aquatic compartment may be considered negligible.

#### Atmospheric compartment

Due to its physico-chemical properties (low vapour pressure of 2.6 x 10-22 Pa at 20°C and low Henry’s law constant of 2.35 x 10-18 Pa.m3.mol-1), brodifacoum is not expected to be present in the atmosphere in significant quantities.The exposure of air is therefore considered negligible for the application of FANGA RONGEUR PRO biocidal product.

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#### Terrestrial compartment (soil and groundwater)

As FANGA RONGEUR PRO is intended to be used indoor only, no exposure to soil and groundwater is expected.

#### Non-compartmental-specific exposure relevant to the food chain (secondary poisoning)

##### Primary poisoning

As stated in the ESD (Larsen, 2003), primary poisoning hazard to mammals and birds (both wild and domestic) can be considered small when rodenticides are applied according to the label instructions. In the scenario “in and around buildings” when the product is placed in protected bait point, the risk for primary poisoning is mainly for birds and mammals of equal size or smaller as the target rodents, which may be able to enter into the bait stations. Another exposure of non-target animals may arise when target rodents carry bait away from bait stations.

Worst case exposure estimations are based on the equations and default values proposed by the ESD (Larsen, 2003). Some defaults parameters may be replaced by product-specific properties.

###### Primary poisoning – Tier 1 assessment

The Tier 1 assessment assumes that the whole day’s food requirement is satisfied by consumption of baits and therefore the concentration in food will be the same as the concentration of the active substance in the bait: 50 mg.kg-1 (0.005% w/w of brodifacoum in FANGA RONGEUR PRO).

Hence, **the worst case Tier 1 PECoral is 50 mg.kg-1**.

###### Primary poisoning – Tier 2 assessment, acute exposure

According to ESD (Larsen, 2003), a Tier 2 assessment can be done estimating a daily uptake of a compound (ETE, mg.kg-1bw.d-1) by non-target animals according to the equation 19 of ESD:



With:

FIR: food intake rate of the indicator species (g.d-1),

BW: indicator species body weight (g),

C: concentration of the active substance in fresh diet (mg.kg-1),

AV: avoidance factor (-),

PT: fraction of diet obtained in treated area (-),

PD: the fraction of the food type in the diet (-).

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

Table 11

: Expected concentrations of brodifacoum in non-target animals in the worst case (Step 1) and realistic worst case (Step 2) for acute situations.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Non-target animal** | **BW (g)a** | **FIR**  **(g dry weight.day-1)** | **C (mg.kg-1)** | **ETE = concentration of brodifacoum after one meal**  **(mg.kg-1bw.d-1)** | |
|  | | | | **Step 1** | **Step 2** |
| **Dog** | 10 000 | 456b | 50 | 2.28 | 1.64 |
| **Pig** | 80 000 | 600a | 50 | 0.38 | 0.27 |
| **Pig young** | 25 000 | 600a | 50 | 1.20 | 0.86 |
| **Tree sparrow** | 22 | 7.6 a | 50 | 17.27 | 12.44 |
| **Chaffinch** | 21.4 | 6.42 a | 50 | 15.00 | 10.80 |
| **Wood pigeon** | 490 | 53.1 a | 50 | 5.42 | 3.90 |
| **Pheasant** | 953 | 102.7 a | 50 | 5.39 | 3.88 |

a From EUBEES 2, Table 3.1, section 3.2.1

b From EUBEES 2, using the equation log FIR = 0.822 log BW - 0.629 (for mammals)

###### Primary poisoning – Tier 2 assessment, long-term exposure

The long-term risks of brodifacoum are determined by the expected concentrations (EC) in the animal after metabolisation and elimination, which is regarded as PEC. The EC values are calculated on the basis of the actual dose of the substance consumed by a non-target animal each day (ETE) using the realistic worst case scenario (Step 2), calculated above. Calculations are performed according to the equation 20 of the ESD.



According to the ESD, a default value of 0.3 for daily uptake eliminated (El) can be used if no studies are submitted. The EC values are the expected concentrations of active substance brodifacoum in non-target animals in primary poisoning scenarios after one meal followed by a 24 hour elimination period.

Table 12

Expected concentrations of brodifacoum in non-target animals in realistic worst case (Step 2) for long-term situation.

|  |  |
| --- | --- |
| **Non-target animal** | **EC, conc. of brodifacoum after one day of elimination (mg.kg-1bw)** |
|  | **Step 2** |
| **Dog** | 1.15 |
| **Pig** | 0.19 |
| **Pig young** | 0.60 |
| **Tree sparrow** | 8.71 |
| **Chaffinch** | 7.56 |
| **Wood pigeon** | 2.73 |
| **Pheasant** | 2.72 |

##### Secondary poisoning

***Secondary poisoning via the aquatic food chain***

As no exposure of the aquatic compartment is foreseen with the use of FANGA RONGEUR PRO inside buildings, no risk assessment for secondary poisoning through the aquatic food chain is required.

***Secondary poisoning via the terrestrial food chain***

As no exposure of the terrestrial compartment is foreseen with the use of FANGA RONGEUR PRO inside buildings, no risk assessment for secondary poisoning through the terrestrial food chain is needed.

***Secondary poisoning for the rodent-eating mammal or the rodent-eating bird***

According to the ESD (Larsen, 2003) document, for uses ‘in and around buildings’ it is assumed that predators among mammals and birds may occur inside buildings or they may hunt rats in the immediate vicinity of buildings (parks and gardens or further away). Scavengers may also search for food close to buildings.

Therefore secondary poisoning through poisoned rats exists, even in case of an indoor use. Secondary poisoning hazard can only be ruled out completely when the rodenticide is used in fully enclosed spaces so that rodents cannot move to outdoor areas or to (parts of) buildings where predators may have access.

###### Secondary poisoning - Tier 1 assessment, acute

Calculations of the risk for secondary poisoning of scavengers and predators are done by determining the concentration of brodifacoum in their food, i.e. the poisoned rodents. This PECoral is then compared to the LC50 values for a qualitative risk assessment in accordance with the decision from TM III-06. According to the ESD section 3.3.1, the consumption of rodenticides makes up at least 20 % of total consumptions in a choice test and could in a worst case be up to 100 %, whilst 50 % would be considered as the normal situation. Therefore, in the calculations the fractions of the food type in the diet (PD) are set to 0.2, 0.5 and 1.0. The FIR/BW quotient (food intake rate of the indicator species/indicator species body weight) is a default value set to 0.1, i.e. it is assumed that the rats eat 10 % of their bodyweight each day. The avoidance factor (AV) and the fraction of diet (PT) obtained in the area are both set to 1.

The calculations are done according to equation 19 in the ESD:

 (mg.kg-1bw.d-1)

This equation gives the concentration of brodifacoum in rodent (PECoral) after the first meal. Considering the elimination rate and the mean time to death (seven days), the concentrations in rodents can be calculated each day by the equation 21 in the ESD:



For the active substance brodifacoum, the default value of 0.3 is used for elimination (El).

Table 13: Residues of brodifacoum in target animals at specific points in time and varying bait consumption

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Residues in target animal (mg.kg-1bw)** | | |
| **20%** | **50%** | **100%** |
| **Day 1 after the first meal** | 1.0 | 2.5 | 5.0 |
| **Day 2 before new meal** | 0.7 | 1.8 | 3.5 |
| **Day 5 after the last meal** | 2.8 | 6.9 | 13.9 |
| **Day 7 mean time to death** | 1.4 | 3.4 | 6.8 |

According to the ESD, the concentrations of brodifacoum in rats are at peak after consuming bait during 5 days; thereafter the concentrations in rodents are decreasing until day 7 due to excretion and metabolisation of the rodenticide in rodents. The values from day 5 (after the meal) are used as worst case PECoral.

###### Secondary poisoning - Tier 1 assessment, long-term

To assess the risk of long-term secondary poisoning to mammals, the PEC in rodents after 1 day and after 5 days are used considering that the consumption of rodenticides makes up 100% of total consumptions (refer to Table 13).

Table 14: Residues of brodifacoum in target animals at specific points in time and varying bait consumption used in the long term assessment

|  |  |
| --- | --- |
|  | **PECoral**  **Brodifacoum conc. in target rodent (mg.kg-1 bw), ESD default values** |
| **Birds** | **13.9** |
| **Mammals** | **13.9** |

###### Secondary poisoning - Tier 2 assessment, long-term

For the Tier 2 assessment, the average food intake for each species and the average weight of the species have been considered, according to the Table 3.5 in the ESD. The calculations are based on the expected values for uptake of active substance by a mammal predator after a single day of exposure presented as an illustrative example in the ESD.

The amount of a.i. consumed by the non-target animal is 13.9 mg.kg-1 bw for rodents caught on day 5 and 16.6 mg.kg-1 bw for resistant rodents caught on day 14, also assuming that the non-target animals feed to 50 % on the rodents, all in accordance with the ESD. By knowing the amount of a.i. consumed by the non-target animal and the weight of the animal, the PEC (concentration in non-target animal) after one day consumption of rodents can be calculated. The results are presented in Table 15.

Table 15: Expected concentrations of brodifacoum in non-target animals (predators/carnivores) due to secondary poisoning after a single day of exposure (concentration of brodifacoum in rodenticide bait 0.005%). Rodents fed 100% on rodenticide and predators/carnivores fed 50% on poisoned rodents.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | **Normal susceptible rodents caught on day 5** | | **Resistant rodents caught on day 14** | |
| **Species** | **Body weight**  **(g)** | **Daily mean food intake**  **(g.d-1)** | **Amount a.i. (mg)1** | **Conc. (mg.kg-1)2** | **Amount a.i. (mg)1** | **Conc. (mg.kg-1)2** |
| **Barn owl**  ***(Tyto alba)*** | 295 | 72.9 | 0.51 | 1.7 | 0.60 | 2.1 |
| **Kestrel**  ***(Falco tinnunculus)*** | 209 | 78.7 | 0.55 | 2.6 | 0.65 | 3.1 |
| **Little owl**  ***(Athene noctua)*** | 164 | 46.4 | 0.32 | 2.0 | 0.38 | 2.3 |
| **Tawny owl**  ***(Strix aluco)*** | 426 | 97.1 | 0.67 | 1.6 | 0.80 | 1.9 |
| **Fox**  ***(Vulpes vulpes)*** | 5700 | 520.2 | 3.61 | 0.6 | 4.31 | 0.8 |
| **Polecat**  ***(Mustela putorius)*** | 689 | 130.9 | 0.91 | 1.3 | 1.08 | 1.6 |
| **Stoat**  ***(Mustela erminea)*** | 205 | 55.7 | 0.39 | 1.9 | 0.46 | 2.3 |
| **Weasel**  ***(Mustela nivlis)*** | 63 | 24.7 | 0.17 | 2.7 | 0.20 | 3.3 |

1Amount a.i. consumed by non-target animal

2 Conc. in non-target animal

### Risk characterisation for the environment-PAR- 2014

#### Primary poisoning

Risk characterization for the environment is done quantitatively by comparing predicted environmental concentrations (PEC) and the concentrations below which effects on organism will not occur (PNEC and/or LD50) according to the guidance in Technical guidance document (TGD, 2003) and “Emission Scenario document for biocides used as rodenticides” (Larsen, 2003, ESD PT14).

The environmental risk characterization has been carried out for brodifacoum.

##### Tier 1 assessment

The PEC value for Tier 1 assessment is compared to the long-term PNEC for mammals and birds.

Table 16

: Tier 1 risk characterization of primary poisoning – Long-Term

|  |  |  |  |
| --- | --- | --- | --- |
|  | **PEC1**  **mg.kg food -1** | **PNEC1**  **mg.kg food -1** | **PEC/PNEC** |
| **Birds** | 50 | 1.3E-04 | 384 615 |
| **Mammals** | 50 | 2.22E-04 | 225 225 |

1 Concentration of brodifacoum in food.

For mammals and birds, the resulting PEC/PNEC ratios reveal high risks of long-term primary poisoning.

**Tier 2 assessment – acute**

For the acute situation of primary poisoning, only a qualitative risk assessment is carried out in accordance with the decision from TM III-06. In this Tier 2 acute qualitative assessment, the PEC values are compared to the LD50 values.

Table 17

: Tier 2 acute qualitative risk assessment of primary poisoning

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **PECoral1**  **mg.kg-1bw** | | **LD50 dose**  **mg.kg-1 bw d-1** | **PECoral> LD50**  **(y/n)** | |
| **Step 1** | **Step 2** | **Step 1** | **Step 2** |
| **Dog** | 2.28 | 1.64 | 0.40 | y | y |
| **Pig** | 0.38 | 0.27 | n | n |
| **Pig young** | 1.20 | 0.86 | y | y |
| **Tree sparrow** | 17.27 | 12.44 | 0.31 | y | y |
| **Chaffinch** | 15.00 | 10.80 | y | y |
| **Wood pigeon** | 5.42 | 3.90 | y | y |
| **Pheasant** | 5.39 | 3.88 | y | y |

1 PECoral = ETE, concentration of brodifacoum after one meal

This comparison indicates that the situation for mammals is uncertain. Dogs and young pigs are at risk while pigs are not at risk but very close to the trigger value. On the other hand, this comparison indicates that all birds are at risk for acute primary poisoning.

**Tier 2 assessment – long-term**

The PEC values are compared to the PNEC values.

Table 18

: Tier 2 long-term risk assessment of primary poisoning

|  |  |  |  |
| --- | --- | --- | --- |
|  | **PECoral1**  **mg.kg-1bw** | **PNEC**  **mg.kg-1 bw d-1** | **PEC /PNEC** |
| **Step 2** | | |
| **Dog** | 1.15 | 1.1E-05 | **104 545** |
| **Pig** | 0.19 | **17 273** |
| **Pig young** | 0.60 | **54 545** |
| **Tree sparrow** | 8.71 | 1.3E-05 | **670 000** |
| **Chaffinch** | 7.56 | **581 538** |
| **Wood pigeon** | 2.73 | **210 000** |
| **Pheasant** | 2.72 | **209 231** |

1 PECoral = EC, concentration of brodifacoum after one day of elimination

The risk characterization indicates a very high risk to non-target mammals and birds from direct eating of bait. Primary poisoning incidents can be minimized by preventing the access of non-target animals to the baits. It is assumed in the ESD that if the rodenticide baits are use according to the label instructions, the risk for primary poisoning is negligible. However, it is stated at the EU level that it may not be possible to exclude exposure of all non-target animals, as the baits have to be accessible to target rodents, they may as well be accessible to non-target mammals birds of equal or smaller size than the target rodents.

Nevertheless, as the product FANGA RONGEUR PRO is intended to be used indoor and in bait stations only, primary poisoning can therefore be considered negligible as domestic animals can be kept away from the product, and wild animals other than rats and mice are not expected to be found inside buildings.

#### Secondary poisoning

The only relevant scenario of secondary poisoning in the case of an indoor application only is for the rodent-eating mammal or bird.

##### Tier 1 assessment, acute

The PECoral are compared to the LC50 value presented in the section above for qualitative risk assessment in accordance with the decisions taken at the TMII-06.

Table 19

Tier 1 long-term risk assessment of secondary poisoning

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Non-target animal** | **PECoral**  **mg.kg-1bw** | | | **LC50 dose**  **mg.kg-1 food** | **PECoral> LC50**  **(y/n)** | | |
| **PD=0.2** | **PD=0.5** | **PD=1** | **PD=0.2** | **PD=0.5** | **PD=1** |
| **Birds** | 2.8 | 6.9 | 13.9 | 8 | n | n | y |
| **Mammals** | 2.8 | 6.9 | 13.9 | 0.72 | y | y | y |

PECoral = Expected concentration in rodent caught on day 5 after meal

PD = fraction of the food type in the diet

This qualitative risk assessment indicates risk for birds with a fraction of the food type in the diet of 1 and with a PEC in rodent caught on day 5 after meal, and indicates risk for mammals at all fractions of food type in the diet and with a PEC in rodent caught on day 5 after meal.

