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 RENEWAL OF NATIONAL AUTHORISATION APPLICATIONS**

(submitted by the evaluating Competent Authority)



**FANGA B+**

Product type 14

Brodifacoum

Case Number NA-RNL in R4BP: BC-TN041613-27

Case Number NA-MIC: BC-AM079574-28

Evaluating Competent Authority: France

Date: 17/01/2019

Revision: 10/04/24

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**Note to the reader**

This consolidated PAR for the minor change of the product FANGA B+ is based on the PAR of the renewal, in which all necessary addenda have been included.

In part 1 of the consolidated PAR, the summary of product characteristics corresponds to the autorised uses.

In part 2 of this consolidated PAR:

* Each section contains the initial assessment and the subsequent successive assessments (minor change, 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 MIC application of the product are at the end of each section and are highlighted in grey.

**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 (Part 1), uses for “professionals” are mentioned according to the agreed standard SPC, but they not relevant in France. It is proposed that each cMS adapts the conditions of authorization of the product according to its own legislation.

# 0- History of the dossier

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Application type** | **refMS** | **Case number in the refMS** | **Decision date** | **Assessment carried out (i.e. first authorisation / amendment /)** |
| NA-APP | FR | BC-RQ006542-27 | 12/02/2016 and updated on 14 /02/2018 | Initial assessment : FANGA B+ |
| NA-MIC | FR | BC-MA037998-32 | 15/10/2018 | Minor change application :   * Reduction of the application rate for rats: from 180-200 g to 100 g per bait station * Modification of packagings |
| NA-RNL | FR | BC-TN041613-27 | 26/06/2019 | Renewal of the authorisation |
| NA-MIC | FR | BC-AM079574-28 | 26/12/2023 | Minor change:  - Substitution of two co-formulants.  -modification of packagings  -addition of four trade names  -change of the name of the product manufacturer  - addition of three new product manufacturers  -update of the address of the manufacturing site of the active substance |

**Authorised uses - Minor change 2018**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Users** | **Target organisms** | **Dose** | **Field of use** | **Packagings** |
| Professionals | Rats (*Rattus rattus* and *Rattus norvegicus*) | 100 g every 5 to 10 meters | In and around buildings, open areas, waste dumps and landfills | FANGA B+ is packed in individual heat-sealed paper sachet from 5,10 and 20 g  The paper sachet is packed in   * Bucket (PP,PE): 5-10-15-18-20 kg ; * Carton box with PE/PP liner from 5-10-12-15-20-25-30-50 kg.   Minimum pack size of 3 kg. |
| Mice (*Mus musculus*) | 30-40 g every 1 to 2 meters |
| Non-professionals | Rats (*Rattus rattus* and *Rattus norvegicus*) | 100 g every 5 to 10 meters | In and around buildings | FANGA B+ is packed in individual heat-sealed paper sachet of 5, 10 and 20 g  Packaging for sachet in   * prefilled bait station (PVC, PP, PET, PE or PS) max 100 g * bucket (PE/PP) - max 150 g * metal box (without lacquer) – max 150 g * cardboard - max 150 g * flacon (PE/PP) – max 150 g   Maximum pack size of 150 g. |
| Mice (*Mus musculus*) | 30-40 g every 1 to 2 meters | Indoor buildings |

* **Intended uses for the Renewal (2019):**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Users** | **Target organisms** | **Dose** | **Field of use** | **Packagings** |
| Professionals | Rats (*Rattus rattus* and *Rattus norvegicus*) | 100 g every 5 to 10 meters | In and around buildings, open areas, waste dumps and landfills | The product FANGA B+ is supplied in heat sealed paper sachets of 5-10-20g, wrapped in :  • Buckets PP/PE (5-10-15-18-20kg)  •Carton box with plastic protection PE/PP (5-10-12-15-20-25-30-50kg) |
| Mice (*Mus musculus*) | 30-40 g every 1 to 2 meters |
| Non-professionals | Rats (*Rattus rattus* and *Rattus norvegicus*) | 100 g every 5 to 10 meters | In and around buildings | FANGA B+ is packed in individual heat-sealed paper sachet of 5, 10 and 20 g  Packaging for sachet in   * prefilled bait station (PVC, PP, PET, PE or PS) max 100 g * bucket (PE/PP) - max 150 g * metal box (without lacquer) – max 150 g * Cardboard box (with plastic protection PE or PP) (up to 150 g)flacon (PE/PP) – max 150 g   Maximum pack size of 150 g. |
| Mice (*Mus musculus*) | 30-40 g every 1 to 2 meters | Indoor buildings |

# Conclusion on the assessment (MIC 2022 - BC-AM079574-28)

## Details on change application

The minor change consists of substitution of two co-formulants (substitution of BHT and Bronopol by Oxabiol (Tocopherol) and Myco Curb (Ammonium propionate and Propionic acid); modification of packagings; addition of four names *(BRODIEX B+, FINORAT B+, TURAT B+, JABOBRODI B+)*; change of name of the product manufacturer INDUSTRIAL CHEMICAL SRL to INDUPHARMA S.r.l.; addition of three new product manufacturers NOXIMA, AGGRESS and FARMA-CHEM SA and update of the address of the manufacturing site of the active substance ACTIVA S.R.L.

**Conclusion on Physico-chemical properties and analytical methods**

French competent authorities (FR CA) assessed that the new formulation of the product FANGA B+ has shown that the new composition is acceptable. The new packaging are acceptable.

**Conclusion on Efficacity**

French competent authorities (FR CA) assessed that the new formulation of the product FANGA B+ has shown a sufficient efficacy for the control of rats (*R. norvegicus* and *R. rattus*) and mice (*Mus musculus*).

The application rates validated are the following:

* Rats (*Rattus norvegicus* and *Rattus rattus*): 100 g /secured bait point separated by 5-10 m.
* House mice (*Mus musculus*): 30-40 g/secured bait point separated by 1-2 m.

**Conclusion on Humain Health**

The minor change application has no impact on the classification of the product, the identification of any substance of concern and the risk assessment for human health.

**Conclusion on Environment**

The minor change application has no impact on the classification of the product, the identification of the substances of concern and the risk assessment for the environment.

## General conclusion

The minor change application is acceptable and the product can therefore be authorised with this change.

# 1- Summary of product caracterisation (MIC 2022 - BC-AM079574-28)

**1.1. Administrative information**

**1.1.1 Trade name(s) of the product**

| **Trade name(s)[[1]](#footnote-1)** | FANGA B+ |
| --- | --- |
|  | JABOBRODI B+ BRODIEX B+ TURAT B+ FINORAT B+ |

**1.1.2. Authorisation holder**

|  |  |  |
| --- | --- | --- |
| **Name and address of the authorisation holder** | **Name** | TRIPLAN SA |
| **Address** | BP 258 Poste française  AD500 Andorre La Vieille  Principauté d'Andorre  ANDORRA |
| **Authorisation number** | FR-2016-0005 | |

**1.1.3. Manufacturer(s) of the product**

|  |  |
| --- | --- |
| **Name of manufacturer** | INDUPHARMA S.r.l. |
| **Address of manufacturer** | Via Sorgaglia 40  35020 Arre (PD)  Italy |
| **Location of manufacturing site** | Via Sorgaglia 40  35020 Arre (PD)  Italy |

|  |  |
| --- | --- |
| **Name of manufacturer** | IRIS |
| **Address of manufacturer** | 1126 A AVENUE DU MOULINAS  ROUTE DE SAINT PRIVAT  30340 SALINDRES  FRANCE |
| **Location of manufacturing site** | 1126 A AVENUE DU MOULINAS  ROUTE DE SAINT PRIVAT  30340 SALINDRES  FRANCE |

|  |  |
| --- | --- |
| **Name of manufacturer** | FARMAVIT OOD |
| **Address of manufacturer** | BUL TSAR BORIS III, n°63, OFFICE 1  1612 SOFIA  BULGARIA |
| **Location of manufacturing site** | INDUSTRIANA 2 STR, PLEVEN DISTRICT  5960 GULIANTSI  BULGARIA |

|  |  |
| --- | --- |
| **Name of manufacturer** | NOXIMA |
| **Address of manufacturer** | Carrefour Jean Monnet/ Lacroix Saint-Ouen,  60201 Compiègne  France |
| **Location of manufacturing site** | Carrefour Jean Monnet/ Lacroix Saint-Ouen,  60201 Compiègne  France |

|  |  |
| --- | --- |
| **Name of manufacturer** | AGGRESS |
| **Address of manufacturer** | EL. VENIZELOU 158 A,  16341 Athens  Greece |
| **Location of manufacturing site** | ARMA THEBES,  32200 Voiotia  Greece |

|  |  |
| --- | --- |
| **Name of manufacturer** | FARMA-CHEM S.A. |
| **Address of manufacturer** | Industrial Area of Sindos P.O. BOX 1026 Block 53 Zone C,  57022 THESSALONIKI  Greece |
| **Location of manufacturing site** | Industrial Area of Sindos P.O. BOX 1026 Block 53 Zone C,  57022 THESSALONIKI  Greece |

**1.1.4. Manufacturer(s) of the active substance(s)**

|  |  |
| --- | --- |
| **Active substance** | Brodifacoum |
| **Name of manufacturer** | ACTIVA S.r.l |
| **Address of manufacturer** | Via Feltre 32  20132  Milan  Italy |
| **Location of manufacturing sites** | Dr. Tezza S.r.l.  Via Tre Ponti 22,  37050  S. Maria di Zevio (VR)  Italy |

**1.2. Product composition and formulation**

**1.2.1. Qualitative and quantitative information on the composition of the product**

| **Common name** | **IUPAC name/chemical name** | **Function** | **CAS number** | **EC number** | **Content (%)** |
| --- | --- | --- | --- | --- | --- |
| Brodifacoum | 3-[3-(4'-bromobiphenyl-4-yl)-1,2,3,4-tetrahydro-1-  naphthyl]-4-hydroxycoumarin | Active substance | 56073-10-0 | 259-980-5 | 0.0010 |

**1.2.2. Type of formulation**

|  |
| --- |
| Pasta bait |

# 1.3. Hazard and precautionary statements according to Regulation (EC) 1272/2008

|  |  |
| --- | --- |
| **Classification - Regulation (EC) 1272/2008** | |
| Hazard category | - |
| Hazard statements | - |
| Labelling |  |
| Signal words | - |
| Hazard statements | - |
| Precautionnary statements | -  - |
|  |  |
| Note | - |

# 1.4. Authorised use(s)

**1.4.1. 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[[2]](#footnote-2)  - *[Covered and protected baiting points]* |
| **Application rate(s) and frequency** | Bait products:  *Rats*   * *-* High infestation: 100 g of bait per baiting point every 5 meters * - Low infestation: 100 g of bait per baiting point every 10 meters   Mice:   * *High infestation: 30-40 g of bait per baiting point every 1 meter* * *Low infestation: 30-40 g of bait per baiting point every 2 meters* |
| **Category(ies) of users** | Trained professionals |
| **Pack sizes and packaging material** | FANGA B+ is packed in individual heat-sealed paper sachet from 5,10 and 20 g  The paper sachet is packed in   * Bucket (PP,PE): 5-10-15-18-20-25 -30 kg ; * Paper bags with inerliner PE/PP foil: 5-10-12-15-20-25-30-40-50kg. * Carton box with PE/PP liner from 5-10-12-15-20-25-30-40-50 kg. * PP/PP, PP/PP or metalized/PE bags : 5-10-15-20-25-30-40-50kg * Metal boxes (without lacquer): 5-10-15-20-25-30-40-50kg * Bait boxes in PET/PP/PE/PVC   Minimum pack size of 3 kg.  (In France only : minimum pack size of 5 kg) |

***1.4.1.1.* *Use-specific instructions for use***

|  |
| --- |
| - Remove the remaining product at the end of treatment period.  - *[*Follow any additional instructions provided by the relevant code of best practice. |

***1.4.1.2 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. |

***1.4.1.3 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. |

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

|  |
| --- |
| - |

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

|  |
| --- |
| - |

**1.4.2. 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: 100 g of bait per baiting point every 5 meters * Low infestation: 100 g of bait per baiting point every 10 meters   Mice:   * High infestation: 30-40 g of bait per baiting point every 1 meter * Low infestation: 30-40 g of bait per baiting point every 2 meters |
| **Category(ies) of users** | Trained professionals |
| **Pack sizes and packaging material** | FANGA B+ is packed in individual heat-sealed paper sachet from 5,10 and 20 g  The paper sachet is packed in   * Bucket (PP,PE): 5-10-15-18-20 -25 -30 kg ; * Paper bags with iner liner PE/PP foil: 5-10-12-15-20-25-30-40-50kg. * Carton box with PE/PP liner from 5-10-12-15-20-25-30-40-50 kg. * PP/PP, PP/PP or metalized/PE bags : 5-10-15-20-25-30-40-50kg * Metal boxes (without lacquer): 5-10-15-20-25-30-40-50kg * Bait boxes in PET/PP/PE/PVC     Minimum pack size of 3 kg.  (In France only : minimum pack size of 5 kg) |

***1.4.2.1.* *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.  - 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].* |

***1.4.2.2 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.  - Do not use this product in the burrow. |

***1.4.2.3 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. |

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

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| --- |
|  |

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

|  |
| --- |
|  |

**1.4.3. Use description**

**Table 3. Use # 3 – Mice and/or 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) – in 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: 100 g of bait per baiting point every 5 meters * Low infestation: 100 g of bait per baiting point every 10 meters   Mice:   * High infestation: 30-40 g of bait per baiting point every 1 meter   Low infestation: 30-40 g of bait per baiting point every 2 meters |
| **Category(ies) of users** | Trained professionals |
| **Pack sizes and packaging material** | FANGA B+ is packed in individual heat-sealed paper sachet from 5,10 and 20 g  The paper sachet is packed in   * Bucket (PP,PE): 5-10-15-18-20-25 -30 kg ; * Paper bags with inerl iner PE/PP foil: 5-10-12-15-20-25-30-40-50kg. * Carton box with PE/PP liner from 5-10-12-15-20-25-30-40-50 kg. * PP/PP, PP/PP or metalized/PE bags : 5-10-15-20-25-30-40-50kg * Metal boxes (without lacquer): 5-10-15-20-25-30-40-50kg * Bait boxes in PET/PP/PE/PVC     Minimum pack size of 3 kg.  (In France only : minimum pack size of 5 kg) |

***1.4.3.1.* *Use-specific instructions for use***

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| - 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  - *[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].* |

***1.4.3.2 Use-specific risk mitigation measures***

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| - 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.  *-* 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.  - Do not use this product in the burrow. |

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

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| - 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. |

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

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

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**1.4.4. Use description**

**Table 4. Use # 4 *(not relevant in France)*– House mice – professionals – indoor**

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| **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[[3]](#footnote-3) |
| **Application rate(s) and frequency** | 30-40 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** | FANGA B+ is packed in heat-sealed paper sachet from 5,10 and 20 g  The paper sachet is packed in   * Bucket (PP,PE): 5-10-15-18-20-25 -30 kg ; * Paper bags with iner liner PE/PP foil: 5-10-12-15-20-25-30-40-50kg. * Carton box with PE/PP liner from 5-10-12-15-20-25-30-40-50 kg. * PP/PP, PP/PP or metalized/PE bags : 5-10-15-20-25-30-40-50kg * Metal boxes (without lacquer): 5-10-15-20-25-30-40-50kg * Bait boxes in PET/PP/PE/PVC     Minimum pack size of 3 kg. |

***1.4.4.1.* *Use-specific instructions for use***

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| - 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.  - Follow any additional instructions provided by the relevant code of best practice. |

***1.4.4.2 Use-specific risk mitigation measures***

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

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| - When placing bait stations close to water drainage systems, ensure that bait contact with water is avoided. |

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

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

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**1.4.5. Use description**

**Table 5. Use # 5 *(not relevant in France)*– Rats – professionals – indoor**

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| **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** | 100 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** | FANGA B+ is packed in paper sachet from 5,10 and 20 g  The paper sachet is packed   * Bucket (PP,PE): 5-10-15-18-20-25 -30 kg ; * Paper bags with iner liner PE/PP foil: 5-10-12-15-20-25-30-40-50kg. * Carton box with PE/PP liner from 5-10-12-15-20-25-30-40-50 kg. * PP/PP, PP/PP or metalized/PE bags : 5-10-15-20-25-30-40-50kg * Metal boxes (without lacquer): 5-10-15-20-25-30-40-50kg * Bait boxes in PET/PP/PE/PVC     Minimum pack size of 3 kg. |

***1.4.5.1.* *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. |

***1.4.5.2 Use-specific risk mitigation measures***

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***1.4.5.3 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. |

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

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

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**1.4.6. Use description**

**Table 6. Use # 6 *(not relevant in France)*– House mice and/or rats – professionals – outdoor around buildings**

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| **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** | Rats: 100 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.  Mice: 30-40 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** | FANGA B+ is packed in heat-sealed paper sachet from 5,10 and 20 g  The paper sachet is packed in   * Bucket (PP,PE): 5-10-15-18-20-25 -30 kg ; * Paper bags with iner liner PE/PP foil: 5-10-12-15-20-25-30-40-50kg. * Carton box with PE/PP liner from 5-10-12-15-20-25-30-40-50 kg. * PP/PP, PP/PP or metalized/PE bags : 5-10-15-20-25-30-40-50kg * Metal boxes (without lacquer): 5-10-15-20-25-30-40-50kg * Bait boxes in PET/PP/PE/PVC     Minimum pack size of 3 kg. |

***1.4.6.1.* *Use-specific instructions for use***

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| * 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. |

***1.4.6.2 Use-specific risk mitigation measures***

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| - Do not apply this product directly in the burrows. |

***1.4.6.3 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. |

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

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

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**1..7. Use description-General public**

