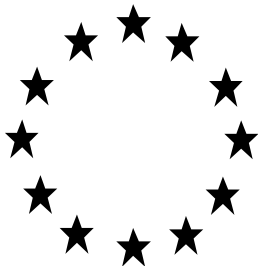
Directive 98/8/EC concerning the placing biocidal products on the market

Inclusion of active substances in Annex I or IA to Directive 98/8/EC

Assessment Report[i]



Fipronil
Product-type PT18
(insecticides, acaricides and products to control other arthropods)

6th May 2011

Annex I - FR

Fipronil (PT18)

Assessment report

Finalised in the Standing Committee on Biocidal Products at its meeting on 6th May 2011 in view of its inclusion in Annex I to Directive 98/8/EC

CONTENTS

1 STATEMENT OF SUBJECT MATTER AND PURPOSE

1.1 PROCEDURE FOLLOWED

This assessment report has been established as a result of the evaluation of fipronil as product-type 18 (insecticide), carried out in the context of the work programme for the review of existing active substances provided for in Article 16(2) of Directive 98/8/EC concerning the placing of biocidal products on the market1, with a view to the possible inclusion of this substance into Annex I or IA to the Directive.

Fipronil (CAS no. 120068-37-3) was notified as an existing active substance, by BASF Agro B.V., hereafter referred to as the applicant, in product-type 18.

Regulation (EC) No 1451/2007 of 4 December 2007,[2] which has repealed and replaced Commission Regulation (EC) No 2032/2003 of 4 November 2003,[3] lays down the detailed rules for the evaluation of dossiers and for the decision-making process in order to include or not an existing active substance into Annex I or IA to the Directive.

In accordance with the provisions of Article 5(2) of Regulation (EC) No 2032/2003, France was designated as Rapporteur Member State to carry out the assessment on the basis of the dossier submitted by the applicant. The deadline for submission of a complete dossier for fipronil as an active substance in product-type 18 was 30 April 2006, in accordance with Annex V of Regulation (EC) No 2032/2003.

On 2 May 2006, the French competent authorities received a dossier from the applicant. The Rapporteur Member State accepted the dossier as complete for the purpose of the evaluation on 30 October 2006.

On 06 february 2009, the Rapporteur Member State submitted, in accordance with the provisions of Article 14(4) and (6) of Regulation (EC) No 1451/2007, to the Commission and the applicant a copy of the evaluation report, hereafter referred to as the competent authority report.

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1 Directive 98/8/EC of the European Parliament and of the Council of 16 February 1998 concerning the placing biocidal products on the market. OJ L 123, 24.4.98, p.1

2 Commission Regulation (EC) No 1451/2007 of 4 December 2007 on the second phase of the 10-year work programme referred to in Article 16(2) of Directive 98/8/EC of the European Parliament and of the Council concerning the placing of biocidal products on the market. OJ L 325, 11.12.2007, p. 3

3 Commission Regulation (EC) No 2032/2003 of 4 November 2003 on the second phase of the 10-year work programme referred to in Article 16(2) of Directive 98/8/EC of the European Parliament and of the Council concerning the placing of biocidal products on the market and amending Regulation (EC) No 1896/2000. OJ L 307, 24.11.2003, p. 1

The Commission made the report available to all Member States by electronic means on 25 february 2009. The competent authority report included a recommendation for the inclusion of fipronil in Annex I to the Directive for PT 18.
In accordance with Article 16 of Regulation (EC) No 1451/2007, the Commission made the competent authority report publicly available by electronic means on 02 march 2009. This report did not include such information that was to be treated as confidential in accordance with Article 19 of Directive 98/8/EC.
In order to review the competent authority report and the comments received on it, consultations of technical experts from all Member States (peer review) were organised by the Commission. Revisions agreed upon were presented at technical and competent authority meetings and the competent authority report was amended accordingly.
On the basis of the final competent authority report, the Commission proposed the inclusion of fipronil in Annex I to Directive 98/8/EC and consulted the Standing Committee on Biocidal Product on 6th May 2011.
In accordance with Article 15(4) of Regulation (EC) No 1451/2007, the present assessment report contains the conclusions of the Standing Committee on Biocidal Products, as finalised during its meeting held on.

1.2 PURPOSE OF THE ASSESSMENT REPORT

This assessment report has been developed and finalised in support of the decision to include fipronil in Annex I to Directive 98/8/EC for product-type 18. The aim of the assessment report is to facilitate the authorisation in Member States of individual biocidal products in product-type 18 that contain fipronil. In their evaluation, Member States shall apply the provisions of Directive 98/8/EC, in particular the provisions of Article 5 as well as the common principles laid down in Annex VI.
For the implementation of the common principles of Annex VI, the content and conclusions of this assessment report, which is available at the Commission website[4], shall be taken into account.
However, where conclusions of this assessment report are based on data protected under the provisions of Directive 98/8/EC, such conclusions may not be used to the benefit of another applicant, unless access to these data has been granted.

1.3 OVERALL CONCLUSION IN THE CONTEXT OF DIRECTIVE 98/8/EC

The overall conclusion from the evaluation is that it may be expected that there are products containing fipronil for the product-type 18, which will fulfill the requirements laid down in Article 10(1) and (2) of Directive 98/8/EC. This conclusion is however subject to:

i. compliance with the particular requirements in the following sections of this assessment report,

4 http://ec.europa.eu/comm/environment/biocides/index.htm

ii. the implementation of the provisions of Article 5(1) of Directive 98/8/EC, and

iii. the common principles laid down in Annex VI to Directive 98/8/EC.

Furthermore, these conclusions were reached within the framework of the uses that were proposed and supported by the applicant (see Appendix II). Extension of the use pattern beyond those described will require an evaluation at product authorisation level in order to establish whether the proposed extensions of use will satisfy the requirements of Article 5(1) and of the common principles laid down in Annex VI to Directive 98/8/EC.

2 OVERALL SUMMARY AND CONCLUSIONS

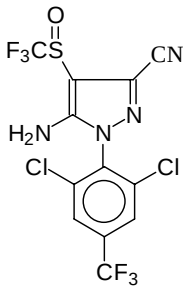
2.1 PRESENTATION OF THE ACTIVE SUBSTANCE

2.1.1 Identity, Physico-Chemical Properties and Methods of Analysis

2.1.1.1 Active substance

Identification of the substance

Its structure and relevant physical/chemical properties are shown below.



Chemical name of Fipronil

IUPAC name	(±)-5-amino-1-(2,6-dichloro-α,α,α,-trifluoro-p-tolyl)-4-trifluoromethylsulfinylpyrazole-3-carbonitrile. (Isomeric ratio 1:1)
Common name	Fipronil
CAS registry number	120068-37-3
EINECS-No.	n. a.
CIPAC, ELINCS	CIPAC 581, ELINCS 424-610-5

Empirical formula	$C_{12}H_4Cl_2F_6N_4OS$
Molecular weight	437.15 g/mol
Purity	> 95% w/w

Chlorobenzene and 5-amino-1-(2,6-dichloro-4-(trifluoromethyl)phenyl)-1*H*-pyrazole-3-carbonitrile are impurities of toxicological and ecotoxicological concern present in the active substance.

Physico-chemical properties

Fipronil is a white powder at room temperature. Its melting point is ca. 200°C and it decomposes before reaching its boiling point. The relative density of pure fipronil is D^{20}_4 = 1.705 and its vapour pressure is less than 2.0 x 10^{-6} Pa at 25°C.

The Henry's constant at 25°C using data from purified material was calculated to be less than 2.31 x 10^{-4} $Pa.m^3.mol^{-1}$. Fipronil has low solubility in water (deionised water) (3.78 mg/L at 20°C; pH: 6.58) and non-polar organic solvents (n-hexane: 28 mg/L at 20°C; toluene: 3 g/L at 20°C) but high solubility in some polar organic solvents such as acetone (545.9g/L at 20°C) and methanol (137.5g/L at 20°C).

Partition coefficient n-octanol/water for the purified material is 3.5 - 4.0 at 20°C.

Fipronil is neither flammable nor auto-flammable nor does it degrade at temperatures below its melting point (>200°C). Fipronil has no oxidising or explosive properties and shows no re-activity towards its container material (polyethylene).

Analytical methods for determination and identification

Validated analytical methods (based on HPLC-UV) with acceptable levels for linearity, specificity and recovery have been developed to measure the purity of technical material and the levels of impurities in technical material.

Validated analytical methods (based on GC –EC/MS, GC-MS, GC-EC or LC-MS/MS) with acceptable levels for linearity, specificity and recovery have been developed to measure residues of fipronil and its metabolites in soil, drinking and surface water, in blood plasma, in plant and in foodstuff of animal origin.

2.1.1.2 Biocidal product:

Identification of the product

Trade name	Goliath gel	
Ingredient of preparation	*Function*	*Content*
Fipronil	Active substance	0.05 % w/w
Formulants	Details on the composition of the product are confidential.	
Physical state of preparation	Aqueous based gel	
Nature of preparation	Ready to use gel bait	

Physico-chemical properties

The biocidal product, Goliath Gel is a ready to use light brown aqueous-based gel containing 0.05% fipronil. It is acid (pH=5.83-5.98 at 21°C). It is neither flammable nor auto-flammable, has

no oxidising or explosive properties. A storage stability study shows that it remains stable in its commercial container for up to three years.

Analytical methods for determination and identification

Validated analytical method (based on HPLC-UV) with acceptable levels for linearity, specificity and recovery has been developed to measure the quantity of active ingredient in Goliath Gel.

2.1.2 Intended Uses and Efficacy

2.1.2.1 Field of use / function / Mode of action

2.1.2.1.1 Field of use

The reference product Goliath Gel is an insecticide (PT 18) used for preventive and curative treatment against cockroaches. The product is a ready to use with a fipronil concentration of 0.05%. The product is contained in sealed cartridges, and applied as droplets (approximately 0.03 g each) related to the level of infestation and the cockroach's species. The table below presents the application rate for which an efficacy has been demonstrated

Normal rate (low infestation)	
German cockroach (*Blattella germanica*)	one spot of 0.03 g gel per square metre = 15 µg/m² ai
Oriental or American cockroach (*Blatta orientalis or Periplaneta Americana*)	two spots of 0.03 g gel per square metre = 30 µg/m² ai
High rate (high infestation)	
German cockroach (*Blattella germanica*)	two spots of 0.03 g gel per square metre = 30 µg/m² ai
Oriental or American cockroach (*Blatta orientalis or Periplaneta Americana*)	three spots of 0.03 g gel per square metre = 45 µg/m² ai

It is stipulated to apply Goliath Gel in cracks and crevices, or in concealed locations inaccessible to man or domestic animals and protected from cleaning event. Goliath Gel is used indoors by professional pest control operators (PCO) for the control of cockroaches in industrial, domestic and public buildings.

2.1.2.1.2 Function

The active substance fipronil is claimed as an **insecticide** against cockroaches**.**

2.1.2.1.3 Mode of action

The mode of action of Goliath Gel is a contact/ingested insecticide acting on the nervous system, blocking the GABA regulated chloride channel. It leads to reduce cockroach infestations through the death of insects consuming the bait.
According to Harald at al.[5], there was no significant difference in acute or residual activitybetween the racemic mixture and the individual enantiomers of fipronil.

2.1.2.2 Objects to be protected, Target organisms

Laboratory and field tests under a variety of use conditions have well demonstrated the efficacy against cockroaches:

- German cockroach *(Blattella germanica)*,
- Oriental cockroach *(Blatta orientalis)*,
- American cockroach *(Periplaneta americana)*.

2.1.2.3 Resistance

Studies on the heritability of fipronil resistance show that some resistance cases have previously been reported, which might impair the fipronil efficacy. An integrated resistance strategy management plan for fipronil is recommended at the product authorisation level (for e.g. alternative use of product that contains other active substances) .

5 Harald B. Teicher, Britt Kofoed-Hansen, and Niels Jacobsen. Insecticidal activity of the enantiomers of fipronil. Pest.Manag.Sci. 59 (12):1273-1275, 2003.

2.1.3 Classification and Labelling

Classification and labelling (active substance)

2.1.3.1 Current classification of the active substance

The classification and labelling of the active substance fipronil in accordance with Annex I of Council Directive 67/548/EEC (30th ATP) are given in Table 2.1.3.1-1.

Table 2.1.3.1-1: Classification and labelling of the active substance fipronil indicated by the applicant

Classification:	According to Annex I of Council Directive 67/548/EEC T Toxic N Dangerous to the Environment
Class of danger:	Toxic by inhalation, in contact with the skin and by ingestion Very toxic to aquatic organisms
Risk phrases:	R23/24/25 Toxic by inhalation, in contact with skin and if swallowed R48/25 Toxic: danger of serious damage to health by prolonged exposure if swallowed R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
Safety phrases:	S1/2 Keep locked up and out of the reach of children S28 After contact with skin, wash immediately with plenty of water S36/37 Wear suitable protective clothing and gloves S45 In case of accident or if you feel unwell seek medical advice immediately (show the label where possible) S60 This material and its container must be disposed of as hazardous waste 61 Avoid release to the environment. Refer to special instructions/safety data sheet

2.1.3.2 Proposed classification of the active substance

The above classification is accepted and is compliant with Council Directive 67/548/EEC (30th ATP) as amended on the classification packaging and labelling of dangerous substances.

Proposed classification of the substance according to Regulation 1272/2008:

Classification according to CLP regulation	AcuteTox. 3; STOT Rep.1 N Dangerous to the Environment Aquatic Acute 1 Aquatic Chronic 1
Hazard Statement	H301: Toxic if swallowed H311: Toxic in contact with skin H331: Toxic if inhaled H372: Causes damage to organs (central nervous system) through prolonged or repeated exposure H400 Toxic to aquatic life H410 very toxic to aquatic life with long lasting effects M-factor : 1000

Classification, packaging and labelling (product)

The classification and labelling of the biocidal product, Goliath Gel, according to Directive 1999/45/EC is given in Table 2.1.3.3-1.

Table 2.1.3.3-1: Proposed classification and labelling of Goliath Gel

Classification	As in Directive 1999/45/EC
Class of danger	None
R phrases	R52/53 Harmful to aquatic organisms, may cause long term adverse effects in the aquatic environment
S phrases	S2 Keep out of the reach of children S13 Keep away from food, drink and animal feedingstuffs S20/21 When using do not eat, drink or smoke S49 Keep only in original container

Classification according to CLP regulation	Aquatic Acute 1 Aquatic Chronic 1
Hazard Statement	H400 Toxic to aquatic life H410 very toxic to aquatic life with long lasting effects

2.2 SUMMARY OF THE RISK ASSESSMENT

2.2.1 Human Health Risk Assessment

2.2.1.1 Hazard identification

Fipronil is toxic by inhalation, in contact with skin and if swallowed.