**Tier 1 assessment, long-term**

To assess the risk of long-term secondary poisoning, the PEC in rodents after 5 days is used and compared to the long-term PNECoral for birds and mammals.

Table 20: Tier 1 long-term risk assessment of secondary poisoning

|  |  |  |  |
| --- | --- | --- | --- |
| **Non-target animal** | **PECoral**  **mg.kg-1bw** | **PNEC**  **mg.kg-1 food** | **PEC /PNEC** |
| **Birds** | 13.9 | 1.3E-04 | 106 923 |
| **Mammals** | 13.9 | 2.22E-04 | 62 613 |

PECoral = Expected concentration in rodent caught on day 5 after meal

The tier 1 long-term assessment indicates very high risks of long-term secondary poisoning for birds and mammals.

**Tier 2 assessment, long-term**

Table 21: Tier 2 long-term risk assessment of secondary poisoning

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Species** | **PEC (mg/kg bw)** | | **PNEC (mg/kg bw)** | **PEC/PNEC** | |
| **day 5** | **day 14** |  | **day 5** | **day 14** |
| **Barn owl**  ***(Tyto alba)*** | 1.7 | 2.1 | 1.3E-05 | **130 769** | **161 538** |
| **Kestrel**  ***(Falco tinnunculus)*** | 2.6 | 3.1 | **200 000** | **238 462** |
| **Little owl**  ***(Athene noctua)*** | 2.0 | 2.3 | **153 846** | **176 923** |
| **Tawny owl**  ***(Strix aluco)*** | 1.6 | 1.9 | **123 077** | **146 154** |
| **Fox**  ***(Vulpes vulpes)*** | 0.6 | 0.8 | 1.1E-05 | **54 545** | **72 727** |
| **Polecat**  ***(Mustela putorius)*** | 1.3 | 1.6 | **118 182** | **145 455** |
| **Stoat**  ***(Mustela erminea)*** | 1.9 | 2.3 | **172 727** | **209 091** |
| **Weasel**  ***(Mustela nivlis)*** | 2.7 | 3.3 | **245 455** | **300 000** |

The tier 2 risk characterisation shows very high risks for secondary poisoning at long-term for birds and mammals.

However, considering the fact that FANGA RONGEUR PRO is intended to be used indoor only, it can be assumed that, applying use restrictions (such as collecting dead rodents), the risk for secondary poisoning will be lower.

Nevertheless, in order to reduce the risk of secondary poisoning, it is very important to follow the use instructions of the rodenticide baits. The risk reduction measures are considered in the following section.

#### Conclusion of the risk assessment for the environment

No studies were conducted with the product FANGA RONGEUR PRO for the environment part; therefore the environmental risk assessment has been carried out with data from the Combined AR of brodifacoum. The environmental risk is considered as limited for the indoor use by professionals, in strict compliance with the specific use instructions of rodenticidal baits and the use restrictions to reduce the risk for primary and secondary poisoning.

***Risk mitigation measures linked to risk assessment for environment***

***For professional users***

* Use in tamper-resistant bait boxes or in covered bait stations. The bait stations must be placed only in areas not accessible to the general public and non-target animals.
* Tamper-resistant bait boxes should be clearly marked to show that they contain rodenticides and that they should not contain other products than rodenticides.
* Never wash the tamper-resistant bait boxes and covered bait stations with water.
* Place the tamper-resistant bait boxes and covered bait stations in areas non-liable to floodings.
* Collect uneaten bait, bait fragments dragged away from the tamper-resistant bait boxes or covered bait stations and dead rodents, during and after treatment[[16]](#footnote-16).
* Baits must be unattainable to children, pets or other non-target animals in order to minimize the risk of poisoning.
* Dispose of the tamper-resistant bait boxes and covered bait stations, packaging, uneaten baits and dead rodents in accordance with local requirements.
* Remove all bait points after the end of treatment.
* Do not throw the product on the ground, into a water course, into the sink or down the drain and into the environment.

***Disposal considerations***

* Collect uneaten bait, bait fragments dragged away from the tamper-resistant bait boxes or covered bait stations and dead rodents, during and after treatment48.
* Dispose of the tamper-resistant bait boxes and covered bait stations, packaging, uneaten baits and dead rodents in accordance with local requirements.
* Never wash the tamper-resistant bait boxes and covered bait stations with water.
* Do not throw the product on the ground, into a water course, into the sink or down the drain and into the environment.
* Remove all bait points after the end of treatment.

***Required information linked to risk assessment for environment***

None.

* **Major change application 2016**

### Environmental exposure assessment (revised Environmental exposure assessment section during the major change application 2016)

The product FANGA RONGEUR PRO is a rodenticide bait containing 0.005% brodifacoum (0.05 g/kg). The product is in the grain bait form (packaged in sachet or bulk). Pre-filled secured bait boxes are available for non-professional users. The applicant also intends manual application of baits in bait stations for non-professional and professional users. The product is used as 40 g for mouse and 200 g for rat / bait point. The secured bait points are refilled 4 times over 28 days. Dead rodents and unconsumed baits are removed each week.

FANGA RONGEUR PRO is used in the following areas:

* In and around buildings (professional and non-professional use);
* Open areas (professional and non-professional use);
* Waste dumps area (professional use only).

For the intended uses, the terrestrial (including groundwater) compartment is the only relevant compartment of release. The risks are also calculated for primary and secondary poisoning.

#### Aquatic compartment (surface water, sediment, STP)

Exposure of the aquatic compartment *via* the STP after the treatment with rodenticides is only relevant for sewers. Contamination of surface water, STP or sediment with brodifacoum from the placing of bait in and around buildings, in open areas or in waste dumps is considered negligible according to the ESD (Larsen, 2003) for rodenticides (ESD PT14)[[17]](#footnote-17).

#### Atmospheric compartment

Due to its physico-chemical properties (low vapour pressure << 1 x 10-6 Pa and low Henry’s law constant << 2.18 x 10-3 Pa.m3.mol-1), brodifacoum is not expected to be present in the atmosphere in significant quantities.The exposure of air is therefore considered negligible for the application of FANGA RONGEUR PRO biocidal product.

#### Terrestrial compartment (soil and groundwater)

##### In and around buildings

The exposure assessment has been carried out according to the ESD PT14 and the TGD. The ESD PT14 indicates that the only primary compartment to be exposed during a use in and around buildings is the terrestrial compartment. Emission calculations to soil and groundwater were conducted with the default parameters of the ESD PT14 as well as the specific information on the product provided by the applicant:

* A brodifacoum concentration of 0.005% (w/w),
* The protection of baits in bait stations,
* Maximal dose rates: 200 g for rats and 40 g for mice,
* Minimal distance between two bait points: 5 m for rats and 1 m for mice,
* Number of refilling times: 1.5 (refined parameter according to the ESD TP14).

Exposure of the terrestrial compartment (soil) will occur when brodifacoum bait is deployed outdoors. ESD TP14 considers a scenario that entails outdoor baiting with bait grains around a farm building. In this situation, exposure is assumed to arise through a combination of transfer (direct release) and deposition *via* urine and faeces (indirect release) onto soil. The active substance metabolism is taken into account. ESD TP14 considers that, in general, 90% of the total amount of rodenticide consumed by the target rodents over the duration of the outdoor baiting campaign enters soil via urine and faeces.

The estimated direct release (Frelease-D-soil) during application and use is set to 1% (ESD TP14), according to the packaging worst case (bulk).

According to the ESD PT14 and the applicant’s usage, the normal campaign baiting is:

Day 1: Treatment with one normal bait per box,

Day 3: 100 % replenishment,

Day 7: 25-50 % replenishment,

Day 14: 10 % replenishment,

Day 21: 0% replenishment

The normal campaign baiting is roughly equivalent to 1.5 replenishments corresponding to a total direct release over 28 days.

The direct and indirect brodifacoum releases (Elocalsoil,) to the relevant soil surfaces are calculated according to the input values presented in the table below. The different PEC values are calculated using the TGD equations. The degradation in soil was not considered in the calculations.

Table 22

2.8.4‑23PEC brodifacoum in soil and groundwater for uses in and around buildings

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Typical scenario** | |  |
| **Symbol** | **Variable/parameters** | **Rat** | **Mouse** | **Unit** |
| **INPUTS** | | | | |
| Q*prod:* | Amount of product used in control operation for each bait box | 200 | 40 | [g] |
| Fc*product*: | Concentration of active substance in product | 0.05 | 0.05 | [g.kg-1] |
| Nsites: | Number of application sites | 10 | 10 | [-] |
| N*refil*: | Number of refilling times | 1.5 | 1.5 | [-] |
| F*release-D, soil*: | Fraction of product released directly to soil | 0.01 | 0.01 | [-] |
| F*release-ID, soil*: | Fraction released indirectly to soil | 0.9 | 0.9 | [-] |
| Koc | Organic carbon adorption coefficient | 9 155 | 9 155 | [L.kg-1] |
| Distance | Distance between 2 bait points | 5 | 1 | [m] |
| AREA*exposed-D*: | Area directly exposed to rodenticide originating from one bait box | 0.09 | 0.09 | [m2] |
| AREA*exposed-ID*: | Area indirectly exposed to rodenticide | 550 | 110 | [m2] |
| DEPTH*soil*: | Depth of exposed soil | 0.1 | 0.1 | [m] |
| RHO*soil*: | Density of exposed soil | 1700 | 1700 | [kg.m-3] |
| **OUTPUTS** | | | | |
| Elocal*soil-campaign, direct*: | Direct emission to soil from a campaign | 1.50E-03 | 3.00E-04 | [g.camp-1] |
| Elocal*soil-campaign, indirect*: | Indirect emission to soil from a campaign | 1.34E-01 | 2.67E-02 | [g.camp-1] |
| Elocal*soil-campaign*: | Total emission to soil from a campaign | 1.35E-01 | 2.70E-02 | [g.camp-1] |
| Clocal*soil-D* | Concentration in soil due to direct release (AREAexposed-D) after a campaign | 9.80E-03 | 1.96E-03 | [mg.kg-1wwt] |
| Clocal*soil-ID* | Concentration in soil due to indirect (AREAexposed-ID ) release after a campaign | 1.43E-03 | 1.43E-03 | [mg.kg-1wwt] |
| **Clocal*soil*** | **Worst case total concentration in soil = Clocalsoil-D + Clocalsoil-ID** = **PECsoil** | **1.12E-02** | **3.39E-03** | **[mg.kg-1wwt]** |
| **Clocalsoil mean concentration** | **Mean concentration in soil. The total amount of product release (=Elocalsoil-campaign) is divided by the whole area exposed(=AREAexposed-ID)** | **1.45E-03** | **1.45E-03** | **[mg.kg-1wwt]** |
| Kpsoil | Partition coefficient solid-water in soil | 183 | 183 | [L.kg-1] |
| Ksoil water | Soil-water partitioning coefficient | 275 | 275 | [m3.m-3] |
| **PEClocal soil, porew** | **Worst case concentration in groundwater (based on the total concentration in soil)** | **6.95E-05** | **2.10E-05** | **[mg.L-1]** |
| **PEClocal soil, porew** | **Mean concentration in groundwater (based on mean concentration in soil)** | **8.94E-06** | **8.94E-06** | **[mg.L-1]** |

##### Renewal application 2017

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A realistic worst case scenario has been added to be harmonised with recommandations of the ESD TP14.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  | **Realistic worst case** | |  | | **Symbol** | **Variable/parameters** | **Rat** | **Mouse** | **Unit** | | **INPUTS** | | | | | | Q*prod:* | Amount of product used in control operation for each bait box | 200 | 40 | [g] | | Fc*product*: | Concentration of active substance in product | 0.05 | 0.05 | [g.kg-1] | | Nsites: | Number of application sites | 10 | 10 | [-] | | N*refil*: | Number of refilling times | 5 | 5 | [-] | | F*release-D, soil*: | Fraction of product released directly to soil | 0.01 | 0.01 | [-] | | F*release-ID, soil*: | Fraction released indirectly to soil | 0.9 | 0.9 | [-] | | Koc | Organic carbon adorption coefficient | 9 155 | 9 155 | [L.kg-1] | | Distance | Distance between 2 bait points | 5 | 1 | [m] | | AREA*exposed-D*: | Area directly exposed to rodenticide originating from one bait box | 0.09 | 0.09 | [m2] | | AREA*exposed-ID*: | Area indirectly exposed to rodenticide | 550 | 110 | [m2] | | DEPTH*soil*: | Depth of exposed soil | 0.1 | 0.1 | [m] | | RHO*soil*: | Density of exposed soil | 1700 | 1700 | [kg.m-3] | | **OUTPUTS** | | | | | | Elocal*soil-campaign, direct*: | Direct emission to soil from a campaign | 5.00E-03 | 1.00E-03 | [g.camp-1] | | Elocal*soil-campaign, indirect*: | Indirect emission to soil from a campaign | 4.46E-01 | 8.91E-02 | [g.camp-1] | | Elocal*soil-campaign*: | Total emission to soil from a campaign | 4.51E-01 | 9.01E-02 | [g.camp-1] | | Clocal*soil-D* | Concentration in soil due to direct release (AREAexposed-D) after a campaign | 3.27E-02 | 6.54E-03 | [mg.kg-1wwt] | | Clocal*soil-ID* | Concentration in soil due to indirect (AREAexposed-ID ) release after a campaign | 4.76E-03 | 4.76E-03 | [mg.kg-1wwt] | | **Clocal*soil*** | **Worst case total concentration in soil = Clocalsoil-D + Clocalsoil-ID** = **PECsoil** | **3.74E-02** | **1.13E-02** | **[mg.kg-1wwt]** | | **Clocalsoil mean concentration** | **Mean concentration in soil. The total amount of product release (=Elocalsoil-campaign) is divided by the whole area exposed(=AREAexposed-ID)** | **4.82E-03** | **4.82E-03** | **[mg.kg-1wwt]** | | Kpsoil | Partition coefficient solid-water in soil | 183 | 183 | [L.kg-1] | | Ksoil water | Soil-water partitioning coefficient | 275 | 275 | [m3.m-3] | | **PEClocal soil, porew** | **Worst case concentration in groundwater (based on the total concentration in soil)** | **2.31E-04** | **6.99E-05** | **[mg.L-1]** | | **PEClocal soil, porew** | **Mean concentration in groundwater (based on mean concentration in soil)** | **2.98E-05** | **2.98E-05** | **[mg.L-1]** | |

##### Open areas

FANGA RONGEUR PRO is applied in open areas inside or near the openings of the tunnels of the target rodents. According to the ESD TP14, the use near the openings of the tunnels, demanding the use of bait boxes, is covered by the assessment of the scenario “in and around buildings”. Thus this section “Open areas” only assesses the use inside the tunnels during which, according to the scenario presented in ESD TP14, two treatments would typically be applied in the interval of six days. Bait deployment comprises 200 g of product against rats and 40 g against mice per application and per tunnel entrance. Based on a tunnel of 8 cm diameter, worst-case soil exposure is assumed to occur to a depth of 10 cm from the contact half (*i.e*. the burrow floor) of a 30 cm tunnel section in which the bait is placed. This section of tunnel floor is assumed to receive an input corresponding to 5% of the product during application and a further 20% as the bait is consumed.

Considering the localized treated area, the risk for groundwater from this use is not considered relevant.