**Table 7. Use # 7 – House mice – general public – indoor**

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| --- | --- |
| **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 *[in sachets for loose bait]* to be used in tamper-resistant bait stations. |
| **Application rate(s) and frequency** | Bait products:  - 30-40 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** | General public (non professional) |
| **Pack sizes and packaging material** | FANGA B+ is packed in individual heat-sealed paper sachet of 5, 10 and 20 g  Packaging for sachet in:  -Bucket (PE/PP)  -Flacon bottles or cans (PE/PP)  -Cardboard box (with plastic protection PE or PP)  -Sachets/ Films (PE/PP or PP/PP metalized/PE)  -Metal box (without lacquer)  -Prefilled bait station of 30 or 40g (PVC/PP/PET/PE)  Maximum pack size of 50 g. |

***1.4.7.1.* *Use-specific instructions for use***

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| - 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. |

***1.4.7.2 Use-specific risk mitigation measures***

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***1.4.7.3 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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***1.4.7.4 Where specific to the use, the instructions for safe disposal of the product and its packaging***

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

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**1.4.8. Use description**

**Table 8. Use # 8 – Rats – general public – indoor**

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| --- | --- |
| **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 *[in sachets for loose bait]* to be used in tamper-resistant bait stations |
| **Application rate(s) and frequency** | Bait products:  100 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** | General public |
| **Pack sizes and packaging material** | FANGA B+ is packed in individual heat-sealed paper sachet of 5, 10 and 20 g  Packaging for sachet in:  -Bucket (PE/PP)  -Flacon bottles or cans (PE/PP)  -Cardboard box (with plastic protection PE or PP)  -Sachets/ Films (PE/PP or PP/PP metalized/PE)  -Metal box (without lacquer)  -Bait station pre-filled with the corresponding dose or not (PVC/PP/PET/PE)  Maximum pack size of 150 g. |

***1.4.8.1.* *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. |

***1.4.8.2 Use-specific risk mitigation measures***

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***1.4.8.3 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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***1.4.8.4 Where specific to the use, the instructions for safe disposal of the product and its packaging***

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

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**1.4.9. Use description**

**Table 9. Use # 9 – Rats – general public – outdoor around buildings**

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| --- | --- |
| **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** | outdoor around buildings |
| **Application method(s)** | Ready-to-use bait *[in sachets for loose bait]* to be used in tamper-resistant bait stations. |
| **Application rate(s) and frequency** | Bait products:  100 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** | General public |
| **Pack sizes and packaging material** | FANGA B+ is packed in individual heat-sealed paper sachet of 5, 10 and 20 g  Packaging for sachet in:  -Bucket (PE/PP)  -Flacon bottles or cans (PE/PP)  -Cardboard box (with plastic protection PE or PP)  -Sachets/ Films (PE/PP or PP/PP metalized/PE)  -Metal box (without lacquer)  -Bait station pre-filled with the corresponding dose or not (PVC/PP/PET/PE)  Maximum pack size of 150 g. |

***1.4.9.1.* *Use-specific instructions for use***

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| - Place the bait stations in areas not liable to flooding.  - Replace any bait in a bait station in which bait has been damaged by water or contaminated by dirt.  - 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. |

***1.4.9.2 Use-specific risk mitigation measures***

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***1.4.9.3 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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***1.4.9.4 Where specific to the use, the instructions for safe disposal of the product and its packaging***

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

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**1.5. General directions for use**

**1.5.1. Instructions for use6**

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| **TRAINED PROFESSIONAL and PROFESSIONNAL USERS**  - 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.  **NON PROFESSIONNAL USERS**  - Read and follow the product information as well as any information accompanying the product or provided at the point of sale before using it.  - Prior to the use of rodenticide products, non-chemical control methods (e.g. traps) should be considered.  - 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.  - Bait stations should be placed in the immediate vicinity where rodent activity has been observed (e.g. travel paths, nesting sites, feedlots, holes, burrows etc.).  - Where possible, bait stations must be fixed to the ground or other structures.  - *[*Do not open the sachets containing the bait *- where relevant for the bait formulation in the product].*  - Place bait stations out of the reach of children, birds, pets, farm animals and other non-target animals.  - Place bait stations away from food, drink and animal feeding stuffs, as well as from utensils or surfaces that have contact with these.  - Do not place bait stations near water drainage systems where they can come into contact with water.  - When using the product do not eat, drink or smoke. Wash hands and directly exposed skin after using the product.  - Remove the remaining bait or the bait stations at the end of the treatment period. |

**1.5.2. Risk mitigation measures**

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| **TRAINED PROFESSIONAL and PROFESSIONNAL USERS**  - 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.  **NON PROFESSIONNAL USERS**   * 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. * Do not use anticoagulant rodenticides as permanent baits (e.g. for prevention of rodent infestation or to detect rodent activity). * The product information (i.e. label and/or leaflet) shall clearly show that: * 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"). * 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. * Search for and remove dead rodents during treatment, at least as often as bait stations are inspected. * 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]*. |

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

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| * 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. |

**1.5.4. 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]. |

**1.5.5. 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 |

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

* **Renewal application – 2019**

**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. However,the product contains the preservative bronopol which is currently assessed.

* **Renewal application – 2019**

FANGA B+ does not contain any substance of concern according to the Guidance on the BPR Volume III Human Health – Part B Risk Assessment[[4]](#footnote-4). Nevertheless, one co-formulant is still currently being assessed.

### Assessment of endocrine disruption (ED) properties of co-formulants in biocidal products

According to our assessment, none of the co-formulants contained in the product FANGA B+ are identified as endocrine disruptors.

However, one co-formulant is currently being evaluated in the frame of REACH for its potential ED properties. Hence, it is not possible to conclude whether this co-formulant should be considered to have ED properties or not before the end of the assessment. In case this co-formulant is finally identified as ED, the biocidal product will be considered as ED and authorisation will have to be revised accordingly.

Please refer to Confidential Annex.

## 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 B+ RONGEUR and FANGA RONGEUR PRO were provided by Triplan. Read across is acceptable (see confidential part).

A letter of access has been provided by Activa to Triplan for physico-chemical properties studies and analytical methods on the active substance.

* **Minor change application – 2018.**

No additional data was provided in the frame of the minor change of the product authorisation. The minor change consists on an addition of packagings. See dedicated part (part 2.2.4) for details.

* **Renewal application – 2019**

Physico-chemical properties studies and analytical methods on the biocidal product FANGA B+ and FANGA PATE PRO were provided by Triplan. Read across is acceptable (see confidential part).

For the renewal of the authorization, additional data was submitted for the physico-chemical properties section (long terme storage stability study).

**Efficacy data**

The following efficacy studies were submitted:

* A free-choice laboratory test was carried out with mice (***Mus musculus***), with exposure to a one year aged formulation of **FANGA B+** (0.001 % w/w brodifacoum) for 4 days.
* A free-choice laboratory test was carried out with rats (***Rattus norvegicus***), with exposure to a one year aged formulation of **FANGA B+** (0.001 % w/w brodifacoum) for 4 days.
* A free-choice laboratory test was carried out with rats (***Rattus rattus***), with exposure to a one year aged formulation of **FANGA B+** (0.001 % w/w brodifacoum) for 4 days.
* A free-choice laboratory test was carried out with house mice (***Mus musculus***), brown and black rats (***Rattus*** ***norvegicus*** and ***Rattus rattus***), with exposure to a fresh formulation of **FANGA B+** (0.001 % w/w brodifacoum) for 20 days.
* A field test was carried out with house mice (***Mus musculus***), with exposure to a one year aged formulation of **FANGA B+** (0.001 % w/w brodifacoum).
* A field test was carried out with brown rats (***Rattus norvegicus***), with exposure to a fresh formulation of **FANGA B+** (0.001 % w/w brodifacoum).
* 2 field tests were carried out with black rats (***Rattus rattus***), with exposure respectively to a two and three year aged formulation of **FANGA B+** (0.001 % w/w brodifacoum).
* **Minor change application – 2018:**
* A field test was carried out with black rats (*Rattus rattus*), with exposure to a 4 years-aged formulation of **FANGA B+** (0.001 % w/w brodifacoum).
* A field test was carried out with brown rats (*Rattus norvegicus*), with exposure to a 4 years- aged formulation **FANGA B+** (0.001 % w/w 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 specific residue data were submitted in the context of this dossier. The product FANGA B+ is intended to be used in bait station indoor and outdoor. It will not get in contact with food or feed. Residue in food or feed are not expected. Considering the intended uses no data is required.

**Ecotoxicology data**

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

* **Minor change application – 2018:**

No new study has been submitted for the Toxicology, Residue and Ecotoxicology sections

* **Renewal application – 2019:**

No new study has been submitted for the Efficacy section

### 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 B+*** *(PT14).*

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

* **Renewal application – 2019**

For the renewal of the authorization, a LOA (02/2018) has been submitted by Activa to Triplan.

* **Minor change for FANGA B+ - 2022**

For the this minor change dossier, no data were submitted for physico-chemistry section.

# 2- Summary of the product assessment –initial PAR 2016

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

The source of the active substance used in the biocidal product FANGA B+ is Activa, source not used for annex I inclusion. According to the combined CAR (2010), the technical equivalence between Pelgar source and Activa source has been performed and accepted by Italy in August 2013 by IT.

Therefore the source ACTIVA used for the biocidal product FANGA B+ is accepted.

Refer to the confidential annex for more details.

* **Renewal application – 2019**

For the renewal of the authorization, both the source and the composition are identical.

## Classification, labelling and packaging

### Harmonised classification of the active substance initial 2016

|  |  |  |
| --- | --- | --- |
| **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. |

### Classification of the biocidal product initial PAR 2016

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

### Labelling of the biocidal product

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

* **Minor change application 2018**

|  |  |
| --- | --- |
| **Classification - Regulation (EC) 1272/2008** | |
| Hazard category | - |
| Hazard statements | - |
| Labelling |  |
| Signal words | - |
| Hazard statements | - |
| Precautionnary statements | - |
|  |  |
| Note | - |

* **Renewal application - 2019**

|  |  |
| --- | --- |
| **Classification - Regulation (EC) 1272/2008** | |
| Hazard category | - |
| Hazard statements | - |
| Labelling |  |
| Signal words | - |
| Hazard statements | - |
| Precautionnary statements | - |
|  |  |
| Note | - |

### Packaging of the biocidal product

For professional users:

* 10 g and 20 g sachets in paper packed in 5-10-15-18-20 kg PE bucket or 5-10-12-15-20-50 kg carton box with PE liner

For non-professional users:

* 10 g and 20 g sachets in paper packed in PE bucket or carton box with PE liner or 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; 1.5kg) or bait box in PET/PP/PE/PVC (135cm3, 235cm3)
* **Minor change application – 2018.**

Packaging have been modified as follows :

For professional users:

The product FANGA B+ is supplied in heat-sealed paper sachets of 5-10-20 g, wrapped in:

* PP or PE Buckets (5-10-15-18-20 kg)
* Carton box with plastic protection PE orPP (5-10-12-15-20-25-30-50 kg)

For non-professional users:

The product FANGA B+ is supplied in heat-sealed paper sachets of 5-10-20 g, wrapped in:

* PP or PE Bucket PP/PE (up to 150 g)
* Carton box with plastic protection PE or PP (up to 150 g)
* Metal box without lacquer (up to 150 g)
* PE or PP Flacon (up to 150 g)
* Tamper resistant prefilled PET/PP/PE/PVC/PS bait station up tyo 150g. However, considering the new maximum application rates claimed (100g for rats), the content of a prefilled bait station is limited to 100g.
* **Renewal application - 2019**

For professional users, FANGA B+ is supplied in sachet.

* heat-sealed paper sachets (5-10-20g) are packed in:

- PE/PP Bucket 5-10-15-18-20kg

- Cardboard box (with plastic protection PE or PP) 5-10-12-15-20-25-30-50kg

For non-professional users, FANGA B+ is supplied in sachet.

* heat-sealed paper sachets (5-10-20g) are packed in:

- PE/PP Bucket (up to 150 g)

- Metal box without lacquer (up to 150 g)

- Cardboard box (with plastic protection PE or PP) (up to 150 g)

- PE or PP Flacon (up to 150 g)

- Prefilled bait box of 30 or 40g for mice and 100g for rats (PET/PP/PE/PVC/PS)

* **Assessment of minor change - 2022**

The 2022 packagings are presented in table below. The added packagings are highlitghten in green:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Type of packaging1** | **Size/volume of the packaging2** | **Material of the packaging3** | **Type and material of closure(s)** | **Intended user4** | **Compatibility of the product with the proposed packaging materials (Yes/No)** |
| Sachet | From 5g to 20g | Paper sachet | Prefabricated  sachets or  serial  production,  both thermal  welded | Trained professionals  Professionals  Non-professionals | Yes |
| Buckets/Barrels | From 3kg to 30kg  (old packaging sizes: from 5kg to 20kg) | PE/PP | Bucket with lid | Trained professionals  Professionals | Yes |
| Buckets | Mice only: Maximum 50g  Mice and Rats :  Maximum 150g | PE/PP | Bucket with lid | Non-professionals | Yes |
| Flacons/Bottles/Cans | Mice only: Maximum 50g  Mice and Rats :  Maximum 150g | PE/PP | Prefabricated | Non-professionals | Yes |
| Bags – with plastic film inside | From 3kg to 50kg | Paper with Plastic in PE/PP inside | Prefabricated bags or serial production bags | Trained professionals  Professionals | Yes |
| Cardboards – with plastic film inside | From 3kg to 50kg | Carton with plastic in PE/PP inside | Prefabricated cardboard or serial production | Trained professionals  Professionals | Yes |
| Carton boxes – with plastic film inside | Mice only: Maximum 50g  Mice and Rats:  Maximum 150g | Carton with plastic in PE/PP inside | Prefabricated carton box or serial production | Non-professionals | Yes |
| Bags/Films | From 3kg to 50kg | PE/PP  PP/PP metalized/PE | Prefabricated bags or serial production bags/films | Trained professionals  Professionals | Yes |
| Sachets/Films | Mice only: Maximum 50g  Mice and Rats:  Maximum 150g | PE/PP  PP/PP metalized/PE | Prefabricated bags or serial production sachets/films | Non-professionals | Yes |
| Bait boxes | Rats:  230mm x 135 mm x 85 mm  Mice :  127mm x 95 mm x35 mm | PET/PP/  PE/PVC | Prefabricated boxes | Trained professionals  Professionals  Non-professionals | Yes |
| Metal boxes | From 3kg to 50kg | Metal without lacquer | Prefabricated boxes | Trained professionals  Professionals | Yes |
| Metal boxes | Mice only: Maximum 50g  Mice and Rats :  Maximum 150g | Metal without lacquer | Prefabricated boxes | Non-professionals | Yes |

The new packagings are acceptable.

## Physico/chemical properties and analytical methods

### Biocidal product initial PAR 2016

#### Identity, composition of the biocidal product, packaging.

The biocidal product is not the same as the one assessed for the inclusion of the active substance in annex 1 of directive 98/8/EC.

|  |  |  |
| --- | --- | --- |
| Trade name | FANGA B+ | |
| Ingredient of preparation | Function | Content |
| brodifacoum (CAS No.56073-10-0) | Active substance | 0.01 g/kg (0.001 %w/w) |
| Formulants | Details on the composition of the product are included in the Confidential part | |
| Physical state of preparation | solid | |
| Nature of the preparation | pasta | |

The composition of the product is confidential and is presented in a confidential annex. The product contains 0.001% w/w of pure active substance brodifacoum.

* **Assessment of minor change - 2022**

A change of composition was requested in this MIC dossier. The change of composition is acceptable.

Please refer to the confidential section for complete details

#### Physico-chemical properties

The tested product is FANGA B+. Some properties have already been described for FANGA PATE PRO. Read across of the two compositions allow to accept this justification.