It is not a skin or eye irritant and not a skin sensitiser.

In toxicity studies with fipronil, clinical signs of toxicity were observed that are consistent with its interaction at the GABA-gated chloride channel in the nervous system. These neurological clinical signs are noted in all species tested and in general, rats showed recovery following cessation of treatment. No histopathological findings are observed in the nervous system after acute, chronic or perinatal exposures to fipronil.

Other evidences of fipronil toxicity include changes in the liver of mice and rats, and the induction of follicular cell tumours in the rat thyroid at high dose levels.
The absence of a genotoxicity/mutagenicity potential of fipronil was demonstrated in a battery of *in vitro* and *in vivo* tests. Mechanistic studies indicated that the thyroid tumours occur via a rat-specific, non-genotoxic (threshold) mechanism involving the disturbance of the hypothalamic-pituitary-thyroid axis. The sensitivity of the rat to the induction of thyroid tumours compared to the relative insensitivity noted in other species is well known and indicates that these lesions have no practical relevance for human risk assessment.

No evidence developmental toxicity or of impaired fertility was found in reproduction toxicity studies with fipronil.

2.2.1.2 Effects assessment

Toxicokinetics

- Absorption

Fipronil is rapidly and extensively absorbed after oral intake. An oral absorption estimate of approximately 90% was actually estimated from radiolabelled recoveries in urine, bile and tissues within 72 hours following oral gavage treatment with 4 mg/kg bw radiolabelled fipronil. Thus, a default factor of 100% for oral absorption has been retained because the real value has not been determined.
For dermal exposure assessment, a factor of 11% was used, based on information available on fipronil formulations. This dermal absorption value is a conservative estimate based on an *in vitro* study carried out with a 100-fold dilution of a suspension concentrate (initially at 50 g/L) over 24h. The tested concentration was therefore 0.05% (m/m) which corresponds to the fipronil concentration in the representative product (Goliath Gel). Although not fully adapted for extrapolating the dermal absorption of a gel for which a skin contact duration will be much

shorter, this value was nevertheless considered as the most relevant for a conservative approach in the absence of any better data.

- Distribution

Fipronil is widely distributed with a preference for fatty tissues.

- Metabolisation

Fipronil is extensively metabolised.

- Elimination

Fipronil is slowly eliminated via both bile (metabolites) and faeces and urine (parent residue). The slow elimination appears to be partly due to the distribution of fipronil into fatty compartments and to the extent of gastrointestinal reabsorption of biliary excreted fipronil metabolites.

Acute toxicity

Fipronil is toxic by oral route (LD_{50} = 92 mg/kg bw in male rats), by dermal route (LD_{50} = 354 mg/kg bw in female rabbits) and by inhalation (LC_{50} = 0.36 mg/L in male rats exposed to air-milled fipronil for 4h). Accordingly, fipronil is classified as T, R25/24/23.

Local toxicity

Fipronil is neither a skin nor an eye irritant.
No study is available for respiratory irritation, but based on the different available data, fipronil is not expected to have a respiratory irritant potential.

Fipronil is not a skin sensitiser (negative results in a Magnusson and Kligman test and in a Buehler test).
No study is available for respiratory sensitisation, but based on the available data, fipronil is not expected to have a respiratory sensitising potential.

Repeated dose toxicity

When orally administered to Sprague-Dawley rats for 28 days, fipronil induced hepatic effects. From 100 ppm (corresponding to 12.6 and 12.9 mg/kg bw/d in males and females respectively), a follicular hypertrophy was observed in thyroid.
These target organs were confirmed in a 90-day study in the same strain since a tendency towards higher liver and thyroid weights were observed from 30 ppm (corresponding to 1.9 and 2.3 mg/kg bw/d in males and females respectively). At the next higher dose of 300 ppm (corresponding to 20 and 24 mg/kg bw/d in males and females respectively) a fat deposition in male liver was observed together with a thyroid follicular hypertrophy and follicular cell hyperplasia. On the basis of these observed effects, a NOAEL was set at 0.35 mg/kg bw/d, which is the average of values corresponding to 5 ppm in males and females (i.e. 0.33 and 0.37 mg/kg bw/d respectively).

Oral studies in Beagle dogs are also available. In a 90-day study, a reduction of food consumption and body weight in females exposed to 2 mg/kg bw/d was considered as a critical effect. Overt toxicity was reported at the next higher dose of 10 mg/kg/ bw/d. This consisted in inappetence, underactivity, hunched posture, emaciation and neurotoxicity (tremors and/or convulsions, head nodding, facial twitching, ataxia, exaggerated blink and gag reflexes). Based on these observed effects, the NOAEL was set at 0.5 mg/kg bw/d.
Two 1-year studies were performed showing significant toxicity including mortality, neurological effects characterised by convulsions, twitching or tremors, changes in behaviour (nervousness or aggression) and activity patterns and gait abnormalities, at dose levels of 1 to 5 mg/kg bw/d. Other signs were exaggerated rigidity or stiffness of limbs, ataxia, vocalisation, head nodding and resistance to dosing. There were no histopathological changes.
A NOAEL of 0.35 mg/kg bw/d was retained for deriving a medium-term AEL, based on the 1-year dog studies and the 90-day in rat study.
In a combined chronic/carcinogenicity study in rat, convulsive episodes were observed in a dose dependent manner at 1.5 ppm (corresponding to 0.059 and 0.078 mg/kg bw/d in males and females respectively) and above. Neurological signs were seen at 300 ppm and to lesser degree at 1.5 and 30 ppm. Moreover, functional and morphological changes were found in the liver, thyroid and kidney particularly at 30 and 300 ppm. **The NOAEL of 0.5 ppm (corresponding to 0.019 mg/kg bw/day) was chosen for deriving a long-term AEL.**
Another combined chronic/carcinogenicity study was conducted in mouse. Convulsions were recorded at 60 ppm and significantly low body weight gains were seen at 30 ppm. Liver was identified as the target organ characterised by an increase in organ weight correlated with histopathological changes in both sexes. The NOAEL was 0.5 ppm, corresponding to 0.055 mg/kg bw/d of fipronil in males and to 0.063 mg/kg bw/d in females.

Finally, one dermal 21-day study in rabbit was submitted. At 10 mg/kg bw/d, some animals showed one episode of extreme hyperactivity and bodyweight gain in both sexes and food consumption were reduced. The NOAEL was 5 mg/kg bw/d.

Genotoxicity

- *In vitro* tests

Fipronil gave negative results in Ames tests until cytotoxic doses, in a gene mutation assay in Chinese hamster cells (V79) and in a cytogenicity study in human lymphocytes. However, evidence of clastogenicity at cytotoxic concentrations with and without S9 mix following 6-h exposure was mentioned in Chinese hamster lung cells. No evidence was reported at lower concentrations or in cultures treated for 24- or 48-hours**.**

- *In vivo* tests

Three *in vivo* tests were conducted. Fipronil did not induce a clastogenic response in two micronucleus tests in mouse exposed to a single oral application of 1, 5 or 25 mg/kg bw or of 12.5, 25 and 50 mg/kg bw. Moreover, it did not possess a genotoxic potential in an UDS assay in primary hepatocytes from treated rats.

Fipronil does not seem to be mutagenic with *in vitro* and *in vivo* tests.

Carcinogenicity
Fipronil is not carcinogenic in mice. In rats, exposure to fipronil for 89/91 weeks, has led to increased incidences of thyroid tumors at 300 ppm (corresponding to 12.68 and 16.75 mg/kg bw/d in males and females). It is known that rats are especially sensitive to generate this tumor type. Additional mechanistic studies have suggested that the rat thyroid tumors are induced by a mechanism which is not relevant for humans (thyroid follicular cell tumours due to a rat specific non-genotoxic mechanism), therefore it was concluded that fipronil is not a likely human carcinogen,

Toxicity on the reproduction and teratogenicity

- Developmental toxicity

In two oral teratogenicity studies in rat and rabbit, fipronil did not induce adverse effects in foetus. The only effect observed in dams was reduced bodyweight gain. The NOAEL for maternal toxicity were 4 and 0.2 mg/kg bw/d for rat and rabbit, respectively the NOAEL and for developmental effects, were 20 and 1 mg/kg bw/d for rat and rabbit, respectively.

- Fertility

An oral two-generation reproduction study was conducted in rat. Toxicity on the liver and on the thyroid at 30 ppm (corresponding to 2.54 mg/kg bw/d for males or 2.74 mg/kg bw/d for females) and above, a decreased body weight gain and food consumption and a neurotoxicity with mortality at 300 ppm (approx. 25 mg/kg bw/d for males or 27 mg/kg bw/d for females) were reported.
A slightly reduced mating performance and fertility index of F1 parents were reduced at toxic dose of 300 ppm. A reduced viability, a neurotoxicity and a delayed development were observed in offspring, in the presence of parental toxicity at 300 ppm.
The NOAEL for systemic toxicity was 3 ppm (equivalent to 0.25 mg/kg bw/d for males or 0.27 mg/kg bw/d for females). The NOAEL for reproductive and developmental toxicity was 30 ppm (equivalent to 2.54 mg/kg bw/d for males or 2.74 mg/kg bw/d for females).

Fipronil is not a reproduction toxicant and is not regarded as a teratogenic substance.

Neurotoxicity
Fipronil has shown to be neurotoxic in all species tested in single and/or repeated-dose toxicity studies. The observed clinical symptoms are consistent with fipronil's mode of action at the GABA-gated chloride channel in the central and peripheral nervous system. Specific neurotoxicity studies have shown that the neurotoxicity of fipronil is of a pharmacological nature and repeated exposure does not lead to histopathological changes in the brain or other parts of the nervous system.
The NOAEL of 2.5 mg/kg bw from an acute neurotoxicity study was chosen for deriving a acute-term AEL. It is based on reduction of hind-leg splay at the higher doses of 5 and 7.5 mg/kg bw at 7 hours post dosing.

Human data
Several effects such as headache, nausea, vomiting, dizziness and weakness were mentioned after ingestion. Some cases of toxicity on central nervous system were also reported after ingestion of fipronil. After inhalation or eye contact, irritation was observed.

Therapy is based on barbiturates and benzodiazepines.

2.2.1.3 Exposure assessment

Exposure was assessed for the fipronil-containing insecticide product, Goliath Gel. Both primary and secondary exposures were taken into account.
Goliath Gel is to be applied indoors by professional pest control operators (PCO) in cracks and crevices, or in concealed locations inaccessible to man or domestic animals. The product is contained in sealed cartridges, which are designed to be used with a bait gun applicator as small spots. The cartridge is locked into the applicator and an appropriate application tip is attached. The product is applied as droplets of approximately 0.03 g each. The application rate is of one to three spots (0.03 g of gel) per square metre.

Table 2.2.1.3-1: Summary of human exposure paths to Goliath Gel

Exposure path	Industrial use	Professional use	General public
Inhalation	Not applicable	Negligible	Negligible
Dermal	Not applicable	Direct exposure	Indirect exposure only (infants and young children)
Oral	Not applicable	Not relevant	Indirect exposure only (infant)

Professional exposure
In the absence of available models and default exposure data, a worst-case scenario was assumed, describing the possible dermal exposure in the course of changing the needle of the application gun. Two cases are identified. The first one is the treatment of 35 apartments in the same building and the needle of the application is changed at the end of the day leading to a daily deposition of 6 droplets (180 mg) of product on the hand of the operator. The second one is the treatment of 8 apartments but in different buildings and the needle is changed between each treatment leading to a daily deposition of 8 droplets (240 mg) of product on the hand of the operator.

Table 2.2.1.3-2: Results of the exposure assessment for professional operators

Intended use (MG/PT)	Exposure scenario	Frequency	Tier PPE	Inhalation uptake	Oral uptake	Dermal uptake
MG03/PT18	Changing the needle on the application gun after treatment of 35 apartments in the same building	Once a day Up to 3 days a week Whole year Considered as medium term exposure	Tier 1 None	Negligible	Not relevant	1.7×10^{-4} mg/kg bw/d
MG03/PT18	Changing the	Once a day	Tier 1	Negligible	Not	

	needle on the application gun between each treatment for 8 apartments in different buildings	Up to 3 days a week Whole year Considered as medium term exposure	None		relevant	$2.2x10^{-4}$ mg/kg bw/d

Non-professional exposure

Goliath Gel is to be used by professional operators only.

Secondary exposure
No direct contact to the placed gel should occur since the product is to be applied in cracks, crevices or other inaccessible places. Inhalation uptake is negligible as the vapour pressure is very low. Dermal exposure of adults and older children is not to be expected, and could result only in the case of deliberate misuse. However, infants and young children could possibly get access to the product or be exposed to gel that has become dislodged from treated places. Thus, acute dermal exposure is possible. The worst-case scenario leads to the exposure to 3 droplets of product. Acute oral intake by an infant is also by hand-to-mouth transfer.

Table 2.2.1.3-3: Results of the secondary exposure assessment

Intended use (MG/PT)	Exposure scenario	Inhalation uptake	Oral uptake	Dermal uptake	Total uptake
MG03/PT18	Infant coming in contact with droplets of product and ingesting a part of it	Negligible	Acute: 0.00045 mg/kg bw	Acute: 0.0005 mg/kg bw	Acute: 0.0009 mg/kg bw
MG03/PT18	Young child coming in contact with droplets of product	Negligible	Negligible	Acute: 0.00025 mg/kg bw	Acute: 0.00025 mg/kg bw

2.2.1.4 Risk characterisation

The human health risk characterisation is performed using both the AEL and the MOE approaches.
Furthermore, as no uses are intended in animal housing or in food contact, no Acceptable Daily Intake (ADI) was derived to perform a dietary risk assessment for human consumers of food of animal origin. Actually, although the product may be applied in occupied premises, except during cooking activities, it is recommended to apply it in cracks and crevices, or in concealed locations inaccessible to man or domestic animals: behind refrigerators cupboards and shelves, under kitchen appliances (the application on hoods has not been evaluated), in electrical control boxes, voids and ducting and under bathroom fixtures etc. Furthermore, spots should not be applied in areas where it will become submersed or likely to be removed by routine cleaning.