Table 242.8.4‑25PEC of brodifacoum in soil for uses in open area

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | | Rat treatment | Mice treatment | unit |
| INPUTS | Qprod: | Amount of product used in control operation | 200 | 40 | [g.burrow-1] |
| Fc*product*: | Fraction of active substance in product | 0.05 | 0.05 | [g a.i. kg-1] |
| N*app*: | Number of application sites | 1 | 1 | [-] |
| N*refil*: | Number of refilling times | 2 | 2 | [-] |
| F*release, soil, appl*: | Fraction of product released to soil during application | 0.05 | 0.05 | [-] |
| F*release, soil, use*: | Fraction of product released to soil during use | 0.2 | 0.2 | [-] |
| Vsoil*exposed*: | Soil volume exposed to rodenticide | 0.0085 | 0.0085 | [m3] |
| RHO*soil*: | Density of wet exposed soil | 1700 | 1700 | [kg.m-3] |
| Koc | Organic carbon adsorption coefficient | 9155 | 9155 | [L.kg-1] |
|  | | | | | |
| OUTPUTS | Elocal*soil-campaign* | *Local emission of active substance to soil during a campaign* | 5.00E-03 | 1.00E-03 | [g.camp] |
| Clocal*soil* | *Local concentration in soil after a campaign* | 3.46E-01 | 6.92E-02 | [mg.kg-1wwt] |

##### Waste dumps

The default exposure scenario suggests in the event of an infestation outbreak a treatment with 40 kg of baits distributed over an area of 1 ha, with a total of seven applications per year. In this situation, soil exposure is assumed to arise through a combination of deposition via urine and faeces combined with rodenticide contained in the carcasses of poisoned target rodents. In general, ninety percent of the total amount of rodenticide consumed by the target rodents over the duration of each baiting campaign is assumed to enter soil over the 1 ha surface.

FANGA RONGEUR PRO is intended to be used in secured bait boxes or bait stations containing 200 g of biocidal product (0.005%) with 5 m spacing. So to predict the concentration of brodifacoum in soil and groundwater for the uses in waste dump, the intended doses are calculated for the 1 ha surface as below:

**Q*prod*** = (length of the waste dump of 1ha/distance between bait) + 1) x (length of the waste dump of 1ha/distance between bait) x (amount of product per bait point

**Q*prod*** = ((100 m /5 m) + 1) x (100 m / 5 m) x 0.20 kgproduct

**Q*prod*** = 84 kg/ha

The ESD (Larsen, 2003) considers that, in general, 90% of the total amount of rodenticide consumed by the target rodents over the duration of the outdoor baiting campaign enters soil via urine and faeces.

Table 262.8.4‑27 PEC of brodifacoum in soil and groundwater for uses in waste dump

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | | **Anticoagulant-Rat- ESD default values** | **Dose for rat intended by the applicant** | **Unit** |
| INPUTS | **Q*prod*** | Amount of product used in control operation / ha | 40 | 84 | [kg.ha-1] |
| **Fc*product*** | Fraction of active substance in product | 0.05 | 0.05 | [g a.i.kg-1] |
| **N*app*** | Number of applications | 7 | 7 | [-] |
| **F*release, soil*** | Fraction of product released to soil | 0.9 | 0.9 | [-] |
| **AREA*exposed*** | Area exposed to rodenticide | 10 000 | 10 000 | [m2] |
| **DEPTH*soil*** | Depth of exposed soil | 0.1 | 0.1 | [m] |
| **RHO*soil*** | Density of wet exposed soil | 1700 | 1700 | [kg.m-3] |
| **Koc** | Organic carbon adsorption coefficient | 9 155 | 9 155 | [L.kg-1] |
| OUTPUTS | **Elocal*soil-campaign*** | *Local emission of active substance to soil from a campaign* | 12.6 | 26.5 | [g.camp-1] |
| **Clocal*soil*** | *Local concentration in soil after a campaign* | 7.41E-03 | 1.56E-02 | [mg.kg-1wwt] |
| **Kpsoil** | *Partition coefficient solid-water in soil* | 1.83E+02 | 1.83E+02 | [L.kg-1] |
| **Ksoil water** | *Soil-water partitioning coefficient* | 2.75E+02 | 2.75E+02 | [m3.m-3] |
| **PEClocal soil, porew** | *Concentration in groundwater* | 4.59E-05 | 9.63E-05 | [mg.L-1] |

#### Non-compartmental-specific exposure relevant to the food chain (secondary poisoning)

##### Primary poisoning

Non-target birds and mammals may encounter bait containing brodifacoum if they are small enough to be able to reach the bait, or because the bait is inadequately safeguarded or a secured bait point has become damaged, or by finding pieces of bait which have been removed by target rodents. The quantities of brodifacoum potentially accessible to non-target mammals can be calculated based on the size and number of bait at each secured bait point and an estimate of the amount of bait removed from them. The primary poisoning risk assessment is presented in this dossier according to the scenario “in and around building” covering the other uses.

##### Primary poisoning - Tier 1 assessment

The Tier 1 assessment assumes that the whole day’s food requirement is satisfied by consumption of bait and therefore the concentration in food will be the same as the concentration of the active substance in the bait: 50 mg.kg-1 (0.005% w/w of brodifacoum in FANGA RONGEUR PRO). Hence, **the worst case Tier 1 PEC oral is 50 mg.kg-1**.

**For birds**, a separate, graded assessment of long-term risks of primary poisoning by bait has been done. It is based on different intakes of brodifacoum-treated bait in relation to untreated food, depending on to which extent brodifacoum bait is accessible to birds.Table 28**2.8.4‑29PECoral for non-target, birds exposed to brodifacoum in bait removed from secured bait points in and around buildings**

|  |  |
| --- | --- |
| **Proportion of bait point contents accessible, expressed as fraction of ingested food (%)** | **Brodifacoum conc. potentially ingested by non-target vertebrates (mg/kg)  PECoral** |
| 100 | 50 |
| 50 | 25 |
| 40 | 20 |
| 30 | 15 |
| 20 | 10 |
| 10 | 5 |
| 5 | 2.5 |
| 2 | 1 |
| 1 | 0.5 |

##### Primary poisoning - Tier 2 assessment, acute exposure

###### According to ESD TP14, a Tier 2 assessment can be done estimating a daily uptake of a compound (ETE, mg.kg-1bw.d-1) by non-target animals according to the equation 19 of ESDTP14:

**ETE = (FIR/BW) \* C \* AV \* PT \* PD (mg brodifacoum /kg bw/day)**

With:

ETE is the estimated daily uptake of the active substance (mg.kg-1bw.d-1),

FIR: food intake rate of the indicator species (g.d-1),

BW: indicator species body weight (g),

C: concentration of the active substance in fresh diet (mg.kg-1),

AV: avoidance factor (-),

PT: fraction of diet obtained in treated area (-),

PD: the fraction of the food type in the diet (-).

In the ESD TP14, in Tier 2 Step 1 (worst case) AV, PT and PD are all set at 1; in Step 2 (realistic worst case) AV and PT are refined to 0.9 and 0.8, respectively.

Table 302.8.4‑31 Expected concentrations of brodifacoum in non-target animals in the worst case (Step 1) and realistic worst case (Step 2) for acute situations.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Non-target mammal** | **BW (g)a** | **FIR**  **(g dry weight.day-1)** | **C (mg.kg-1)** | **ETE = concentration of brodifacoum after one meal**  **(mg.kg-1bw.d-1)** | |
| **Step 1** | **Step 2** |
| **Dog** | 10 000 | 456b | 50 | 2.28 | 1.64 |
| **Pig** | 80 000 | 600a | 50 | 0.38 | 0.27 |
| **Pig, young** | 25 000 | 600a | 50 | 1.20 | 0.86 |
| **Tree sparrow** | 22 | 7.6a | 50 | 17.27 | 12.44 |
| **Chaffinch** | 21.4 | 6.42a | 50 | 15.00 | 10.80 |
| **Wood pigeon** | 490 | 53.1a | 50 | 5.42 | 3.90 |
| **Pheasant** | 953 | 102.7a | 50 | 5.39 | 3.88 |

a From ESD TP14, Table 3.1, Section 3.2.1.

b From ESD TP14, using the equation log FIR = 0.822 log BW – 0.629 (for mammals)

##### Primary poisoning – Tier 2 assessment, long-term exposure

The long-term risks of brodifacoum are determined by the expected concentrations (EC) in the animal after metabolism and elimination, which is regarded as PEC. The EC are calculated by using the dose of the substance consumed by a non-target animal each day (ETE) using the realistic worst case scenario (Step 2), calculated above. When calculating the long-term risks, elimination and metabolism of the substance (El) have to be considered. Calculations are performed according to the equation 20 of the ESD TP14.

**EC = ETE\*(1-El)**

According to the ESD TP14, a default value of 0.3 for daily uptake eliminated (El) can be used if no studies are submitted. The EC values are the expected concentrations of active substance brodifacoum in non-target animals in primary poisoning scenarios after one meal followed by 24 hour elimination period.

Table 322.8.4‑33Expected concentrations of brodifacoum in non-target animals in realistic worst case (Step 2) for long-term situation.

|  |  |
| --- | --- |
| **Non-target animal** | **PEC: EC, concentration of brodifacoum after one day elimination (mg/kg)** |
| Dog | 1.15 |
| Pig | 0.19 |
| Pig, young | 0.60 |
| Tree sparrow | 8.71 |
| Chaffinch | 7.56 |
| Wood pigeon | 2.73 |
| Pheasant | 2.72 |

##### Secondary poisoning

###### ***Secondary poisoning via the aquatic food chain***

As no exposure of the aquatic compartment is foreseen with the use of FANGA RONGEUR PRO in and around buildings, in open areas and in waste dumps, no risk assessment for secondary poisoning through the aquatic food chain is required.

###### ***Secondary poisoning via the terrestrial food chain***

According to the TGD, secondary poisoning through the terrestrial route is soil → terrestrial organisms (earthworm) → earthworm-eating mammal or bird. Since birds and mammals consume worms with their gut contents and the gut of earthworms can contain substantial amounts of soil, the exposure of the predators may be affected by the amount of substance that is in the soil. The risk assessment for secondary poisoning for earthworm-eating mammals and birds has been carried out for the in and around use and for the waste dump application. As the use in open area is localised, the exposure of earthworm was deemed negligible in this case.

The calculation is done according to equation 80 and 82 (TGD):

**PEC oral, predator = C earthworm**

**C earthworm = (BCF earthworm \* C porewater) + C local soil mean concentration \* F gut \* CONV soil) / (1+Fgut \* CONV soil)**

With (example for rat treatment application in and around building):

BCF earthworm (bioconcentration factor for earthworms on wet weight basis) =**15 820** L.kg wet earthworm-1,

Cporewater (concentration in pore water) = **8.94E-06** mg.L-1, based on mean concentration in soil– typical case,

C local soil mean concentration (concentration in soil) = **1.45E-03** mg.kg-1wwt, based on mean concentration in soil– typical case,

F gut (fraction of gut loading in worm, default value) = 0.1 kg dwt.kg wwt-1,

CONV soil (conversion factor for soil concentration wet-dry weight soil) = 1.13 kg wwt.kg dwt-1,

According to the TGD, the most appropriate scenario is that 50% of the diet comes from a local area and 50% comes from the regional area, thus when the PEC local, soil is used in calculation, the PEC oral, predator to be used in risk assessment is C earthworm x 0.5.

Table 342.8.4‑35 Expected concentrations of brodifacoum in predator

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **PEC oral, predatormg/kg wet earthworm-1** | |  | |
| **In and around building** | |  | |
| ***TIER I: Worst case (based on the total concentration in soil)*** | | |  | |
| *Rat treatment* | 4.94E-01 | |  | |
| *Mice treatment* | 1.49E-01 | |  | |
| ***TIER I: Mean (based on the mean concentration in soil)*** | | |  | |
| *Rat treatment* | 3.18E-02 | |  | |
| *Mice treatment* | 3.18E-02 | |  | |
| ***TIER II: Mean (based on the mean concentration in soil) + considering degradation in soil (twa over 180 d with DT50 soil=298)*** | | |  | |
| *Rat treatment* | 3.07E-02 | |  | |
| *Mice treatment* | 3.07E-02 | |  | |
| *\*NA=not assessed* |  |  | |

###### ***Secondary poisoning for the rodent-eating mammal or the rodent-eating bird***

According to the ESD TP14 document, for uses ‘in and around buildings’, ‘open areas’ and ‘waste dumps’, it is assumed that predators among mammals and birds may occur inside buildings or they may hunt rats in the immediate vicinity of buildings (parks and gardens or further away). Scavengers may also search for food close to buildings. Therefore secondary poisoning through poisoned rats exists, even in case of an indoor use. Secondary poisoning hazard can only be ruled out completely when the rodenticide is used in fully enclosed spaces so that rodents cannot move to outdoor areas or to (parts of) buildings where predators may have access.

##### Secondary poisoning - Tier 1 assessment, acute

Calculations of the risk for secondary poisoning of scavengers and predators are done by determining the concentration of brodifacoum in their food, i.e. the poisoned rodents. This PECoral is then compared to the LC50 values for a qualitative risk assessment in accordance with the decision from TM III-06. According to the ESD TP14 section 3.3.1, the consumption of rodenticides makes up at least 20 % of total consumptions in a choice test and could in a worst case be up to 100 %, whilst 50 % would be considered as the normal situation. Therefore, in the calculations the fractions of the food type in the diet (PD) are set to 0.2, 0.5 and 1.0. The FIR/BW quotient (food intake rate of the indicator species/indicator species body weight) is a default value set to 0.1, i.e. it is assumed that the rats eat 10 % of their bodyweight each day. The avoidance factor (AV) is 1, which means no avoidance, since rats is their natural prey, and the fraction of diet (PT) obtained in the area is set to 1.

The calculation is done according to equation 19 in the ESD:

**ETE = (FIR/BW) \* C \* AV \* PT \* PD (mg brodifacoum.kg bw-1.day-1)**

This equation gives the concentration of brodifacoum in the rat (PECoral) after a meal the first day. Considering the elimination rate and that the mean time to death is seven days the concentration in the rodents each day can be calculated by the equation 21 in the ESD:

n

For the active substance brodifacoum, the default value of 0.3 is used for elimination (El).

Table 36: Residues of brodifacoum in target animals at specific point in times and varying bait consumption

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Residues in target animal (mg.kg-1 bw)** | | |
| **20%** | **50%** | **100%** |
| Day 1 after the first meal | 1.0 | 2.5 | 5.0 |
| Day 2 before new meal | 0.7 | 1.8 | 3.5 |
| **Day 5 after the last meal** | 2.8 | 6.9 | **13.9** |
| Day 7 mean time to death | 1.4 | 3.6 | 6.8 |

According to the ESD, the concentrations of brodifacoum in rats are at peak after consuming bait for 5 days; thereafter the concentrations in rodents are decreasing until day 7 due to excretion and metabolism of the rodenticide. The values from day 5 are used as PECoral.

##### Secondary poisoning - Tier 1 assessment, long-term

To assess the risk of long-term secondary poisoning, the PEC in rodents after 5 days are used considering that the consumption of rodenticides makes up 100% of total consumptions (refer to Table above).

Table 372.8.4‑38Residues of brodifacoum in target animals at specific point in times and varying bait consumption used in the long term assessment

|  |  |
| --- | --- |
| **Birds / Mammals** | **PECoral**  **Brodifacoum conc. in target rodent (mg.kg-1bw),**  **ESD default values** |
| **Day 5 after the last meal** | 13.9 |

##### Secondary poisoning - Tier 2 assessment, long-term

For the Tier 2 assessment the average food intake for each species and the average weight of the species have been considered, according to the Table 3.5 in the ESD. The calculations are based on the expected values for uptake of active substance by a mammal predator after a single day of exposure presented as an illustrative example in the ESD.

The amount of a.i. consumed by the non-target animal is 13.9 mg.kg-1 bw for rodents caught on day 5 and 16.6 mg.kg-1 bw for rodents caught on day 14, also assuming that the non-target animals feed to 50 % on the rodents, all in accordance with the ESD. By knowing the amount of a.i. consumed by the non-target animal and the weight of the animal, the PEC (concentration in non-target animal) after one day consumption of rodents can be calculated. The results are presented in Table below.