Table 2.3.1‑1: Physico-chemical properties of the biocidal product- initial PAR 2016

| Properties | | Method | | Purity/ Specification | | Results | | | | | Reference | | | Acceptable Yes/no | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| B3 – Physical, chemical and technical properties | | | | | | | | | | | | | | | |
| B3.1 Appearance | | | | | | | | | | | | | | | |
| **B3.1.1 – Physical state and nature**  **B3.1.2 – Colour**  **B3.1.3 – Odour** | | Visual control | | FANGA B+ 0.00938 g/kg  Brodifacoum  11/308/02 | | Translucid greasy paper bags containing about 9-10 g piece of paste  Blue sky  Strong chemical odour | | | | | 22776-Interim report[[5]](#footnote-5) | | **Acceptable** | | |
| **B3.2 Acidity/alkalinity** | | | | | | | | | | | | | | | |
| **pH 1% dilution** | | CIPAC MT 75.3 | | FANGA PATE PRO (brodifacoum 0.0055%)  Batch: 308/11/01 | | The pH mean value of the test item at 1% m/v in standard water D is:  5.22 at 19.4 °C after 1 min.  5.43 at 19.5°C after 2 min.  5.83 at 19.7°C after 10 min.  The pH of the test item being higher than 4 and lower than 10, CIPAC MT 191 the test was not performed. | | | | | 11-920010-17[[6]](#footnote-6) | | | **Acceptable. Read across is acceptable.** | |
| **B3.3 Relative density and bulk, tap density** | | | | | | | | | | | | | | | |
| **Relative density** | | EU A3 method (2008)  OECD guideline 109 (1995) | | FANGA PATE PRO (brodifacoum 0.0055%)  Batch: 308/11/01 | | The relative density mean value of the test item using the gas comparison method with the stereopycnometer was:  D4-20°C = 1.322 ± 0.001 | | | | | 11-920010-016 | | | **Acceptable**  **Read across is acceptable.** | |
| **B3.4 Storage stability, stability and shelf-life** | | | | | | | | | | | | | | | |
| **B3.4.1 Storage stability tests** | | | | | | | | | | | | | | | |
| **B3.4.1.1 – Accelerated storage study (2 weeks at 54°C)** | CIPAC MT 46.3  HPLC Defitraces Report n°11-920010-019 AMD | | | FANGA B+ 0.00938 g/kg  Brodifacoum  11/308/02 | | | | **Aspect**  Before the accelerated storage for 14 days at 54°C:  Physical state at ambient temperature: intact translucent greasy paper bags containing about 9 g of piece of paste.  Colour of paste: blue sky.  Odour:strong chemical odour  After the procedure of storage for 14 days at 54°C:  Physical state at ambient temperature: intact translucent greasy paper bags containing about 9 g of piece of paste.  Colour of paste: blue sky.  Odour:strong chemical odour.  No modification of appearance.  **Appearance and stability of the commercial type package**  Before the accelerated storage for 14 days at 54°C:  polypropylene bucket of 1 kg closed with a white PE lid to clip. Ø :± 19.5 cm, h : ± 13.5 cm.  Well closed bucket without deterioration or special anomaly.  No observable sign of test item contamination on the outer surface, no leak during shaking or turning, no noticeable odour before opening of the package.  Weight =769.6 g  After the procedure of storage for 14 days at 54°C:  polypropylene bucket of 1 kg closed with a white PE lid to clip. Ø :± 19.5 cm, h : ± 13.5 cm.  Well closed bucket without deterioration or special anomaly.  No observable sign of test item contamination on the outer surface, no leak during shaking or turning, no noticeable odour before opening of the package.  Weight =765.9g  DW= -0.5%  No modification of appearance or significant pack weight change.  **Quantitative analysis of Brodifacoum:**  The content of Brodifacoum before accelerated storage procedure was: 0.000938% ± 0.000027% w/w.  The content of Brodifacoum after accelerated storage procedure was:  0.000878% ± 0.000036% w/w.  A slight change was observed (-6.4% deviation from T=0 value) after the accelerated storage procedure for 14 days at 54°C±2°C.  The applicant states: FANGA B+ is a paste essentialy made of cereal. Content of active substance brodifacoum in the product is very low (0.01g/kg, 10ppm). The product is considered heterogeneous and variations of active substance content (>5%) cannot be explained as a degradation. A study is in progress to demonstrate it. | | 22776-First Interim report | | | | **Acceptable. Packaging (polypropylene) is stable after accelerated storage**  **Acceptable**  **Variation of brodifacoum: -6.4%**  **Variations are above 5%. The applicant states that they may be due to the heterogeneity of the product and to the adsorption of the a.i on the matrix. A study is in progress to demonstrate it and is required in post authorization.**  **The method used for the determination of brodifacoum is validated.** | |
| **B3.4.1.1 – Accelerated storage study (8 weeks at 40°C))** | CIPAC MT 46.3  HPLC Defitraces Report n°11-920010-019 AMD | | | FANGA B+ 0.0099 g/kg  Brodifacoum  15-024 | | | | **Aspect**  Before and after accelerated storage:  blue paste, thermofused plastic bags in an aluminium can. No change of weight.  **Active substance content**  Before accelerated storage: 0.00099  After accelerated storage: 0.00096 (-3%) | | Report 15-920010-005 (2015) | | | | **Acceptable. The product is considered stable in metal can.** | |
| **B3.4.1.2 –** **Ambient shelf life study** | Technical Monograph n°17, 2nd edition, 2009  HPLC Defitraces Report n°11-920010-019 AMD | | | | FANGA B+ 0.00938 g/kg  Brodifacoum  11/308/02 | | **Aspect:**  Before storage:  Physical state at ambient temperature: intact translucent greasy paper bags containing about 9 g of piece of paste.  Colour of paste: blue sky.  Odour:strong chemical odour  After the procedure of storage for 16 months: No modification of appearance.  After the procedure of storage for 2 years: No modification of appearance.  **Appearance and stability of the commercial type package**  *Before* the accelerated storage:  polypropylene bucket of 1 kg closed with a white PE lid to clip.  Ø :± 19.5 cm, h : ± 13.5 cm.  Well closed bucket without deterioration or special anomaly.  No observable sign of test item contamination on the outer surface, no leak during shaking or turning, no noticeable odour before opening of the package.  Mass=1183.1 g  *After* the procedure of storage for 16 months:  No change in the appearance of the packaging  Mass (product + packaging): 1181.6 g.  Difference : **-0.1%**  *After* the procedure of storage for 2 years:  No change in the appearance of the packaging  Mass before storage for the second year: 1105.4 g  Mass at sampling (product + packaging): 1105.0 g. Difference : **0.0%**  **Quantitative analysis of Brodifacoum**  Initial active substance content: 9.38 ± 0.27 mg/kg  After the procedure of storage for 16 months:  Active substance content: 8.24 ± 0.31 mg/kg  Difference: **-12.1%**  After the procedure of storage for 2 years:  Active substance content: 7.65 ± 0.39 mg/kg  Difference : **-18.4%**  The applicant states: FANGA B+ is a paste essentialy made of cereal. Content of active substance brodifacoum in the product is very low (0.01g/kg, 10ppm). The product is considered heterogeneous and variations of active substance content (>5%) cannot be explained as a degradation. For other product (FANGA B+ rongeur (mainly made of wheat) and FANAG B+ SOURIS RAT (mainly made of oat), variations of active substance brodifacoum with time were not linear. Therefore for these products, it can be assumed that the variations are not related to a degradation of the active substance.  A study is in progress to demonstrate it with the product FANGA B+.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Product tested | determination T1 | | determination T2 | | determination T3 | | | FANGA B+  (pasta made of cereal mixture) | | 14 days | | 16 months | | 24 months | | -6,4 | | -12,1% | | -18,4% | | FANGA B+ rongeur  (cereal :wheat) | | 14 days | | 16 months | | 24 months | | -8,8% | | +0,1% | | -27,8% | | FANGA B+ SOURIS RAT  (cereal : oat) | | 14 jrs | | 16 mois | | 24 mois | | -25,4 % | | + 16,5 % | | -13% | | | 22776-Final report[[7]](#footnote-7) | | | **Acceptable. The product is stable 2 years at ambient temperature in polypropylene packaging. A variation of a.i > 10% has been noted. The applicant states it is due to the heterogeneity of the product and of the adsorption of the a.i on the matrix. A study to demonstrate the variations of the active substance content or an appropriate shelf life study is required in post authorization.**  **The method used for the determination of brodifacoum is validated.** | | | |
| **B3.4.1.3 – Low temperatures stability test (liquids)** | |  | |  | | | | Not applicable | | |  | | | **Not applicable** | |
| **B3.4.2 Effects on content of the active substance and technical characteristics of the biocidal product** | | | | | | | | | | | | | | | |
| **B3.4.2.1 – Light** | |  | |  | | No data provided. The active substance is sensitive to light (DT50: photolysis in water<1day). According to the label, the product must be stored away from light. | | | | |  | | | **The product must be stored away from light.** | |
| **B3.4.2.2 – Temperature and humidity** | | - | | - | |  | | |
| **B3.4.2.3 – Reactivity towards container material** | | - | | - | |  | | |
| **B3.5 Technical characteristics of the biocidal product** | | |
| **B3.5.1 – Wettability** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** |
| **B3.5.2 – Suspensibility, spontaneity and dispersion stability** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** |
| **B3.5.3 – Wet sieve analysis and dry sieve test** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** |
| **B3.5.4 – Emulsifiability, re-emulsifiability and emulsion stability** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** |
| **B3.5.5 – Disintegration time** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** |
| **B3.5.6 – Particle size distribution, content of dust/ fines attrition, friability** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** |
| **B3.5.7 – Persistent foaming** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** |
| **B3.5.8 – Flowability/ Pourability/ Dustability** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** |
| **B3.5.9 – Burning rate – smoke generators** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** |
| **B3.5.10 – Burning completeness – smoke generators** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** |
| **B3.5.11 – Composition of smoke – smoke generator** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** |
| **B3.5.12 –Spraying pattern - aerosols** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** |
| **B3.5.13 – Other technical characteristics** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** |
| **B3.6 Physical and chemical compatibility with other products including other biocidal products with which its use is to be authorised** | | |
| **B3.6.1 – Physical compatibility** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B3.6.1 –Chemical compatibility** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B3.7 Degree of dissolution and dilution stability** | | | | | | | | | | | | | | | |
| **Dilution stability** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B3.8 Surface tension** | | | | | | | | | | | | | | | |
| **Surface tension** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B3.9 Viscosity** | | | | | | | | | | | | | | | |
| **Viscosity** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B4 – Physical hazards and respective characteristics** | | | | | | | | | | | | | | | |
| **B4.1 – Explosives** | | Differential Scanning Calorimetric method (DSC).  Literature survey on explosive properties and oxidizing properties of the ingredients of the product FANGA PATE PRO. | | FANGA PATE PRO (brodifacoum 0.0055%)  Batch: 308/11/01 | | One assay with four phases was performed during the test.  During the first phase, one exothermic peak was observed at 243.1 °C with an enthalpy difference of 210.1 J/g which was lower than the limit of 500 J/gspecified in the guideline.  Neither endothermic nor exothermic peak was observed up to 500 °C under the experimental conditions used during the second phase. During the third phase, neither endothermic nor exothermic peak was observed up to 500 °C under the experimental conditions used.  This thermodynamic information allows knowing that a test on explosive properties with EC A14 method should not be performed.  Based on most recent approach of structural formulas, the components of the product are not classified as explosive.  In addition, the DSC graph shows an exothermic effect with decomposition energy lower than 500 J/g which confirms that FANGA PATE PRO is not likely to be explosive. | | | | | 11-920010-016[[8]](#footnote-8) | | | **Acceptable. According to the composition and the DSC results, the product does not contain explosive compounds. Read across is acceptable.** | |
| **B4.2 – Flammable gases** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B4.3 – Flammable aerosols** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B4.4 – Oxidising gases** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B4.5 – Gases under pressure** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B4.6 – Flammable liquids** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B4.7 – Flammable solids** | | EU A10 (2008) | | FANGA PATE PRO (brodifacoum 0.0055%)  Batch: 308/11/01 | | Preliminary test: the test was performed twice.  Conditions of the test:  Humidity: About 39%  Room temperature: About 19.5 °C  Atmospheric pressure: 97.9 kPa  Assay 1: A consumption of the paste was observed at the contact of the flame. Neither propagation nor ignition was observed.  Assay 2: The same observations as for the assay 1 were recorded.  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 of the test**.** | | | | | 11-920010-016 | | | **Acceptable. The product is not auto-flammable and not flammable.** | |
| **B4.8 – Self-reactive substances and mixtures** | | - | | - | | No data provided. | | | | | - | | | **The product does not contain self reactive substances.** | |
| **B4.9 – Pyrophoric liquids** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B4.10 – Pyrophoric solids** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B4.11 – Self heating substances and mixtures** | | EU A16 (2008) | | FANGA PATE PRO (brodifacoum 0.0055%)  Batch: 308/11/01 | | No self ignition temperature of the test item was observed up to 400°C (corrected value). | | | | | 11-920010-016 | | | **Acceptable. The product is not auto-flammable up to 400°C. Read across is acceptable.** | |
| **B4.12 – Substances and mixtures which in contact with water emit flammable** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B4.13 – Oxidising liquids** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B4.14 – Oxidising solids** | | Literature survey on explosive properties and oxidizing properties of the ingredients of the product FANGA PATE PRO | |  | | Based on most recent approach of structural formulas, the product does not contain oxidizing compound, or they are in low content (<1%).  Accordingly, the biocidal product is not expected to present a significant hazard, and testing is considered as unnecessary. | | | | | 11-920010-016 | | | **Acceptable. According to the composition and the type of formulation, the product is not expected to have oxidizing properties. Read across is acceptable.** | |
| **B4.15 – Organic peroxides** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B4.16 – Corrosive to metals** | | - | | - | | Not applicable | | | | | - | | | **Not applicable** | |
| **B4.17 Additionnal physical indications of hazard** | | | | | | | | | | | | | | | |

**Conclusion:**

FANGA B+ is a paste ready-to-use rodenticide. It is presented as 10 g piece of paste in individual sachet in paper.

Considering the small changes of composition and the non-physico-chemical classification of formulants, physico-chemical properties can be considered as similar between FANGA PATE PRO and FANGA B+.

FANGA B+ is not flammable, not autoflammable, has no explosive properties and no oxidizing properties. No change appeared in the appearance of the biocidal product or the packaging after storage procedures for 14 days at 54°C and 2 years at ambient temperature in polypropylene and metal box packaging. The product is therefore compatible with all claimed packaging.

The active substance content was considered as stable after accelerated storage procedure. A decrease in active substance content was observed after 2 years of storage (- 18.4%). The variation of active ingredient can be due to the heterogeneity of the product. A study to demonstrate that the variations of brodifacoum content in the product after storage 2 years are not due to a degradation of the active substance or a new storage stability study including intermediate results is required in post authorization.

The active substance is sensitive to light. Therefore, the product must be stored away from light.

FANGA B+ is not classified for physico-chemical properties.

**Shelf life: 2 years based on the results of the accelerated storage stability results**

* **Renewal application – 2019**

A new storage stability study including intermediate results was required in post-authorization. The study was received and assessed in the context of the renewal.

Table 2: Physico-chemical properties of the active substance (addendum renewal 2018)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Subsection (Annex Point IIB. 3/TNsG)** | **Method** | **Purity/ Specification** | **Results** | **GLP (Y/N)** | **Reference** | **Evaluation FR** |
| **3.7 Storage stability - stability and shelf life (IIB3.7/Pt. I-B3.7)** | 30 months at 20°C (Technical Monograph N°17) | BDPA10V1  Batch 15/016 | **Test item during the shelf life study:** thermofused plastic bags in a metal can with the product (blue paste) inside. | Y | Report 15-920010-006 (2018) | Acceptable.  Aspect of the test item and packaging are stable after long term storage in thermofused plastic bags in a metal can. For metal packaging, another storage stability (8 weeks at 40°C) study has been previously provided. FR considers the product as compatible with all claimed packaging.  The product is stable after storage in plastic bucket packaging.  However, pH before and after storage is required.  A doubt exists regarding the formulation of the sample item BDPA10V1 (Fanga B+? Fanga Pate Pro?). This information is not specified in the study report. Moreover, the reference to Bromadiolone as active substance instead of Brodifacoum occurs several times in the study report. |
| **Aspect:**  Before the storage the product looks like a blue paste.  After the procedure of storage, the test item looks like a hard blue paste.  The aspect of the test item was considered to be stable after 30 months of storage procedure at 20 °C even if the paste progressively became harder. |
| **Packaging of the test item**  Before storage: thermofused plastic bags in a metal can with the test item  After 30 months: thermofused plastic bags in a metal can with the test item  Weight change = -0.1%  The packaging material was considered to be stable after 30 months of storage procedure at 20 °C; no significant change ofweight was observed. |
| **Quantitative analysis of brodifacoum (analytical method validated in report 11-920010019 and 15-920010-004) :**    No significant change was observed after the long term storage procedure.  The test item is considered to be stable. |

* **Renewal application - 2019 - Conclusion**

The product FANGA B+ is considered stable after storage 2 years at ambient temperature in all claimed packaging.

* **Assessment of minor change (2022)**

No new physico-chemical properties are provided in the dossier.

Due to the nature of the component substituted, this could affect stability of biocide product. No stability studies performed with the new product are provided in the dossier.

eCA considers this substitution should not impact the stability of biocide product. However, for confirmation, storage studies studies should be provided for renewal of the product.

The substitution of theses co-formulant should not affect physical hazard of this biocide product.

#### Analytical method for determining the active substance and relevant component in the biocidal product

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 0.51to 1.50mg/L. The same linearity was used for the determination of active substance in the product FANGA PATE 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 PATE PRO.

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

Test item: FANGA PATE PRO, Batch 308/11/01.

Blank formulation: (FANGA PATE PRO): Batch 311/11.

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

Results are summarized in the following table.

Table 2.3.1‑3: Analytical method for the determination of brodifacoum (reverse phase HPLC-UV)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample** | **Test substance** | **Analytical method** | **Fortification range/ number of measurements** | **Linearity** | **Specificity** | **Recovery rate (%)** | **Repeatability** | | | **Reference** |
| **range** | **Mean** | **St dev.** |  |  |
| FANGA PATE PRO  Batch 308/11/01  Blank formulation  Batch 311/11 | 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 | 100-102%  two reconstituted sample in duplicate at 0.005% of active substances (1mg/L) | 101% | SD: 0.8  RSD: 0.8% | 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. 11-920010-019, May 2012 |

Chromatograms were provided for the formulation blank, reference item and test item (at 0.005%). 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 PATE PRO.

**Extrapolation with FANGA B+**

Specificity of the method with the formulation FANGA B+ has been demonstrated in the report CRA-W Study n° 22776. Chromatograms of the blank formulation, calibration standard and test item have been provided. No interference at the retention time of brodifacoum was observed. Nevertheless, a complementary analytical method for the determination of brodifacoum in FANGA B+ by definition of the accuracy of the method was required since the content of brodifacoum is lower (0.001%w/w) than in FANGA PATE PRO.

Additional validation data on accuracy were provided in report No. R15-920010-004. A blank formulation of FANGA B+ was fortified with brodifacoum at a content of 0.001% (10ppm). Two samples were prepared and injected twice. Mean recovery was 98%. Results are in acceptable range (80-120%). The method is considered suitable for the determination of brodifacoum in the product FANGA B+.

* **Assessment of minor change (2022)**

Analytical section is not affected by this minor change dossier.

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

A letter of access has been provided by Activa to TRIPLAN for analytical methods in the different matrices.

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 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 application – 2019**

For the renewal, no additional information has been provided. A letter of access (02/2018) has been provided by Activa to Triplan.

## Risk assessment for Physico-chemical properties

FANGA B+ is a ready-to-use paste bait. The product is not flammable, not auto-flammable (up to 400°C), not explosive and does not have oxidizing properties.

The product is stable 14 days at 54°C and 2 years at ambient temperature in polypropylene packaging and 8 weeks at 40°C in metal can. Therefore, the product is considered compatible with all claimed packaging.