AELs determination

For each exposure scenario, an appropriate AEL is determined on the basis of the exposure frequency.
Accordingly, three types of AELs are classically derived: $AEL_{acute\text{-}term}$, $AEL_{medium\text{-}term}$ and $AEL_{long\text{-}term}$ corresponding to acute-, medium- and long-term exposures respectively.
AELs are usually derived by applying the following formula:

$$AEL = \frac{NOAEL}{Assessment\ factors}$$

In the case of fipronil, the $AEL_{acute\text{-}term}$ was derived on the basis of the NOAEL of 2.5 mg/kg bw/day obtained in an acute neurotoxicity study[6].
The $AEL_{medium\text{-}term}$ was based on the 90-day oral rat study and the 1-year oral dog study in which the NOAEL was 0.35 mg/kg bw/day.
Finally, the $AEL_{long\text{-}term}$ was derived on the basis of the NOAEL of 0.019 mg/kg bw/day from the combined chronic/carcinogenicity rat study. This latter AEL was derived for completeness only, as far as no chronic exposure to fipronil is expected through PT18 uses.

As fipronil did not induce any local effects by dermal and inhalation route, no local AEC was derived.

Regarding the assessment factors, a default value of 100 (including an inter-species factor of 10 and an intra-species factor of 10) was applied. This value is used as the reference margin of exposure (MOE_{ref}).

The following AELs were therefore derived, taking into account a default value of 100% for oral absorption:

- $AEL_{acute\text{-}term}$ = 2.5 / 100 = 0.025 mg/kg bw/day
- $AEL_{medium\text{-}term}$ = 0.35 / 100 = 0.0035 mg/kg bw/day
- $AEL_{long\text{-}term}$ = 0.019 / 100 = 0.0002 mg/kg bw/day

In the AEL approach, a risk is considered as acceptable if AEL > exposure.
In practice, exposure is expressed as a percentage of the AEL (%AEL). The risk is therefore considered as acceptable if %AEL < 100.

In the MOE approach, a risk is considered as acceptable if MOE > MOE_{ref} (where $MOE = \frac{NOAEL}{Exposure}$).

Risk characterisation for primary exposure scenarios

[6] In the PPP dossier (Conclusion regarding the peer review of the pesticide risk assessment of the active substance, 2006), the ARfD was set at 0.009 mg/kg bw/d on the basis of a developmental neurotoxicity study in rats exposed for three weeks (Mandella, 1995), which was not submitted under the BPD. The BPD dossier had been considered as complete, containing relevant data permitting to assess the risks. This study was not considered as the most relevant for setting the acute AEL because of the accidental nature of the secondary exposure scenarios. In these conditions, an acute neurotoxicity study has been preferred for the evaluation.
In addition, the calculation of the risk with this value of 0.009 mg/kg bw/d would not modify the outcome of the risk characterisation (still acceptable). Indeed, the exposure expressed in % of AEL is much lower than 100%, for the infant coming in contact with droplets and ingesting a part of it (10%) and also for the child coming in contact with droplets (3%).

Professional users

The %AELs and the MOEs were calculated for application exposure periods as below:

Table 2.2.1.4-1: Summary of Risk Assessment for professional users

Exposure Scenario		Total systemic exposure (mg/kg bw/day)	NOAEL (mg/kg.bw day) AEL (mg/kg.bw day)	MOE_{ref}	MOE	%AEL
Tier 1 (no PPE)	Application: Changing the needle on the application gun after treatment of 35 apartments in the same building (medium term)	$1.7x10^{-4}$	NOAEL: 0.35 $AEL_{medium-term}$: 0.0035	100	2059	5%
Tier 1 (no PPE)	Application: Changing the needle on the application gun between each treatment for 8 apartments in different buildings (medium term)	$2.2x10^{-4}$	NOAEL: 0.35 $AEL_{medium-term}$: 0.0035	100	1591	6%

The results demonstrate that the use of Goliath Gel as a spot treatment for the control of cockroaches poses no unacceptable risks, during the changing of the needle on the application gun after treatment of 35 apartments in the same building or during the changing of the needle on the application gun between each treatment for 8 apartments in different buildings.

The %AEL in the Tier 1 (without gloves) are lower than 100% and the calculated MOE (2059 and 1591) are much higher than the MOE ref (100), thus, the risk is considered as acceptable.

Non-professional users

This product is for use by professional users only therefore there is no exposure to non-professional users.

Risk characterisation for secondary exposure scenarios

The %AELs and the MOEs were calculated for secondary exposure as below:

Table 2.2.1.4-2: Summary of Risk Assessment – Secondary Exposure

Exposure Scenario		Total systemic exposure (mg/kg bw/day)	NOAEL (mg/kg.bw day) AEL (mg/kg.bw day)	MOE_{ref}	MOE	%AEL
Tier 1 (no PPE)	Infant coming in contact with droplets of product and ingesting a part of it	0.0009	NOAEL: 2.5 $AEL_{acute-term}$: 0.025	100	2778	4%
Tier 1 (no PPE)	Child coming in contact with droplets of product	0.00025	NOAEL: 2.5 $AEL_{acute-term}$: 0.025	100	10000	1%

The results summarised in Table 2.2.1.4-2, demonstrate that 3 Goliath Gel drops do not pose significant risk to children and infants by dermal contact with ingestion of a part of it. The MOE (2778 for infants and 10000 for children) are much higher than the MOE ref (100). Moreover the %AELs are much lower than 100%.

In conclusion, the risks of indirect exposure as a result of use of fipronil in Goliath Gel, under the conditions specified above, are then considered as acceptable.
There is no cause of concern and no further refinement is necessary.

Combined Exposure
Combined exposure is unlikely to occur. An adult would have to be a professional pest-control operator, who lives in a home which has been subject to pest-control measures with the Goliath Gel. Due to its very low vapour pressure, the exposure by inhalation is considered as negligible and so the risk for an adult living in a recently treated home.
It is therefore justified to individually assess the risk associated with each of the exposure scenarios rather combining all potential exposures.
For children and infants, combined exposure is also irrelevant because these subpopulations are exposed only indirectly.

Overall conclusion of the risk characterisation for human health
No unacceptable risk was identified for professional applying fipronil as gel spots in cracks and crevices, or in concealed locations inaccessible to man or domestic animals.

The indirect exposure of infants and children to fipronil by ingestion (scenario considered as a worst case for secondary exposures) does not induce any unacceptable risk.

2.2.2 Environmental Risk Assessment

2.2.2.1 Fate and distribution in the environment

Degradation

Biodegradation
Ready biodegradation
Fipronil attained 47% degradation after 28 days in Ready Biodegradability study OECD 301B (CO_2 evolution test). Fipronil cannot be considered readily degradable under the strict terms and conditions of the OECD guidelines.

Aerobic degradation
Biodegradation in water/sediment systems
A [^{14}C]-fipronil degradation in two water/sediment systems showed that in an aerobic aquatic environment, fipronil partitions steadily into the underlying sediment where it degrades partly by reduction to MB 45950. MB 45950 is further degraded by hydrolysis to MB 46126. Fipronil is also hydrolysed to RPA 200766 and, to a much lesser extent oxidised to MB 46136. There is evidence than RPA 200766 and MB 46136 are further transformed to RPA 105320 via oxidation or hydrolysis respectively. MB 46126 reaches a max. 6.33% in water and max. 6.48% in sediment. Amongst all those metabolites identified, RPA 200766 is a major metabolite in water (max. 20%) and MB 45950 is a major metabolite in sediment (max. 54.69% at 163 days). Two others water/sediment degradation studies were provided from the PPP dossier. The results of one study showed that the majority of the test substance, [14C]-fipronil, was rapidly transferred/adsorbed to the sediment within 7 days of incubation with less than 4% in the water phase after 7 days. The half-life of [^{14}C]-fipronil under aerobic aquatic conditions was 14.5 days. MB 45950 was found as the major metabolite in the sediment and accounted for <1% in the water phase. The results of the other study showed that fipronil was readily degraded in aerobic water with anaerobic sediment systems with DT50 values in the water of less than 14 days and in the total system less than 35 days. Fipronil was the only major component found in the water. It rapidly transferred to the sediment (up to 20 to 40% of applied) and was reduced to MB 45950 which was the major metabolite in the sediment, which undergoes further degradation.
The geometric mean degradation half-lives were calculated based on these values for water and total system compartments as follows: DT50 water = 23.13 days at 12°C (12.19 days at 20°C); DT50 total system = 61.69 days at 12°C (32.53 days at 20°C).

Biodegradation in soil systems
In studies of [^{14}C]-fipronil degradation in six soils (at 20°C) and two soils (at 10°C), fipronil was degraded under aerobic conditions by hydrolysis to RPA 200766 (38.44%) and by oxidation to MB 46136 (34.34%); these two compounds were considered as major metabolites in soil. The

reduced metabolite MB 45950 was found in minor quantities (<10%), except in one soil (16.99%). The rate of degradation was temperature dependent with more rapid degradation at 20°C than 10°C. The rate of degradation was also related to the soil microbial biomass activity.

For risk assessment purposes for soil, the geometric mean value from all the submitted studies (with converted half-lives at 12°C) was calculated. This DT_{50} value of 334 days was used for risk assessment purposes

Abiotic degradation
At pHs 5 and 7, TLC and HPLC data showed that fipronil was hydrolytically stable. At pH 9 fipronil is unstable with only RPA 200766 as breakdown product. At this pH, the rate of conversion is best modelled by pseudo-first order kinetics with at 25°C a half-life of 28 days and a rate constant k = 0.0243 day^{-1}, and at 12°C a half-life of 76.2 days and a rate constant k = 0.009 day^{-1}.

Two major degradation products were formed during photolysis in water. The major organic extract photo-product was MB 46513 (43.4 % of the applied radioactivity) and a minor component (HPLC RT = 2 min) accounting for 4.0% of applied radioactivity. The aqueous extract photo-products RPA 104615 and a minor component (HPLC RT = 3.3 min) accounted for 8.2 and 5.6% of applied radioactivity, respectively. The kinetics of photolytic degradation were first order with a half-life of 3.63 hours under the xenon lamp corresponding to 0.33 days of summer sunlight in Florida and a rate constant k = 0.0176 $days^{-1}$. Photolysis can be considered as a significant route of fipronil degradation when it reaches the aqueous environment.

Distribution

Adsorption onto / desorption from soils
The soil adsorption/desorption properties of [^{14}C]-fipronil were investigated using five European soil types using the slurry technique. The adsorption constants (K) obtained ranged from 4.19 in a UK sandy loam to 20.69 in a UK loam. The value of K increased with increasing organic carbon content of the soil suggesting that more fipronil was adsorbed. The K_{OC} values obtained ranged from 427 to 1248 with a mean of 727. The Freundlich desorption constants increased with the increasing desorption cycles, the results suggest that the adsorption was reversible with similar processes involved in desorption as in adsorption. The results of this test indicated that fipronil is unlikely to demonstrate significant mobility in soil due to its relatively high sorption to soil. According to McCall's designation, fipronil would be expected to show medium to low mobility.

Field soil dissipation
The environmental behaviour of fipronil and its metabolites was studied following the soil incorporation of an experimental wettable powder at two locations in Northern Europe.
The major metabolite found was MB 46136 (up to 40% of the applied quantity of fipronil after the first year of application) with significant amounts of RPA 200766 (up to 19% of the applied quantity of fipronil at day 174 after the first application). The amounts of MB 45950 found were only about 10 to 20% of MB 46136. Residues of the photolyte, MB 46513, remained below the limit of quantification (LOQ).

The same studies were conducted at two locations in Southern Europe.
Residues of fipronil declined to below LOQ by one year after application at both trial sites. No residues of the photolyte, MB 46513, were found which is consistent with soil incorporation of the parent compound.

Soil mobility
In a column leaching study on five European soils fipronil and its metabolites were shown to have a low mobility in soil.

Accumulation

Bioconcentration
The bioconcentration factor and bioaccumulation potential of [^{14}C]-labelled fipronil were measured in a fish species (bluegill, *Lepomis macrochirus*). The bioconcentration factor (BCF) estimated in whole fish was 321. Uptake residues were rapidly and nearly completely (>99%) eliminated from whole fish within the 14-day depuration phase. Using samples of fractions, muscle and viscera obtained in this fish bioaccumulation study, analyses were carried out to identify and quantify metabolites. Results indicate that MB 45950 and MB 46136 were the major metabolites detected in fish tissues after uptake of fipronil and that all metabolites were rapidly eliminated.

2.2.2.2 Effects assessment

2.2.2.2.1 Effects on aquatic species

Aquatic compartment

Acute and chronic toxicity to fish
The acute toxicity of fipronil to juvenile Bluegill sunfish (*Lepomis macrochirus*) was studied under laboratory conditions during 96 hours of flow-through exposure. The 96-h LC_{50} was calculated at 85.2 µg a.s./L. The chronic toxicity of fipronil to rainbow trout (*Oncorhynchus mykiss*) was investigated during an early life-stage exposure in a 90-day (60-day post hatch) flow through test. The NOEC was 15 µg a.s./L.

Acute and chronic toxicity to invertebrates
Daphnids are less sensitive to fipronil than other invertebrates, particularly insects. Therefore, testing with fipronil has been conducted on additional species of aquatic invertebrates, including insects. The acute toxicity of fipronil to the Mayfly *Hexagenia spp* was studied in a 96-h static renewal laboratory test. The 96-h LC_{50} value derived from this study was calculated to be 0.44 µg a.s./L.
The lowest chronic NOEC value was found at 0.121 µg a.s./L from a spiked-water test with *Chironomus riparius*.

Growth inhibition in algae and aquatic plant toxicity
The algae static activity of fipronil was measured in a 96-h laboratory study using *Scenedesmus subspicatus*. The E_bC_{50} was determined to be 68 µg a.s./L. The NOE_rC was 40 µg a.s./L. The

toxicity of fipronil to the freshwater macrophyte *Lemna gibba* was studied in a 14-day static limit test in the laboratory. There were no effects at the concentration tested. Therefore, the 14-d EC_{50} of fipronil in *Lemna gibba* is > 0.081 mg a.s./L (geometric mean) and the 14-d NOEC is 0.081 mg a.s./L.

Inhibition to microbiological activity
The effects of fipronil on the microbiological activity in an aquatic medium with a mixed inoculum of microorganisms were studied in an activated sludge respiration inhibition test under laboratory conditions. The test substance was a straight formulation of fipronil containing 788 g fipronil/kg. The activity of activated sludge was not affected at the highest concentration tested; the toxicity values derived from this study are: 3-h EC_{50} > 1000 mg a.s./L and NOEC 1000 mg a.s./L.