Table 39: 2.8.4‑40 Expected concentrations of brodifacoum in non-target animals (predators/carnivores) due to secondary poisoning after a single day of exposure (concentration of brodifacoum in rodenticide bait 0.005%). Rodents fed 100% on rodenticide and predators/carnivores fed 50% on poisoned rodents

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | **Normal susceptible rodents caught on day 5** | | **Resistant rodents caught on day 14** | |
| **Species** | **Body weight**  **(g)** | **Daily mean food intake**  **(g.d-1)** | **Amount a.i. (mg)1** | **Conc. (mg.kg-1)2** | **Amount a.i. (mg)1** | **Conc. (mg.kg-1)2** |
| Barn owl  *(Tyto alba)* | 294 | 72.9 | 0.51 | 1.72 | 0.60 | 2.05 |
| Kestrel  *(Falco tinnunculus)* | 209 | 78.7 | 0.55 | 2.61 | 0.65 | 3.12 |
| Little owl  *(Athene noctua)* | 164 | 46.4 | 0.32 | 1.96 | 0.38 | 2.34 |
| Tawny owl  *(Strix aluco)* | 426 | 97.1 | 0.67 | 1.58 | 0.80 | 1.89 |
| Fox  *(Vulpes vulpes)* | 5700 | 520.2 | 3.61 | 0.63 | 4.31 | 0.76 |
| Polecat  *(Mustela putorius)* | 689 | 130.9 | 0.91 | 1.32 | 1.08 | 1.57 |
| Stoat  *(Mustela erminea)* | 205 | 55.7 | 0.39 | 1.88 | 0.46 | 2.25 |
| Weasel  *(Mustela nivlis)* | 63 | 24.7 | 0.17 | 2.72 | 0.20 | 3.25 |

1Amount a.i. consumed by non-target animal

2 Conc. in non-target animal

##### Risk characterisation for the environment (revised risk characterisation for the environment section during the major change application 2016)

Risk characterization for the environment is done quantitatively by comparing predicted environmental concentrations (PEC) and the concentrations below which effects on organism will not occur (PNEC and/or LD50) according to the guidance in TGD and “Emission Scenario document for biocides used as rodenticides” (Larsen, 2003, ESD PT14).

The environmental risk characterization has been carried out for brodifacoum.

##### Aquatic compartment (including water, sediment and STP)

Exposure of surface water arising from the uses of FANGA RONGEUR PRO bait in and around buildings, open areas and waste dumps is not expected to be significant or widespread. Therefore, estimates of brodifacoum concentrations in surface water have not been calculated and aquatic PEC/PNEC ratios are not presented. Since the scope for exposure is negligible, the risks presented to aquatic biota by brodifacoum are expected to be very low. No further assessment of risk is necessary.

##### Atmospheric compartment

Due to its physico-chemical properties (low vapour pressure << 1 x 10-6 Pa and low Henry’s law constant << 2.18 x 10-3 Pa.m3.mol-1), brodifacoum is not expected to be present in the atmosphere in significant quantities.The exposure of air is therefore considered negligible for the application of FANGA RONGEUR PRO biocidal product.

##### Terrestrial compartment (including soil and groundwater)

Soil exposure occurs both through a combination of direct and indirect releases from the use of FANGA RONGEUR PRO bait in the scenario ‘in and around buildings’, ‘open areas’ and ‘waste dump’.

##### In and around building

Exposure of the terrestrial compartment (soil) will occur when FANGA RONGEUR PRO is deployed outdoors.

Typical case predicted soil concentrations (PECs) have been calculated for the use scenario in and around buildings, for application in control campaign. The resulting PEC/PNEC ratios for soil are summarized in the table below:

Table 412.8.5‑42PECsoil/PNECsoil for soil organisms exposed to brodifacoum following outdoor use of bait around buildings

|  |  |  |  |
| --- | --- | --- | --- |
| **Baiting scenario**  **(ESD PT14)** | **PECsoil**  **(mg brodifacoum.kg wwt soil-1)** | **PNECsoil (mg brodifacoum.kg wwt soil-1)** | **PEC/PNEC ratio** |
| **Typical scenario** | | | |
| Rat treatment | 1.12E-02 | 0.88 | 1.28E-02 |
| Mice treatment | 3.39E-03 | 3.85E-03 |

The PEC/PNEC ratios are below 1 indicating no unacceptable risks to the terrestrial compartment when the product FANGA RONGEUR PRO is used in and around building.

The risk is acceptable in groundwater for the use of FANGA RONGEUR PRO in and around building as presented below:

Table 432.8.5‑44PEC groundwater due to use of FANGA RONGEUR PRO in and around building

|  |  |  |  |
| --- | --- | --- | --- |
| **Baiting scenario**  **(ESD PT14)** | **PEC groundwater (µg brodifacoum.L-1)** | **Threshold value in groundwater (µg.L-1)** | **Risk characterization** |
| **Typical scenario** | | | |
| Rat treatment | 8.94E-03 | 0.1 | Acceptable |
| Mice treatment | 8.94E-03 |

##### Renewal application 2017

|  |  |  |  |
| --- | --- | --- | --- |
| **Baiting scenario**  **(ESD PT14)** | **PEC groundwater (µg brodifacoum.L-1)** | **Threshold value in groundwater (µg.L-1)** | **Risk characterization** |
| **Realistic worst case** | | | |
| Rat treatment | 2.98E-02 | 0.03\* | Acceptable |
| Mice treatment | 2.98E-02 |
| **Typical scenario** | | | |
| Rat treatment | 8.94E-03 | 0.03\* | Acceptable |
| Mice treatment | 8.94E-03 |

\*0.03µg/L corresponds on the threshold value for the toxicity in drinking water.

##### Open areas

Exposure of the terrestrial compartment will occur when FANGA RONGEUR PRO bait is applied in open areas by inserting inside the openings of the tunnels of the target rodents.

Predicted soil concentrations (PECs) have been calculated for the use scenario in open areas, for application in rats/rodents control campaign according to the doses claimed by the applicant. The resulting PEC/PNEC ratios for the soil are summarized in the table below:

Table 452.8.5‑46PECsoil/PNECsoil for soil organisms exposed to brodifacoum following use of bait in open area

|  |  |  |  |
| --- | --- | --- | --- |
| **Baiting scenario (EUBEES 2)** | **PECsoil**  (mg /kg wwt) | **PNECsoil**  (mg /kg wwt) | **PEC/PNEC** |
| **Typical use (rat treatment)** | 3.46E-01 | 0.88 | 3.93E-01 |
| **Typical use (mice treatment)** | 6.92E-02 | 7.86E-02 |

The PEC/PNEC ratios are below 1 and indicate that there are no unacceptable risks to the terrestrial compartment when the product FANGA RONGEUR PRO is used inside the tunnels of open areas. According to the ESD TP14 scenario, the use near the openings of the tunnels is covered by the assessment of the scenario “in and around buildings” with bait box. As argued above (section ’in and around building’), there is no unacceptable risk for the terrestrial compartment (including groundwater) when the FANGA RONGEUR PRO is used near the openings of the tunnels of the target rodents.

Considering the localized treated area in the tunnels, the risk for groundwater was not considered relevant.

##### Waste dump

Predicted soil concentrations (PECs) have been calculated for the use scenario in waste dump. The resulting PEC/PNEC ratios for the soil are summarized in the Table below:

Table 47

PECsoil/PNECsoil for soil organisms exposed to brodifacoum following use of bait at waste dumps

The PEC/PNEC ratios are below 1 indicating that there no unacceptable risks to the terrestrial compartment when the product FANGA RONGEUR PRO is used in waste dump.

|  |  |  |  |
| --- | --- | --- | --- |
| **Baiting scenario**  **(ESD PT14)** | **PECsoil**  **(mg brodifacoum.kg wwt soil-1)** | **PNECsoil (mg brodifacoum.kg wwt soil-1)** | **PEC/PNEC ratio** |
| **Rat treatment**  **(40 kg.ha-1)** | 7.42E-03 | 0.88 | 8.43E-03 |
| **Rat treatment**  **(84 kg.ha-1)** | 1.56E-02 | 0.88 | 1.77E-02 |

Table 48:PEC groundwater due to use of FANGA RONGEUR PRO in waste dump.

|  |  |  |  |
| --- | --- | --- | --- |
| **Baiting scenario**  **(ESD PT14)** | **PEC groundwater (µg brodifacoum.L-1)** | **Threshold value in groundwater (µg.L-1)** | **Risk characterization** |
| **Rat treatment**  **(40 kg.ha-1)** | 4.59E-02 | 0.1 | Acceptable |
| **Rat treatment**  **(84kg.ha-1)** | 9.63E-02 | Acceptable |

The risk for groundwater is acceptable.

* **Renewal 2017**

|  |  |  |  |
| --- | --- | --- | --- |
| **Baiting scenario**  **(ESD PT14)** | **PEC groundwater (µg brodifacoum.L-1)** | **Threshold value in groundwater (µg.L-1)** | **Risk characterization** |
| **Rat treatment**  **(40 kg.ha-1)** | 4.59E-02 | 0.03\* | Acceptable |
| **Rat treatment**  **(84kg.ha-1)** | 9.63E-02 | Acceptable |

\*0.03µg/L corresponds on the threshold value for the toxicity in drinking water.

Due to the new threshold value in groundwater, the risk is unacceptable. A FOCUS modelling was realised to refine the PEC groundwater: Application rate is calculated from Brodifacoum concentration in soil of 2.1g/application as a worst case leading to a dose rate of 84kg.ha-1.

|  |  |
| --- | --- |
| Model used | FOCUS PEARL 4.4.4. |
| Years of simulation | 1 |
| Application rate | 0.0021 kg.ha-1 |
| Standard crop for arable land | Alfalfa |
| Application depth | Incorporation 0 cm |
| Date of application | Twelve application per year |
| Molar mass | 523.4 g.mol-1 |
| Vapour pressure | 1E-06 Pa at 20°C |
| Water solubility | 0.240 mg.L-1 at 20°C |
| Kom | 5310.3 L.kg-1 at 25°C |
| Freundlich exponent | 1 |
| DT50soil | 298 d at 12°C |
| Coefficient for uptake for plant | 0 |
| Molar activation energy | 54 kJ.mol-1 |

RESULTS :

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **RESULT\_TEXT** | **SUBSTANCE** | **BRODIFACOUM** | **LOCATION** | **IRRIGATION\_SCHEME** |
| Concentration closest to the 80th percentile (ug/L) | Brodifacoum | 0.000000 | CHATEAUDUN | FOCUS |
| Concentration closest to the 80th percentile (ug/L) | Brodifacoum | 0.000000 | HAMBURG | No |
| Concentration closest to the 80th percentile (ug/L) | Brodifacoum | 0.000000 | JOKIOINEN | No |
| Concentration closest to the 80th percentile (ug/L) | Brodifacoum | 0.000000 | KREMSMUENSTER | No |
| Concentration closest to the 80th percentile (ug/L) | Brodifacoum | 0.000000 | OKEHAMPTON | No |
| Concentration closest to the 80th percentile (ug/L) | Brodifacoum | 0.000000 | PIACENZA | FOCUS |
| Concentration closest to the 80th percentile (ug/L) | Brodifacoum | 0.000000 | PORTO | FOCUS |
| Concentration closest to the 80th percentile (ug/L) | Brodifacoum | 0.000000 | SEVILLA | FOCUS |
| Concentration closest to the 80th percentile (ug/L) | Brodifacoum | 0.000000 | THIVA | FOCUS |

According to the FOCUS modelling, the risk is acceptable in groundwater for the use of FANGA RONGEUR PRO in waste dump.

##### Non-compartmental specific effects relevant to the food chain

Risk characterization for the environment is done quantitatively by comparing predicted environmental concentrations (PEC) and the concentrations below which effects on organism will not occur (PNEC and/or LD50) according to the TGD, 2003 and “Emission Scenario document for biocides used as rodenticides” (Larsen, 2003, ESD PT14).

The environmental risk characterization has been carried out for brodifacoum.

Bait containing brodifacoum contains also 50 mg denatonium benzoate per kg, a powerful bittering agent that is intended to deter accidental ingestion of baits by humans. It may also deter some non-target mammals.

##### Primary poisoning

##### Tier 1 assessment

The PEC value for Tier 1 assessment is compared to the long-term PNEC for mammals and for birds.

Table 49Tier 1 risk characterization of primary poisoning – Long-Term

|  |  |  |  |
| --- | --- | --- | --- |
|  | **PEC1**  mg.kg food-1 | **PNEC1**  mg.kg food-1 | **PEC/PNEC** |
| **Mammals** | 50 | 2.22E-04 | **225 225** |
| **Birds** | 50 | 1.30E-04 | **384 615** |

1 Concentration of brodifacoum in food.

The resulting PEC/PNEC ratio reveals a high risk of long-term primary poisoning for mammals.

For **birds**, a separate, graded assessment of long-term risks of primary poisoning by bait has been done. It is based on different intakes of brodifacoum-treated bait in relation to untreated food, depending on to which extent brodifacoum bait is accessible to birds. The PNEC for birds has been used as a worst case in the calculations.

Table 502.8.5‑51PEC oral/ PNEC oral for non-target, birds exposed to brodifacoum in bait removed from secured bait points in and around buildings

|  |  |  |  |
| --- | --- | --- | --- |
| **Fraction of ingested food (%)** | **PECoral**  mg.kg food-1 | **PNEC**  mg.kg food-1 | **PEC/PNEC** |
| 100 | 50 | 1.30E-04 | **384 615** |
| 50 | 25 | **192 307** |
| 40 | 20 | **153 846** |
| 30 | 15 | **115 383** |
| 20 | 10 | **76 923** |
| 10 | 5 | **38 461** |
| 5 | 2.5 | **19 231** |
| 2 | 1 | **7 692** |
| 1 | 0.5 | **3846** |

The long-term assessment indicates clearly unacceptable risks even if only 1% of the food is constituted of bait. The risk is, however, mitigated by the prerequisite that good practice requires that secured bait points, containing bait in a chamber not directly accessible from the access hole, be used in locations where a potential for avian exposure exists.

##### Tier 2 assessment, acute exposure

For the acute situation of primary poisoning only a qualitative risk assessment is carried out in accordance with the decision from TM III-06. In this Tier 2 acute qualitative assessment, the PEC values are compared to the LD50 value.

Table 522.8.5‑53 Tier 2 acute qualitative risk assessment of primary poisoning

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **PECoral1**  mg.kg-1bw | | **LD50 dose**  mg.kg-1 bw d-1 | **PECoral> LD50**  **(y/n)** | |
| Step 1 | Step 2 | Step 1 | Step 2 |
| **Tree sparrow** | 2.28 | 1.64 | 0.31 | **y** | **y** |
| **Chaffinch** | 0.38 | 0.27 | **y** | n |
| **Wood pigeon** | 1.20 | 0.86 | **y** | **y** |
| **Pheasant** | 17.27 | 12.44 | **y** | **y** |
| **Dog** | 15.00 | 10.80 | 0.4 | **y** | **y** |
| **Pig** | 5.42 | 3.90 | **y** | **y** |
| **Pig young** | 5.39 | 3.88 | **y** | **y** |

1 PECoral = ETE, concentration of brodifacoum after one meal

The qualitative approach for the acute situation confirms the potential risk of primary poisoning to all species except chaffinch.

##### Tier 2 assessment, long-term exposure

The PEC values for the Tier 2 assessment of the long-term exposure are compared to the PNEC values.

Table 542.8.5‑55Tier 2 long-term risk assessment: PECoral/PNECoral for non-target animals in realistic worst case (step 2) for long-term situation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Non-target animal** | **PECoral**1  mg.kg-1bw | **PNEC**  mg.kg-1 bw d-1 | **PEC/PNEC** | |
| Dog | 1.64 | 1.10E-05 | **149 236** |
| Pig | 0.27 | **24 545** |
| Pig, young | 0.86 | **78 545** |
| Tree sparrow | 12.44 | 1.30E-05 | **956 643** |
| Chaffinch | 10.80 | **830 769** |
| Wood pigeon | 3.90 | **300 094** |
| Pheasant | 3.88 | **298 426** |

1 PECoral = EC, concentration of brodifacoum after one day of elimination

This assessment provides indication of very high risks to both mammals and birds, but, it should be noted that consumption of these quantities of brodifacoum bait is generally not realistic and should be regarded strictly as worst case.