Variations of active substance in the product are higher than 10 % and can be due to the heterogeneity of the product. A study to demonstrate that the variations of brodifacoum content in the product after storage 2 years are not due to a degradation of the active substance is required in post authorization. Alternatively, an appropriate long term storage stability study could be provided.

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

* Store away from light.

***Required information linked to assessment of physico-chemical properties***

A study to demonstrate that the variations of brodifacoum content in the product after storage 2 years are not due to a degradation of the active substance or a new storage stability study including intermediate results is required in post authorization.

* **Assessment of minor change (2018)**

No information has been submitted as the post-authorisation was required at the renewal of the product.

* **Renewal application – 2019 - General conclusion on the physical, chemical and technical properties of the product for renewal of national authorisation applications.**

The product FANGA B+ is a ready to use paste formulation. All studies have been performed in accordance with the current requirements and the results are deemed to be acceptable. It is not explosive and has no oxidising properties. The product is not flammable.

The appearance of the product is blue sky paste and with a strong chemical odor.

Storage stability study results are acceptable. The biocidal product is stable 2 weeks at 54°C and 2 years at ambient temperature with white opaque PP bucket packaging containing paper bags with the product.

Considering that the product is a solid and it is compatible with this type of packaging, 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 paste ready to use 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, the product FANGA B+ is intended to be used to control rats and mice. The target organisms to be controlled are *Mus musculus*, *Rattus norvegicus* and *Rattus rattus*.

FANGA B+ is used in and around buildings, and in open areas by professional and non-professional users, in waste dumps by professional users only.

The products, organisms or objects to be protected are public and private buildings, farms, opens areas and waste dump sites.

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

* Rats: 180-200 g /secured bait point separated by 5-10 m.
* Mice: 30-40 g /secured bait point separated by 1-2 m.
* **Assessment of minor change (2018)**

The product FANGA B+, containing 0.0010 % w/w brodifacoum, was initially authorized for use against *Mus musculus, Rattus norvegicus* and *Rattus rattus*, in and around buildings and outdoor environments (open areas and waste dumps) by professional users and in and around buildings by non-professional users with a shelf-life of 24 months.

The initial validated application rates were the following:

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

Mice (*Mus musculus*): 30-40 g bait/secured bait point separated by 1-2 m.

The applicant requires the minor change related to the reduction of the application rate against rats (*Rattus rattus* and *Rattus norvegicus*).The claimed application rate is 100 g / bait station.

* **Renewal application – 2019**

For the renewal of the product FANGA B+ (0.001 % 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 first authorisation requirements and the minor application change.

The products, organisms or objects to be protected are public and private buildings, and farms, open areas.

* **Assessment of minor change (2022)**

The product FANGA B+ was authorized for use against *Mus musculus, Rattus norvegicus* and *Rattus rattus*, in and around buildings and open areas and in waste dumps with a shelf-life of 24 months.

The validated application rates were the following:

- Rats (*Rattus norvegicus, Rattus rattus*): 100 g of bait/secured bait point separated by 5-10 m.

- Mice (*Mus musculus*): 30-40 g of bait/secured bait point separated by 1-2 m.

In the frame of the minor change application, changes in the composition of the product FANGA B+ (0.001 % w/w brodifacoum) are claimed by the applicant: substitution of two co-formulants by two others having an identical function (please refer to the confidential section of th PAR for more detailed explanations).

To support the efficacy of the new claimed composition of the product new efficacy studies (new formulation) were submitted by the applicant.

### Effects on target organisms and efficacy

The applicant submitted the following studies, all performed with the product FANGA B+ (0.001 % w/w brodifacoum):

**Efficacy and palatability laboratory studies**

* Study n° ROD 201201:

This trial has been conducted with a fresh formulation of **FANGA B+** (0.001 % w/w brodifacoum).

For house mice (*Mus musculus*), the mean palatability percentage is very low with 14 % and the mortality percentage is 100 % within 6 to 15 days.

For brown rats (*Rattus norvegicus*), the mean palatability percentage is very low with 14 % and the mortality percentage is 100 % within 5 to 10 days.

For black rats (*Rattus rattus*), the mean palatability percentage is 27 % and the mortality percentage is 100 % within 6 to 21 days.

It has to be noted that the duration of exposure was 20 days instead of 4, and palatability was under the criteria of 20 % according tot he TNsG on product evaluation for rodenticides. Therefore, others tests have been performed to prove the efficacy of the product FANGA B+

* Study n°: 12-TOX024-4:

This trial has been conducted with a one year aged formulation of **FANGA B+** (0.001 % w/w brodifacoum).

For house mice (*Mus musculus*), the mean palatability percentage is 61 % and the mortality percentage of 100 % within 3 to 9 days.

* Study n° 12 TOX024-3:

This trial has been conducted with a one year aged formulation of **FANGA B+** (0.001 % w/w brodifacoum).

For brown rats (*Rattus norvegicus*), the mean palatability percentage is 43 % and the mortality percentage is 90 % within 4 to 6 days.

* Study n° 13 TOX025:

This trial has been conducted with a one year aged formulation of **FANGA B+** (0.001 % w/w brodifacoum).

For black rats (*Rattus rattus*), the mean palatability percentage is 59 % and the mortality percentage is 100 % within 3 to 10 days.

**Field studies:**

* Study n°13TOX019:

This trial has been conducted in a farm in France with a fresh formulation of **FANGA B+** (0.001 % w/w brodifacoum).

For house mice (*Mus musculus*), the assessed bait has been very well accepted and the efficacy is estimated at 100 %.

* Study n°13TOX020:

This trial has been conducted in a farm in France with a fresh formulation of **FANGA B+** (0.001 % w/w brodifacoum).

For brown rats (*Rattus norvegicus*), the assessed bait has been very well accepted and the efficacy is estimated at 100 %.

* Studies n°2008.BCD.SAG13 and 2001.BCD.SAG15

These trials have been conducted in a farm in Italy with respectively a two and a three year aged formulation of **FANGA B+** (0.001 % w/w brodifacoum).

For black rats (*Rattus rattus*), the assessed bait has been very well accepted and the efficacy is estimated at 100 %.

* **Assessment of minor change (2018)**

The applicant has submitted new field studies in order to support the new application rate against rats (*Rattus norvegicus* and *Rattus rattus*) of the product FANGA B+.

* Study n°2073.BCD.SAG17 :

For brown rats (*Rattus norvegicus*), the assessment of the bait (4 years-aged FANGA B+) has been very well accepted and the estimated efficacy is 100%.

* Study n°2073.BCD.SAG17 :

For black rats (*Rattus rattus*), the assessment of the bait (4 years-aged FANGA B+) has been very well accepted and the estimated efficacy is 100%.

Regarding the claimed uses, submitted efficacy data are compliant with the requirements of the TNsG PT14 (2009) and the results of these tests are respecting the criteria of the TNsG PT14 (2009).

|  |
| --- |
| **Conclusion on the efficacy of the product** |
| French competent authorities (FR CA) consider that the elements presented in the dossier are sufficient to demonstrate the efficacy of the product FANGA B+ against rats (*Rattus norvegicus* and *Rattus rattus*) at the claimed application rate of 100g / bait station . |

All efficacy studies are presented in annex 9/9a.

* **Renewal application (2019)**

The product FANGA B+ (0.001 % 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.

* **Assessment of minor change (2022)**

The applicant has submitted new laboratory and field studies in order to support the new formulation of the product FANGA B+ against rats (*Rattus norvegicus* and *Rattus rattus*) and mice (*Mus musculus*).

All new efficacy studies are presented in annex 9b.

### Mode of action including time delay

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.

Taking into account the results of the submitted laboratory studies, death of target animals occurs 3 to 21 days after ingestion.

### Occurrence of resistance – resistance management / Unacceptable Effect

**Initial assessment 2016**

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[[9]](#footnote-9); Lund, 1984[[10]](#footnote-10); Pelz *et al*. 1995[[11]](#footnote-11)). 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[[12]](#footnote-12)). 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[[13]](#footnote-13)).

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

* **Minor change application 2018**

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[[14]](#footnote-14); Lund, 1984[[15]](#footnote-15); Pelz et al. 1995[[16]](#footnote-16)). 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[[17]](#footnote-17)). 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[[18]](#footnote-18)).

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.

* **Renewal application – 2019:** a statement has been provided by the applicant indicating that the surveys implemented don’t outline any issues for resistance in the field. Nevertheless it has to be noticed that rodenticides baits are commonly challenged by the presence of food.

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

### Evaluation of the Label Claims

* First authorisation

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

The application rates validated are the following:

* Rats (*Rattus norvegicus* and *Rattus rattus*): 180-200 g /secured bait point separated by 5-10 m.
* House mice (*Mus musculus*): 30-40 g/secured bait point separated by 1-2 m.
* Bait points should be controlled and resupply as long as the bait is consumed:
* 3 days after the first application then weekly for use in and around building and open areas;
* 1 week after the first application then monthly for use in waste dump.

The product FANGA B+ 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.

* **Assessment of minor change (2018)**

French competent authorities (FR CA) assessed that the product FANGA B+ has shown a sufficient efficacy for the control of rats (*R. norvegicus* and *R. rattus*)

The application rates validated are the following:

Rats: (*Rattus norvegicus* and *Rattus rattus*); 100 g paste/secured bait point separated by 5-10 m

* **Renewal application – 2019**

The application rates validated are the following:

* Rats (*Rattus norvegicus* and *Rattus rattus*): 100 g grains/secured bait point separated by 5-10 m
* Mice (*Mus musculus*): 30-40 g grains/secured bait point separated by 1-2 m.

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

* **Assessment of minor change (2022)**

French competent authorities (FR CA) assessed that the new formulation of the product FANGA B+ has shown a sufficient efficacy for the control of rats (*R. norvegicus* and *R. rattus*) and mice (*Mus musculus*) with a shelf life of 24 months.

The application rates validated are the following:

* Rats (*Rattus norvegicus* and *Rattus rattus*): 100 g /secured bait point separated by 5-10 m.
* House mice (*Mus musculus*): 30-40 g/secured bait point separated by 1-2 m.

### Summary of efficacy assessment

* First authorisation

French competent authorities (FR CA) assessed that the product product FANGA B+ SOURIS RAT has shown a sufficient efficacy for the control of *Rattus norvegicus, Rattus rattus and Mus musculus*, in and around building, , in open areas and in waste dump.

***Conditions of use linked to efficacy assessment (professional users)***

* Adapt the number of bait stations to the infestation level.
* Products have always to be used in accordance with the label.
* Inspect and resupply the bait stations as long as the bait is consumed:
* 3 days after the first application then weekly in and around building and in open areas.
* 1 week after the first application then monthly for use in waste dump.
* Remove all bait stations after the end of treatment.
* The amount of bait per bait point and distances between bait points must be respected.
* 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:
* The treatment has to be alternated 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;
* The level of efficacy have to be monitored (periodic check), and the case of reduced efficacy has to be investigated for possible evidence of resistance.
* Do not use the product in areas where resistance is suspected or established.

***Conditions of use linked to efficacy assessment (non-professional users)***

* 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.
* Inspect and resupply the bait stations as long as the bait is consumed, 3 days after the first application then weekly, in and around building and in open areas.
* Remove all bait stations after the end of treatment.
* The users should inform if the treatment is ineffective and report straightforward to the registration holder any alarming signals which could be assumed to be resistance development.

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

* Adapt the amount of bait per bait point to the validated effective dose.
* 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.
* **Assessment of minor change (2018)**

French competent authorities (FR CA) assessed that the product FANGA B+ has shown a sufficient efficacy for the control of of mice (*M.musculus*) and rats (*R. norvegicus* and *R. rattus*)

The application rates validated are the following:

Rats: (*Rattus norvegicus* and *Rattus rattus*): 100 g grains/secured bait point separated by 5-10 m

Mice: (*Mus musculus*): 30-40 g grains/secured bait point separated by 1-2 m.

* **Renewal application – 2019**

The application rates validated are the following:

* Rats (*Rattus norvegicus* and *Rattus rattus*): 100 g grains/secured bait point separated by 5-10 m
* Mice (*Mus musculus*): 30-40 g grains/secured bait point separated by 1-2 m.

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

## Description of the intended use(s)

The product FANGA B+ is intended to be used for the control of rats (*Rattus rattus* and *Rattus norvegicus*) and mice (*Mus musculus*) in and around buildings, and in open areas by professional and non-professionnal users; in waste dumps by professional users only.

The application rates validated are the following:

* Rats (*Rattus norvegicus* and *Rattus rattus*): 180-200 g /secured bait point separated by 5-10 m.
* House mice (*Mus musculus*): 30-40 g/secured bait point separated by 1-2 m.

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

* **Assessment of minor change (2018)**

The application rates validated are the following:

* Rats (*Rattus norvegicus* and *Rattus rattus*): 100 g /secured bait point separated by 5-10 m.
* House mice (*Mus musculus*): 30-40 g/secured bait point separated by 1-2 m.
* **Renewal application – 2019**

FANGA B+ is intended to be used for the control of :

* Rats (*Rattus rattus and Rattus norvegicus*) in and around buildings by professional and non-professional users, and in outdoor environments (open areas and waste dumps) by professional users only.
* Mice (*Mus musculus*) in buildings by professional and non-professional users, and around buildings and in outdoor environments (open areas and waste dumps) by professional users only.

The application rates intended to be used are the following

- Rats (*Rattus norvegicus* and *Rattus rattus*): 100 g bait/secured bait point separated by 5-10 m.

* Mice (*Mus musculus*): 30 to 40 g g bait/secured bait point separated by 1-2 m.

## Risk assessment for human health

### Hazard potential - initial PAR 2016

#### Toxicology of the active substance

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

The results of this toxicological assessment can be found in the **combined** AR.

Brodifacoum (CAS no. 56073-10-0) was notified as an existing active substance, by Syngenta Limited and Activa / Pelgar brodifacoum and difenacoum Task Force, hereafter referred to as the 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.

***A (data from Syngenta) and B (data from Activa/PelGar)***

* **Toxicokinetics**

**A:**

*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 absorption was >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 *Brodifacoumvs* 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.

**B:**

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 (below reported under Section 2.2.1.8). 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 characterization for wax block bait, in the Combined Assessment Report for d*ifenacoum* (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 characterization depending on the type of formulation: 5% (pellets and grains) or 0.047 % (wax block bait).

* **Acute effects**

**A:**

*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.

**B:**

*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**

**A:**

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.

**B:**

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 b*rodifacoum* 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**

**A:**

*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 applicants 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.

**B:**

*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**

**A, B:**

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

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

**A:**

*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*.

**B:**

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**

**A:**

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

*Brodifacoum*

**B:**

The toxicological studies do not indicate any neurotoxic effects.

**Conclusion on repeated dose effects:** Repeated oral exposure to b*rodifacoum* 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 b*ifenacoum*, 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 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 the 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 Tox1 H310  Acute Tox 2 H300  STOT RE Cat 1 H372  No specific limit concentrations |

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

**A:** 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 AELacuteresultsto 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 resultsto be of 3.3 x 10-6  mg/kg/day.

**B:** 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 AELacuteresultsto 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 resultsto 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 and medium termof 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

The biocidal product FANGA B+ contains no substances of concern.

* **Renewal application – 2019**

Considering the definition of a substance of concern set in the Guidance on the BPR Volume III Human Health – Part B Risk Assessment, FANGA B+ does not contain any substance of concern. Nevertheless, one co-formulant is still being assessed.

#### 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 realized with the product FANGA BLOC SP PRO, a block formulation containing 0.005% of brodifacoum. The compositions of FANGA BLOC SP PRO and FANGA B+ are considered similar.

##### Percutaneous absorption

A default value of 0.047% was considered for product containing 0.005% of brodifacoum, as mentioned in the brodifacoum assessment report. This value has been considered relevant for the product FANGA B+ containing 0.001%. Indeed, no major increase in the dermal absoprtion value is expected with such very low concentrations of active substance in products and considering that the concentrations are in the same order of magnitude.

* **Renewal application – 2019**

For the renewal, no new data on dermal absorption have been submitted.

A dermal absorption value of 0.047 %, based on the *in vitro* study presented in the CAR of the a.s and carried out with a reference product containing 0.005% a.s (50 ppm) has been retained.

##### 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 B+.

##### Irritation and corrosivity

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Route | Method | Species | Dose level |  |
| skin | OECD 404 | Rabbit NZ  3 females | 0.5 g | No irritant |
| eye | OCDE 405 | Rabbit NZ  3 females | 0.1 g | No irritant |

##### Sensitization

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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 | No skin sensitizing |

##### Other studies

No other studies are performed on FANGA B+.

### Human exposure assessment

*FANGA B+ (PT14) is a ready-to-use rodenticide containing 0.001 % of brodifacoum (pure: 950 g/kg). Baits are packaged in bulk and in sachet for professional users, only in sachet for non professional users.The baits are placed in bait stations (bait boxes or secured bait stations) out of reach of children and domestic animals.*

* **Minor change and Renewal application – 2019**

Primary exposure level of the users during application depends on the number of sachets to be dealt with (HEEG opinion 10).

As the maximum number of sachets remains unchanged in the frame of the minor change application and the renewal application (old: 200 g/10g, new: 100 g station/5 g sachet), the exposure remains unchanged for professionnals and non-professionnals.

The risk assessment for non-professionnals has been reviewed considering the new value of AELshort term selected for brodifacoum.

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

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

Table 2.7.2‑1: Main paths of human exposure:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Exposure path** | **Industrial use** | **Professional use** | **General public** | ***via* the environment** |
| Inhalation | Not relevant | Negligible | Negligible | Negligible |
| Dermal | Not relevant | Potentially significant | Potentially significant | Negligible |
| Oral | Not relevant | Negligible | Potentially significant | 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 B+ is used for the control of rats and mice for use indoor and outdoor, with the purpose of protecting human food and animal feedstuffs, and for human hygiene.