Sediment dwelling organisms

According to the TNsG on data requirements, the test using spiked-sediment is considered more appropriate than the test using spiked-water. Three studies on sediment dwelling organisms were submitted but only one was carried out according to the OECD guideline 218 "sediment-water chironomid toxicity test using spiked sediment".
The NOEC as determined by comparison with either the solvent control or the water control for development rate was 2.38 µg a.i./kg dry sediment and for emergence rate **1.39 µg a.i./kg dry sediment**. These biological results are based on mean measured concentrations. We considered the results of this study should be used to derive a PNECsediment

PNEC definition for aquatic compartments
$PNEC_{surfacewater}$ was calculated from the lowest available freshwater NOEC (*Chironomus riparius* 28-d, NOEC = 0.121 µg a.s./L) with an Assessment Factor (AF) of 10 as long-term toxicity NOECs are available for at least three species representing three trophic levels.

To define a **$PNEC_{sediment}$** according to the TGD for Risk Assessment (2003), an assessment factor of 10 was applied to the NOEC value (1.39 µg a.s./kg dry sediment) as a long-term test is available for the species *Chironomus riparius.*

According to the TGD for Risk Assessment (2003), and taking into account the available test with aquatic microorganisms (according to OECD guideline 209 with activated sludge, NOEC ≥ 1000 mg/L), an assessment factor of 10 can be applied to define a **$PNEC_{microorganisms}$**. Nevertheless as the PNEC defined was higher than the solubility limit of the molecule (3.35 $mg.L^{-1}$), $PNEC_{microorganisms}$.was set to the solubility limit.

The different PNEC for the aquatic compartments are summarized in Table 2.2.2.2–1

Table 2.2.2.2-1: PNEC for water compartments

Compartment	Test organisms Study type	NOEC		Assessment factor	PNEC
Surface water	*Chironomus riparius* static, spiked water, 28 d	0.12 µg/L		10	0.012 µg/L
Sediment	*Chironomus riparius*, spiked-sediment, 28-d	1.39 µg/kg (dry sediment)		10	$3.02\ 10^{-2}$ µg/kg (wet sediment)
STP	Activated sludge, respiration inhibition test	1000 mg/L		10	3.35** mg/L

* PNEC wet sediment = (PNEC dry sediment * Fsolidsusp * RHOsolid) / RHOsusp
** As the calculated PNEC is higher than the limit of solubility for fipronil = 3.35 $mg.L^{-1}$, $PNEC_{microorganisms}$ was set to this limit of solubility.

2.2.2.2.2 Atmosphere

The atmosphere is not a relevant compartment for fipronil due to the intended indoor use and application. In addition, fipronil is very unlikely to reach the air due to a low vapour pressure value (less than 2×10^{-6} Pa).

2.2.2.2.3 Terrestrial compartment

Effects on soil micro-organisms
The effects of fipronil on the inhibition of the microbiological activity in natural soil were studied in the laboratory following exposure for 28 days. There were no adverse effects on soil respiration or nitrogen turnover at the two rates tested, which were equivalent to soil concentrations of 0.133 and 0.667 mg a.s./kg soil. Therefore, the NOEC (inhibition effects below 25%) was 0.667 mg a.s./kg soil.

Toxicity to earthworms
The acute toxicity of fipronil to earthworms (*Eisenia foetida*) was measured in a laboratory study conducted over 14 days in artificial soil according to the OECD 207. The LC_{50} of fipronil was found to be greater than 1000 mg/kg. The NOEC was 1000 mg a.s./kg on the basis that no significant mortalities or adverse effects were observed after 14 days exposure.
The effects on reproduction and chronic toxicity of fipronil to earthworms (*Eisenia foetida*) were measured in a study conducted over 8 weeks of exposure in artificial soil. No adverse effects on survival, growth or reproduction were observed at any of the concentrations tested. The NOEC from this study was 1000 mg a.s./kg soil, the highest concentration tested.

Effects on non-target arthropods – Toxicity to non-target soil-dwelling arthropods
A worst-case laboratory study was carried out by exposing the soil-dwelling arthropod beetle *Aleochara bilineata* on treated quartz sand. Based on the results of all bioassays and on measured concentrations of fipronil and major metabolites in soil, acceptable effects were observed at a concentration corresponding to 0.243 mg total residues/ kg dry soil.

Effects on terrestrial plants
A seedling emergence and growth test has been conducted to assess the effects of fipronil on terrestrial plants. Endpoints of the study were effects on seedling emergence, plant fresh weight and phytotoxicity. Pre-emergence exposure to fipronil did not result in reduced seedling emergence for all plant species up to the highest tested concentration of 2.0 mg fipronil/kg dry soil. For all tested plant species no symptoms of phytotoxicity were observed. A slight reduction of plant fresh weight was observed for two plant species, *i.e. Brassica napus* and *Avena sativa*, resulting in a NOEC value of 0.5 mg fipronil/kg dry soil.

Effects on birds
The acute oral toxicity of fipronil to bobwhite quail *(Colinus virginianus)* was measured in a 21-d LD_{50} study following exposure to single dosing. The LD_{50} of fipronil in bobwhite quail was determined at 11.3 mg ai/kg bw.
The short-term dietary toxicity of fipronil to bobwhite quail *(Colinus virginianus)* was measured in a 22-d LC_{50} study. The LC_{50} was determined to be 48.0 mg a.s./kg diet and the NOEL was 19.5 mg a.s./kg diet.
The chronic toxicity of fipronil on the adults and reproduction performance of the bobwhite quail *(Colinus virginianus)* was measured in a 22-week dietary administration test in the laboratory. The study did not found direct adverse effects on reproductive parameters but parental toxicity. Based on the overall results of the study, the NOEC was 10 mg a.s./kg diet.

Effects on Honeybees - Acute toxicity
The acute oral and contact toxicity of fipronil to honeybees (*Apis mellifera*) was studies in the laboratory. The acute oral and contact LD_{50} determined were 0.00417 and 0.00593 µg a.s./bee, respectively.

$PNEC_{soil}$ definition
According to the TGD for Risk Assessment (2003), and taking into account the available test with the rove beetle which is the most sensitive species, an assessment factor of 10 can be applied to derive **$PNEC_{soil}$**.

Table 2.2.2.2-2: PNEC for soil organisms exposed to fipronil

Test organisms Study type	NOEC [mg a.s./ kg soil]	NOECstandard [mg a.s./ kg soil]	Assessment factor	PNECsoil [mg a.s./kg dry soil]	PNECsoil [mg a.s./kg wet soil]
Terrestrial plants (Avena sativa, Brassica napus) / Seedling emergence, plant fresh weight and phytotoxicity test	0.5	1.4*	10	0.14	0.123

* In order to allow the PNEC determination, results of the tests are converted to standard soil which is defined as a soil with an organic matter content of 3.4% using the following equation (TGD, part II, p. 116):
NOEC or L(E)C50(standard) = NOEC or L(E)C50 (exp) x (Fom (soil standard)/ Fomsoil (exp))
With: NOEC or L(E)C50 (exp) = NOEC or L(E)C50 in the experiment
Fom (soil standard) = fraction of organic matter in standard soil (0.034 as in the TGD, part II, p43)
Fomsoil (exp) = fraction of organic matter in the experimental soil.

PNEC for birds and mammals

The PNECbird and the PNECmammals calculations are therefore based on a long-term toxicity / reproduction study with bird and on a reproduction test on rat. According to the TGD for Risk Assessment (2003), and taking into account the duration of the test (2-generation), an assessment factor of 30 for bird can be applied and an assessment factor of 30 for rat can be applied. Thus, the following PNECoral are derived:

Table 2.2.2.2-3: PNEC for birds and mammals exposed to fipronil

Test organisms Study type	**Reference**	**NOEC [mg/kg diet]**	**Assessment factor**	**$PNEC_{top\ predator}$ [mg/kg diet]**
Long-term / toxicity and reproduction study Bobwhite quail (*Colinus virginianus)*	A7.5.3.1.3/01	10	30	0.33
Rat / Reproduction	A6.8.2/01 A6.8.2/02	30	30	1

2.2.2.3 PBT assessment

According to the PBT assessment in TGD, criteria for substance to be persistent are fulfilled when:

- T 1/2 in freshwater > 40 days or,
- T 1/2 in freshwater sediment > 120 days.

Results of biodegradation studies show that fipronil will degrade in an aerobic aquatic environment: the half-life of biodegradation of fipronil is 23.13 days at an average EU outdoor temperature of 12°C in freshwater.
Taking into account the studies submitted in the biocide dossier, fipronil will also persist in the soil compartment with a DT_{50} at 12°C which can reach 334 days which correspond to the geometric mean value from all the submitted studies.
Considering these results, **fipronil fulfills the P criterion**.
Nevertheless, under the plant protection products directive (91/414/EEC), several field studies were submitted and assessed. At the biocidal product authorisation stage, the persistency criteria should be re-assessed if these studies are submitted, and if the studies adequately describe the degradation, the conclusion on the persistency criteria should be modified accordingly if needed.

According to the PBT assessment in TGD, a substance is considered to fulfill the B criterion when the bioconcentration factor (BCF) exceeds a value of 2 000 L/kg.
In a BCF study done with *Lepomis macrochirus*, the steady-state BCF for uptake of fipronil estimated in whole fish was 321 L/kg.
Considering this result, **fipronil is not selected according to the B criterion**.

According to the PBT assessment in TGD, the toxicity criterion is fulfilled when the chronic NOEC for aquatic organism is less than 0.01 mg/L or when the substance is toxic to mammals and classified as Very Toxic or Toxic after oral dosing.
Based on ecotoxicity freshwater data on *Chironomus riparius*, NOEC (28 d) = 0.121 µg/L, and on ecotoxicity marine data on *Mysidopsis bahia*, NOEC (28 d) = 0.0077 µg/L, T criterion is fulfilled.

As the B criterion is not fulfilled, fipronil is not classified according the PBT assessment.

It should be noted that fipronil was listed in the document of the EU Commission on endocrine disrupting chemicals (Communication from the Commission to the council and the European parliament on the implementation of the Community Strategy for Endocrine Disrupters - a range of substances suspected of interfering with the hormone systems of humans and wildlife (COM (1999) 706) in Table 4 (Substances with insufficient data). Nevertheless, in 2007, the progress report of the European Commission on the Community Strategy for Endocrine Disrupters does not include fipronil in the range of substances suspected of interfering with hormone systems of humans and wildlife.

2.2.2.4 Exposure assessment

The notifier applied for an intended use of indoor application against cockroaches in domestic and public areas. Goliath Gel, applied as droplets in cracks and crevices or in concealed locations inaccessible to man or domestic animals, will be used exclusively by professional pest-control personnel. The main emission route of the product is via wastewater in sewage water treatment plants after the use as an indoor insecticide. Any immediate exposure of aquatic or sediment organisms can therefore be ruled out. The PEC values for surface water and sediment as secondary compartments were calculated. Direct contamination of the environment via the

pathways air, soil and groundwater is also considered negligible. However, STP sludge might be applied to soils and therefore, the PEC for soil and groundwater were also calculated.
The Predicted Environmental Concentrations for the active substance fipronil were defined according to the OECD 'ESD for insecticides, acaricides and products to control other arthropods (PT18) for household and professional uses'[7] considering that 4000 houses (130 m^2) and 300 larger buildings (609 m^2) are connected to the standard STP of the TGD. For the house scenario, it was stated that only substance applied in wet rooms (kitchen and bathroom) was directed to sewage treatment plant after cleaning (corresponding to about 30% of the treated surface). For the large building, the entire surface was considered to be subjected to cleaning.

2.2.2.5 Risk characterisation

Relevant metabolites
Summaries of metabolites' toxicity have been presented in Doc IIC and a comparison between toxicity and quantities found in the different compartments has been made in order to ensure that the risk assessment for the parent compound covers the risk for all the metabolites.
The comparison between the relative quantities of metabolites (major or minor) in the environment and the toxicity ratio fipronil/metabolites showed that a risk assessment carried out for fipronil covers the risk for all its metabolites (Document IIC, 13.6 Risk characterization of fipronil metabolites). Therefore risk characterization was presented only for the parent compound fipronil.

Summary of PEC/PNEC ratios for the different environmental compartments
To allow for a quantitative assessment of a potential risk for the environment when fipronil is applied as an indoor insecticide (PT18), the calculated PEC values are compared to the respective PNEC values for the different compartments, resulting in the following PEC/PNEC ratios:

Table 2.2.2.5-1: PEC/PNEC ratios for the different environmental compartments

Compartment	PEC/PNEC curative treatment	PEC/PNEC preventive treatment
Aquatic: - freshwater - sediment	 0.014 0.09	 0.005 0.03
Sewage treatment plant	$5.07\ 10^{-7}$	$1.68\ 10^{-7}$
Soil	$8.13\ 10^{-6}$	$2.71\ 10^{-6}$
Groundwater*	a.r.	a.r.
Air	n.r.	n.r.

*: The estimated PEC values for groundwater were compared to the drinking water limit for pesticide (0.1 µg/L) and were demonstrated to be below this concentration.
n.r. (not relevant)

[7] OECD ESD PT18 Household Professional Uses (July 2008)

a r. (acceptable risk)

Secondary poisoning:
The risk assessment was done with $PNEC_{oral/birds}$ as birds were demonstrated to be more sensitive to fipronil than mammals. The PNEC value is compared to the corresponding PEC values calculated for curative and preventive treatments.

Table 2.2.2.5-2: PEC/PNEC ratios for the secondary poisoning

Oral predator	PEC/PNEC curative treatment	PEC/PNEC preventive treatment
Aquatic	$8.21\ 10^{-5}$	$2.74\ 10^{-5}$
Terrestrial	$1.01\ 10^{-5}$	$3.67\ 10^{-6}$

Conclusions:
The PEC/PNEC ratios for curative or preventive treatment are below 1 for all the compartments. These results indicate that the risk can be considered acceptable for surface water, sediment, soil, sewage treatment plant, groundwater and predator considering the intended use of the product.

2.2.3 List of endpoints

In order to facilitate the work of Member States in granting or reviewing authorisations, and to apply adequately the provisions of Article 5(1) of Directive 98/8/EC and the common principles laid down in Annex VI of that Directive, the most important endpoints, as identified during the evaluation process, are listed in Appendix I: list of endpoints

2.2.4 Overall summary

Indoor gel application by professional operators (PCO) for the control of cockroaches in industrial, domestic and public buildings							
Human primary exposure	**Human secondary exposure**	**Aquatic compartment**	**STP**	**Terrestrial compartment**	**Groundwater**	**Air**	**Secondary poisoning**
Professional	**Consumer**						
Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

3 DECISION

3.1 BACKGROUND TO THE DECISION

With regard to human health, there is no scientific evidence of carcinogenic or mutagenic effects and adverse effects on reproduction and development of fipronil. The results of the risk assessment for primary exposure indicate that users will not be exposed to unacceptable levels of fipronil during the changing of the needle on the application gun after treatment of 35 apartments in the same building or between each treatment for 8 apartments in different buildings. In addition, the product is applied such that it will not normally result in indirect exposure and if residents (young children, infants) are exposed accidentally, they will not be exposed to unacceptable levels of fipronil.