##### Secondary poisoning

###### ***Secondary poisoning via the aquatic food chain***

As no exposure of the aquatic compartment is foreseen with the use of FANGA RONGEUR PRO for the uses in and around buildings, in open areas and in waste dumps, no risk assessment for secondary poisoning through the aquatic food chain is required.

###### ***Secondary poisoning via the terrestrial food chain***

The PEC oral predator values are compared to the long-term PNEC for mammals and for birds.

Table 562.8.5‑57: risk characterization of secondary poisoning via the terrestrial food chain

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **PEC oral, predator mg/kg wet earthworm-1** | **PNEC oral mg.kg food-1** | | **PEC/PNEC** | |
|  | **Typical scenario in and around building** | **Mammals** | **Birds** | **Typical scenario in and around building** | |
|  | **Mammals** | **Birds** |
| ***TIER I: Worst case (based on the total concentration in soil)*** | | | | | |
| *Rat treatment* | 4.94E-01 | 2.22E-04 | 1.30E-04 | **2.23E+03** | **3.80E+03** |
| *Mice treatment* | 1.49E-01 | **6.72E+02** | **1.15E+03** |
| ***TIER I: Mean (based on the mean concentration in soil)*** | | | | | |
| *Rat treatment* | 3.18E-02 | 2.22E-04 | 1.30E-04 | **1.43E+02** | **2.45E+02** |
| *Mice treatment* | 3.18E-02 | **1.43E+02** | **2.45E+02** |
| ***TIER II: Mean (based on the mean concentration in soil) + considering degradation in soil (twa over 180 d with DT50 soil=298)*** | | | | | |
| *Rat treatment* | 3.07E-02 | 2.22E-04 | 1.30E-04 | **1.38E+02** | **2.36E+02** |
| *Mice treatment* | 3.07E-02 | **1.38E+02** | **2.36E+02** |

Whatever the scenario, the PEC/PNEC ratio exceeds 1 for both earthworm eating birds and mammals.

###### ***Secondary poisoning for the rodent-eating mammal or the rodent-eating bird***

##### Tier 1 assessment, acute

The PECoral are compared to the LC50 value presented in the section above for a qualitative risk assessment in accordance with the decisions taken at the TMII-06.

Table 582.8.5‑59 Tier 1 acute risk assessment of secondary poisoning

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Non-target animal** | **PECoral**  mg.kg-1bw | | | **LC50 dose**  mg.kg-1 food | **PECoral> LC50**  **(y/n)** | | |
| PD=0.2 | PD=0.5 | PD=1 | PD=0.2 | PD=0.5 | PD=1 |
| Birds | 2.8 | 6.9 | 13.9 | 8 | n | n | **y** |
| Mammals | 2.8 | 6.9 | 13.9 | 0.72 | **y** | **y** | **y** |

1 PECoral = Expected concentration in rodent caught on day 5 after meal

PD = fraction of the food type in the diet

This qualitative risk assessment indicates risk for birds, when the fraction of the contaminated food type in the diet reaches 100%, and indicates risk for mammals at all fractions of food type in the diet and with a PEC in rodent caught on day 5 after meal.

##### Tier 1 assessment, long-term

To assess the risk of long-term secondary poisoning, the PEC in rodents after 5 days is used and compared to the long-term PNECoral for birds and mammals.

Table 602.8.5‑61 Tier 1 long-term risk assessment of secondary poisoning

|  |  |  |  |
| --- | --- | --- | --- |
| **Non-target animal** | **PECoral**  mg.kg-1bw | **PNEC**  mg.kg-1 food | **PEC /PNEC** |
| Birds | 13.9 | 1.30E-04 | **1.07E+05** |
| Mammals | 13.9 | 2.22E-04 | **6.26E+04** |

PECoral = Expected concentration in rodent caught on day 5 after meal

The tier 1 long-term assessment indicates very high risks of long-term secondary poisoning for birds and mammals.

##### Tier 2 assessment, long-term

Table 622.8.5‑63Tier 2 long-term risk assessment of secondary poisoning

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Species** | **PEC (mg/kg bw)** | | **PNEC (mg/kg bw)** | **PEC/PNEC** | |
| **day 5** | **day 14** | **day 5** | **day 14** |
| Barn owl (Tyto alba) | 1.72 | 2.05 | 1.30E-05 | **1.32E+05** | **1.58E+05** |
| Kestrel (Falco tinnunculus) | 2.61 | 3.12 | **2.01E+05** | **2.40E+05** |
| Little owl (Athene noctua) | 1.96 | 2.34 | **1.51E+05** | **1.80E+05** |
| Tawny owl (Strix aluco) | 1.58 | 1.89 | **1.22E+05** | **1.45E+05** |
| Fox (Vulpes vulpes) | 0.63 | 0.76 | 1.10E-05 | **5.75E+04** | **6.87E+04** |
| Polecat (Mustela putorius) | 1.32 | 1.57 | **1.20E+05** | **1.43E+05** |
| Stoat (Mustela erminea) | 1.88 | 2.25 | **1.71E+05** | **2.04E+05** |
| Weasel (Mustela nivlis) | 2.72 | 3.25 | **2.47E+05** | **2.95E+05** |

The tier 2 risk characterisation shows very high risks for secondary poisoning at long-term for birds and mammals.

Nevertheless, in order to reduce the risk of secondary poisoning, it is very important to follow the use instructions of the rodenticide baits. The risk reduction measures are considered in the section 2.9.

##### Conclusions for the major change application 2016

No studies were conducted with the product FANGA RONGEUR PRO for the environment part; therefore the environmental risk assessment has been carried out with data from the Combined AR of brodifacoum. The environmental risk is considered as limited for the indoor use by non-professionals and for the use in and around building by professionals, in strict compliance with the specific use instructions of rodenticidal baits and the use restrictions to reduce the risk for primary and secondary poisoning.

Nevertheless, the Authority in charge of the efficacy and risk assessment is not able to assess the applicability of the specific use instructions and restrictions for

* the applications around building and near the openings of the tunnels in open areas with bait boxes by non-professionals;
* the use in open area with bait boxes or bait stations by professionals;
* the use in waste dump by professionals ;

***Risk mitigation measures linked to risk assessment for environment***

**Conditions of use linked to environmental risk assessment (professional users)**

* Use only in tamper-resistant bait boxes or covered bait stations in area unattainable to children or non-target animals.
* Tamper-resistant bait boxes should be clearly marked to show that they contain rodenticides and that they should not contain other products than rodenticides.
* Never wash the tamper-resistant bait boxes and covered bait stations with water.
* Never wash the tamper-resistant bait boxes and covered bait stations with water.
* Place the tamper-resistant bait boxes and covered bait stations in areas non-liable to floodings
* Collect uneaten bait, bait fragments dragged away from the tamper-resistant bait boxes or covered bait stations and dead rodents, during and after treatment.
* Do not use in areas accessible to children, pets or other non-target animals in order to minimize the risk of poisoning.
* Dispose of the tamper-resistant bait boxes and covered bait stations, uneaten baits and dead rodents in accordance with local requirements.
* Remove all bait points after the end of treatment.
* Do not throw the product on the ground, into a water course, into the sink or down the drain and into the environment.

**Conditions of use linked to environmental risk assessment (non-professional users)**

* Use only in tamper-resistant bait boxes.
* Tamper-resistant bait boxes should be clearly marked to show that they contain rodenticides and that they should not contain other products than rodenticides.
* Never wash the tamper-resistant bait boxes with water.
* Place the tamper-resistant bait boxes in areas non-liable to floodings
* Collect uneaten bait, bait fragments dragged away from the tamper-resistant bait boxes or covered bait stations and dead rodents, during and after treatment.
* Do not use in areas accessible to children, pets or other non-target animals in order to minimize the risk of poisoning.
* Dispose of the tamper-resistant bait boxes, uneaten baits and dead rodents in accordance with local requirements.
* Remove all bait points after the end of treatment.
* Do not throw the product on the ground, into a water course, into the sink or down the drain and into the environment.

***Disposal considerations***

**Professionnals**

* Dispose of the tamper-resistant bait boxes and covered bait stations, uneaten baits and dead rodents in accordance with local requirements.
* Remove all bait points after the end of treatment.
* Do not throw the product on the ground, into a water course, into the sink or down the drain and into the environment.
* Never wash the tamper-resistant bait boxes and covered bait stations with water.
* Collect uneaten bait, bait fragments dragged away from the tamper-resistant bait boxes or covered bait stations and dead rodents, during and after treatment.

**Non-profesionnals**

* Dispose of the tamper-resistant bait boxes, uneaten baits and dead rodents in accordance with local requirements.
* Remove all bait points after the end of treatment.
* Do not throw the product on the ground, into a water course, into the sink or down the drain and into the environment.
* Never wash the tamper-resistant bait boxes with water.
* Collect uneaten bait, bait fragments dragged away from the tamper-resistant bait boxes and dead rodents, during and after treatment.
* **Renewal 2017**

No new ecotoxicological information has been submitted at the renewal of the approval of the active substance brodifacoum and in the product dossier. Evaluation of the risk for groundwater has been updated, the conclusion of the environmental risk assessment remains unchanged.

**Conclusion of the renewal 2017**

No studies were conducted with the product FANGA RONGEUR PRO for the environment part; therefore the environmental risk assessment has been carried out with data from the combined CAR of brodifacoum. The environmental risk is considered as acceptable for the intended uses except for the primary and secondary poisoning. The specific use restriction must be applied to reduce the risk for primary and secondary poisoning.

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

*See Summary of Product Characteristics (SPC).*

### Proposal for the decision - Minor change 2022

### Summary of product characteristics for a biocidal product

**1.Administrative information**

* 1. **Trade name(s) of the product**

| **Trade name(s)** | SANIFAR |
| --- | --- |
|  |  |

**1.2. Authorisation holder**

|  |  |  |
| --- | --- | --- |
| **Name and address of the authorisation holder** | **Name** | SOFAR FRANCE |
| **Address** | BP 02  29190 PLEYBEN  FRANCE |
| **Authorisation number** | BC-EL055178-34 | |
| **R4BP asset reference number** | FR-0014523-0000 | |
| **Date of the authorisation** | 05/07/2017 | |
| **Expiry date of the authorisation** | 01/07/2024 | |

**1.3. Manufacturer(s) of the product**

|  |  |
| --- | --- |
| **Name of manufacturer** | SOFAR FRANCE |
| **Address of manufacturer** | ZA DU DREVERSBP 02  29190PLEYBEN  France |
| **Location of manufacturing sites** | ZA DU DREVERSBP 02  29190PLEYBEN  France |

**1.4. Manufacturer(s) of the active substance(s**)

|  |  |
| --- | --- |
| **Active substance** | Brodifacoum |
| **Name of manufacturer** | ACTIVA/TEZZA |
| **Address of manufacturer** | Via feltre 32  20132Milan  Italy |
| **Location of manufacturing sites** | PM TEZZA SFL  Via tre ponti 22  37050S.Maria Di Zevio (VR)  Italy |

**2. Product composition and formulation**

**2.1. Qualitative and quantitative information on the composition of the product**

| **Common name** | **IUPAC name** | **Function** | **CAS number** | **EC number** | **Content (%)** |
| --- | --- | --- | --- | --- | --- |
| Brodifacoum  (pure) | 3-[3-(4'-bromobiphenyl- 4-yl)-1,2,3,4-tetrahydro -1-napthyl]-4-hydroxycoumarin | Active substance | 56073-10-0 | 259-980-5 | 0.005 |

**2.2. Type of formulation**

|  |
| --- |
| RB-Grain bait ready to use |

**3. Hazard and precautionary statements according to Regulation (EC) 1272/2008**

|  |  |
| --- | --- |
| **Classification - Regulation (EC) 1272/2008** | |
| Hazard category | STOT RE 2  Repr. 1A |
| Hazard statements | H373: May cause damage to organs (blood) through prolonged or repeated exposure  H360D: May damage the unborn child |
|  |  |
| **Labelling** |  |
| Signal words | Danger |
| Hazard statements | H373: May cause damage to organs (blood) through prolonged or repeated exposure  H360D: May damage the unborn child |
| Precautionnary statements | P201: Obtain special instructions before use.  P202: Do not handle until all safety precautions have been read and understood.  P260: Do not breathe dust/fumes/gas/mist/vapours/spray  P280: Wear protective gloves/protective clothing/eye protection/face protection  P308 + 313:. IF exposed or concerned: Get medical advice/attention.  P314: Get medical advice/attention if you feel unwell  P405: Store locked up  P501: Dispose of contents/container to … [… in accordance with local/regional/national/international regulation (to be specified)]. |
|  |  |
| Note | - |

**4. Authorised use(s)**

**4.1. Use description**

Table 1. Use # 1 – House mice and/or rats – trained professionals – indoor

|  |  |
| --- | --- |
| **Product Type** | 14 |
| **Where relevant, an exact description of the authorised use** | Not relevant for rodenticides |
| **Target organism(s) (including development stage)** | *Mus musculus* (house mice)  *Rattus norvegicus* (brown rat)  *Rattus rattus* (black or roof rat) |
| **Field(s) of use** | Indoor |
| **Application method(s)** | Bait formulations:  - Ready-to-use bait to be used in tamper-resistant bait stations[[18]](#footnote-18)  - *Covered and protected baiting points* |
| **Application rate(s) and frequency** | Bait products:  Rats  - High infestation: 180-200 g of bait per baiting point every 5 meters  - Low infestation: 180-200 g of bait per baiting point every 10 meters  Mice:  - High infestation: 40 g of bait per baiting point every 1 meters  - Low infestation: 40 g of bait per baiting point every 2 meters |
| **Category(ies) of users** | Trained professionals |
| **Pack sizes and packaging material** | The product SANIFAR is supplied in individual PE/PP sachets (Rats : 10-20-25-30-40-50-60-90-100-200 g) (Mice : 10-20-25-30-40g) wrapped in :   * Buckets-Barrel PP/PE (5-10-15-18-20-25-30 kg) * Paper bags with or without plastic film PE/PP inside (5-10-15-20-25-30kg) * PE/PP bags-film (5-10-15-20-25kg) * Metal box (5-10-15-20-25kg) * Cardboard box (5-10-12-15-20-25-30-50kg) * Bait station PET/PP/PE/PVC   The product SANIFAR is supplied in bulk in :   * Buckets-Barrel PP/PE (5-10kg) * paper bags with or without plastic film PE/PP inside (5-10kg) * PE/PP bags-film (5-10kg) * Metal box (5-10kg) * Carton box (5-10kg) * Bait station PET/PP/PE/PVC   Minimum pack size of 3 kg*.*  *(****In France only*** *: minimum pack size of 5 kg)* |

***4.1.1. Use-specific instructions for use***

|  |
| --- |
| - Remove the remaining product at the end of treatment period.  - *[When available]* Follow any additional instructions provided by the relevant code of best practice. |

***4.1.2 Use-specific risk mitigation measures***

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

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

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

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

|  |
| --- |
| - |

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

|  |
| --- |
| - |

**4.2. Use description**

Table 2 Use # 2 Mice and/or rats – trained professionals – outdoor around buildings

|  |  |
| --- | --- |
| **Product Type** | 14 |
| **Where relevant, an exact description of the authorised use** | Not relevant for rodenticides |
| **Target organism(s) (including development stage)** | *Mus musculus* (house mice)  *Rattus norvegicus* (brown rat)  *Rattus rattus* (black or roof rat) |
| **Field(s) of use** | Outdoor around buildings |
| **Application method(s)** | Bait formulations:  - Ready-to-use bait to be used in tamper-resistant bait stations.  - *Covered and protected baiting points* |
| **Application rate(s) and frequency** | Bait products:  Rats  - High infestation: 180-200 g of bait per baiting point every 5 meters  - Low infestation: 180-200 g of bait per baiting point every 10 meters  Mice:  - High infestation: 40 g of bait per baiting point every 1 meters  - Low infestation: 40 g of bait per baiting point every 2 meters |
| **Category(ies) of users** | Trained professionals |
| **Pack sizes and packaging material** | The product SANIFAR is supplied in individual PE/PP sachets (Rats : 10-20-25-30-40-50-60-90-100-200 g) (Mice : 10-20-25-30-40g) wrapped in :   * Buckets-Barrel PP/PE (5-10-15-18-20-25-30 kg) * Paper bags with or without plastic film PE/PP inside (5-10-15-20-25-30kg) * PE/PP bags-film (5-10-15-20-25kg) * Metal box (5-10-15-20-25kg) * Cardboard box (5-10-12-15-20-25-30-50kg) * Bait station PET/PP/PE/PVC   The product SANIFAR is supplied in bulk in :   * Buckets-Barrel PP/PE (5-10kg) * paper bags with or without plastic film PE/PP inside (5-10kg) * PE/PP bags-film (5-10kg) * Metal box (5-10kg) * Carton box (5-10kg) * Bait station PET/PP/PE/PVC   Minimum pack size of 3 kg*.*  *(****In France only*** *: minimum pack size of 5 kg)* |