The product is only supplied in sachets. Considering the nature of sachet (paper), a dermal exposure during loading and cleaning is taken into account. Exposure assessment has been realized with the dose of 200 g of product for the control of rats. This assessment covers the assessment for mice as the intended doses are lower.

Based on the CEFIC study and taking into account the *HEEG opinion on an harmonised approach for the assessment of rodenticides (anticoagulants)* agreed at TMII2011, the amount of product on fingers/hands **during the loading** of 5 wax blocks of 20g per one manipulation was 27.79 mg. The following parameters were taken into account:

* active substance in product: 0.001 %,(w/w);
* Number of blocks per bait site[[19]](#footnote-19): 20 for control of rats
* dermal absorption: 0.047 %,
* body weight: 60kg.

Thus, the systemic dose of brodifacoum per placing of one bait site is 8.7x10-9mg/kg bw/event for control of rats and mice (because the amount of disposed bait is not taken into account).

The harmonized number of manipulations for rodenticides anticoagulant set in the HEEG opinion agreed at TM III 2010 was used to assess the overall exposure systemic dose. Considering 60 loading are done per day, the systemic dose via skin is 5.2 x10-7 mg a.s/kg bw/day for the control of rats.

Based on the CEFIC study and taking into account the *HEEG opinion on an harmonised approach for the assessment of rodenticides (anticoagulants)* agreed at TMII2011, the amount of product on fingers/hands **during the cleaning** of one bait site is 5.70mg. The following parameters were taken into account:

* active substance in product: 0.001 %,(w/w);
* dermal absorption: 0.047 %,
* body weight: 60kg.

Thus, the systemic dose of brodifacoum per cleaning of one bait site is 4.47 x10-10mg/kg bw/event for control of rats and mice (because the amount of disposed bait is not taken into account).

The harmonized number of manipulations for rodenticides anticoagulant set in the HEEG opinion agreed at TM III 2010 was used to assess the overall exposure systemic dose. Considering 15 cleaning are done per day, the systemic dose via skin is 6.7 x10-9 mg a.s/kg bw/day for the control of 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 5.3 x10-7 mg/kg bw/day without PPE for the control of rats and mice.

* **Minor change 2018 and renewal application 2019**

As the maximum number of sachets remains unchanged in the frame of the minor change application and the renewal application (old: 200 g/10g, new: 100 g station/5 g sachet), the exposure of professionnals remains unchanged.

##### Exposure of non-professional users

The product is also supplied in sachets for non-professional users. Considering the nature of sachet (paper), a dermal exposure during loading and cleaning is taken into account. Exposure assessment has been realized with the dose of 200 g of product for the control of rats. This assessment covers the assessment for mice as the intended doses are lower.

Based on the CEFIC study and taking into account the *HEEG opinion on an harmonised approach for the assessment of rodenticides (anticoagulants)* agreed at TMII2011, the amount of product on fingers/hands **during the loading** of 5 wax blocks of 20g per one manipulation was 27.79 mg. The following parameters were taken into account:

* active substance in product: 0.001 %,(w/w);
* Number of blocks per bait site[[20]](#footnote-20): 20 for control of rats
* dermal absorption: 0.047 %,
* body weight: 60kg.

Thus, the systemic dose of brodifacoum per placing of one bait site is 8.7 x10-9mg/kg bw/event for control of rats and mice (because the amount of disposed bait is not taken into account).

The harmonized number of manipulations for rodenticides anticoagulant set in the HEEG opinion agreed at TM III 2010 was used to assess the overall exposure systemic dose. Considering 5 loading are done per day, the systemic dose via skin is 4.35 x10-8 mg a.s/kg bw/day for the control of rats.

Based on the CEFIC study and taking into account the *HEEG opinion on an harmonised approach for the assessment of rodenticides (anticoagulants)* agreed at TMII2011, the amount of product on fingers/hands **during the cleaning** of one bait site is 5.70mg. The following parameters were taken into account:

* active substance in product: 0.001 %,(w/w);
* dermal absorption: 0.047 %,
* body weight: 60kg.

Thus, the systemic dose of brodifacoum per cleaning of one bait site is 4.47 x10-10mg/kg bw/event for control of rats and mice (because the amount of disposed bait is not taken into account).

The harmonized number of manipulations for rodenticides anticoagulant set in the HEEG opinion agreed at TM III 2010 was used to assess the overall exposure systemic dose. Considering 5 cleaning are done per day, the systemic dose via skin is 2.23 x10-9 mg a.s/kg bw/day for the control of 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 4.6 x10-8 mg/kg bw/day without PPE for the control of rats and mice.

* **Minor change 2018 and renewal application 2019**

As the maximum number of sachets remains unchanged in the frame of the minor change application and the renewal application (old: 200 g/10g, new: 100 g station/5 g sachet), the exposure of non-professionnals remains unchanged.

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

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)).

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 6.7 x 10-6 mg a.s/kg bw/day, a body weight of 10kg and an oral absorption of 75% (as stated in the Assessment report of brodifacoum), ingestion of more than 4.4 mg of product per day by an infant is needed to exceed the AEL.

* **Renewal application - 2019**

Regarding the exposure of non users occuring during ingestion of poison baits, as stated in the Assessment Report of brodifacoum, a worst case oral absorption of 100% has been retained instead of 75%. Consequently, ingestion of more than 3.3 mg of product/day by an infant is needed to exceed the AEL.

See Excel spreadsheets for more details.

#### Exposure to residues in food

In Annex 8 “Residue behaviour”, the results of the residue assessment are laid out.

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

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 long-term exposure and 6.7 x10-6 mg/kg bw/day for short term exposure).

* **Renewal application - 2019**

Two AELshort term have been set for brodifacoum at the time of the first authorisation of the substance: 3.3 x 10-6 mg/kg/d (derived from a Syngenta study) and 6.7 x 10-6 mg/kg/d (derived from an Activa / Pelgar study). Applying the worst-case approach, the value of 3.3 x 10-6 mg/kg/d has been chosen.

#### 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 B+, even if gloves are not worn (%AEL at 16%) for the control of rats and, by extension, of 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 2.7.3-1: Summary of risk characterisation for professionals for the control of rats

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Scénario** | **AEL**  **(mg/kg bw/d)** | **Exposure**  **(mg/kg bw/d)** | **%AEL** | **Risk** |
| **Sachet formulation (paper) (exposure during loading and cleaning phases)** | | | | |
| Professionnal  (without gloves) | 3.3 x10-6 | 5.3 x 10-7 | 16% | Acceptable |

##### Non-professional users

Based on the risk assessment of the active substance, the risk for non-professional users resulting from the intended use is acceptable for FANGA B (%AEL at 1%) for the control of rats and, by extension, of mice.

Table 2.7.3-1: Summary of risk characterisation for non-professionals for the control of rats

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Scénario** | **AEL**  **(mg/kg bw/d)** | **Exposure**  **(mg/kg bw/d)** | **%AEL** | **Risk** |
| **Sachet formulation (paper) (exposure during loading and cleaning phases)** | | | | |
| Non Professionnal | 6.7x10-6 | 4.6 x 10-8 | 0.7% | Acceptable |

* **Renewal application – 2019**

Based on the risk assessment of the active substance, the risk for non-professional users resulting from the intended use is acceptable for FANGA B (%AEL at 1.4%) for the control of rats and, by extension, of mice.

Table 2.7.3-1: Summary of risk characterisation for non-professionals for the control of rats

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Scénario** | **AEL**  **(mg/kg bw/d)** | **Exposure**  **(mg/kg bw/d)** | **%AEL** | **Risk** |
| **Sachet formulation (paper) (exposure during loading and cleaning phases)** | | | | |
| Non Professionnal | 3.3x10-6 | 4.6 x 10-8 | 1.4% | Acceptable |

#### Risk for indirect exposure

Based on a reverse scenario, more than 8.9 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 FANGA B+ 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.

* **Renewal application – 2019**

Considering an oral absorption of brodifacoum of 100%, more than 3.3 mg of product per day should be ingested by an infant to exceed the AEL. Therefore, 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 specific use restriction must be applied to reduce the risk for secondary poisoning.

#### 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. However, the product does not come in direct or indirect contact with food and feedstuff.

#### Risk for combined exposure

Not relevant.

#### Conclusion on health risk assessment

***Summary of risks characterisation of the product for human health***

Based on the risk assessmentof the product, the risk for professional and non-professional users resulting from the intended use is acceptable for FANGA B+ for the control of rats and mice.

Risk of secondary poisoning to infants and children is considered as relevant. Therefore, even if FANGA B+ contains a bittering agent which reduces the likelihood of ingestion, the baits should be unattainable for children.

***Summary of risks characterisation of the product for consumer***

The intended uses description of the product FANGA B+ indicates that these uses are not relevant in terms of residues in food and feed. However, the product does not come in direct or indirect contact with food and feedstuff.

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

**Professional**

* 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.

**Non- professional**

* 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.
* Tamper-resistant bait boxes should be clearly marked to show that they contain rodenticides and that they should not contain other products than rodenticides.
* For non-professional users, use only in tamper-resistant boxes.
* 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 inhaled: 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 B+ 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 application - 2019**

See Summary of Product Characteristics (SPC) in section 1.

* **Assessment of minor change (2022)**

The minor change application has no impact on the classification of the product, the identification of any substance of concern and the risk assessment for human health.

## Risk assessment for the environment- initial 2016

### 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 Assessment Report (AR) of brodifacoum owned by Syngenta Limited and Activa / Pelgar brodifacoum and difenacoum Task Force[[21]](#footnote-21).

#### 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

No data on photolysis of the active substance in soil has been submitted in the combined AR of 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 GBPR IV Part B[[22]](#footnote-22), 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 degradation of the active substance in water/sediment system has been submitted in the combined AR of brodifacoum.

###### Degradation in STP

No study on degradation of the active substance in sewage treatment plant system has been submitted in the combined AR of brodifacoum.

###### Terrestrial compartment

Brodifacoum is persistent in soil with a DT50 value of 157 days at 20°C, corresponding to a DT50 value of 298 days à 12°C.

#### Distribution

Based on literature data, the Koc value (50 000 L/kg) 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 shows 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, brodifacoum can be considered immobile in soil. Under basic conditions (high pH), brodifacoum is not likely to be adsorbed onto soils or sewage sludge due to the ionisation of the molecule; whereas under acidic conditions (low pH), brodifacoum is 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; GBPR IV Part B).

The terrestrial BCF has been estimated with calculation method:

**BCFearthworm = 15 820 L/kg**(according to Equation 82d; GBPR IV Part B).

These BCF values confirm the high bioaccumulation potential 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 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[[23]](#footnote-23).

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

##### Aquatic organisms

Based on the results of acute toxicity studies submitted in the combined AR by Activa / PelGarbrodifacoum and difenacoum Task Force, brodifacoum is toxic to aquatic organisms at low concentrations. No long-term tests have been performed. Studies are available for the three trophic levels (fish, daphnia and algae). *Selenastrum capricornutum* is the most sensitive species with a 72h ErC50 of 0.04 mg a.s./L.

Table 2.8.2‑1 Toxicity to freshwater aquatic organisms (measured concentrations)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **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 |

Justification of PNECwater

According to the GBPR, 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 GBPR 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 GBPR 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 effect 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 2.8.2‑2 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 GBPR when an EC10 from a respiration inhibition test is used, an assessment factor of 10 must be applied.

**PNEC STP microorganisms > 0.0058 mg a.s/L**

Additional endpoints:

According to the combined AR of brodifacoum, a lower PNEC value for sewage treatment microorganisms is provided by Syngeta Limited: **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 must be 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 effect of brodifacoum, in soil concentration ranging up to 994 mg/kg dry weight, were found on earthworms in a test conducted according to the guideline OECD 207. LC50 was determined to be > 994 mg/kg dry weight, corresponding to a LC50 >879.6 mg/kg in wet weight.

Table 2.8.2‑3 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 wet weight, when corrected for soil humidity, an assessment factor of 1000 was used in accordance with GBPR (2003).

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

#### 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 2.8.2‑4 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 & 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: a LD50 value =< 5 mg a.s. /kg bwis provided.

Additional endpoints:

According to the combined AR of brodifacoum, a lower **LD50** value of **0.4** **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 GBPR II is the lowest value for the acute toxicity.**)** is provided by another notifier. 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 **0.31** **mg a.s. /kg bw** is provided by another notifier. 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).

Studies on dietary toxicity were submitted by another notifier in the combined AR and provided a **LC50 = 0.72 mg/kg food**. 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 GBPR, 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 (on 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 toxicity based 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 show high toxicity 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 GBPR, 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 notifier. 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. A NOEC = 0.0038 mg brodifacoum /kg diet and a NOEL = 3.85E-04 mg brodifacoum/kg bw/d are derived.

According to GBPR, an assessment factor of 30 is 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.

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#### Summary of PNECs of the active substance brodifacoum

Table 2.8.2‑5 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 |

According to the combined AR, the lowest PNEC values (from Syngenta limited or Activa / PelGar brodifacoum and difenacoum Task Force) are used in the risk assessment.

#### PBT and ED Assessment

Persistence

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

Bioaccumulation

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

Toxicity

Brodifacoum is proposed to be classified as Repr. Cat 1 or 2, R61. brodifacoum is also proposed to be classified as T+;R26/27/28, R43, R48/23/24/25, R61, N;R50/53. According to the GBPR, brodifacoum fulfils the T criterion.

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

### Effects on environmental organisms for biocidal product

It is important to note that the applicant did not provide ecotoxicological data about the biocidal product FANGA B+. So the whole effect assessment for the product 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 B+, the substance does not contribute to the classification of the biocidal product.

The 2,6−di−tert.−butyl−p−crésol as ”BHT” is used in the biocidal product as antioxydant. This substance is classified as Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment” according to the product Data Sheet. Nevertheless in the concentration used in the product FANGA B+, 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

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

##### Aquatic organisms

Refers to section Aquatic compartment (including water, sediment and STP)

##### Sediment dwelling organisms

Refers to section Aquatic compartment (including water, sediment and STP)

##### STP micro-organisms

Refers to section Aquatic compartment (including water, sediment and STP)

#### Atmosphere

Refers to section Atmosphere

#### Terrestrial compartment

Refers to section Terrestrial compartment

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

Refers to section

**Erreur ! Source du renvoi introuvable.**

#### Summary of PNECs

Refers to section Summary of PNECs of the active substance brodifacoum

### Environmental exposure assessment

As the product contains no substances of concern except brodifacoum, it is considered that risks posed to environment following the use of FANGA B+ 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 B+ is a rodenticide bait containing 0.001% brodifacoum (0.01 g/kg). The product is in the form ofa paste (individually packaged in sachet). Baits are placed in secured bait box for professional and non-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 B+ 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 PT14.

#### 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 B+ biocidal product.

#### Terrestrial compartment (soil and groundwater)

##### In and around buildings

The exposure assessment has been carried out according to the ESD (Larsen, 2003) for rodenticides (ESD PT14)[[24]](#footnote-24) and the GBPR IV Part B[[25]](#footnote-25). 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 0.001% (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: 4 m for rats and 1 m for mice (default value)/ 5 m for rats and 1 m for mice (specific parameter),
* Number of refilling times: 5 (default value) / 4 (specific parameter).

Exposure of the terrestrial compartment (soil) will occur when brodifacoum bait is deployed outdoors. ESD (Larsen, 2003) considers a scenario that entails outdoor baiting with bait blocks 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 (disperse release) onto soil. The active substance metabolism is taken into account; 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.

In both scenarios, the direct and disperse brodifacoum releases (Elocalsoil, mg) to the relevant soil surfaces may be calculated according to the input values presented in the table below. The different PEC values are calculated using the GBPR equations. The degradation in soil was not considered in the calculations.