Concerning the exposure of the environment and according to claimed intended uses, there are no direct emissions of fipronil to surface water, sediments and soil. Considering secondary emissions of fipronil consecutive to the cleaning of treated rooms, the risks are demonstrated to be acceptable for all the compartments considering the applied risk mitigation measures (a clear labelling on the way of using the product and especially on the locations where the product has to be applied: in concealed locations inaccessible to man or domestic animals, excluding areas liable to submersion or likely to be routinely cleaned).

The efficacy of fipronil as an insecticide against cockroaches *(Blattella germanica, Blatta orientalis, Periplaneta Americana)* has been demonstrated. Goliath Gel leads to reduce cockroaches infestations through the death of insects consuming the baits. Studies on the heritability of fipronil resistance show that some resistance cases have previously been reported, which might impair the fipronil efficacy.

The physico-chemical properties of the active substance and biocidal product are deemed acceptable for the appropriate use, storage and transportation of the active substance and biocidal product.

3.2 DECISION REGARDING INCLUSION IN ANNEX I

On the basis of the proposed and supported use, it is concluded that the proposed use of fipronil in insecticidal products fulfils the safety requirements laid down in Article 5(1) of Directive 98/8/EC.

It is therefore proposed that fipronil (CAS-No. 120068-37-3), from BASF Agro B.V., be included into Annex I of the Directive 98/8/EC as an active substance in insecticide products (product type 18), subject to the following specific provisions:

1. The active substance fipronil, as manufactured, shall have a minimum of purity of 950 g/kg.
2. The identity and the maximum content of impurities have to comply with the confidential part of the dossier.
3. Only professional use indoors by application in locations normally inaccessible to man and domestic animals after application has been addressed in the Union level risk assessment. When assessing the application for authorisation of a product in accordance with Article 5 and Annex VI, Member States shall assess, where relevant for the particular product, those uses or exposure scenarios and those risks to human populations and to environmental compartments that have not been representatively addressed in the Union level risk assessment.
    a. .

3.3 ELEMENTS TO BE TAKEN INTO ACCOUNT BY MEMBER STATES WHEN AUTHORISING PRODUCTS

3.3.1 Intended uses

Only professional application of the product, formulated as a gel, and efficacy against *Blattella germanica*, *Blatta orientalis*, *Periplaneta americana* have been claimed. Therefore, some additional risk assessment and efficacy tests should be required if necessary.

Fipronil can be applied in preventive and curative treatments against cockroaches in industrial, domestic and public buildings. Other uses would require further assessment at the product authorisation stage.

For professional users, the following particular conditions also apply:

- The operator must apply the product in cracks and crevices, in concealed locations inaccessible to man and domestic animals, in order to minimized the possibility of secondary exposure.
- Clear labelling must indicate where and when the product may be applied: in concealed locations normally inaccessible to man or domestic animals after application, in areas that are not liable to submersion or likely to be routinely cleaned, and not during cooking activities.

These provisions to be reported on Labels/SDS

When evaluating products containing fipronil, Member States should take into account cumulative exposure from biocidal uses of fipronil (in accordance with art. 10.1 to Directive 98/8EC) using agreed EU guidance where possible.

Should applications be made for authorisation of products containing fipronil that may lead to residues in food or feed, Member States shall verify the need to set new or to amend existing maximum residue levels (MRLs) according to Regulation (EC) No 470/2009 or Regulation (EC)

No 396/2005, and take any appropriate risk mitigation measures ensuring that the applicable MRLs are not exceeded.

3.3.2 Occupational safety measures

No occupational safety measures.

3.3.3 Environmental Protection measures

Releases should be avoided by a strict application of the product in concealed locations and not in areas liable to submersion or likely to be routinely cleaned.
Disposal of contaminated materials (e.g. cartridges, gloves) and dead insects should be specified by the applicant.

3.3.4 Persistency criteria

On the basis of data submitted for the propose of the annex I inclusion, fipronil shall be considered as persistent.
Nevertheless, under the plant protection products directive (91/414/EEC), several field studies were submitted and assessed. At the biocidal product authorisation stage, the persistency criteria should be re-assessed if these studies are submitted, and the conclusion on the persistency criteria should be modified accordingly if needed.

3.3.5 Resistance management strategy

The operator PCO have to be informed that the use of gel that contains fipronil should be alternated with other active substances.
An integrated resistance strategy management plan for fipronil is recommended as a risk of heritability of fipronil resistance has been demonstrated.
The final recommendations for an integrated resistance management plan for fipronil should contain the following elements:

- Rotation of mode of action - use other modes of action to remove resistant individuals from a population
- Proper dosage - fipronil should be applied at the correct dosage so as to achieve as complete a kill as possible. This “high dosage” strategy means that fewer insects will survive to pass on the resistance genes. This is especially effective when combined with a rotational scheme.
- Proper timing - Target the most susceptible stage of the pest and target the timing of applications for best control.
- Monitoring - Information from resistance monitoring programs allows early detection of problems and gives information for correct decision making
- There are currently cockroach control products, both sprays and gels, based on numerous different chemistries, including avermectin

3.4 REQUIREMENT FOR FURTHER INFORMATION

The evaluation has shown that sufficient data have been provided to verify the outcomes and conclusions of the risk assessment and permits the proposal for the inclusion of fipronil on to Annex I of the Directive 98/8/CE.

The conditions and the restrictions proposed are considered appropriate, and no further information is required.

3.5 UPDATING THIS ASSESSMENT REPORT

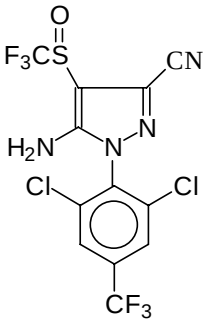
This assessment report may need to be updated periodically in order to take account of scientific developments and results from the examination of any of the information referred to in Articles 7, 10.4 and 14 of Directive 98/8/EC. Such adaptations will be examined and finalised in connection with any amendment of the conditions for the inclusion of fipronil in Annex I to the Directive.

APPENDIX I: LIST OF ENDPOINTS

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

Active substance (ISO Common Name)	Fipronil
Product-type	18

Identity

Chemical name (IUPAC)	(±)-5-amino-1-(2,6-dichloro-α,α,α,-trifluoro-p-tolyl)-4-trifluoromethylsulfinylpyrazole-3-carbonitrile (Isomeric ratio 1:1)
Chemical name (CA)	1H-Pyrazole-3-carbonitrile, 5-amino-1-[2,6-dichloro-4-(trifluoromethyl)phenyl]-4-(trifluoromethyl)sulfinyl]-
CAS No	120068-37-3
EC No	424-610-5
Other substance No.	CIPAC 581
Minimum purity of the active substance as manufactured (g/kg or g/l)	950 g/kg; 95 % w/w
Identity of relevant impurities and additives (substances of concern) in the active substance as manufactured (g/kg)	Chlorobenzene and 5-amino-1-(2,6-dichloro-4-(trifluoromethyl)phenyl)-1*H*-pyrazole-3-carbonitrile
Molecular formula	$C_{12}H_4Cl_2F_6N_4OS$
Molecular mass	437.15 g/mol
Structural formula	

Physical and chemical properties

Melting point (state purity)	204.1 – 204.5°C (99.7 %)
Boiling point (state purity)	At ca. 220°C decomposition started indicated by an exothermic effect and gas evolution at 238°C. No boiling point was observed. (99.7 %)
Temperature of decomposition	There is an exothermal decomposition of pure fipronil starting at 220°C (99.7 %)
Appearance (state purity)	White powder (96.6 %, 97.4%, 99.3%)
Relative density (state purity)	D^{20}_4 = 1.705 (99.8%)
Surface tension	72.5 mN/m at 20 °C at a concentration of about 2 mg/l (90% saturation) in distilled water (96.2% w/w)
Vapour pressure (in Pa, state temperature)	Fipronil substance, pure (99.4% w/w) Temperature: 25°C Result: < 2.0 x 10^{-6} Pa
Henry's law constant (Pa m^3 mol^{-1})	Fipronil substance, pure < 2.31 x 10^{-4} Pa.m^3 mol^{-1} at 25°C
Solubility in water (g/l or mg/l, state temperature)	Fipronil substance, pure (98.9%) at 20 °C 5.84 mg/l in deionised water (pH 5.7) 5.29 mg/l at pH 4 3.35 mg/l at pH 7 3.97 mg/l at pH 9 Fipronil substance, pure (99.3%) at 20 °C 3.78 mg/l in deionised water at pH 6.58
Solubility in organic solvents (in g/l or mg/l, state temperature)	Measurement performed at 20°C: solvent — g/l acetone — 545.9 methylene chloride — 22.3 ethyl acetate — 264.9 n-hexane — 0.028 methanol — 137.5 1-octanol — 12.2 2-propanol — 36.2 toluene — 3 No significant influence of temperature is expected.
Stability in organic solvents used in biocidal products including relevant breakdown products	Biocidal products of fipronil are not formulated in organic solvents.
Partition coefficient (log P_{OW}) (state temperature)	4.0 at 20°C, shake flask method, Fipronil (99.3%) 3.5 at 20°C, HPLC method, Fipronil (99.9%)

Hydrolytic stability (DT_{50}) (state pH and temperature)	pH 5 and 7: virtually stable pH 9: DT_{50}= 28 days at 25° ±1°C
Dissociation constant	All three methods of OECD 112 to determine dissociation constants (the titration method, the spectrophotometric method, and the conductometric method) are not suitable for the determination of the dissociation constant (pK_a) of Fipronil. No dissociation is expected in the pH range (4-9) based on structural considerations and lack of pH dependence of water solubility)
UV/VIS absorption (max.) (if absorption > 290 nm state ε at wavelength)	Molar extinction coefficients of the UV/VIS absorption maxima in methanolic solution: ε = 48385 $L.mol^{-1}.cm^{-1}$ (λ= 203 nm) ε = 7457 $L\ mol^{-1}.cm^{-1}$ (λ= 279 nm) ε = 7281 $L\ mol^{-1}.cm^{-1}$ (λ= 286 nm) Molar extinction coefficient at a wavelength above 290nm ε = 6008 $L\ mol^{-1}.cm^{-1}$ (λ= 291 nm)
Photostability (DT_{50}) (aqueous, sunlight, state pH)	3.63 hours (under a xenon lamp corresponding to 0.33 days of summer sunlight in Florida) at pH 5
Quantum yield of direct phototransformation in water at Σ > 290 nm	1.99×10^{-1} at 300nm.
Flammability	Not highly flammable or autoflammable up to 200°C
Explosive properties	Fipronil technical does not show a danger of explosion

Classification and proposed labelling

with regard to physical/chemical data	Not classified
with regard to toxicological data	T Toxic R23/24/25 Toxic by inhalation, in contact with the skin and if swallowed R48/25 Toxic: danger of serious damage to health by prolonged exposure if swallowed
with regard to fate and behaviour data	N Dangerous to the Environment
with regard to ecotoxicological data	R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Summary of intended uses

Object and/or situation	Member State or Country	Product name	Organisms controlled	Formulation		Application			Applied amount per treatment			Remarks
				Type	Conc. of as	Method kind	Number Min max	**Interval between applications**	**g as / L** **Min max**	Water L/m^2 Min max	g as / m^2 **Min max**	
Indoors by professional operators (PCO) for the control of cockroaches in industrial, domestic and public buildings*	**All**	**Goliath gel**	**Cockroaches** *Blattella germanica* *Blatta orientalis* *Periplaneta americana*	**RB**	**0.05% of fipronil**	**Placement of spots of gel (bait gun)**	**1-3 droplets (of 0.03 g each) / m^2**	**n.s.**	**n.a.** **The product is applied undiluted**		**0.000015 to 0.000045**	

n.a.: not applicable
n.s.: not specified

* Applicable in cracks and crevices, or in concealed locations inaccessible to man or domestic animals: behind refrigerators cupboards and shelves, under kitchen appliances, in electrical control boxes, voids and ducting and under bathroom fixtures etc. Spots should not be applied in areas where it will become submersed or likely to be removed by routine cleaning.

Chapter 2: Methods of Analysis

Analytical methods for the active substance

Technical active substance (principle of method)	HPLC with UV detection
Impurities in technical active substance (principle of method)	HPLC-UV (DAD)

Analytical methods for residues

Soil (principle of method and LOQ)	Fipronil and metabolites (MB 45950, MB 46136 and MB 46513) GC –EC/MS LOQ 0.002 mg/kg (for each analyte). Fipronil and metabolites (MB045950, MB046136, MB46513 and RPA200766) LC-MS/MS LOQ 0.002 mg/kg (for each analyte)
Air (principle of method and LOQ)	Not applicable
Water (principle of method and LOQ)	Drinking water Fipronil and metabolites (MB46513, MB45950 and MB46136) GC-MS (only confirmatory method for the GC-EC method) LOQ 0.05 µg/l (for each analyte). Fipronil and metabolites (MB 45950, MB46136 and MB46513) GC-EC LOQ 0.1 µg/l (for each analyte). Fipronil and metabolites (MB045950, MB046136 and MB46513) LC-MS/MS LOQ 0.004 µg/kg (for each analyte). Surface Water Fipronil and metabolites (MB46513, MB45950, MB46136) LC-MS/MS LOQ 0.004 µg/kg (for each analyte). Fipronil and metabolites (MB45950, MB46136 and MB46513) GC-EC LOQ 0.2 µg/l (for each analyte).
Body fluids and tissues (principle of method and LOQ)	Fipronil and metabolites (MB045950, MB046136 and MB46513) GC-EC Human plasma LOQ 50 µg/l for Fipronil, MB045950 and MB046136 and 2 µg/l for MB46513 Confirmatory method: Fipronil and metabolites (MB 46136, MB 45950) GC-EC Micro-pigs plasma LOQ 1ng/mL for Fipronil, 5ng/mL for MB45950 and 10ng/mL for MB46136
Food/feed of plant origin (principle of method and LOQ for methods for monitoring purposes)	Fipronil and metabolites (MB46136 and MB46513) GC-EC/MS

	LOQ 0.002 mg/kg (for each analyte).
Food/feed of animal origin (principle of method and LOQ for methods for monitoring purposes)	Fipronil and metabolites (MB46136, MB46513, MB045950 and RPA200766) LC-MS/MS (liver, fat, muscle, milk, kidney, egg) LOQ 0.0005 mg/kg (for each analyte). Fipronil and metabolites (MB45950, MB46136 and MB46513) GC-EC (not for fat) LOQ 0.002 mg/kg (for each analyte).