***4.2.1. Use-specific instructions for use***

|  |
| --- |
| - Protect bait from the atmospheric conditions. Place the baiting points in areas not liable to flooding.  - Replace any bait in baiting points in which bait has been damaged by water or contaminated by dirt.  - *[When available]* Follow any additional instructions provided by the relevant code of best practice.  *- [For outdoor use, baiting points must be covered and placed in strategic sites to minimise the exposure to non-target species].* |

***4.2.2 Use-specific risk mitigation measures***

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

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

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

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

|  |
| --- |
| - |

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

|  |
| --- |
| - |

**4.3. Use description**

Table 3. Use # 3 – Mice/Rats – trained professionals – Outdoor open areas & waste dumps

|  |  |
| --- | --- |
| **Product Type** | 14 |
| **Where relevant, an exact description of the authorised use** | Not relevant for rodenticides |
| **Target organism(s) (including development stage)** | *Mus musculus* (house mice) (Open areas only)  *Rattus norvegicus* (brown rat)  *Rattus rattus* (black or roof rat) |
| **Field(s) of use** | Outdoor open areas  Outdoor waste dumps |
| **Application method(s)** | - Ready-to-use bait to be used in tamper-resistant bait stations.  *- Covered and protected baiting points* |
| **Application rate(s) and frequency** | Bait products:  Rats  - High infestation: 180-200 g of bait per baiting point every 5 meters  - Low infestation: 180-200 g of bait per baiting point every 10 meters  Mice:  - High infestation: 40 g of bait per baiting point every 1 meters  - Low infestation: 40 g of bait per baiting point every 2 meters |
| **Category(ies) of users** | Trained professionals |
| **Pack sizes and packaging material** | The product SANIFAR is supplied in individual PE/PP sachets (Rats : 10-20-25-30-40-50-60-90-100-200 g) (Mice : 10-20-25-30-40g) wrapped in :   * Buckets-Barrel PP/PE (5-10-15-18-20-25-30 kg) * Paper bags with or without plastic film PE/PP inside (5-10-15-20-25-30kg) * PE/PP bags-film (5-10-15-20-25kg) * Metal box (5-10-15-20-25kg) * Cardboard box (5-10-12-15-20-25-30-50kg) * Bait station PET/PP/PE/PVC   The product SANIFAR is supplied in bulk in :   * Buckets-Barrel PP/PE (5-10kg) * paper bags with or without plastic film PE/PP inside (5-10kg) * PE/PP bags-film (5-10kg) * Metal box (5-10kg) * Carton box (5-10kg) * Bait station PET/PP/PE/PVC   Minimum pack size of 3 kg*.*  *(****In France only*** *: minimum pack size of 5 kg)* |

***4.3.1.Use-specific instructions for use***

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

***4.3.2 Use-specific risk mitigation measures***

|  |
| --- |
| - Where possible, prior to the treatment inform any possible bystanders (e.g. users of the treated area and their surroundings) about the rodent control campaign *[in accordance with the applicable code of good practice, if any]*.  - To reduce risk of secondary poisoning, search for and remove dead rodents during treatmentat frequent intervals*,* in line with the recommendations provided by the relevant code of best practice. |

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

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

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

|  |
| --- |
|  |

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

|  |
| --- |
|  |

**4.4. Use description**

Table 4. Use # 4 *(not relevant in France)*– House mice – professionals – indoor

|  |  |
| --- | --- |
| **Product Type** | 14 |
| **Where relevant, an exact description of the authorised use** | Not relevant for rodenticides |
| **Target organism(s) (including development stage)** | *Mus musculus* (house mice) |
| **Field(s) of use** | Indoor |
| **Application method(s)** | Ready-to-use bait to be used in tamper-resistant bait stations[[19]](#footnote-19) |
| **Application rate(s) and frequency** | 40 g of bait per bait station. If more than one bait station is needed, the minimum distance between bait stations should be of 1 to 2 meters. |
| **Category(ies) of users** | Professionals |
| **Pack sizes and packaging material** | The product SANIFAR is supplied in individual PE/PP sachets (Rats : 10-20-25-30-40-50-60-90-100-200 g) (Mice : 10-20-25-30-40g) wrapped in :   * Buckets-Barrel PP/PE (5-10-15-18-20-25-30 kg) * Paper bags with or without plastic film PE/PP inside (5-10-15-20-25-30kg) * PE/PP bags-film (5-10-15-20-25kg) * Metal box (5-10-15-20-25kg) * Cardboard box (5-10-12-15-20-25-30-50kg) * Bait station PET/PP/PE/PVC   The product SANIFAR is supplied in bulk in :   * Buckets-Barrel PP/PE (5-10kg) * paper bags with or without plastic film PE/PP inside (5-10kg) * PE/PP bags-film (5-10kg) * Metal box (5-10kg) * Carton box (5-10kg) * Bait station PET/PP/PE/PVC   Minimum pack size of 3 kg*.* |

***4.4.1.Use-specific instructions for use***

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

***4.4.2 Use-specific risk mitigation measures***

|  |
| --- |
|  |

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

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

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

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

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**4.5. Use description**

Table 5. Use # 5 *(not relevant in France)*– Rats – professionals – indoor

|  |  |
| --- | --- |
| **Product Type** | 14 |
| **Where relevant, an exact description of the authorised use** | Not relevant for rodenticides |
| **Target organism(s) (including development stage)** | *Rattus norvegicus* (brown rat)  *Rattus rattus* (black or roof rat) |
| **Field(s) of use** | Indoor |
| **Application method(s)** | Ready-to-use bait to be used in tamper-resistant bait stations |
| **Application rate(s) and frequency** | -180-200 g of bait per bait station. If more than one bait station is needed, the minimum distance between bait stations should be of 5 to 10 meters. |
| **Category(ies) of users** | Professionals |
| **Pack sizes and packaging material** | The product SANIFAR is supplied in individual PE/PP sachets (Rats : 10-20-25-30-40-50-60-90-100-200 g) (Mice : 10-20-25-30-40g) wrapped in :   * Buckets-Barrel PP/PE (5-10-15-18-20-25-30 kg) * Paper bags with or without plastic film PE/PP inside (5-10-15-20-25-30kg) * PE/PP bags-film (5-10-15-20-25kg) * Metal box (5-10-15-20-25kg) * Cardboard box (5-10-12-15-20-25-30-50kg) * Bait station PET/PP/PE/PVC   The product SANIFAR is supplied in bulk in :   * Buckets-Barrel PP/PE (5-10kg) * paper bags with or without plastic film PE/PP inside (5-10kg) * PE/PP bags-film (5-10kg) * Metal box (5-10kg) * Carton box (5-10kg) * Bait station PET/PP/PE/PVC   Minimum pack size of 3 kg*.* |

***4.5.1. Use-specific instructions for use***

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

***4.5.2 Use-specific risk mitigation measures***

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

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

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

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

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**4.6. Use description**

Table 6. Use # 6 *(not relevant in France)*– House mice and/or rats – professionals – outdoor around buildings

|  |  |
| --- | --- |
| **Product Type** | 14 |
| **Where relevant, an exact description of the authorised use** | Not relevant for rodenticides |
| **Target organism(s) (including development stage)** | *Mus musculus* (house mice)  *Rattus norvegicus* (brown rat)  *Rattus rattus* (black or roof rat) |
| **Field(s) of use** | Outdoor around buildings |
| **Application method(s)** | Ready-to-use bait to be used in tamper-resistant bait stations |
| **Application rate(s) and frequency** | Rat: 180-200 g of bait per bait station. If more than one bait station is needed, the minimum distance between bait stations should be of 15 to 10 meters.  Mice: 40 g of bait per bait station. If more than one bait station is needed, the minimum distance between bait stations should be of 1 to 2 meters. |
| **Category(ies) of users** | Professionals |
| **Pack sizes and packaging material** | The product SANIFAR is supplied in individual PE/PP sachets (Rats : 10-20-25-30-40-50-60-90-100-200 g) (Mice : 10-20-25-30-40g) wrapped in :   * Buckets-Barrel PP/PE (5-10-15-18-20-25-30 kg) * Paper bags with or without plastic film PE/PP inside (5-10-15-20-25-30kg) * PE/PP bags-film (5-10-15-20-25kg) * Metal box (5-10-15-20-25kg) * Cardboard box (5-10-12-15-20-25-30-50kg) * Bait station PET/PP/PE/PVC   The product SANIFAR is supplied in bulk in :   * Buckets-Barrel PP/PE (5-10kg) * paper bags with or without plastic film PE/PP inside (5-10kg) * PE/PP bags-film (5-10kg) * Metal box (5-10kg) * Carton box (5-10kg) * Bait station PET/PP/PE/PVC   Minimum pack size of 3 kg*.* |

***4.6.1.Use-specific instructions for use***

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

***4.6.2 Use-specific risk mitigation measures***

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| - Do not apply this product directly in the burrows. |

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

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

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

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

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**5. General directions for use**

**5.1. Instructions for use6**

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| * Read and follow the product information as well as any information accompanying the product or provided at the point of sale before using it. * Carry out a pre-baiting survey of the infested area and an on-site assessment in order to identify the rodent species, their places of activity and determine the likely cause and the extent of the infestation. * Remove food which is readily attainable for rodents (e.g. spilled grain or food waste). Apart from this, do not clean up the infested area just before the treatment, as this only disturbs the rodent population and makes bait acceptance more difficult to achieve. * The product should only be used as part of an integrated pest management (IPM) system, including, amongst others, hygiene measures and, where possible, physical methods of control. * The product should be placed in the immediate vicinity of places where rodent activity has been previously explored (e.g. travel paths, nesting sites, feedlots, holes, burrows etc.). * Where possible, bait stations must be fixed to the ground or other structures. * Bait stations must be clearly labelled to show they contain rodenticides and that they must not be moved or opened (see section 5.3 for the information to be shown on the label). * *[If national policy or legislation requires it]* When the product is being used in public areas, the areas treated should be marked during the treatment period and a notice explaining the risk of primary or secondary poisoning by the anticoagulant as well as indicating the first measures to be taken in case of poisoning must be made available alongside the baits. * Bait should be secured so that it cannot be dragged away from the bait station. * Place the product out of the reach of children, birds, pets and farm animals and other non-target animals. * Place the product away from food, drink and animal feeding stuffs, as well as from utensils or surfaces that have contact with these. * When using the product do not eat, drink or smoke. Wash hands and directly exposed skin after using the product.   ***FOR TRAINED PROFESSIONAL ONLY***   * The frequency of visits to the treated area should be at the discretion of the operator, in the light of the survey conducted at the outset of the treatment. That frequency should be consistent with the recommendations provided by the relevant code of best practice. * If bait uptake is low relative to the apparent size of the infestation, consider the replacement of bait points to further places and the possibility to change to another bait formulation. * If after a treatment period of 35 days baits are continued to be consumed and no decline in rodent activity can be observed, the likely cause has to be determined. Where other elements have been excluded, it is likely that there are resistant rodent so consider the use of a non-anticoagulant rodenticide, where available, or a more potent anticoagulant rodenticide. Also consider the use of traps as an alternative control measure.   **FOR PROFESSIONNALS ONLY**   * Consider preventive control measures (e.g. plug holes, remove potential food and drinking as far as possible) to improve product intake and reduce the likelihood of reinvasion.   **FOR PROFESSIONNALS ONLY**   * Remove the remaining bait or the bait stations at the end of the treatment period. * Do not open the sachets containing the bait. * Decanting is to be avoided. In case decanting cannot be avoided, an RPE of APF 10 has to be used. |

**5.2. Risk mitigation measures**

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| * Where possible, prior to the treatment inform any possible bystanders about the rodent control campaign [in accordance with the applicable code of good practice, if any]". * The product information (i.e. label and/or leaflet) shall clearly show that the product shall only be supplied to trained professional users holding certification demonstrating compliance with the applicable training requirements (e.g. "for trained professionals only".   ***FOR TRAINED PROFESSIONAL ONLY***   * Do not use in areas where resistance to the active substance can be suspected. * Products shall not be used beyond 35 days without an evaluation of the state of the infestation and of the efficacy of the treatment.   ***FOR TRAINED PROFESSIONAL ONLY***   * Do not rotate the use of different anticoagulants with comparable or weaker potency for resistance management purposes. For rotational use, consider using a non-anticoagulant rodenticide, if available, or a more potent anticoagulant. * Do not wash the bait stations or utensils used in covered and protected bait points with water between applications. * Dispose dead rodents in accordance with local requirements [The method of disposal shall be described specifically in the national SPC and be reflected on the product label].   ***FOR PROFESSIONAL ONLY*** *To* reduce risk of secondary poisoning, search for and remove dead rodents at frequent intervals during treatment (e.g. at least twice a week). [Where relevant, specify if more frequent or daily inspection is required].  ***FOR PROFESSIONAL ONLY***   * Do not use baits containing anticoagulant active substances as permanent baits for the prevention of rodent infestation or monitoring of rodent activities.   ***FOR PROFESSIONAL ONLY***.   * The product information (i.e. label and/or leaflet) shall clearly show that: * the product shall not be supplied to the general public (e.g. "for professionals only"). * the product shall be used in adequate tamper resistant bait stations (e.g. "use in tamper resistant bait stations only"). * users shall properly label bait stations with the information referred to in section 5.3 of the SPC (e.g. label bait stations according to the product recommendations").   ***FOR PROFESSIONAL ONLY***  *Using this product should eliminate rodents within 35 days. The product information (i.e. label and/or leaflet) shall clearly recommend that in case of suspected lack of efficacy by the end of the treatment (i.e. rodent activity is still observed), the user should seek advice from the product supplier or call a pest control service.* |

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

|  |
| --- |
| * This product contains an anticoagulant substance. If ingested, symptoms, which may be delayed, may include nosebleed and bleeding gums. In severe cases, there may be bruising and blood present in the faeces or urine. * Antidote: Vitamin K1 administered by medical/veterinary personnel only. * In case of: * Dermal exposure, wash skin with water and then with water and soap. * Eye exposure, rinse eyes with eyes-rinse liquid or water, keep eyes lids open at least 10 minutes. * Oral exposure, rinse mouth carefully with water. Never give anything by mouth to unconscious person. Do not provoke vomiting. If swallowed, seek medical advice immediately and show the product's container or label *[insert* country specific information*]*. Contact a veterinary surgeon in case of ingestion by a pet *[insert* country specific information]. * Bait stations must be labelled with the following information: "do not move or open"; "contains a rodenticide"; "product name or authorisation number"; "active substance(s)" and "in case of incident, call a poison centre [insert national phone number]" * Hazardous to wildlife. |

**5.4. Instructions for safe disposal of the product and its packaging**

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| * At the end of the treatment, dispose the uneaten bait and the packaging in accordance with local requirements [The method of disposal shall be described specifically in the national SPC and be reflected on the product label]. |

**5.5. Conditions of storage and shelf-life of the product under normal conditions of storage**

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| * Store in a dry, cool and well ventilated place. Keep the container closed and away from direct sunlight. * Store in places prevented from the access of children, birds, pets and farm animals. * Shelf life: 2 years |