Table 2.8.4‑1:PEC brodifacoum in soil and groundwater for uses in and around buildings

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **ESD Default parameters: realistic worst-case** | | **Refined and specific parameters: typical scenario** | |  |
| **Symbol** | **Variable/parameters** | **Rat** | **Mouse** | **Rat** | **Mouse** | **Unit** |
| **INPUTS** | | | | | | |
| Q*prod:* | Amount of product used in control operation for each bait box | 200 | 40 | 200 | 40 | [g] |
| Fc*product*: | Concentration of active substance in product | 0.01 | 0.01 | 0.01 | 0.01 | [g.kg-1] |
| Nsites: | Number of application sites | 10 | 10 | 10 | 10 | [-] |
| N*refil*: | Number of refilling times | 5 | 5 | 4 | 4 | [-] |
| F*release-D, soil*: | Fraction of product released directly to soil | 0.01 | 0.01 | 0.01 | 0.01 | [-] |
| F*release-ID, soil*: | Fraction released indirectly to soil | 0.9 | 0.9 | 0.9 | 0.9 | [-] |
| Koc | Organic carbon adorption coefficient | 9 155 | 9 155 | 9 155 | 9 155 | [L.kg-1] |
| Distance | Distance between 2 bait points | 4 | 1 | 5 | 1 | [m] |
| AREA*exposed-D*: | Area directly exposed to rodenticide originating from one bait box | 0.09 | 0.09 | 0.09 | 0.09 | [m2] |
| AREA*exposed-ID*: | Area indirectly exposed to rodenticide | 440 | 110 | 510 | 110 | [m2] |
| DEPTH*soil*: | Depth of exposed soil | 0.1 | 0.1 | 0.1 | 0.1 | [m] |
| RHO*soil*: | Density of exposed soil | 1700 | 1700 | 1700 | 1700 | [kg.m-3] |
| **OUTPUTS** | | | | | | |
| Elocal*soil-campaign, direct*: | *Direct emission to soil from a campaign* | 1.00E-03 | 2.00E-04 | 8.00E-04 | 1.60E-04 | [g.camp-1] |
| Elocal*soil-campaign, indirect*: | *Indirect emission to soil from a campaign* | 8.91E-02 | 1.78E-02 | 7.13E-02 | 1.43E-02 | [g.camp-1] |
| Elocal*soil-campaign*: | *Total emission to soil from a campaign* | 9.01E-02 | 1.80E-02 | 7.21E-02 | 1.44E-02 | [g.camp-1] |
| Clocal*soil-D* | *Local concentration in soil due to direct release (AREAexposed-D) after a campaign:* | 6.54E-03 | 1.31E-03 | 5.23E-03 | 1.05E-03 | [mg.kg-1wwt] |
| Clocal*soil-ID* | *Concentration in soil due to indirect (disperse=AREAexposed-ID ) release after a campaign:* | 1.19E-03 | 9.53E-04 | 7.62E-04 | 7.62E-04 | [mg.kg-1wwt] |
| **Clocal*soil*** | ***Worst case total concentration in soil =* Clocal*soil-D +* Clocal*soil-ID***= ***PECsoil*** | **7.73E-03** | **2.26E-03** | **5.99E-03** | **1.81E-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)*** | **1.20E-03** | **9.64E-04** | **7.71E-04** | **7.71E-04** | **[mg.kg-1wwt]** |
| Kpsoil | *Partition coefficient solid-water in soil* | 1.83E+02 | 1.83E+02 | 1.83E+02 | 1.83E+02 | [L.kg-1] |
| Ksoil water | *Soil-water partitioning coefficient* | 2.75E+02 | 2.75E+02 | 2.75E+02 | 2.75E+02 | [m3.m-3] |
| **PEClocal soil, porew** | ***Worst case concentration in groundwater (based on the total concentration in soil)*** | **4.78E-05** | **1.40E-05** | **3.71E-05** | **1.12E-05** | **[mg.L-1]** |
| **PEClocal soil, porew** | ***Mean concentration in groundwater (based on mean concentration in soil)*** | **7.45E-06** | **5.96E-06** | **4.77E-06** | **4.77E-06** | **[mg.L-1]** |

***High-tier assessment for groundwater***

For the scenario “in and around buildings”, the calculated values for the groundwater compartment indicated a potential risk to groundwater. A higher-tier assessment of the potential for groundwater contamination has also been carried out using the simulation model FOCUS-PEARL 4.4.4. Simulations were performed for all nine FOCUS scenarios.

It is necessary to calculate an effective brodifacoum application rate on a per-hectare basis.

The corresponding application rate of brodifacoum to land can be calculated using the following equation

:

Where:

|  |  |  |  |
| --- | --- | --- | --- |
| Symbol | Value | Unit | Source |
| *Q prod* | 0.2\* | [kg] | Input |
| *Fc product* | 1E-05 | [kg.kg-1] | Input |
| N sites | 10\*\* | [-] | Input |
| N *refil*: | 5 | [-] | Input |
| AREA *exposed* | 440 | [m2] | Input |
| AREA *total* | 10 000 | [m2] | Input |
| *Appl rate* | 2.27E-03 | [kg.ha-1.yr-1] | Output |

.\* Amount of product used in control operation for each bait box

.\*\* ESD Default parameters: realistic worst-case

One application of brodifacoum were modelled each year during the simulation period (20 years), each at a rate of 2.27 g a.s.ha-1. In accordance with FOCUS guidelines, applications were simulated to the soil surface. Canopy interception was set to 0% in the simulations.

**Relevant input variables in PEARL**

| **Parameter** | **Unit** | **Value** |
| --- | --- | --- |
| ***Substance parameters*** | | |
| Molecular weight | g.mol-1 | 523.42 |
| Water solubility (20 °C) | mg.L-1 | 0.058 |
| Molar enthalpy of dissolution | kJ.mol-1 | 27 |
| Saturated vapour pressure (20 °C) | Pa | 2.6E-22 |
| Molar enthalpy of vaporisation | kJ.mol-1 | 95 |
| Diffusion coefficient in water (20 °C) | m².d-1 | 4.3E-05 |
| Diffusion coefficient in air (20 °C) | m².d-1 | 0.43 |
| Half-life (20°C, pF2) | d | 157 |
| Arrhenius activation energy | kJ.mol-1 | 65.4 |
| Kom\*\* value | mL.g-1 | 5310.32 |
| Freundlich exponent 1/n | - | 0.951 |
| Method of subroutine description | - | pH independent |
| ***Tab Scenario*** | | |
| Location | | All 9 EU scenarios |
| Crop Calendar | | GRASS |
| Irrigation | | FOCUS standard irrigation scheme |
| Tillage | | No tillage |
| Repeat interval for application events (years) | | 1 |
| Deposition | | No deposition |
| **Absolute Application** | | |
| Application type | | To the soil surface |
| Date | | 01-May |
| Dosage (kg/ha) | | 2.27E-03 |

**Overview of results of FOCUS runs**

|  |  |  |
| --- | --- | --- |
| RESULT\_TEXT | Brodifacoum | LOCATION |
| Concentration closest to the 80th percentile (ug/L) | 0.000000 | CHATEAUDUN |
| Concentration closest to the 80th percentile (ug/L) | 0.000000 | HAMBURG |
| Concentration closest to the 80th percentile (ug/L) | 0.000000 | JOKIOINEN |
| Concentration closest to the 80th percentile (ug/L) | 0.000000 | KREMSMUENSTER |
| Concentration closest to the 80th percentile (ug/L) | 0.000000 | OKEHAMPTON |
| Concentration closest to the 80th percentile (ug/L) | 0.000000 | PIACENZA |
| Concentration closest to the 80th percentile (ug/L) | 0.000000 | PORTO |
| Concentration closest to the 80th percentile (ug/L) | 0.000000 | SEVILLA |
| Concentration closest to the 80th percentile (ug/L) | 0.000000 | THIVA |

Calculated PECGW for brodifacoum, represented by the 80th percentile annual average leachate concentration at a soil depth of 1 m, were <0.0001 μg.L-1 for all scenarios. All PECGW values for brodifacoum and its metabolites were therefore several orders of magnitude below the trigger value of 0.03 μg.L-1, indicating safe use for brodifacoum.

##### Open areas

FANGA B+ is applied in open areas inside or near the openings of the tunnels of the target rodents. According to the ESD (Larsen, 2003), the use near the openings of the tunnels is covered by the assessment of the scenario “in and around buildings” with bait box. Thus this section “Open areas” only assesses the use inside the tunnels during which, according to the scenario presented in ESD (Larsen, 2003), 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. This scenario is worst case as the product FANGA B+ is intended to be applied in secured bait boxes only.

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

Table 2.8.4‑2PEC of brodifacoum in soil and groundwater 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 | 0.01 | 0.01 | [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 adorption coefficient | 9155 | 9155 | [L.kg-1] |
|  | | | | | |
| OUTPUTS | Elocal*soil-campaign* | *Local emission of active substance to soil during a campaign* | 1.00E-03 | 2.00E-04 | [g.camp] |
| Clocal*soil* | *Local concentration in soil after a campaign* | 6.92E-02 | 1.38E-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 B+ is intended to be used in bait boxes containing 200 g of biocidal product (0.001%) 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 0.2 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 2.8.4‑3 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** |
| INPUT | **Q*prod*** | Amount of product used in control operation / ha | 40 | 84 | [kg.ha-1] |
| **Fc*product*** | Fraction of active substance in product | 0.01 | 0.01 | [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] |
| OUTPUT | **Elocal*soil-campaign*** | *Local emission of active substance to soil from a campaign* | 2.5 | 5.3 | [g.camp-1] |
| **Clocal*soil*** | *Local concentration in soil after a campaign* | 1.48E-03 | 3.11E-03 | [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* | 9.17E-06 | 1.93E-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 - Tier1 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: 10 mg.kg-1 (0.001% w/w of brodifacoum in FANGA B+). Hence, **the worst case Tier 1 PECoral is 10 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 2.8.4‑4PECoral 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 (%)** | **Bromadiolone conc. potentially ingested by non-target vertebrates (mg/kg) ≡ PECoral** |
| 100 | 10 |
| 50 | 5 |
| 40 | 4 |
| 30 | 3 |
| 20 | 2 |
| 10 | 1 |
| 5 | 0.5 |
| 2 | 0.2 |
| 1 | 0.1 |

###### 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:

**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 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 2.8.4‑5Expected 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 | 10 | 0.46 | 0.33 |
| **Pig** | 80 000 | 600a | 10 | 0.08 | 0.05 |
| **Pig, young** | 25 000 | 600a | 10 | 0.24 | 0.17 |
| **Tree sparrow** | 22 | 7.6a | 10 | 3.45 | 2.49 |
| **Chaffinch** | 21.4 | 6.42a | 10 | 3.00 | 2.16 |
| **Wood pigeon** | 490 | 53.1a | 10 | 1.08 | 0.78 |
| **Pheasant** | 953 | 102.7a | 10 | 1.08 | 0.78 |

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 metabolism and elimination, which is regarded as PEC. The EC are calculated by using the actual dose of the substance consumed by a non-target animal each day (ETE) using the realistic worst case scenario (Step 2), calculated above. 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 (Larsen, 2003).

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

According to the ESD (Larsen, 2003), 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 concentration of active substance brodifacoum in non-target animals in primary poisoning scenarios after one meal followed by 24 hour elimination period.

**Table 2.8.4‑6Expected 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 | 0.23 |
| Pig | 0.04 |
| Pig, young | 0.12 |
| Tree sparrow | 1.74 |
| Chaffinch | 1.51 |
| Wood pigeon | 0.55 |
| Pheasant | 0.54 |

##### Secondary poisoning

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

As no exposure of the aquatic compartment is foreseen with the use of FANGA B+ 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***

According to the GBPR 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 quite localised, the exposure of earthworm was deemed negligible in this case.

The calculation is done according to equation 80 and 82 (GBPR, 2015):

**PEC oral,predator = Cearthworm**

**Cearthworm = (BCFearthworm\*Cporewater)+ Clocalsoil mean concentration\*Fgut\*CONVsoil) / (1+Fgut\*CONV soil)**

With (example for rat treatment application for the in and around - typical scenario):

BCF earthworm = 15 820 L.kg wet earthworm-1,

C porewater = 4.77E-06 mg.L-1 (based on mean concentration in soil – typical case)

C local soil mean concentration= 7.71 E-04 mg.kg-1wwt,

F gut= 0.1 Kg dwt.kg wwt-1,

CONV soil = 1.13 Kg wwt.kg dwt-1,

According to the GBPR, 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 PEClocal, soil is used in calculation, the PECoral,predator to be used in risk assessment is Cearthworm x 0.5.

**Table 2.8.4‑7Expected concentrations of brodifacoum in predator**

|  |  |  |
| --- | --- | --- |
|  | **PEC oral, predatormg/kg wet earthworm-1** | |
| **ESD Default parameters: realistic worst-case** | **Refined and specific parameters: typical scenario** |
| ***TIER I: Worst case (based on the total concentration in soil)*** | | |
| *Rat treatment* | 3.40E-01 | 2.64E-01 |
| *Mice treatment* | 9.94E-02 | 7.96E-02 |
| ***TIER I: Mean (based on the mean concentration in soil)*** | | |
| *Rat treatment* | 5.30E-02 | 3.39E-02 |
| *Mice treatment* | 4.24E-02 | 3.39E-02 |
| ***TIER II: Mean (based on the mean concentration in soil) + considering degradation in soil*** | | |
| *Rat treatment* | 5.12E-02 | 3.28E-02 |
| *Mice treatment* | 4.10E-02 | 3.28E-02 |

###### ***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’, ‘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 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 2.8.4‑8Residues of brodifacoum in target animals at specific point in times and varying bait consumption

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Residues in target animal (mg.kg-1bw)** | | |
| **20%** | **50%** | **100%** |
| Day 1 after the first meal | 0.20 | 0.50 | 1.00 |
| Day 2 before new meal | 0.14 | 0.35 | 0.70 |
| **Day 5 after the last meal** | 0.55 | 1.39 | 2.77 |
| Day 7 mean time to death | 0.27 | 0.68 | 1.36 |

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 2.8.4‑9Residues 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** | 2.77 |

###### 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 2.77 mg.kg-1 bw for rodents caught on day 5 and 3.31mg.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 2.8.4‑10 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 0.001%). 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 | 0.10 | 0.34 | 0.12 | 0.41 |
| Kestrel  *(Falco tinnunculus)* | 209 | 78.7 | 0.11 | 0.52 | 0.13 | 0.62 |
| Little owl  *(Athene noctua)* | 164 | 46.4 | 0.06 | 0.39 | 0.08 | 0.47 |
| Tawny owl  *(Strix aluco)* | 426 | 97.1 | 0.13 | 0.32 | 0.16 | 0.38 |
| Fox  *(Vulpes vulpes)* | 5700 | 520.2 | 0.72 | 0.13 | 0.86 | 0.15 |
| Polecat  *(Mustela putorius)* | 689 | 130.9 | 0.18 | 0.26 | 0.22 | 0.31 |
| Stoat  *(Mustela erminea)* | 205 | 55.7 | 0.08 | 0.38 | 0.09 | 0.45 |
| Weasel  *(Mustela nivlis)* | 63 | 24.7 | 0.03 | 0.54 | 0.04 | 0.65 |

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

2 Conc. in non-target animal

### Risk characterisation for the environment

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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 (GBPR, 2003) 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)

##### In and around building

Exposure scenario is not considered relevant in the ESD for rodenticides. brodifacoum is not expected to occur to any significant extent following the use of FANGA B+ in and around buildings. Therefore, PEC values for brodifacoum in surface water and sediment are assumed to be negligible and have not been further considered.

##### Open areas

. Exposure of surface water arising from the use of FANGA B+ bait in open areas is not expected to be significant or widespread for open area uses. 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.

##### Waste dumps

. Exposure of surface water arising from the use of FANGA B+ bait is not expected to be significant or widespread for waste dump uses. 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 deployed in waste dumps are expected to be very low. No further assessment of risk is necessary.

#### 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 B+ biocidal product.

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

Soil exposure occurs both through a combination of direct and indirect releases from the use of FANGA B+ 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 B+ is deployed outdoors.

Realistic worst case and 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 the worst case scenario (addition of direct and indirect exposure) for the soil are summarized in the table below:

Table 2.8.5‑1PECsoil/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** |
| **Realistic worst case** | | | |
| Rat treatment | 7.73E-03 | 0.88 | 8.78E-03 |
| Mice treatment: | 2.26E-03 | 2.57E-03 |
| **Typical scenario** | | | |
| Rat treatment | 5.99E-03 | 0.88 | 6.81E-03 |
| Mice treatment | 1.81E-03 | 2.05E-03 |

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

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

Table 2.8.5‑2PEC groundwater due to use of FANGA B+ in and around building

|  |  |  |  |
| --- | --- | --- | --- |
| **Baiting scenario**  **(ESD PT14)** | **PEC groundwater (µg brodifacoum.L-1)** | **Threshold value in groundwater (µg.L-1)** | **Risk characterization** |
| **Realistic worst case** | | | |
| Rat treatment | <0.0001 | 0.03 | Acceptable1 |
| Mice treatment | <0.0001 |
| **Typical scenario** | | | |
| Rat treatment | <0.0001 | 0.03 | Acceptable1 |
| Mice treatment | <0.0001 |

‘1 After refinement by Focus model

##### Open areas

Exposure of the terrestrial compartment (soil) will occur when FANGA B+ 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 2.8.5‑3PECsoil/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)** | 6.92E-02 | 0.88 | 0.079 |
| **Typical use (mice treatment)** | 1.38E-02 | 0.016 |

The PEC/PNEC ratios are below 1.0 and indicate that there are no unacceptable risks to the terrestrial compartment when the product FANGA B+ is used in the tunnels of open areas. According to the EUBEES 2 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, there is no unacceptable risk for the terrestrial compartment (including groundwater) when the FANGA B+ 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 2.8.5‑4PECsoil/PNECsoil for soil organisms exposed to brodifacoum following use of bait at waste dumps

|  |  |  |  |
| --- | --- | --- | --- |
| **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)** | 1.48E-03 | 0.88 | 0.002 |
| **Rattreatment**  **(84 kg.ha-1)** | 3.11E-03 | 0.88 | 0.004 |

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

Table 2.8.5‑5PEC groundwater due to use of FANGA B+ 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)** | 9.17E-03 | 0.03 | Acceptable |
| **Rat treatment**  **(84 kg.ha-1)** | 1.93E-02 | Acceptable |

The risk for groundwater is acceptable.

#### 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 guidance in Technical guidance document (GBPR, 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 blocks or gains 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 2.8.5‑6Tier 1 risk characterization of primary poisoning – Long-Term**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **PEC1**  mg.kg food-1 | **PNEC1**  mg.kg food-1 | **PEC/PNEC** |
| **Mammals** | 10 | 2.22E-04 | **45 000** |
| **Birds** | 10 | 1.30E-04 | **77 000** |

1Concentration 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 2.8.5‑7PECoral/PNECoral 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 | 10 | 1.30E-04 | **76 923** |
| 50 | 5 | **38 462** |
| 40 | 4 | **30 769** |
| 30 | 3 | **23 077** |
| 20 | 2 | **15 385** |
| 10 | 1 | **7 692** |
| 5 | 0.5 | **3 846** |
| 2 | 0.2 | **1 538** |
| 1 | 0.1 | **769** |

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 2.8.5‑8Tier 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** | 3.45 | 2.49 | 0.31 | y | y |
| **Chaffinch** | 3.00 | 2.16 | y | y |
| **Wood pigeon** | 1.08 | 0.78 | y | y |
| **Pheasant** | 1.08 | 0.78 | y | y |
| **Dog** | 0.46 | 0.33 | 0.4 | y | n |
| **Pig** | 0.08 | 0.05 | n | n |
| **Pig young** | 0.24 | 0.17 | n | n |

1 PECoral = ETE, concentration of brodifacoum after one meal

The qualitative approach for the acute situation confirms the potential risk of primary poisoning to dogs. The level of the risk is not clarified for all other species with this approach, as A PEC below the LD50 does not indicate the absence of unacceptable risk if the required margin of safety is not established

#### 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 2.8.5‑9Tier 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 | 0.23 | 1.10E-05 | **20 909** |
| Pig | 0.04 | **3 636** |
| Pig, young | 0.12 | **10 909** |
| Tree sparrow | 1.74 | 1.30E-05 | **133 846** |
| Chaffinch | 1.51 | **116 154** |
| Wood pigeon | 0.55 | **42 308** |
| Pheasant | 0.54 | **41 538** |

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 B+ 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 PECoral predator values are compared to the long-term PNEC for mammals and for birds.