Chapter 3: Impact on Human Health

Absorption, distribution, metabolism and excretion in mammals

Rate and extent of oral absorption:	Approx. 90% (based on radiolabelled fipronil in urine, bile and tissues within 72 hours following oral gavage with 4 mg/kg bw radiolabelled Fipronil) Default factor retained : 100 %
Rate and extent of dermal absorption:	11% (this value applies to a ≥ 0.05% diluted formulation of fipronil. No dermal absorption study was conducted with the pure a.s.)8
Distribution:	Widely distributed in the tissues with predominance in fatty tissues.
Potential for accumulation:	Terminal elimination half-lives of *ca* 183 h (male rat) and 245 h (female rat)
Rate and extent of excretion:	Low dose (single or daily administration): Via faeces: 46 - 61% within 7 days Via urine+cage wash: 7 - 18% within 7 days Via bile: 7 within 72 hours Evidence of significant enterohepatic recirculation
Toxicologically significant metabolite(s)	M&B 46136 and M&B 45950

Acute toxicity

Rat LD_{50} oral	Male rat: 92 mg/kg bw	**T, R25**
Rat; Rabbit LD_{50} dermal	Rat: > 2000 mg/kg bw Female rabbit: 354 mg/kg bw	**T, R24**
Rat LC_{50} inhalation	Male rat (4-h, nose only, air-milled material): 0.36 mg/l air	**T, R23**
Skin irritation	Not a skin irritant	
Eye irritation	Not an eye irritant	
Skin sensitization (test method used and result)	Not a skin sensitiser (M&K, Buehler)	

Repeated dose toxicity

Species/ target / critical effect	All species: clinical signs of neurotoxicity Rat: liver (clin.chem. parameters, weight increase, hepatocellular hypertrophy) and thyroid (weight increase, follicular cell hypertrophy)
Lowest relevant oral NOAEL / LOAEL	90-day oral diet, rat NOAEL: 0.35 mg/kg bw/d LOAEL: 1.93 mg/kg bw/d (males) 2.28 mg/kg bw/d (females)
Lowest relevant dermal NOAEL / LOAEL	21-day (6 h/day, 5 days/wk, 3 wk), rabbit NOAEL: 5 mg/kg bw/d

8 in the PPP evaluation the use of the dermal absorption value for the concentrate (1%) rather than the dilution (11%) in operator exposure calculations is acceptable due to the fact that the operator is exposed to the concentrate, as water is added to the tank.

	LOAEL : 10 mg/kg bw/d
Lowest relevant inhalation NOAEL / LOAEL	Not determined
Genotoxicity	No genotoxic potential
Carcinogenicity	
Species/type of tumour	Rat: thyroid follicular cell adenomas and carcinomas not relevant for human risk assessment Mouse: no evidence of carcinogenicity
lowest dose with tumours	NOAEL: 30 ppm (1.27 / 1.61 mg/kg bw/d in males / females) LOAEL: 300 ppm in the diet (12.68 mg/kg bw/d in males; 16.75 mg/kg bw/d in females)
Overall LOAEL/NOAEL from the combined chronic/carcinogenicity study	NOAEL: 0.5 ppm (0.019 /0.025 mg/kg/d in males / females) LOAEL: 1.5 ppm (0.059 /0.078 mg/kg/d in males / females)
Reproductive toxicity	
Species/ Reproduction target / critical effect	2-generation rat: Slightly reduced mating performance / litter size in the presence of significant parental toxicity
Lowest relevant reproductive NOAEL / LOAEL	NOAEL: 30 ppm (2.54 mg/kg bw/d for males or 2.74 mg/kg bw/d for females) LOAEL: 300 ppm (approx. 25 mg/kg bw/d for males or 27 mg/kg bw/d for females)
Species/Developmental target / critical effect	Rabbit prenatal toxicity No evidence of developmental toxicity at maternally toxic dose levels (reduced body weight gain)
Lowest relevant developmental NOAEL / LOAEL	NOAEL: 1 mg/kg bw/d (highest dose) LOAEL: Not applicable
Neurotoxicity / Delayed neurotoxicity	
Species/ target/critical effect	Acute neurotoxicity, oral gavage, rat: Critical effect: transiently reduced hind-leg splay at LOEL; severe clinical signs of neurotoxicity (including convulsions and tremors) and mortality at high dose levels) 90-day neurotoxicity, oral diet, rat: Critical effect: reduced food consumption and body weight gain at highest dose level (150 ppm), no neurological effects observed
Lowest relevant developmental NOAEL / LOAEL.	Acute neurotoxicity, rat: NOAEL: 2.5 mg/kg bw LOAEL: 5 mg/kg bw 90-day oral neurotoxicity, rat

	NOAEL: 150 ppm (8.9 mg/kg bw/d, highest dose tested) LOAEL: not applicable

Other toxicological studies

Mechanism of thyroid carcinogencity in rat long-term study	Mechanistic studies demonstrated that the thyroid tumours occur via a rat-specific, non-genotoxic (threshold) mechanism involving the disturbance of the hypothalamic-pituitary-thyroid axis. The sensitivity of the rat to the induction of thyroid tumours compared to the relative insensitivity noted in other species is well known and indicates that these lesions have no practical relevance for human risk assessment.

Medical data

	No known human intoxications during production, transportation, formulation and packaging. Reports of suicidal attempts involving fipronil intake include one death preceded by severe neurological symptoms and further non-lethal cases with general and neurological clinical signs.

Summary	Value	Study	Safety factor
ADI (acceptable daily intake, external long-term reference dose)	Not relevant		
AEL long-term (not used for this usage)	0.0002 mg/kg bw/d	Combined chronic/carcinogenicity in rats	100
AEL medium-term (Operator Exposure)	0.0035 mg/kg bw/d	90d oral in rat and 1-year studies in dog	100
AEL acute-term (secondary exposure)	0.025 mg/kg bw/d	Acute oral neurotoxicity studies in rats	100

Acceptable exposure scenarios (including method of calculation)

Professional users	Tier1: Changing the needle on the application gun after treatment of 35 apartments in the same building: Exposure: $1.7.10^{-4}$ mg/kg bw AEL medium-term: 0.0035 mg/kg bw/d MOE = 2059 %AEL: 5% Changing the needle on the application gun between each treatment for 8 apartments in different buildings: Exposure: $2.2.10^{-4}$ mg/kg bw without gloves. AEL medium-term: 0.0035 mg/kg bw/d MOE = 1591 %AEL: 6%
Intended uses	Control of cockroaches in industrial, domestic and public buildings
Non-professional users	Not applicable – the product is for professional use only
Indirect exposure as a result of use	Exposure to Goliath Gel: Infant: 0.00091 mg/kg bw; child: 0.00026 mg/kg bw AEL acute-term: 0.025 mg/kg bw/d Infant (dermal + oral): MOE: 2778; %AEL: 3.6% Child (dermal): MOE: 10000; %AEL: 1%

Chapter 4: Fate and Behaviour in the Environment

Route and rate of degradation in water

Hydrolysis of active substance and relevant metabolites (DT_{50}) (state pH and temperature)	pH 5 and 7: virtually stable pH 9: DT_{50}= 28 days at 25° ±1°C
Photolytic / photo-oxidative degradation of active substance and resulting relevant metabolites	DT_{50}:3.63 hours (under the xenon lamp corresponding to 0.33 days of summer sunlight in Florida) at pH 5
Readily biodegradable (yes/no)	No
Biodegradation in seawater	Not applicable
Non-extractable residues	Not applicable
Distribution in water / sediment systems (active substance)	In an aerobic aquatic environment, fipronil partitions steadily into the underlying sediment where it degrades by reduction to MB 45950 which is further degraded by hydrolysis to MB 46126. Fipronil is also hydrolysed to RPA 200766 and, to a much lesser extent oxidised too MB 46136. There is evidence than RPA 200766 and MB 46136 are further transformed to RPA 105320 via oxidation or hydrolysis respectively. RPA 200766 is a major metabolite in water (max. 20%) and MB 45950 is a major metabolite in sediment (max. 54.69% at 163 days).
Distribution in water / sediment systems (metabolites)	Not applicable

Route and rate of degradation in soil

Mineralization (aerobic)	<1%
Laboratory studies (range or median, with number of measurements, with regression coefficient)	DT_{50lab} (20°C to 25°C, aerobic): ranges from 128 to 308 days. DT_{50lab} (12°C recalculated): ranges from 362 to 871 days
	DT_{50lab} (20°C, aerobic): (linear first order, R^2 0.84-0.97) ranges from 31 to 304 days (4 soils)
	DT_{90lab} (20°C, aerobic): (linear first order, R^2 0.84-0.97) ranges from 102 to 1010 days (4 soils)
	DT_{50lab} (10°C, aerobic): (linear first order, R^2 0.5-0.73) ranges from 358 to 686 days (2 soils)
	DT_{90lab} (10°C, aerobic): (linear first order, R^2 0.5-0.73) ranges from 1189 to 2279 days (2 soils)

	degradation in the saturated zone: Not relevant
Field studies (state location, range or median with number of measurements)	DT_{50f} : Not given in the study
	DT_{90f}: Not given in the study
Anaerobic degradation	Not relevant
Soil photolysis	No data
Non-extractable residues	Aerobic conditions: max. 15 %
Relevant metabolites - name and/or code, % of applied active ingredient (range and maximum)	In dark conditions - amide RPA200766, formed after hydrolysis, max. 38.4% after 219 days, - sulfone MB46136, formed after oxidation, max. 34.3% after 182 days, - sulfide MB45950, formed after reduction, max. 17% after 91 days.
Soil accumulation and plateau concentration	Soil accumulation studies in Northern Europe - no accumulation of Fipronil in soil - maximum residues of metabolites related to an annual application rate of 200 g a.i./ha MB 46136: 345 g / ha MB 45950: 57 g / ha RPA 200766: 147 g / ha Soil accumulation studies in Southern Europe - no accumulation of Fipronil in soil - maximum residues of metabolites related to an annual application rate of 200 g a.i./ha MB 46136: 252 g / ha MB 45950: 29 g / ha RPA 200766: 88 g / ha

Adsorption/desorption

Ka , Kd	5 soils Ka, 4.19 - 20.69 Kd, 7.25 - 21.51
Ka_{oc} , Kd_{oc}	5 soils Ka_{oc}, 427 – 1248 mean 727 Kd_{oc}, 398 – 2162 mean 949
pH dependence (yes / no) (if yes type of dependence)	Not recorded

Fate and behaviour in air

Direct photolysis in air	Calculation using the Atkinson method. Fipronil will be rapidly degraded in the troposphere with a half-life of 0.11 day assuming 12 hours of sunlight
Quantum yield of direct photolysis	No data
Photo-oxidative degradation in air	Latitude: ..... Season: ..... DT_{50} ..... No data
Volatilization	No data

Monitoring data, if available

Soil (indicate location and type of study)	None available
Surface water (indicate location and type of study)	None available
Ground water (indicate location and type of study)	None available
Air (indicate location and type of study)	None available

Chapter 5: Effects on Non-target Species

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

Species	Time-scale	Endpoint	Toxicity
fipronil			
Fish			
Lepomis macrochirus	96 hours	LC_{50}	85.2 µg/L
Oncorhynchus mykiss	90 days	NOEC	15 µg/L
Invertebrates			
Chironomus riparius (water)	**28 days**	**NOEC**	**0.121 µg/L**
Hexagenia sp.	96 hours	LC_{50}	0.44 µg/L
Chironomus riparius (sediment)	**28 days**	**NOEC**	**1,39 µg/L**
Algae			
Scenedesmus subspicatus	96 hours	E_bC_{50}	68 µg/L
Lemna gibba	14 days	EC_{10}	81 µg/L
Microorganisms			
Activated sludge	3 hours	respiration inhibition	NOEC $\geq$ 1 000 000 µg/L
RPA 200766			
Fish			

Oncorhynchus mykiss	96 hours	LC_{50}	>17 000 µg/L
Invertebrates			
Chironomus riparius(water)	48 hours	LC_{50}	250 µg/L
Chironomus riparius(water)	28 days	NOEC	3.58 µg/L
Algae			
Scenedesmus subspicatus	72 hours	EC_{50}	> 7 500 µg/L
MB45950			
Fish			
Oncorhynchus mykiss	96 hours	LC_{50}	29.5 µg/L
Invertebrates			
Daphnia magna	48 hours	EC_{50}	100 µg/L
Daphnia magna	21 days	NOEC	13 µg/L
Mysidopsis bahia	96 hours	LC_{50}	0.077 µg/L
Mysidopsis bahia	28 days	NOEC	0.0046 µg/L
Algae			
Scenedesmus subspicatus	72 hours	E_bC_{50}	450 µg/L
MB46136			
Fish			
Lepomis macrochirus	96 hours	LC_{50}	25 µg/L
Invertebrates			
Daphnia magna	48 hours	EC_{50}	29 µg/L
Daphnia magna	21 days	NOEC	0.63 µg/L
Chironomus riparius(water)	28 days	NOEC	0.069 µg/L
Mysidopsis bahia	96 hours	LC_{50}	0.056 µg/L
Mysidopsis bahia	28 days	NOEC	0.0051 µg/L
Algae			
Scenedesmus subspicatus	72 hours	EC_{50}	> 510 µg/L
MB46513			
Fish			
Lepomis macrochirus	96 hours	LC_{50}	20 µg/L
Invertebrates			
Daphnia magna	21 days	NOEC	41 µg/L
Mysidopsis bahia	96 hours	LC_{50}	1.5 µg/L
Algae			
Scenedesmus subspicatus	120 hours	EC_{50}	> 65 µg/L

Effects on earthworms or other soil non-target organisms

Acute toxicity to earthworms *Eisenia foetida*	LC_{50} : >1000 mg/kg soil (fipronil) LC_{50} : >1000 mg/kg soil (MB45950; MB46136; RPA200766)
Reproductive toxicity to earthworms *Eisenia foetida*	LC_{50} : >1000 mg/kg soil

Effects on soil micro-organisms

Nitrogen mineralization	Not affected at concentrations up to 0.667 mg/kg soil
Carbon mineralization	Not affected at concentrations up to 0.667 mg/kg soil

Effects on terrestrial vertebrates

Acute toxicity to mammals	No exposure
Acute toxicity to birds	LD_{50} = 11.3 mg ai/kg in bobwhite quail *(Colinus virginianus)*
Dietary toxicity to birds	LC50 = 48.0 mg a.s./kg diet in bobwhite quail *(Colinus virginianus).* NOEL was 19.5 mg a.s./kg diet.
Reproductive toxicity to birds	NOEC= 10 mg a.s./kg diet.