**6. Other information**

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

### Appendices

### Annex 1: List of new data[[20]](#footnote-20)submitted in support of the evaluation of the active substance

**Not applicable**

### Annex 2:List of new data submitted in support of the evaluation of the biocidal product

| **Section No** | **Reference No** | **Author** | **Year** | **Title** | **Owner of data** | **Letter of Access** | | **Data protection claimed** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  | **Yes** | **No** | **Yes** | **No** |
| B3 | B3.2-3.4-3.6 | Demangel B | 2012 | Physico chemical tests on FANGA RONGEUR PRO. DEFITRACES, Report n°11-920010-024 of 23 January 2012, GLP (unpublished) | TRIPLAN |  |  |  |  |
| B3 | B3.1, B3.5, 3.7 | Ferron N | 2012 | Physico-chemical tests and analyses before and after an accelerated storage procedure for 14 days at 54±2°C on FANGA RONGEUR PRO in compliance with CIPAC MT 46.3 (CIPAC Handbook J – 2000). DEFITRACES, report n° 11-920010-025 of 16 May 2012, GLP, unpublished. | TRIPLAN |  |  |  |  |
| B3 | B3.2-3.3 | Colombies N | 2012 | Physico chemical tests on FANGA RAT-DICAL TECH. DEFITRACES, report n° 11-920010-028 of 22 February 2012, GLP, unpublished | TRIPLAN |  |  |  |  |
| B3 | B3.7, B3.12 | Grevin P | 2012 | Sieve test and dustiness for granular products test before and after an accelerated storage procedure for 8 weeks at 40°C ± 2°C on FANGA RONGEUR PRO. DEFITRACES, Report 12-920010-008 of 28 September 2012, GLP, unpublished. | TRIPLAN |  |  |  |  |
| B3 | New data submitted for minor change | B. Demangel | 2018 | Physico chemical tests and chemical stability after a storage procedure for 2 years at 20°C +/-2°C on FANGA RONGEUR PRO report N°11-920010-026 amended | TRIPLAN |  |  |  |  |
| B4 | B4.1.1 | Ricau H | 2012 | Analytical method validation for the determination of brodifacoum in the FANGA BLOC SP PRO in compliance with SANCO/3030/99 rev.4 from 11/07/00. DEFITRACES, Report n° 11-920010-015 of 23 January 2012, GLP, unpublished. | TRIPLAN |  |  |  |  |
| B4 | B4.1.1 | Ricau H | 2012 | Analytical method validation for the determination of brodifacoum in the FANGA BLOC SP PRO in compliance with SANCO/3030/99 rev.4 from 11/07/00. DEFITRACES, Amended report n° 11-920010-015 of 04 May 2012, GLP, unpublished. | TRIPLAN |  |  |  |  |
| B4 | B4.1.2 | Ricau H | 2012 | Analytical method validation for the determination of brodifacoum in the FANGA RONGEUR PRO in compliance with SANCO/3030/99 rev.4 from 11/07/00. DEFITRACES, Amended report n° 11-920010-027 of 18 May 2012, GLP, unpublished. | TRIPLAN |  |  |  |  |
| B5 | B5.10.2 | XXX | 2012 | Palatability of “FANGA RONGEUR PRO” (50 ppm brodifacoum) ready-to-use bait targeting brown rat (*Rattus norvegicus*) and house mouse (*Mus musculus*). Walloon XXX | TRIPLAN |  |  |  |  |
| B5 | B5.10.2/01 | XXX | 2013 | Study on the palatability and the efficacy of a wheat bait containing 0.005% brodifacoum in brown rat (*Rattus norvegicus*). XXX | TRIPLAN |  |  |  |  |
| B5 | B5.10.2/02 | XXX | 2013 | Evaluation of the efficacy of a wheat rodenticide (FANGA RONGEUR PRO) containing 0.005% brodifacoum for the control of brown rat infestations. One trial, 1 site: XXX | TRIPLAN |  |  |  |  |
| B5 | B5.10.2  2009.BCD.SAG13 | XXX | 2014 | Efficacy evaluation of FANGA B+ RONGEUR (brodifacoum 0.001 % w/w a.i., wheat bait) against Roof rat (*Rattus rattus* L.) XXX | TRIPLAN |  |  |  |  |
| B5 | B5.10.2 | XXX | 2014 | Study on the palatability and efficacy of a 0.005 % brodifcaoum wheat bait in black rat (*Rattus rattus*) | TRIPLAN |  |  |  |  |
| B5 | B5.10.2 | XXX | 2015 | Study on the palatability and efficacy of a 0.001 % w/w brodifacoum wheat bait in black rat (*Rattus rattus*) | TRIPLAN |  |  |  |  |
|  |  | XXX | 2015 | Efficacy evaluation of BDB50V1 (brodifacoum 0,005% w/w a.i., wheat bait) against House mouse (*Mus musculus L*.) in Italy | TRIPLAN |  |  |  |  |
|  | 2075.BCD.SAG17 | XXX | 2017 | Efficacy evaluation of BDB10V1 (brodifacoum 0.001% w/w a.i., blue wheat bait – aged formulation) against Roof rat (*Rattus rattus L.*) | TRIPLAN |  |  |  |  |
|  | 2074.BCD.SAG17 | XXX | 2017 | Efficacy evaluation of BDB10V1 (brodifacoum 0.001% w/w a.i., blue wheat bait, aged formulation) against Norway rat (*Rattus norvegicus* Berk.) | TRIPLAN |  |  |  |  |
| B6 | B6.1.1 | XXX | 2012 | FANGA BLOC SP PRO evaluation of acute oral toxicity in rats – acute toxic class method. XXX | TRIPLAN |  |  |  |  |
| B6 | B6.1.2 | XXX | 2012 | FANGA BLOC SP PRO evaluation of acute dermal toxicity in rats. XXX | TRIPLAN |  |  |  |  |
| B6 | B6.2.1 | XXX | 2012 | FANGA BLOC SP PRO assessment of acute dermal irritation. XXX | TRIPLAN |  |  |  |  |
| B6 | B6.2.2 | XXX | 2012 | FANGA BLOC SP PRO assessment of acute eye irritation. XXX | TRIPLAN |  |  |  |  |
| B6 | B6.3 | XXX | 2012 | FANGA BLOC SP PRO assessment of the skin sensitization potential in the mouse using the local lymph node assay (LLNA). XXX | TRIPLAN |  |  |  |  |
| B6 | B6.4 | XXX | 2011 | FAAR BLE evaluation of skin absorption: in vitro method (non GLP study). XXX | TRIPLAN |  |  |  |  |
| B6 | B6.4 | XXX | 2013 | ACTIPELLET-DIFE: In vitro dermal delivery with human skin XXX | TRIPLAN |  |  |  |  |
| Add rows as necessary | | | | | | | | | |

### Annex 3: Analytical methods residues – active substance

Brodifacoum

Date: 25.04.2013

Methods suitable for the determination of residues (monitoring methods)

Extract from document IIA of final CAR of brodifacoum.

Table 1: Analytical methods for the determination of brodifacoum residue

| Sample | **Test substance** | **Analytical method** | **Fortification range / Number of measurements** | **Linearity** | **Specificity** | **Recovery rate (%)** | | | **Limit of determination** | **Reference** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Range | Mean | RSD |
| Soil | *Brodifacoum* | RP-HPLC/DAD (detection at 264 nm) | 0.016÷-0.16 mg/kg in soil, with 4 replicates per level  0.256÷-12.8 μg/ml (0.006÷-0.32 mg/kg in soil), single determinations at 8 concentrations levels. r2 = 0.9999  No matrix-matched calibration | Not highly specific  LC/MS method for confirmation (only experimental conditions  provided) | 88.5÷-95.4 (overall)  92.9 (overall) | 2.2 (overall) | LOQ = 0.016 mg/kg in soil  (lowest validated concentration level) | **IIIA4.2 (a)** |  |  |
| Drinking water *(natural mineral water Fiuggi)* | *Brodifacoum* | RP-HPLC with MS/MS detection.  Molecular ion (SIM): 521 (m/z), daughter ion (SRM): 187 (m/z)  Quantification by calibration curve, except for spiking level 0.05 μg/l (quantification with the lowest standard calibration level) | 0.05 μg/l (n=5)  0.5 μg/l (n=5)  5.0 μg/l (n=5)  50 μg/l (n=5) | 0.1÷-0.5 μg/ml  (0.05÷-0.25 μg/l in water),  4 determinations at 5 concentration levels  r = 0.995 (SIM mode)  r = 0.997 (SRM mode) | Highly specific | 83.5*÷-*92.0  77.7*÷-*94.1  72.3*÷-*94.6  83.2*÷-*107.7 | 87.8  82.5  81.7  97.8 | 3.8  7.2  9.8  10.6 | LOQ = 0.05 05 μg/l in drinking and ground water;  0.5 μg/l in surface water  (lowest validated concentration level)  LOD = 0.025 μg/l in water | **IIIA4.2 (c)** |
| 2.9 120.6 116*÷-*124.3 0.05 μg/l (n=5) Ground water  4.5  7.8  3.6  84.5  87.3  110.8  79.5*÷-*88.0  78.7*÷-*98.6  104.6*÷-*117  0.5 μg/l (n=5)  5.0 μg/l (n=5)  50 μg/l (n=5)  *(Well SB1 I.Pi.Ci)* | *0.05 μg/l (n=5)*  *0.5 μg/l (n=5)*  *5.0 μg/l (n=5)*  *50 μg/l (n=5)* | *80.4÷-100.6*  *82.6÷-94.4*  *80.1÷-94.6*  *81.3÷-101.2* | *90.5*  *98.7*  *87.3*  *92.5* | *9.3*  *5.6*  *7.3*  *7.0* |
| Blood serum  (*from Rabbit, lyophilized powder from clotted whole blood)*  *Brodifacoum*  *Surface water (sampled at Desenzano, Garda lake)* | Highly specific | 6.5  8.6 | LOQ = 0.06 mg/l (lowest validated concentration level)  **IIIA4.2 (d)(2)** |  |
| Cucumber | *Brodifacoum* | LC/MS/MS.  Internal standard: Difenacoum  Linear calibration curve for all determinations, except for both spiking levels in lemon and for the validation in meat at 0.1 mg/kg (multi-level calibration standards used)  Brodifacoum  precursor ion 1: 521; product ion 1: 79;  precursor ion 2: 523; product ion 2: 81  *Coumatetralyl*  precursor ion 1: 291; product ion 1: 143; precursor ion 2: 291; product ion 2: 141  Product ion 1 used for measurements | 0.01 mg/kg (n=5)  0.1 mg/kg (n=5) | 0.03-1.2 μg/ml,  2 determinations at 4 concentration levels. Matrix-matched calibration solutions used  r2: 0.9095÷-0.9963 | Highly specific | 82-103  86-106 | 91  94 | 9  9 | LOQ = 0.01 mg/kg in all 5 matrices (lowest validated concentration level)  **IIIA4.3**  **[also IIIA4.2(d)(1) for Meat only]** |  |
| Wheat |  |  | 0.01 mg/kg (n=5)  0.1 mg/kg (n=5) |  |  | 88-126  71-90 | 107  84 | 13  9 |  |  |
| Meat | 0.01 mg/kg (n=5)  0.1 mg/kg (n=5) | 62-86  45-87 | 73  61 | 13  29 |
| Oil-seed rape | 0.01 mg/kg (n=5)  0.1 mg/kg (n=5) | 75-99  110-134 | 86  119 | 10  8 |
| Lemon | 0.01 mg/kg (n=5)  0.1 mg/kg (n=5) | 74-93  62-89 | 84  76 | 10  13 |
|  |  |  |  |  |

### Annex 4: Toxicology and metabolism –active substance

Brodifacoum

Threshold Limits and other Values for Human Health Risk Assessment

Date: 31/07/2012

| **Summary** | | | |
| --- | --- | --- | --- |
|  | Value | Study | SF |
| AEL long-term | 3.3 x 10-6 mg/kg bw/d | Develomental toxicity study in rats | 300 |
| AEL medium-term | 6.67 x 10-6 mg/kg bw/d | Maternal toxicity from developmental study in rabbits | 300 |
| AEL acute | 3.3 x 10-6 mg/kg bw/d | Reproductive 2-generation study in rats  Reproductive 2-generation study in rats | 300 |
| ADI | 3.3 x 10-6 mg/kg bw/d |
| ARfD | Not applicable |
|  | | | |

|  |  |
| --- | --- |
| Inhalative absorption | 100% |
| Oral absorption | 75% |
| Dermal absorption | 0.647% |

| **Classification** | |
| --- | --- |
| with regard to toxicological data (according to the criteria in Dir. 67/548/EEC) | T+ R27/28  T ;R48/24/25  No specific limit concentrations |
| with regard to toxicological data (according to the criteria in Reg. 1272/2008) | Acute Tox 1 H310  Acute Tox 1 H300  Acute Tox 1 H330  STOT RE Cat 1 H372  Repr 1A H360D  Repr. 1A; H360D: C ≥ 0,003 %  STOT RE 1; H372: C ≥ 0,02 %  STOT RE 2; H373: 0,002 % ≤ C < 0,02 % |

### Annex 5: Toxicology – biocidal product

FANGA RONGEUR PRO

Date: 31/07/2012

|  |  |
| --- | --- |
| **General information** | |
| Formulation Type | Cereal grain bait (wheat) |
| Active substance(s) (incl. content) | Brodifacoum (0.005% m/m) |
| Category |  |

| **Acute toxicity, irritancy and skin sensitisation of the preparation (Annex IIIB, point 6.1, 6.2, 6.3)** | | | | |
| --- | --- | --- | --- | --- |
| Rat LD50 oral (OECD 420) | > 2 000 mg/kg bw |  |  |  |
| Rat LD50 dermal (OECD 402) | > 2 000 mg/kg bw |  |  |  |
| Rat LC50 inhalation (OECD 403) | No data submitted |  |  |  |
| Skin irritation (OECD 404) | Non irritant |  |  |  |
| Eye irritation (OECD 405) | Non irritant |  |  |  |
| Skin sensitisation (OECD 429; LLNA) | Non sensitizing |  |  |  |

| **Additional toxicological information (e.g. Annex IIIB, point 6.5, 6.7)** | | | | |
| --- | --- | --- | --- | --- |
| Short-term toxicity studies | None |  |  |  |
| Toxicological data on active substance(s) (not tested with the preparation) | None |  |  |  |
|  |  |  |  |  |
| Toxicological data on non-active substance(s) (not tested with the preparation) | None |  |  |  |
|  |  |  |  |  |
| Further toxicological information | None | | | |

|  |  |
| --- | --- |
| **Classification and labelling proposed for the preparation with regard to toxicological properties (Annex IIIB, point 9)** | |
|  |  |
| Regulation 1272/2008/EC | STOT RE 2 - H373  Repr 1A - H360D |

### Annex 6: Safety for professional operators

FANGA RONGEUR PRO

Date: 31/07/2012

**Exposure assessment**

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

Primary exposure of professionals– FANGA RONGEUR PRO (exposure during cleaning considered) – Control of rats and mice

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Component** | **CAS** | **Actual Dermal Total**  **[mg/kg/d]** | **InhalationExposure**  **[mg/m³]** | **Model** |
| **Control of rats and mice** | | | | | |
| Professionnal rat  (without gloves) | Brodifacoum | 56073-10-0 | 3.3x10-7 | Not applicable | CEFICstudy |

Risk assessment– Control of rats and mice

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Component** | **CAS** | **AEL [mg/kg/d]** | **Absorption**  **[%]** | | **Total syst exposure**  **[mg/kg bw/d]** | | Risk |
| inh | derm | Expo | %AEL |
| **Control of rats and mice** | | | | | | | | |
| Professionnal rat  (without gloves) | Brodifacoum | 56073-10-0 | 3.3x10-6 | 100 | 0.647 | 3.3x10-7 | 9.9 | Acceptable |

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

FANGA RONGEUR PRO

| General information | |
| --- | --- |
| Formulation Type: | Cereal grain bait (wheat) |
| Active substance(s) (incl. content): | Brodifacoum (0.005% m/m) |
| Category |  |
| Authorisation number |  |

| **Brodifacoum** |
| --- |

| Data base for exposure estimation | |
| --- | --- |
| according to | Appendix: Toxicology and metabolism – active substance/CAR |

| Exposure scenarios for intended uses (Annex IIIB, point 6.6 ) | |
| --- | --- |
| Primary exposure | Not applicable |
| Secondary exposure, acute | Infant ingesting bait |
| Secondary exposure, chronic | None |

**Conclusion:**

The accidental ingestion of baits poses a risk to infants since the AEL is exceeded when infant ingests more than 0.88 mg of product per day.