**Table 2.8.5‑10. risk characterization of secondary poisoning via the terrestrial food chain**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **PECoral,predator**  mg/kg wet earthworm-1 | | **PNEC oral**  mg.kg food-1 | | **PEC/PNEC** | | | | |
| **ESD Default parameters** | **Typical scenario** | **Mammals** | **Birds** | **ESD Default parameters** | | **Typical scenario** | | |
| **Mammals** | **Birds** | **Mammals** | **Birds** | |
| ***TIER I: Worst case (based on the total concentration in soil)*** | | | | | | | | | |
| *Rat treatment* | 3.40E-01 | 2.64E-01 | 2.22E-04 | 1.30E-04 | **1 532** | **2 615** | **1 189** | | **2 031** |
| *Mice treatment* | 9.94E-02 | 7.96E-02 | **448** | **765** | **359** | | **612** |
| ***TIER I: Mean (based on the mean concentration in soil)*** | | | | | | | | | |
| *Rat treatment* | 5.30E-02 | 3.39E-02 | 2.22E-04 | 1.30E-04 | **239** | **408** | **153** | | **261** |
| *Mice treatment* | 4.24E-02 | 3.39E-02 | **191** | **326** | **153** | | **261** |
| ***TIER II (based on time-weight average concentration (180d) in soil)*** | | | | | | | | | |
| *Rat treatment* | 5.12E-02 | 3.28E-02 | 2.22E-04 | 1.30E-04 | **231** | **394** | **148** | | **252** |
| *Mice treatment* | 4.10E-02 | 3.28E-02 | **185** | **315** | **148** | | **252** |

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 2.8.5‑11Tier 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 | 0.55 | 1.39 | 2.77 | 8 | n | n | n |
| 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 no risk for birds 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 2.8.5‑12Tier 1 long-term risk assessment of secondary poisoning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Non-target animal** | **PECoral**  mg.kg-1bw | **PNEC**  mg.kg-1 food | **PEC /PNEC** |
| Birds | 2.77 | 1.30E-04 | **21 308** |
| Mammals | 2.77 | 2.22E-04 | **12 477** |

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 2.8.5‑13Tier 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)* | 0.34 | 0.41 | 1.30E-05 | **26 154** | **31 538** |
| Kestrel  *(Falco tinnunculus)* | 0.52 | 0.62 | **40 000** | **47 692** |
| Little owl  *(Athene noctua)* | 0.39 | 0.47 | **30 000** | **36 154** |
| Tawny owl  *(Strix aluco)* | 0.32 | 0.38 | **24 615** | **29 231** |
| Fox  *(Vulpes vulpes)* | 0.13 | 0.15 | 1.10E-05 | **11 818** | **13 636** |
| Polecat  *(Mustela putorius)* | 0.26 | 0.31 | **23 636** | **28 182** |
| Stoat  *(Mustela erminea)* | 0.38 | 0.45 | **34 545** | **40 909** |
| Weasel  *(Mustela nivlis)* | 0.54 | 0.65 | **49 091** | **59 091** |

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

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

No studies were conducted with the product FANGA B+ 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 outdoor applications by non-professionals ;
* the use in open area by professionals ;
* the use in waste dump by profession

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

***For professionals***

* 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[[26]](#footnote-26).
* 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.

**For non-professional**

* 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 and dead rodents, during and after treatment.
* 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, packaging, uneaten baits and dead rodents in accordance with local requirements.
* 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.

***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 treatment9.
* 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.

* **Renewal application – 2019**

No new ecotoxicological information has been submitted at the renewal of the approval of the active substance brodifacoum and in the product dossier. No studies were conducted with the product FANGA B+ 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. Specific use restrictions must be applied to reduce the risk for primary and secondary poisoning. The conclusions remains unchanged.

* **Assessment of minor change (2022)**

The minor change application has no impact on the classification of the product, the identification of the substances of concern and the risk assessment for the environment. Please also refer to the confidential PAR for the argumentation.

## Measures to protect man, animals and the environment

*See Summary of Product Characteristics (SPC).*

Annex 2: List of studies reviewed

##### List of new data[[27]](#footnote-27) submitted in support of the evaluation of the active substance

**None**

##### List of new data submitted in support of the evaluation of the biocidal product initial PAR 2016

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Section n°/**  **Reference n°** | **Author** | **Year** | **Title** | **Data protection**  **Y/N** | **Owner** | **Letter of acces**  **Y/N** | **Essential for the evaluation** |
| B3.2, 3.3, 4.1, 4.2, 4.4, 4.17.1 | XXXX | 2012 | Physico chemical tests on FANGA PATE PRO. DEFITRACES, Report 11-920010-016 of 22 February 2012, GLP. | Y | TRIPLAN | N | Y |
| B3.2 | XXXX | 2012 | Physico-chemical tests and chemical stability before and after an accelerated storage procedure for 14 days at 54 ± 2 °C on FANGA PATE PRO In compliance with CIPAC MT 46.3 (CIPAC Handbook J - 2000). DEFITRACES Report 11-920010-017 of 12 March 2012. | Y | Triplan | N | Y |
| B3.4 | XXXX | 2015 | Chemical analyses before and after accelerated storage procedure at 40°C for 8 weeks on BDPA10V1, Report n° 15-920010-005 of 29 April 2015, GLP, unpublished. | Y | Triplan | N | Y |
| B3.4 | XXXX | 2012 | De Ryckel B. 2012. Physical and chemical properties and storage stability of FANGA B+ FIRST INTERIM REPORT Analysis on the test item as received and after 14 days at 54°C ± 2°C. Centre Wallon de Recherches Agronomiques, Report 22776 of 6 September 2012, GLP | Y | Triplan | N | Y |
| B3.4 | XXXX | 2014 | De Ryckel B. 2012. Physical and chemical properties and storage stability of FANGA B+ - Final Report - Analysis on the test item as received after 14 days at 54°C ± 2°C and after 16 months and 2 years at 20°C ± 2°C. Centre Wallon de Recherches Agronomiques, Report 22776 of 29 April 2014, GLP | Y | Triplan | N | Y |
| B5 | XXXX | 2012 | 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. | Y | Triplan | N | Y |
| B5 | XXXX | 2012 | 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° 11-920010-019 of 18 May 2012, GLP. | Y | Triplan | N | Y |
| B5 | XXXX | 2015 | Validation of the analytical method for the determination of brodifacoum in BDPA10V1, Report n° 15-920010-004 of 02 April 2015, GLP, unpublished. | Y | Triplan | N | Y |
| B6.7 | XXXX | 2013 | Study on the palatability and the efficacy of a bait containing 0.001% (w/w) Brodifacoum in brown rat (*Rattus norvegicus*). Biolytics, Study n° 12-TOX024-3 of 24 January 2013, not GLP (unpublished). | Y | Triplan | N | Y |
| B6.7 | XXXX | 2012 | Palatability of « FANGA B+ » (10 ppm Brodifacoum) ready-to-use bait targeting brown rat (*Rattus norvegicus*), black rat (*Rattus rattus*) and house mouse (*Mus musculus*). Walloon Agricultural Research Centre – Department Pesticide Research, Report n° ROD 2012 01 of the 19 January 2012, not GLP, unpublished. | Y | Triplan | N | N |
| B6.7 | XXXX | 2013 | Study on the palatability and efficacy of a 0.001% Brodifacoum paste bait in house mouse (*Mus musculus*). Biolytics, Study n° 12-TOX024-4 of 24 January 2013, not GLP (unpublished). | Y | Triplan | N | Y |
| B6.7 | XXXX | 2014 | 2014. Efficacy evaluation of FANGA B+ (Brodifacoum 0,001% w/w a.i., oily pasta bait) against Roof rat (Rattus rattus L.) in Italy. SAGEA SR Centro di Saggio, Report n° 2008.BCD.SAG13 of 15 janauary 2014, not GLP, unpublished | Y | Triplan | N | Y |
| B6.7 | XXXX | 2013 | Guicherd A. 2013. Study on the palatability and efficacy of a 0.001% Brodifacoum paste bait in black rat (*Rattus rattus*). Biolytics, Study n° 13-TOX025 of 20 December 2013, not GLP (unpublished). | Y | Triplan | N | Y |
| B6.7 | XXXX | 2013 | Evaluation of the efficacy of a paste rodenticide (FANGA B+) containing 0.001% Brodifacoum for the control of mouse infestation. One trial , 1 Site: Rhones; France, 2012-201. Biolytics, Study n° 13-TOX019 of 20 November 2013, not GLP (unpublished). | Y | Triplan | N | Y |
| B6.7 | XXXX | 2013 | Evaluation of the efficacy of a paste rodenticide (FANGA B+) containing 0.001% brodifacoum for the control of brown rat (Rattus norvegicus) infestations, Study n°13TOX020, November 2013. | Y | Triplan | N | Y |
| B6.7 | XXXX | 2015 | Efficacy evaluation on BDPA10V1 (Brodifacoum 0.001% w/w a.i., pasta bait) against Roof rat (Rattus rattus L.) in Italy, Study n°2001.BCD.SAG15, April 2015 | Y | Triplan | N | Y |
| B8.1 | XXXX | 2012 | FANGA BLOC SP PRO assessment of acute dermal irritation. PHYCHER BIO DEVELOPPEMENT, study n°: IC-OCDE-PH-11/0402 of 5 January 2012, GLP. | Y | Triplan | N | Y |
| B8.2 | XXXX | 2012 | FANGA BLOC SP PRO assessment of acute eye irritation. PHYCHER BIO DEVELOPPEMENT, study n°: IO-OCDE-PH-11/0402 of the 5 January 2012, GLP. | Y | Triplan | N | Y |
| B8.3 | XXXX | 2012 | FANGA BLOC SP PRO assessment of the skin sensitization potential in the mouse using the local lymph node assay (LLNA). PHYCHER BIO DEVELOPPEMENT, study n°: LLNA-PH-11/0402, report n°: LLNA-PH-11/0402-R1 of the 16 January 2012, GLP | Y | Triplan | N | Y |
| B8.5.1 | XXXX | 2012 | FANGA BLOC SP PRO evaluation of acute oral toxicity in rats – acute toxic class method. PHYCHER BIO DEVELOPPEMENT, study n°: TAO423-PH-11/0402 of 5 January 2012, GLP. | Y | Triplan | N | Y |
| B8.5.3 | XXXX | 2012 | FANGA BLOC SP PRO evaluation of acute dermal toxicity in rats. PHYCHER BIO DEVELOPPEMENT, study n°: TAD-PH-11/0402 of 5 January 2012, GLP. | Y | Triplan | N | Y |
| B8.6 | XXXX | 2013 | In vitro absorption of difenacoum from wax block and pasta bait through human epidermis report n°JV2011-REG, not GLP, unpublished | Y | ACTIVA | Y | Y |

* **Minor change aplication 2018**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Section n°/**  **Reference n°** | **Author** | **Year** | **Title** | **Data protection**  **Y/N** | **Owner** | **Letter of acces**    **Y/N** | **Essential for the assessment** |
| 2073.BCD.SAG17 Rn | XXXX | 2017 | Efficacy evaluation of BDPA10V1 (brodifacoum 0,001% w/w a.i., pasta bait – aged formulation) against Norway rat (Rattus norvegicus Berk.) in Italy | Y | TRIPLAN | N | Y |
| 2073.BCD.SAG17 Rr | XXXX | 2017 | Efficacy evaluation of BDPA10V1 (brodifacoum 0,001% w/w a.i., Ypasta bait – aged formulation) against Roof rat (Rattus rattus L.) in Italy | Y | TRIPLAN | N |  |

* **Minor change aplication 2022**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author (s)** | **Year**  **Report date** | **Reference No. *(Annex III requirement)***  **/**  **IUCLID Section No.** | **IUCLID Document name** | **Title.**  **Report No.** | **Type of publication** | **Source (where different from company)**  **Study sponsor** | **GLP**  **(Yes/No)** | **Data Protection Claimed**  **(Yes/No)** |
| XXXX | 2022 | Section 6.7 Efficacy data to support these claims | BDPA10V2 (Mm) Palatability/Efficacity | FINAL REPORT : BDPA10V2/*Mus musculus*  Palatability/efficacity testing of BDPA10V2 bait according to the “Guidance on the Biocidal Products Regulation - Volume II Efficacy - Assessment and Evaluation (Parts B+C) Version 3.0 April 2018" in house mouse (*Mus musculus*) | Study report | TRIPLAN | No | Yes |
| XXXX | 2022 | Section 6.7 Efficacy data to support these claims | BDPA10V2 (Rn) Palatability/Efficacity | FINAL REPORT : BDPA10V2/*Rattus norvegicus*  Palatability/efficacity testing of BDPA10V2 bait according to the “Guidance on the Biocidal Products Regulation - Volume II Efficacy - Assessment and Evaluation (Parts B+C) Version 3.0 April 2018" in brown rat (*Rattus norvegicus*) | Study report | TRIPLAN | No | Yes |
| XXXX | 2022 | Section 6.7 Efficacy data to support these claims | Field trial Mm 30g BDPA10V2 | Efficacy evaluation of BDPA10V2 (brodifacoum 0,0010% w/w a.i., pasta bait) against House mouse (*Mus musculus L.*) in Italy | Study report | TRIPLAN | No | Yes |
| XXXX | 2022 | Section 6.7 Efficacy data to support these claims | Field trial Rn 100g BDPA10V2 | Efficacy evaluation of BDPA10V2 (brodifacoum 0,001% w/w a.i., pasta bait) against Norway rat (*Rattus norvegicus Berk.*) in Italy | Study report | TRIPLAN | No | Yes |
| XXXX | 2022 | Section 6.7 Efficacy data to support these claims | Field trial Rr (1/2) 100g BDPA10V2 | Efficacy evaluation of BDPA10V2 (brodifacoum 0,001% w/w a.i., pasta bait) against Roof rat (*Rattus rattus L.*) in Italy | Study report | TRIPLAN | No | Yes |
| XXXX | 2022 | Section 6.7 Efficacy data to support these claims | Field trial Rr (2/2) 100g BDPA10V2 | Efficacy evaluation of BDPA10V2 (brodifacoum 0,001% w/w a.i., pasta bait) against Roof rat (*Rattus rattus L.*) in Italy | Study report | TRIPLAN | No | Yes |

Annex 3: Analytical methods residues – active substance

brodifacoum

Methods suitable for the determination of residues (monitoring methods)

Extract from document IIA of final CAR of brodifacoum.

Table 6: 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)** |
| Ground water  *(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 |
| Surface water *(sampled at Desenzano, Garda lake)* | 0.05 μg/l (n=5)  0.5 μg/l (n=5)  5.0 μg/l (n=5)  50 μg/l (n=5) | 116*÷-*124.3  79.5*÷-*88.0  78.7*÷-*98.6  104.6*÷-*117 | 120.6  84.5  87.3  110.8 | 2.9  4.5  7.8  3.6 |
| Blood serum  (*from Rabbit, lyophilized powder from clotted whole blood)* | *Brodifacoum* | RP-HPLC with MS/MS detection.  Molecular ion (SIM): 523 (m/z), daughter ion (SRM): 187 (m/z)  Quantification by calibration curve at 0.06 mg/l , quantification with the lowest standard calibration level at 0.3 mg/l | 0.06 mg/l (n=5)  0.3 mg/l (n=6) | 0.05-0.40 μg/ml  (0.05-0.40 mg/l in blood serum), 4 determinations at 5 concentration levels  r = 0.99679 (SIM mode)  r = 0.99623 (SRM mode | Highly specific | 80.8-96.6  86.2-109.1 | 92.1  101.7 | 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: 19/11/2014

| **Summary** | | | |
| --- | --- | --- | --- |
|  | Value | Study | SF |
| AEL long-term | 3.3 x 10-6 mg/kg bw/d | Reproductive 2-generation 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  ADI  ARfD | 6.67 x 10-6 mg/kg bw/d3.3 x 10-6 mg/kg bw/d  Not applicable | Maternal toxicity from developmental study in rabbitsReproductive 2-generation study in rats | 300 |
|  | | | |

|  |  |
| --- | --- |
| Inhalative absorption | 100% |
| Oral absorption | 75% |
| Dermal absorption | 0.047% |

| **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 Tox1 H310  Acute Tox 2 H300  STOT RE Cat 1 H372  No specific limit concentrations |

Annex 5 : Toxicology – biocidal product

<FANGA B+ >

Date: 19/11/2014

|  |  |
| --- | --- |
| General information | |
| Formulation Type | paste |
| Active substance(s) (incl. content) | Brodifacoum (0.001% m/m) |
|  |  |

| 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 |  |  |  |
|  | None |  |  |  |
| Toxicological data on non-active substance(s) (not tested with the preparation) | None |  |  |  |
|  | None |  |  |  |
| Further toxicological information | None | | | |

|  |  |
| --- | --- |
| Classification and labelling proposed for the preparation with regard to toxicological properties (Annex IIIB, point 9) | |
| Directive 1999/45/EC | None |
| Regulation 1272/2008/EC | None |

Annex 6 : Safety for professional operators

<FANGA B+ >

Date: 19/11/2014

Exposure assessment

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

Primary exposure of professionals – FANGA B+ – Control of rats

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Component** | **CAS** | **Actual Dermal Total**  **[mg/kg/d]** | **Inhalation Exposure**  **[mg/m³]** | **Model** |
| **Sachet formulation (paper)** | | | | | |
| Professionnal  (without gloves) | Brodifacoum | 56073-10-0 | 5.3 x 10-7 | negligible | CEFIC  study |

Risk assessment – Professional

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Component** | **CAS** | **AEL [mg/kg/d]** | **Absorption**  **[%]** | | **Total syst exposure**  **[mg/kg bw/d]** | | Risk |
|  |  |  |  | inh | derm | Expo | %AEL |  |
| **Sachet formulation (paper)** | | | | | | | | |
| Professionnal  (without gloves) | Brodifacoum | 56073-10-0 | 3.3x10-6 | 100 | 0.047 | 5.3 x 10-7 | 16% | Acceptable |

* **Renewal application (2018)**



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

<FANGA B+>

Date:19/11/2014

| General information | |
| --- | --- |
| Formulation Type | paste |
| Active substance(s) (incl. content) | Brodifacoum (0.001% m/m) |

| **<Active Substance>** |
| --- |

| 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 | CEFIC Study and HEEG opinion n°12 |
| Secondary exposure, acute | Reverse scenario |
| Secondary exposure, chronic | na |

Conclusion:

Exposure of non-professionals and the general public to the biocidal product containing 0.001% brodifacoum as active substance is considered acceptable, if the biocidal product is used as intended and all safety advices are followed.