Effects on honeybees

Acute oral toxicity	LD50 = 0.00417 µg a.s./bee. (fipronil) LD50= 0.0064 µg/bee (MB46136)
Acute contact toxicity	LD50 = 0.00593 µg a.s./bee

Effects on other beneficial arthropods

Acute oral toxicity	No exposure, Not required for indoor PT 18 uses
Acute contact toxicity	No exposure, Not required for indoor PT 18 uses
Toxicity to *Aleochara bilineata*.	Acceptable effects at 0.243 mg / kg soil

Bioconcentration

Bioconcentration factor (BCF)	321
Depration time (DT_{50}) (DT_{90})	Not recorded Not recorded >99% eliminated from whole fish within 14 days
Level of metabolites (%) in organisms accounting for > 10 % of residues	Whole fish, depuration phase: MB 46136 (43.8%), MB 45897 (26.1%), MB 45950 (11.2%)

Chapter 6: Other End Points

All required end points required for risk assessment are presented here above.

APPENDIX II: LIST OF INTENDED USES

MG/PT	Field of use envisaged	Likely concentration at which a.s. will be used
MG03/PT18.01	Insecticide	0.05% in a ready to use gel

Goliath Gel is used indoors by professional Pest Control Operators (PCO) for the control of cockroaches in industrial, domestic and public buildings. The product is ready to use, i.e. it is applied undiluted and no other substance is added to the product for application. GOLIATH GEL is contained in sealed cartridges, which are designed to be used with a bait gun applicator as small spots. The cartridge is locked into the applicator and an appropriate application tip is attached. The product is applied as droplets of approximately 0.03 g each. The application rate is of one to three spots (0.03 g of gel) per square metre.

The product may be applied in occupied premises, except during cooking activities. It is stipulated to apply GOLIATH GEL in cracks and crevices, or in concealed locations inaccessible to man or domestic animals: behind refrigerators cupboards and shelves, under kitchen appliances (the application on hoods has not been evaluated), in electrical control boxes, voids and ducting and under bathroom fixtures etc. Spots have not be applied in areas where it will become submersed or likely to be removed by routine cleaning.

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[i] When writing the assessment report, please ensure that the following formatting is respected

Text of the report (other than titles and headings):
Font: Times New Roman, 12 pt, English (U.K.), Justified, Line spacing: single, Space After: 12 pt, Widow/Orphan control

Content of tables of the report:
Font: Times New Roman, 11 pt, English (U.K.), Justified, Line spacing: single, Widow/Orphan control

APPENDIX III: LIST OF STUDIES

Reference list by section point

Annex point(s)	Author(s)	Date Year / Month / Day	Title Source BASF DocID GLP or GEP status Published or not	Data Protection Y/N	Owner
A2.10.2.2/01	Mason P	2006	Environmental risk assessment for Goliath® Gel Cambridge Environmental Assessments – ADAS Report No CEA 115 Unpublished (BASF ID 2006/1010799)	Y	BASF
A2.6/01	Besnoin, J.M.	2001	MB46030 – Manufacturing Process of the Technical Active Substance Aventis CropScience SA, Lyon; France GLP (unpublished) (BASF DocID C016926) **Business Confidential Information – See BCI folder**	Y*	BASF
A2.6/02	Foerster R.	2005	Fipronil, starting material - Data regarding the purity and source of the starting material BASF AG Agrarzentrum Limburgerhof, Limburgerhof; Germany GLP (unpublished) (BASF DocID 2005/1008413 **Business Confidential Information – See BCI folder**	Y*	BASF
A2.7/01	Cousin, J.	1997	Technical fipronil Analysis and certification Rhone-Poulenc Agro, Study No. 97-163 R&D/CRLD/AN/9716758. GLP (unpublished) (BASF DocID R010186) **Business Confidential Information – See BCI folder**	Y*	BASF
A3.1.1/01	Daum A.	2004	Determination of the melting point of fipronil (BAS 350I) Reg No 4020907) PAI BASF AG, Aktiengesellschaft Limburgerhof GLP (unpublished) (BASF 2004-1027721)	Y	BASF

A3.1.1/02	Chabert M.S, Lecourt N.C	1996	Suitablility for use as an analytical standard reference material Rhône-Poulenc Secteur Agro, Study number 95-1012 GLP (unpublished) (BASF DocID R010170)	Y	BASF
A3.1.1/03	Chabassol Y.C Hunt G.M	1991	M&B46030 Physical properties Rhône-Poulenc Secteur Agro, Study number 91-21 GLP (unpublished) (BASF DocID R010081)	Y	BASF
A3.1.2/01	Daum A.	2004	Determination of the melting point of fipronil (BAS 350I) Reg No 4020907) PAI BASF AG, Aktiengesellschaft Limburgerhof GLP (unpublished) (BASF 2004-1027721)	Y	BASF
A3.1.2/02	Chabert M.S. Lecourt N.C	1996	Suitablility for use as an analytical standard reference material Rhône-Poulenc Secteur Agro, Study number 95-1012 GLP (unpublished) (BASF DocID R010170)	Y	BASF
A3.1.2/03	Chabert M.S. Lecourt N.C	1996	Suitablility for use as an analytical standard reference material Rhône-Poulenc Secteur Agro, Study number 95-1012 GLP (unpublished) (BASF DocID R010170)	Y	BASF
A3.1.3/01	Nobuhiro K	2001	Measurement of density of fipronil Misubishi Chemical Safety Institute. Study No D000159 GLP (unpublished) (BASF DocID C018244) BASD Doc ID 2007/1035673	Y	BASF
A3.10/01	Daum A.	2004	Determination of the melting point of fipronil (BAS 350I) Reg No 4020907) PAI BASF AG, Aktiengesellschaft Limburgerhof GLP (unpublished) (BASF DocID 2004-1027721)	Y	BASF

A3.11/01	Cousin J Fillion J	1996	Determination of flamability and ability of self-heating of fipronil technicque Rhône-Poulenc Industrialisation Study No 96-130-SEC GLP (unpublished) (BASF DocID R010173)	Y	BASF
A3.11/02	Cousin J Fillion J	1996	Determination of flamability and ability of self-heating of fipronil technicque Rhône-Poulenc Industrialisation Study No 96-130-SEC GLP (unpublished) (BASF DocID R010173)	Y	BASF
A3.13/01	Cousin J	1996	Fipronil: Surface Tension and Particle Size Distribution Rhône-Poulenc Secteur Agro, Study No 96-125 GLP (unpublished) (BASF DocID R010172)	Y	BASF
A3.15/01	Vandermar liere P	1992	Fipronil (M&B 46030) Minimum Ignition Energy, Lower Explosive Limit (Dust cloud) and Auto-ignition (layer) Rhône-Poulenc Industrialisation Non GLP (unpublished) (BASF DocID R010087)	Y	BASF
A3.15/02	Tran Thanh Phong J	1999	Fipronil: Explosion and Oxidising Properties Rhône-Poulenc Industrialisation Study No 99-290-SEC GLP (unpublished) (BASF DocID R010198)	Y	BASF
A3.16/01	Tran Thanh Phong J	1999	Fipronil: Explosion and Oxidising Properties Rhône-Poulenc Industrialisation, Study No 99-290-SEC GLP (unpublished) (BASF DocID R010198)	Y	BASF
A3.17/01	Cousin, J	1997	Wet technical fipronil; storage stability Rhône-Poulenc Secteur Agro, Study number 96-20 GLP (unpublished) (BASF DocID R010178)	Y	BASF
A3.2.1/01	Bascou J P	2002	Fipronil: Henry's Law Constant Calculation Aventis CropScience , Lyon France GLP (Not applicable – calculation) (unpublished) (BASF DocID C018493)	Y	BASF

A3.2.1/02	Chabassol Y	1992	Fipronil Henry-Constant Rhône-Poulenc Secteur Agro GLP (Not applicable – calculation) (unpublished) (BASF DocID R010089)	Y	BASF
A3.2/01	Nobuhiro K	2001	Measurement of vapour pressure of fipronil Misubishi Chemical Safety Institute. Study No D000160 (translation of the original report) GLP (unpublished) (BASF DocID C018246) BASF Doc ID 2007/1035671	Y	BASF
A3.2/02	Chabassol Y Reynaud R	1991	M&B 46030 Technical Grade Vapour Pressure Curve Study number 91-16 GLP (unpublished) (BASF DocID R010076)	Y	BASF
A3.3.1/01	Chabassol Y Hunt G. M	1991	M&B46030 Physical properties Rhône-Poulenc Secteur Agro, Study number 91-21 GLP (unpublished) (BASF DocID R010081)	Y	BASF
A3.3.2/01	Chabassol Y Hunt G. M	1991	M&B46030 Physical properties Rhône-Poulenc Secteur Agro, Study number 91-21 GLP (unpublished) (BASF DocID R010081)	Y	BASF
A3.3.3/01	Chabassol Y Hunt G. M	1991	M&B46030 Physical properties Rhône-Poulenc Secteur Agro, Study number 91-21 GLP (unpublished) (BASF DocID R010081)	Y	BASF
A3.4/01	Muehlberger B	2001	AE F124964/MB046030 Spectral Data (UV/VIS) and Molar Extinction Coefficient Aventis Crop Science GmbH GLP (unpublished) (BASF DocID C017624)	Y	BASF
A3.4/03	Chabert M.S, Lecourt N.C	1996	Suitablility for use as an analytical standard reference material Rhône-Poulenc Secteur Agro, Study number 95-1012 GLP (unpublished) (BASF DocID R010170)	Y	BASF

A3.4/04	Chabert M.S, Lecourt N.C	1996	Suitablility for use as an analytical standard reference material Rhône-Poulenc Secteur Agro, Study number 95-1012 GLP (unpublished) (BASF DocID R010170)	Y	BASF
A3.4/05	Chabert M.S, Lecourt N.C	1996	Suitablility for use as an analytical standard reference material Rhône-Poulenc Secteur Agro, Study number 95-1012 GLP (unpublished) (BASF DocID R010170)	Y	BASF
A3.4/06	Chabert M.S, Lecourt N.C	1996	Suitablility for use as an analytical standard reference material Rhône-Poulenc Secteur Agro, Study number 95-1012 GLP (unpublished) (BASF DocID R010170)	Y	BASF
A3.4/07	Chabert M.S, Lecourt N.C	1996	Suitablility for use as an analytical standard reference material Rhône-Poulenc Secteur Agro, Study number 95-1012 GLP (unpublished) (BASF DocID R010170)	Y	BASF
A3.5/01	Daum A.	2005	Determination of the water solubility of fipronil(BAS 350I) Reg No 4020907) PAI BASF AG, Aktiengesellschaft Limburgerhof GLP (unpublished) (BASF DocID 2005-1013201)	Y	BASF
A3.5/02	Nobuhiro K	2001	Measurement of water solubility of fipronil Misubishi Chemical Safety Institute. Study No D000161 (translation of the original report) GLP (unpublished) (BASF DocID C018248) BASF Doc ID 2007/1035672	Y	BASF
A3.5/03	Chabassol Y.C Reynaud R	1991	M&B46030 Technical Grade: Water solubility at 20°C Rhône-Poulenc Secteur Agro, Study number 91-06 GLP (unpublished) (BASF DocID R010072)	Y	BASF

A3.6/01	Cichy M	2001	Statement on the Dissociation Constant Aventis Crop Science GmbH GLP (Not applicable – Statement) (unpublished) (BASF DocID C011803)	Y	BASF
A3.7/01	Chabassol Y.C Reynaud Rx	1991	M&B46030 Technical Grade: Solubility in Organic Solvents Rhône-Poulenc Secteur Agro, Study number 91-12 GLP (unpublished) (BASF DocID R010071)	Y	BASF
A3.9/01	Chabassol Y Reynaud R	1991	M&B46030 Technical Grade Octanol/Water Partition Coefficient at 20°C Rhône-Poulenc Secteur Agro, Study number 91-22 GLP (unpublished) (BASF DocID R010078)	Y	BASF
A3.9/02	Cousin J	1997	Fipronil Active Ingredient: n-Octanol/Water Partition Coefficient Rhône-Poulenc Secteur Agro, Study number 97-105 GLP (unpublished) (BASF DocID R010185)	Y	BASF
A4.1.2/01	Emeric G.T	2000	Technical fipronil HPLC determination of the main impurities Aventis CropScience, Lyon, France, Report No 447796 F-863-10-99 R&D/CRLD/AN/001559. GLP (unpublished) (BASF DocID R016092) **Business Confidential Information – See BCI folder**	Y*	BASF
A4.1.2/02	Brigitte Przywara, Dr. Christoph Randt	2010	Fipronil Technical Grade Active Ingredient, Characterization of Impurities in Five Batches BASF SE, BASF Agricultural Center Limburgerhof Crop Protection Division Ecology and Environmental Analytics P.O. Box 120 67114 Limburgerhof, Germany, BASF DocID: 2010/1007256, January 12, 2010 56 pages **Business Confidential Information – See BCI folder**	Y*	BASF

A4.1.2/03	Michael Harsch, Dr. Christoph Randt	2010	Fipronil Technical Grade Active Ingredient. Additional Validation Data of Minor Compounds BASF SE, BASF Agricultural Center Limburgerhof Crop Protection Division Ecology and Environmental Analytics P.O. Box 120 67114 Limburgerhof, Germany, BASF DocID: 2010/1055129, April 23, 2010 14 pages **Business Confidential Information – See BCI folder**	Y*	BASF
A4.1.2/04	Anonymous	1999	MT 30 water: 30.5 Karl Fischer method using pyridine-free reagents CIPAC - Collaborative International Pesticides Analytical Council (published) (BASF DocID 1999/1012437) **Business Confidential Information – See BCI folder**	No	BASF
A4.1/01	Robles J.M, Cousin J	1996	Technical Fipronil HPLC determination of active ingredient. Rhône-Poulenc Secteur Agro, Anal Method No. F-735-06-96 GLP (unpublished) (BASF DocID R010986)	Y	BASF
A4.1/02	Buddle G.C. et al.	1993	Insecticides: Fipronil: Impurity/metabolite: 5-Amino-1-(2,6-dichloro-4-trifluoromethylphentyl)-3-cyano-4-trifluoromethyl-thio-pyrazole: (M&B45,950), Batch JJW 2120 Suitability for continued use as an analytical standard Rhone-Poulenc Agriculture Ltd., Ongar, Essex CM5 OHW; UK Unpublished (BASF DocID R010119) **Business Confidential Information – See BCI folder**	Y*	BASF
A4.1/03	Gomez F.	1995	MB46136 - Batch CBL15 - Analytical Log Number EA236RF3 - Suitability for use as an Analytical Standard Reference Material Rhône Poulenc Agro, Lyon; France Unpublished (BASF DocID R010167) **Business Confidential Information – See BCI folder**	Y*	BASF
A4.1/04	Guesnet J.-L. et al.	1998	RPA100344 - NMR, IR, MS and UV-Visible Spectra Rhone-Poulenc Agro, Lyon; France Unpublished (BASF DocID R010194) **Business Confidential Information – See BCI folder**	Y*	BASF