* **Renewal 2017**

Only professional uses are considered.

### Annex 8: Residue behaviour

Brodifacoum

The intended uses description of the product FANGA RONGEUR PRO indicates that these uses are not relevant in terms of residues in food and feed. No further data are required concerning the residue behaviour.

### Annex 9a: Efficacy of the active substance from its use in the biocidal product

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test substance** | **Test organism(s)** | **Test method** | **Test conditions** | **Test results: effects, mode of action, resistance** | **Reference\*** | **RI** |
| FANGA RONGEUR PRO  0.005% brodifacoum | House mice  *Mus musculus*  Brown rat  *Rattus norvegicus* | Laboratory test  House mice: 10 animals (4 males and 6 females).  Brown rat: 10 animals (6 males and 4 females).  Intoxication duration: 20 days with daily measurement of mortality and food consumption. | Acclimation: 7 days in individual cage.  D0-D5: routine food has been given:  40.0 g for rats, 10.0 g for mice.  D6-D20: routine food and tested baits have been given in different feeding dishes.  40.0 g of routine food and 40.0 g of tested baits for rats  10.0 g of routine food and 10.0 g of tested baits for mice.  Food and bait consumption were measured and mortality was observed during 20 days after the first day of intoxication. | For brown rats: Only one rat did not eat tested bait all along the test.  Mean palatability percentage = 11 %  Mortality percentage = 90 %  For house mice: one which has eaten 1.3 g of bait did not die.  Mean palatability percentage = 35 %  Mortality percentage on house mouse = 90 %. | Doc IIIB5.10.2  XXX | 3 |
| FANGA RONGEUR PRO  0.005% brodifacoum | Brown rats  *(Rattus norvegicus)* | Laboratory test  Brown rats:  5 males and 5 females.  Intoxication duration: 4 days with daily measurement of mortality and consumption. | Acclimatization: 4 days in individual cage at room temperature.  Day 0: reference food and bait biocidal product have been given:  - 50 g per animal of reference food for the assessment of palatability,  - 50 g per animal of paste bait for the assessment of efficacy during 4 consecutive days with daily consumption measurements.  Mortality was observed during 21 days every 24 hours. | A palatability equivalent to 68 %  A mortality of 90 % in a period from day 4 to day 7 | Doc IIIB5.10.2/01  XXX | 1 |
| FANGA RONGEUR PRO  0.005% brodifacoum | Brown rats  *Rattus norvegicus*  *Aged bait: 2 years* | Field test  The rodenticide was evaluated using the census baiting technique, which involved the following phases:  Pre-treatment census  Pre-treatment lag phase  Treatment census  Post-treatment lag phase  Post-treatment census  During each assessment the food/bait at each station was weighed and replenished, and the consumption in grams was calculated. During the treatment census, searches were conducted for dead and dying rats around the sites. | Acclimatization: 14 days (150-200 g of wheat per station per day)  Treatment : 200 g of bait per day in each lockable bait station –total 10 bait stations) during11 days  Post-baiting: 7 days  (150-200 g of wheat per station per day)  Mortality was observed from the first day of intoxication and noted about every 2 days until the end of the trial. | The efficacy was of 96.20 %.   * Pre-baiting plateau = 745 g/day * Post-baiting = 28.33 g * Assessed efficacy = 96.20 %   The assessed bait has been very well accepted by brown rats and effective and the results are consistent with laboratory ones (90 %).  No secondary poisoning occurred at the baited site. | Doc IIIB5.10.2/02  XXX | 1 |

### Annex 9b: Efficacy of the active substance from its use in the biocidal product

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test substance** | **Test organism(s)** | **Test method** | **Test conditions** | **Test results: effects, mode of action, resistance** | **Reference\*** | **RI** |
| FANGA RONGEUR PRO  0.005% brodifacoum | Black rats  *(Rattus rattus)* | Laboratory study  Technical Notes for Guidance on Product Evaluation, Appendices to chapter 7 Product type 14 « Efficacy evaluation of rodenticidal biocidal products »  Black rats:  5 males and 5 females.  Intoxication duration: 4 days with daily measurement of mortality and consumption. | Acclimatization: 4 days in individual cage at room temperature.  Day 0: reference food and bait biocidal product have been given:  - 50 g per animal of reference food for the assessment of palatability,  - 50 g per animal of paste bait for the assessment of efficacy  during 4 consecutive days with daily consumption measurements.  Mortality was observed during 21 days every 24 hours. | The FANGA RONGEUR PRO bait containing 50 ppm brodifacoum given to black rats (5 males and 5 females) during 4 days according to the Technical Notes for Guidance on Product Evaluation, Appendices to chapter 7 Product type 14 « Efficacy evaluation of rodenticidal biocidal products » has demonstrated:  • A mean palatability equivalent to 0.41 (41%)  • A good consumption for all rats between D0 and D4  • A very good efficacy, with 100% of mortality for males between D6 and D10 and 100 % of mortality for females in a period from D6 to D9 | XXX | 1 |
| FANGA B+ RONGEUR  0.001% Brodifacoum | Black rat  (*Rattus rattus*) | Laboratory study  Technical Notes for Guidance on Product Evaluation, Appendices to chapter 7 Product type 14 « Efficacy evaluation of rodenticidal biocidal products »  Black rats:  5 males and 5 females.  Intoxication duration: 4 days with daily measurement of mortality and consumption. | Acclimatization: 4 days in individual cage at room temperature.  Day 0: reference food and bait biocidal product have been given:  - 50 g per animal of reference food for the assessment of palatability,  - 50 g per animal of paste bait for the assessment of efficacy during 4 consecutive days with daily consumption measurements.  Mortality was observed during 20 days every 24 hours. | The FANGA B+ RONGEUR bait containing 10 ppm brodifacoum given to black rats (5 males and 5 females) during 4 days according to the Technical Notes for Guidance on Product Evaluation, Appendices to chapter 7 Product type 14 « Efficacy evaluation of rodenticidal biocidal products » has demonstrated:  • A mean palatability equivalent to 0.41 (41%)  • A good consumption for all rats between D0 and D4  • A good efficacy, with 80% of mortality for males between D6 and D7 and 100 % of mortality for females in a period from D5 to D7 | XXX | 1 |
| FANGA B+ RONGEUR  0.001% Brodifacoum | Black rat  (*Rattus rattus*)  Aged bait: 2 years | Field study  EPPO PP 1/114(2) | The trial was set up in an agricultural habitat (farm)  - Method for recording / scoring effects: daily bait take and tracking score during the trial period  The percentage of efficacy of the test product against the rat population was calculated using the following formula:  % efficacy = 100 – [ Post-treatment rat population size index/Pre-treatment rat population size index x 100]  where:  Pre-treatment index: average weight of the bait amounts eaten on the last 4 days of the Pre-treatment census.  Post-treatment index: average weight of the bait amounts eaten on the last 4 days of the Post-treatment census.  Intervals of examination: every day from 2013-11-06 to 2013-12-24 | The trial was set up in an agricultural habitat (cows breeding stable, fodder and equipment warehouse) in which rats infestation was signaled by the farmer.  The farm site was surveyed and a notable rats presence over the entire site was detected. The analysis of the observed runways, footprints and faeces allowed these rats to be identified as belonging to Roof rat (Rattus rattus L.).  Eight bait-stations and eight tracking patches were set out on the main rat runways which were found inside the buildings.  In order to detect the efficacy of the test product against the pest, it was firstly calculated an index of the rat population size during a Pre-treatment census (monitoring of the daily consumption of unpoisoned census baits).  On the same way it was calculated an index of the rat population size after the Poisoning phase (monitoring of the daily consumption of unpoisoned census baits during the Post-treatment phase).  According to the results of the present study, FANGA B+ RONGEUR showed a medium acceptance level but provided a complete effectiveness (100.0%) against the Rattus rattus population present across the trial site. | XXX | 1 |
| FANGA RONGEUR PRO 0.005% Brodifacoum | House Mouse (*Mus musculus*)  Aged bait: 2 years | Field study  EPPO PP 1/114(2) | The trial was set up in an agricultural habitat (farm)  - Method for recording / scoring effects: daily bait take and tracking score during the trial period  The percentage of efficacy of the test product against the rat population was calculated using the following formula:  % efficacy = 100 – [ Post-treatment rat population size index/Pre-treatment rat population size index x 100]  where:  Pre-treatment index: average weight of the bait amounts eaten on the last 4 days of the Pre-treatment census.  Post-treatment index: average weight of the bait amounts eaten on the last 4 days of the Post-treatment census.  Intervals of examination: every day from 2015-02-06 to 2015-03-20 | The trial was set up in an agricultural habitat (cows breeding stable, fodder and equipment warehouse) in which rats infestation was signaled by the farmer.  The farm site was surveyed and a notable mice presence over the entire site was detected. The analysis of the observed runways, footprints and faeces allowed these rats to be identified as belonging to House mouse (*Mus Musculus* L.).  Eight bait-stations and eight tracking patches were set out on the main rat runways which were found inside the buildings.  In order to detect the efficacy of the test product against the pest, it was firstly calculated an index of the rat population size during a Pre-treatment *census* (monitoring of the daily consumption of unpoisoned *census* baits).  On the same way it was calculated an index of the rat population size after the Poisoning phase (monitoring of the daily consumption of unpoisoned *census* baits during the Post-treatment phase).  According to the results of the present study, FANGA RONGEUR PRO showed a good acceptance level but provided a complete effectiveness (100.0%) against the *Mus Musculus* population present across the trial site. | XXX | 1 |
| FANGA B +RONGEUR (BDB10V1)  0.001% w/w  Brodifacoum | Brown rats  *Rattus norvegicus*  *Aged bait : 58 months* | Field study  EPPO PP 1/114(2) | Census baiting technique, which involved the following phases:  Pre-treatment census  Pre-treatment lag phase  Treatment census  Post-treatment lag phase  Post-treatment census  During each assessment the food/bait at each station was weighed and replenished, and the consumption in grams was calculated. During the treatment census, searches were conducted for dead and dying mice around the sites.  Acclimatization: 15 days (100 g mixture of maize grain and poultry/pig feed)  Treatment: 100 g of bait per day in each lockable bait station –total 8 bait stations) during 19 days  Post-baiting: 6 days  (100 g mixture of maize grain and poultry/pig feed per station per day) | Estimated efficacy = 100 %  Pre-baiting plateau = 721.5g/day  Post-baiting= 0 g | XXX | 1 |
| FANGA B +RONGEUR (BDB10V1)  0.001% w/w  Brodifacoum | Black rats  *Rattus rattus*  *Aged bait : 59 months* | Field study  EPPO PP 1/114(2) | Census baiting technique, which involved the following phases:  Pre-treatment census  Pre-treatment lag phase  Treatment census  Post-treatment lag phase  Post-treatment census  During each assessment the food/bait at each station was weighed and replenished, and the consumption in grams was calculated. During the treatment census, searches were conducted for dead and dying mice around the sites  Acclimatization: 15 days (100 g mixture of maize grain and poultry/pig feed)  Treatment: 100 g of bait per day in each lockable bait station –total 8 bait stations) during 18 days  Post-baiting: 5 days  (100 g mixture of maize grain and poultry/pig feed per station per day) | Estimated efficacy = 100 %  Pre-baiting plateau = 800 g/day  Post-baiting = 0 g | XXX | 1 |

1. Guidance on the Biocidal Products Regulation Volume III Human Health – Part B Risk Assessment, October 2015. [↑](#footnote-ref-1)
2. Give also data on test pressure, temperature, pH and concentration range if appropriate. [↑](#footnote-ref-2)
3. Ferron N. 2012. Physico-chemical tests and analyses before and after an accelerated storage procedure for 14 days at 54 ± 2°C on FANGA RONGEUR PRO in compliance with CIPAC MT 46.3 (CIPAC Handbook J – 2000). DEFITRACES, report n° 11-920010-025 of 16 May 2012, GLP, unpublished. [↑](#footnote-ref-3)
4. Demangel B. 2012. Physico chemical tests on FANGA RONGEUR PRO. DEFITRACES, Report n° 11-920010-024 of 23 January 2012, GLP, unpublished. [↑](#footnote-ref-4)
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6. Grevin P. 2012. Sieve test and dustiness for granular products test before and after an accelerated storage procedure for 8 weeks at 40°C ± 2°C on FANGA RONGEUR PRO. DEFITRACES, Report 12-920010-008 of 28 September 2012, GLP, unpublished. [↑](#footnote-ref-6)
7. B. Demangel, 14 March 2014, report N° 11-920010-026, “Physico-chemical tests and chemical stability after a storage procedure for 2 years at 20 ± 2 °C on FANGA RONGEUR PRO”. [↑](#footnote-ref-7)
8. B. Demangel, 07 May 2018, report N° 11-920010-026 amended “Physico-chemical tests and chemical stability after a storage procedure for 2 years at 20 ± 2 °C on FANGA RONGEUR PRO”. [↑](#footnote-ref-8)
9. *Technical Notes for guidance on product evaluation appendices to Chapter 7 Product Type 14 Efficacy Evaluation of Rodenticidal Biocidal Products.* [↑](#footnote-ref-9)
10. Greaves J. H.; Shepherd D. S.; Gill, J. E. (1982): An investigation of difenacoum resistance in Norway rat populations in Hampshire. *Annals of Applied Biology* 100, 581–587. [↑](#footnote-ref-10)
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12. Pelz H-J, Ha¨nisch D, Lauenstein G (1995) Resistance to anticoagulant rodenticides in Germany and future strategies to control *Rattus norvegicus. Pestic Sci* 43, 61–67. [↑](#footnote-ref-12)
13. Greaves J. H.; Cullen-Ayres P. B. (1988): Genetics of difenacoum resistance in the rat. In: J. W. Suttie (Ed.), Current advances in vitamin K research, Elsevier, N.Y., 381–388. [↑](#footnote-ref-13)
14. Quy R.J., Shepherd D.S., Inglis I.R. (1992): Bait avoidance and effectiveness of anticoagulant rodenticides against warfarin- and difenacoum-resistant populations of Norway rats (Rattus norvegicus). *Crop Protection*, Volume 11, Issue 1, February 1992, Pages 14-20 [↑](#footnote-ref-14)
15. Syngenta Limited and Activa / Pelgar Brodifacoum and Difenacoum Task Force Combined Assessment Report according to the procedure of Directive 98/8/EC, active substance in biocidal products, brodifacoum CAS n°56073-10-0, product type 14 (rodenticides), RMS Italy, Revision2: November 2010. [↑](#footnote-ref-15)
16. If the dead rodents, uneaten bait and bait fragments dragged away from the tamper-resistant bait boxes or covered bait stations are not entirely collected, primary and secondary poisoning risks remain unacceptable. [↑](#footnote-ref-16)
17. EUBEES 2 - Emission scenario document for biocides used as rodenticides (Larsen, 2003) [↑](#footnote-ref-17)
18. See document CA-Nov16-Doc.4.x-Final on the concept of tamper-resistant bait stations. [↑](#footnote-ref-18)
19. See document CA-Nov16-Doc.4.x-Final on the concept of tamper-resistant bait stations. [↑](#footnote-ref-19)
20. Data which have not been already submitted for the purpose of the Annex I inclusion. [↑](#footnote-ref-20)