Primary exposure of non professionals – FANGA B+ – Control of rats

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Component** | **CAS** | **Actual Dermal Total**  **[mg/kg/d]** | **Inhalation Exposure**  **[mg/m³]** | **Model** |
| **Sachet formulation (paper)** | | | | | |
| Non Professionnal | Brodifacoum | 56073-10-0 | 4.6 x 10-8 | negligible | CEFIC  study |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario** | **Component** | **CAS** | **AEL [mg/kg/d]** | **Absorption**  **[%]** | | **Total syst exposure**  **[mg/kg bw/d]** | | Risk |
|  |  |  |  | inh | derm | Expo | %AEL |  |
| **Sachet formulation (paper)** | | | | | | | | |
| Non Professionnal | Brodifacoum | 56073-10-0 | 3.3x10-6 | 100 | 0.047 | 4.6 x 10-8 | 0.7% | Acceptable |

Risk assessment – Non-professionals

* **Renewal application (2018)**



Annex 8: Residue behaviour

brodifacoum

Date: 20.08.2015

**Intended Use:** TP14 - Rodenticide against wild mice, brown rats and black rats.

**Active substance:** brodifacoum

**Formulation of biocidal product:** bait

**Place of treatment:**In and around buildings and open areas by professional and non-professional users. In waste dumps and landfills by professional users.

The intended use descriptions of the brodifacoum-containing biocidal products for which authorisation is sought indicate that these uses are not relevant in terms of residues in food and feed. The product is to be used as bait stations in and around buildings and open areas. No further data are required concerning the residue behaviour.

The intended uses are not relevant in terms of consumer health protection.

Annex 9: Efficacy of the active substance from its use in the biocidal product initial PAR 2018

| Test substance | Test organisms | Test system / Concentrations applied / exposure time | Test conditions | Test results: effects, mode of action, resistance | Reference |
| --- | --- | --- | --- | --- | --- |
| FANGA B+  0.001% Brodifacoum | House mice (*Mus musculus*)  Brown rat (*Rattus norvegicus*)  Black rats (*Rattus rattus*) | Laboratory study  House mice: 10 animals (4 males and 6 females)  Brown rat: 10 animals (6 males and 4 females)  Black rats: 10 animals (4 males and 6 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.  D5-D25: 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:  Mean palatability percentage = 14.44%.  Mortality percentage = 100%  For black rats:  Mean palatability percentage = 27.15%  Mortality percentage = 90%  For house mice:  Mean palatability percentage = 13.99%  Mortality percentage = 90%.  Palatability for brown rats and mice are under the criteria of 20 % | ROD 2012 01  R.I = 3 |
| FANGA B+  0.001% Brodifacoum | Brown rats  (*Rattus norvegicus*) | Laboratory study  Method:  Technical Notes for Guidance on Product Evaluation, Appendices to chapter 7 Product type 14 « Efficacy evaluation of rodenticidal biocidal products »  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 43%  - A good efficacy with a mortality of 90%  in a period from day 4 to day 6 | Study n°12-TOX024-03  R.I =1 |
| FANGA B+  0.001% Brodifacoum | House mice  (*Mus musculus*) | Laboratory study  Technical Notes for Guidance on Product Evaluation, Appendices to chapter 7 Product type 14 « Efficacy evaluation of rodenticidal biocidal products »  House mice:  10 males and 10 females.  Intoxication duration: 4 days with daily measurement of mortality and consumption. | Acclimatization: 4 days in separate cages (10 males in a cage and 10 females in a second cage) at room temperature.  Day 0: reference food and bait biocidal product have been given during 4 consecutive days with daily consumption measurements.  Mortality was observed during 21 days every 24 hours or until the death of all animals. | - A palatability equivalent to 61%  - A very good efficacy with a mortality of 100% in a period from day 3 to day 9 | Study n° 12-TOX024-4  R.I =1 |
| FANGA B+  0.001% Brodifacoum | House mice  (*Mus musculus*) | Field test  Method:  Technical Notes for Guidance on Product Evaluation, Appendices to chapter 7 Product type 14 « Efficacy evaluation of rodenticidal biocidal products »  The trial was located at a test site where house mouse populations had been identified. This site was located in Claveisolles (Rhône department) near Lyon city . | Pre-treatment census: 15 days (50 g of wheat per station per day).  Treatment: 20 g of bait per day in each lockable bait station –total 14 bait stations) during 15 days.  Post-baiting: 3 days (50 g of wheat per station per day). | Pre-baiting average consumption = 155 g/day => 30 mice  Post-baiting average consumption = 0 g  Estimated efficacy = 100 % | Study n° 13-TOX019  R.I =1 |
| FANGA B+  0.001% Brodifacoum | Black rats  (*Rattus rattus*) | Laboratory test  Method:  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. | A mean palatability equivalent to 59%.  A total efficacy, with 100% of mortality for males between day 6 and day 8 and 100 % of mortality for females in a period between day 3 and day 10 | Study n°13-TOX025  R.I =1 |
| FANGA B+  0.001% Brodifacoum | Black rats  (*Rattus rattus*) | Field test  EPPO PP 1/114(2)  The trial was set up in an agricultural habitat (farm) which appeared to harbour an established *Rattus rattus* population. | Pre-treatment census: 15 days (200 g of a mixture of cereal grain and poultry/pig feed per station per day).  Treatment: 200 g of bait per day in each lockable bait station –total 8 bait stations) during 15 days.  Post-baiting: 7 days (200 g of a mixture of cereal grain and poultry/pig feed per station per day). | Pre-baiting average consumption = 1239 g/day => 80/90 rats  Post-baiting average consumption = 0 g  Estimated efficacy = 100 % | Study n°2008.BCD.SAG13  R.I =1 |
| FANGA B+  0.001% Brodifacoum | Brown rat (*Rattus norvegicus*) | Field test  Method:  Technical Notes for Guidance on Product Evaluation, Appendices to chapter 7 Product type 14 « Efficacy evaluation of rodenticidal  biocidal products »  The trial was located at a test site where brown rat populations had been identified. This site was located in Claveisolles (Rhône department) near Lyon city | Pre-treatment census: 12 days (50 g of wheat per station per day).  Treatment: 100 g of bait per day in each lockable bait station –total 110 bait stations) during 15 days.  Post-baiting: 3 days (50 g of wheat per station per day). | Pre-baiting average consumption = 1600 g/day => 80 rats  Post-baiting average consumption = 0 g  Estimated efficacy = 100 %  19 dead rats found | Study n° 13TOX020  R.I =1 |
| FANGA B+  (BDPA10V1)  0.001% Brodifacoum | Black rats  (Rattus rattus) | Field test  EPPO PP 1/114(2) | Pre-treatment census: 15 days (200 g of a mixture of cereal grain and poultry/pig feed per station per day).  Treatment: 200 g of bait per day in each lockable bait station –total 8 bait stations) during 18 days.  Post-baiting: 7 days (200 g of a mixture of cereal grain and poultry/pig feed per station per day). | Pre-baiting average consumption = 938.3 g/day => 60/65 rats  Post-baiting average consumption = 0 g  Estimated efficacy = 100 % | Study n°  2001.BCD.SAG15  R.I =1 |

*(\*) fill in one table for each MG/PT and/or field of use envisage*

Annex 9a: Efficacy of the active substance from its use in the biocidal product (minor change – 2018)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Test substance*** | ***Test organism(s)*** | ***Test method*** | ***Test conditions*** | ***Test results: effects, mode of action, resistance*** | ***Reference\**** | ***RI*** |
| FANGA B + (BDPA10V1)  0.001% w/w  Brodifacoum | Brown rats  *Rattus norvegicus* | 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 20 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 = 800 g/day  Post-baiting = 0 g | 2073.BCD.SAG17 | *1* |
| FANGA B + (BDB10V1)  0.001% w/w  Brodifacoum | Black rats  *Rattus rattus* | 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: 14 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 17 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 = 615.5 g/day  Post-baiting = 0 g  R.I. =1 | 2073.BCD.SAG17 | *1* |

Annex 9b: Efficacy of the active substance from its use in the biocidal product (minor change – 2022)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **PT and use number** | **Test product** | **Function / Test organism(s)** | **Test method / Test system / concentrations applied / exposure time** | **Test results: effects** | **Reference** | **Number in IUCLID section 6.7/Test report title** |
| PT14 rodenticide  in & around buildings; open areas | BDPA10V2 (Fanga B+)  Pasta bait - 0.001% Brodifacoum  Batch# BRODI1021PAS10FR, manufactured in 10/2021 | House mouse (*Mus musculus)*  5 males  5 females | Laboratory test  Acclimatization: 7 days in individual cage at room temperature.  Day 0: reference food and bait biocidal product have been given:  - 10g of reference food for the assessment of palatability  - 10g of biocidal product during 5 consecutive days with daily consumption measurements.  Mortality was observed every 24 hours until the death of all animals. | 100% mortality overall.  Death occurring from day 5 to 13.  Palatability = 75.9%  R.I=1 | XXXX | BDPA10V2 (Mm) Palatability/Efficacity |
| PT14 rodenticide  in & around buildings; open areas | BDPA10V2 (Fanga B+)  Pasta bait - 0.001% Brodifacoum  Batch# BRODI1021PAS10FR, manufactured in 10/2021 | Brown rat (*Rattus norvegicus)*  5 males  5 females | Laboratory test  Acclimatization: 7 days in individual cage at room temperature.  Day 0: reference food and bait biocidal product have been given:  - 50g of reference food for the assessment of palatability  - 50g of biocidal product during 5 consecutive days with daily consumption measurements.  Mortality was observed every 24 hours until the death of all animals. | 100% mortality overall.  Death occurring from day 3 to 8.  Palatability = 70.7%  R.I=1 | XXXX | BDPA10V2 (Rn) Palatability/Efficacity |
| PT14 rodenticide  in & around buildings; open areas | BDPA10V2 (Fanga B+)  Pasta bait - 0.001% Brodifacoum  Batch# BRODI1021PAS10FR, manufactured in 10/2021 | House mouse (*Mus musculus)*  Estimated population size: 60-70 mice | Field test  Site location: The trial was set up in an agricultural habitat (breeding stables for hens, fodder and equipment warehouses).  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 mouse around the sites.   * Pre-treatment: 30g of unpoisoned baits per station per day (12 bait station) * Treatment: 30g of bait per day in each lockable bait station – total 12 bait stations– distance of 1 to 2m between stations * Post-baiting: 30g of unpoisoned baits per station per day | Efficacy = 100%  Pre-baiting average daily consumption = 255.8g  Post-baiting = 0g  R.I=1 | XXXX | Field trial Mm 30g BDPA10V2 |
| PT14 rodenticide  in & around buildings; open areas | BDPA10V2 (Fanga B+)  Pasta bait - 0.001% Brodifacoum  Batch# BRODI1021PAS10FR, manufactured in 10/2021 | Brown rat (*Rattus norvegicus)*  Estimated population size: 55-65 rats | Field test  Site location: The trial was set up in an agricultural habitat (cow breeding stables, fodder and equipment warehouses).  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 rat around the sites.   * Pre-treatment: 100g of unpoisoned baits per station per day (10 bait station) * Treatment: 100g of bait per day in each lockable bait station – total 10 bait stations– distance of 5 to 10m between stations * Post-baiting: 100g of unpoisoned baits per station per day | Efficacy = 100%  Pre-baiting average daily consumption = 827.5g  Post-baiting = 0g  R.I=1 | XXXX | Field trial Rn 100g BDPA10V2 |
| PT14 rodenticide  in & around buildings; open areas | BDPA10V2 (Fanga B+)  Pasta bait - 0.001% Brodifacoum  Batch# BRODI1021PAS10FR, manufactured in 10/2021 | Roof rat (*Rattus rattus)*  Estimated population: 50-60 rats | Field test  Site location: The trial was set up in an agricultural habitat (breeding stables for cows, fodder and equipment warehouses).  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 rat around the sites.   * Pre-treatment: 100g of unpoisoned baits per station per day (8 bait station) * Treatment: 100g of bait per day in each lockable bait station – total 8 bait stations– distance of 5 to 10m between stations * Post-baiting: 100g of unpoisoned baits per station per day | Efficacy = 100%  Pre-baiting average daily consumption = 782g  Post-baiting = 0g  R.I=1 | XXXX | Field trial Rr (1/2) 100g BDPA10V2 |
| PT14 rodenticide  in & around buildings; open areas | BDPA10V2 (Fanga B+)  Pasta bait - 0.001% Brodifacoum  Batch# BRODI1021PAS10FR, manufactured in 10/2021 | Roof rat (*Rattus rattus)*  Estimated population : 60-70 rats | Field test  Site location: The trial was set up in an agricultural habitat (breeding stables for hens, fodder and equipment warehouses).  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 rat around the sites.   * Pre-treatment: 100g of unpoisoned baits per station per day (10 bait station) * Treatment: 100g of bait per day in each lockable bait station – total 10 bait stations– distance of 5 to 10m between stations * Post-baiting: 100g of unpoisoned baits per station per day | Efficacy = 100%  Pre-baiting average daily consumption = 969.5g  Post-baiting = 0g  R.I=1 | XXXX | Field trial Rr (2/2) 100g BDPA10V2 |

1. In case the product would have more than one name, all names can be provided in this field. [↑](#footnote-ref-1)
2. See document CA-Nov16-Doc.4.x-Final on the concept of tamper-resistant bait stations. [↑](#footnote-ref-2)
3. See document CA-Nov16-Doc.4.x-Final on the concept of tamper-resistant bait stations. [↑](#footnote-ref-3)
4. Guidance on the Biocidal Products Regulation Volume III Human Health – Part B Risk Assessment, December 2017. [↑](#footnote-ref-4)
5. De Ryckel B. 2012. Physical and chemical properties and storage stability of FANGA B+ FIRST INTERIM REPORT Analysis on the test item as received and after 14 days at 54°C ± 2°C. Centre Wallon de Recherches Agronomiques, Report 22776 of 6 September 2012, GLP. [↑](#footnote-ref-5)
6. Demangel B. 2012. Physico-chemical tests and chemical stability before and after an accelerated storage procedure for 14 days at 54 ± 2 °C on FANGA PATE PRO In compliance with CIPAC MT 46.3 (CIPAC Handbook J - 2000). DEFITRACES Report 11-920010-017 of 12 March 2012. [↑](#footnote-ref-6)
7. De Ryckel B. 2012. Physical and chemical properties and storage stability of FANGA B+ - Final Report - Analysis on the test item as received after 14 days at 54°C ± 2°C and after 16 months and 2 years at 20°C ± 2°C. Centre Wallon de Recherches Agronomiques, Report 22776 of 29 April 2014, GLP [↑](#footnote-ref-7)
8. Demangel B. 2012. Physico chemical tests on FANGA PATE PRO. DEFITRACES, Report 11-920010-016 of 22 February 2012, GLP. [↑](#footnote-ref-8)
9. [↑](#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 LUND, M. (1984): Resistance to the second generation anticoagulant rodenticides. In Proceedings of 11th vertebrate pest conference, Sacramento, Ca. March 6-8, 1984: 89-94 [↑](#footnote-ref-10)
11. 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-11)
12. 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-12)
13. 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-13)
14. 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-14)
15. LUND, M. (1984): Resistance to the second generation anticoagulant rodenticides. *In Proceedings of 11th vertebrate pest conference*, Sacramento, Ca. March 6-8, 1984: 89-94. [↑](#footnote-ref-15)
16. 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-16)
17. 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-17)
18. 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-18)
19. Although the block weights 10 g and not 20 g as in the CEFIC study, it was considered that the important parameter is the number of blocks loaded rather than the weight of the block [↑](#footnote-ref-19)
20. Although the block weights 10 g and not 20 g as in the CEFIC study, it was considered that the important parameter is the number of blocks loaded rather than the weight of the block [↑](#footnote-ref-20)
21. Syngeta 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, Revision: 16 december 2010. [↑](#footnote-ref-21)
22. Guidance on the Biocidal Products Regulation, Volume IV Environment - Part B Risk Assessment (active substances), Version 1.0, April 2015 [↑](#footnote-ref-22)
23. Syngeta 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, Revision: 16 december 2010 [↑](#footnote-ref-23)
24. EUBEES 2 - Emission scenario document for biocides used as rodenticides (Larsen, 2003) [↑](#footnote-ref-24)
25. Guidance on the Biocidal Products Regulation, Volume IV Environment - Part B Risk Assessment (active substances), Version 1.0, April 2015 [↑](#footnote-ref-25)
26. 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-26)
27. Data which have not been already submitted for the purpose of the Annex I inclusion. [↑](#footnote-ref-27)