A4.1/05	Seymour R.J.,Viola M.D.	1994	RPA200766 - Analytical Standard Reference Material Characterization of Batch 57TDS62 Rhone-Poulenc AG Company (RPAC), Research Triangle Park; USA Unpublished (BASF DocID R010192) **Business Confidential Information – See BCI folder**	Y*	BASF
A4.1/06	Vidal J.,Guesnet J.-L.	1998	RPA200766 - IR Spectrum Rhone-Poulenc Agro, Lyon; France Unpublshed (BASF DocID R010193) **Business Confidential Information – See BCI folder**	Y*	BASF
A4.2.1/01	Ballesteros , C. Claviere, B. Kieken, J-L	2000	Fipronil and its metabolites (MB 45950, MB 46136, MB 46513): Analytical method for the determination of residues in soil. Aventis CropScience , Lyon France ; Method AR 252-00; GLP (unpublished) (BASF DocID R016703)	Y	BASF
A4.2.1/02	Grote C.	2005a	Validation of analytical method No. 547/0 - LC-MS/MS determination of BAS 350 I (Fipronil) and its metabolites MB045950, MB046136, MB46513 and RPA200766 in soil. BASF AG, Agrarzentrum Limburgerhof; Limburgerhof; Germany Fed.Rep.; Report no: 180709; GLP (unpublished) (BASF DocID 2005/1004787)	Y	BASF
A4.2.3.1/01	Diot R., Kieken J.-L	2002	Validation of the method AR 163-98 for the determination of residues of Fipronil and its metabolites (MB46513, MB45950 and MB46136) in drinking water at 0.05 µg/L Aventis CropScience - Lyon, France; 01 GLP (unpublished) (BASF DocID C020278)	Y	BASF
A4.2.3.1/02	Bourgade C. Jendrzejczak N. Yslan, F.	1998	Fipronil and its metabolites (MB 45950, MB46136 and MB46513); Analytical method for the determination of residues in drinking water Rhône-Poulenc Agro, France; Report no: 98-44; GLP (unpublished) (BASF DocID R011007)	Y	BASF

A4.2.3.2/01	Ibrahim A.S	1999	Validation of the method of analysis for possible residues of fipronil and its metabolites MB46513, MB45950, MB46136 in water Rhône-Poulenc AG Company (RPAC) - Research Triangle Park, USA; Report no: 99F15502 GLP (unpublished) (BASF DocID R011018)	Y	BASF
A4.2.3.2/02	Fuchsbichler G	1999	Method validation study for Fipronil and its metabolites (MB45950, MB46136 and MB46513) in Surface water (river, Pond) Bayerische Hauptversuchsanstalt für Landwirtschaft der TUM-Weihenstephan; Report no: HVA 11/98 GLP (unpublished) (BASF DocID R011014)	Y	BASF
A4.2.3.2/03	Lopes A.	1997	Validation of method of analysis for the determination of Fipronil and its metabolites in water Rhône-Poulenc AG Company (RPAC) - Research Triangle Park, United States of America; Report no EC-97-384 GLP (unpublished) (BASF DocID R011000)	Y	BASF
A4.2.3.2/04	Grote C	2005b	Validation of analytical method No. 572/0: LC-MS/MS determination of BAS 350 I (Fipronil) and its metabolites MB045950, MB046136 and MB46513 in drinking and surface water BASF AG, Agrarzentrum Limburgerhof; Limburgerhof; Germany Fed.Rep.; Study code 216916 GLP (unpublished) (BASF DocID 2005/1009015)	Y	BASF
A4.2.3.2/05	Grote C	2006	Validation of analytical method No. 559/0 - LC-MS/MS determination of BAS 350 I (Fipronil) and its metabolites MB045950, MB046136, MB46513 and RPA200766 in drinking and surface water BASF AG, Agrarzentrum Limburgerhof; Limburgerhof; Germany Fed.Rep.; Study code 180712 GLP (unpublished) (BASF DocID 2006/1010790)	Y	BASF

A4.2.4/01	Beaudonnet JP	1998	Fiproles determination in blood plasmas Rhône-Poulenc Industrialisation; Report N° RDP/ANA/338/98/0212/BDT/kr; 31 GLP (unpublished) (BASF DocID C016801)	Y	BASF
A4.2.4/02	Communal P.Y.	1994	Validation of the assay method (AGR/MOA/FIP12) of Fipronil and its metabolites (MB 46513, MB 45950 & MB 46136) in human plasma samples Rhone-Poulenc Secteur Agro, Lyon, France; Study code 96-109 GLP (unpublished) BASF DocID: R010998	Y	BASF
A4.2.4/03	Pontal P.G.	1995	Validation of the method for the assay of Fipronil and its metabolites (MB 46136 and MB 46513) in human plasma Rhone-Poulenc Agro, Sophia Antipolis, France; Study code RPS/FIP/94111, 44 pages GLP 28 June 1995 (unpublished) BASF DocID: R010976	Y	BASF
A4.2.4/04	Oullier J.P & Soun A.	1995	MB46030 and Metabolites (MB45950 & MB46136), Analytical determination method of plasma levels in micro-pigs Method N° ANL/061-94E December 22, 1995 GLP (unpublished) BASF DocID: R010979	Y	BASF
A4.2.4/05	Goller G	1998	Stability study of fipronil and its metabolites (MB46513, MB45950 & MB46136) at -20°C and -80°C during a period of 12 months ADME Bioanalysis Study code RPA/FIP/96102 Rhone-Poulenc Agro Study code: 96-121 GLP (unpublished) BASF DocID: R010999		
A4.2.4/06	Bross M.	2009	Fipronil (BAS 350 I): Analytical method for body fluids BASF SE Agricultural Center Limburgerhof, Limburgerhof; Germany Unpublished (BASF DocID 2009/1110691)	Y	BASF

A4.3.1/01	Fuchsbichler G	2001	Independent laboratory validation of method study No. 98-153 for the determination of Fipronil and its metabolites MB46136 and MB46513 in plants. Bayererische Hauptversuchsanstalt fuer Landwirtschaft der TUM-Weihenstephan - Freising, Germany; Report No: HVA 25/00 GLP (unpublished) (BASF DocID C012775)	Y	BASF
A4.3.2/01	Hausmann S.	1999	Multi-residue enforcement method (DFG S19) for the determination of Fipronil and its metabolites (MB45950, MB46136, MB46513) in foodstuff of animal origin PTRL Europe; Ulm; Germany Fed.Rep.; Report No: B-292 G GLP (unpublished) (BASF DocID R011015)	Y	BASF
A4.3.2/02	Kerl W & Hopf B	2007	Validation of the analytical method 568/0: Method for the Determination of Fipronil and its Metabolites in Animal Matrices BASF Aktiengesellschaft. Germany. Study Code : 234262 GLP (unpublished) (BASF DocID 2005/1028985)	Y	BASF
A4.3.2/03	Class T	2005	Independent Laboratory Validation of BASF Method No. 568/0 for the Determination of Fipronil and Its Metabolite MB46136 in Animal Fat PTRL Europe; Ulm; Germany. Study Code : 243142 PTRL Report No. P/B 988 G GLP (unpublished) (BASF DocID 2005/1031368)	Y	BASF
A5.7.1/01 and	Anonymous	2006	Section 5.7: Information on the occurrence or possible occurrence of the development of resistance and appropriate management strategies	Y	BASF
A5.7.2/01 and	Anonymous	2006	Section 5.7: Information on the occurrence or possible occurrence of the development of resistance and appropriate management strategies	Y	BASF
A5.9/01	Kaakeh W, Reid B L Bennett G W	1997	The toxicity of fipronil to German and American Cockroaches Department of Entomology Perdue University, US (published) Entomologia Experimentalis et Applicata Vol 84 pages 229 -237) (BASF ID 1997/1005361)	N	

A6.1.1/01	Gardner JR	1988	Acute oral toxicity to rats of M&B 46,030. Huntingdon Research Centre Ltd; Report No: 881300D/M&B 290/AC; GLP (unpublished) (BASF DocID R010249)	Y	BASF
A6.1.2/01	Gardner JR	1988	Acute dermal toxicity to rats of M&B 46,030. Huntingdon Research Centre Ltd; Report No: 881113D/M&B 291/AC GLP (unpublished) (BASF DocID R010250)	Y	BASF
A6.1.2/02	Myers RC, Christopher SM	1992	M&B 46,030: Acute percutaneous toxicity study in the rabbit. Bushy Run Research Centre, PA, USA; Report No: 92N1009 GLP (unpublished) (BASF DocID R016157)	Y	BASF
A6.1.3/01	Cracknell S	1991	M&B 46030: Acute inhalation toxicity study in the rat. Life Sciences Res Ltd, Eye UK; Report No: 90/RHA358/0791 GLP (unpublished) (BASF DocID R010253)	Y	BASF
A6.1.3/02	Nachreiner DJ	1995	Fipronil: Acute nose-only dust inhalation toxicity study in rats. Bushy Run Research Centre, USA; Report No: 94N1501 GLP (unpublished) (BASF DocID R010357)	Y	BASF
A6.1.4/01	Myers RC, Christopher SM	1993	MB 46030 (technical): cutaneous irritancy study in the rabbit. Bushy Run Research Center (BRRC), Export PA 15632-8902 GLP (unpublished) (BASF DocID R010338)	Y	BASF
A6.1.4/02	Myers RC Christopher SM	1993	MB 46030 (technical): Ocular irritancy study in the rabbit Bushy Run Research Center (BRRC); GLP (unpublished) (BASF DocID R010337)	Y	BASF

A6.1.5/01	Johnson IR	1993	M&B 46030: Delayed contact hypersensitivity study in Guinea-pigs. Pharma LSR Ltd, UK;Report no: 93/RHA503/0167; GLP (unpublished) (BASF DocID R010326)	Y	BASF
A6.1.5/02	Smith K.D.	1990	M&B 46030: Dermal sensitization study in guinea-pigs. Life Sciences Res. Ltd., Eye, UK; Report no: 90/RHA357/0602 GLP (unpublished) (BASF DocID R010254)	Y	BASF
A6.1.5/03	Stinchombe S.	2007	Fipronil: Toxicological assessment according to the Biocidal Product Directive 98/8/EC of The EU-Dossier by the RMS France, Position paper on open points raised by the RMS BASF DocID 2007/1017346 (unpublished)	Y	BASF
A6.10/01	Peters DH et al.	1991	M+B 46,030: An investigation into the potential effects on thyroid function in male rats by studying thyroxine clearance. Huntingdon Research Centre Ltd; Report No: M&B 352/90958; 12 April 1991 (unpublished) (BASF DocID R010279)	Y	BASF
A6.10/02	Peters DH et al.	1991	M&B 46,030: An investigation into the potential effects on thyroid function in male rats using the "Perchlorate Discharge Test". Huntingdon Research Centre Ltd; Report No: M&B 352/90920; (including 2-page amendment from 1993). GLP (unpublished) (BASF DocID R010280)	Y	BASF
A6.10/03	Taylor T	1993	The Effect of singe and repeated oral doses of M&B 46030 on the biliary excretion of intravenously administered ^{125}I-Thyroxine from bile duct cannulated rats Huntingdon Research Centre Ltd; Report no: HRC/ITT 2/930645 GLP (unpublished) (BASF DocID R010330)	Y	BASF

A6.2/01	Powels P	1992	(^{14}-C) M&B 46030: Absorption, distribution, metabolism and excretion in the rat. Hazleton UK, Report No. 7040-68/117, GLP (unpublished) (BASF DocID R010208)	Y	BASF
A6.2/02	Powels P	1994	Addendum to Report (^{14}-C) M&B 46030: Absorption, distribution, metabolism and excretion in the rat. Hazleton UK, Report No. 7040-68/117-GLP (unpublished) (BASF DocID R010223)	Y	BASF
A6.2/03	Totis, M	1995	Fipronil: Bile Excretion Study in the rat Rhône-Poulenc Agrochemie France, Study No : SA95020 GLP (Unpublished) (BASF DocID R010246)	Y	BASF
A6.2/04	Cheng T	1995	Dermal absorption of ^{14}C-Fipronil Regent 80 WDG in male rats (Preliminary and definitive phases). Hazleton Wisconsin Inc., Madison WI, USA, Report No. HWI 6224-210, 10 GLP (unpublished) (BASF DocID R010235)	Y	BASF
A6.2/05	Ward RJ	1997	Fipronil: In vitro absorption from a 25 g/l ULV formulation through human and rat epidermis Central Toxicology Laboratory; Macclesfield, Cheshire, UK. Report No. CTL/P/5390 GLP (unpublished) (BASF DocID R010237)	Y	BASF
A6.2/06	Ward RJ	1997	Fipronil: In vitro absorption from 300 g/l EC formulation through human and rat epidermis Central Toxicology Laboratory; Macclesfield, Cheshire, UK. Report No. CTL/P/5389 GLP (unpublished) (BASF DocID R010238)	Y	BASF
A6.2/07	Ward RJ	1997	Fipronil: In vitro absorption from a 50 g/l SC formulation through human and rat epidermis Central Toxicology Laboratory; Macclesfield, Cheshire, UK. Report No. CTL/P/5388, GLP (unpublished) (BASF DocID R010239)	Y	BASF

A6.2/08	Walters KA, Brain KR	1990	In vitro skin permeability of M&B 46030. Pharmaserve Ltd.; Manchester; UK, Project No. RD8 GLP (unpublished) (BASF DocID R010206)	Y	BASF
A6.2/09	Totis T and Fisher P.	1994	Fipronil: Tissue Kinetic study in the rat. Rhône-Poulenc Secteur Agro, Report No.SA 94225 GLP (unpublished) (BASF DocID R010222)	Y	BASF
A6.3.1/01	Peters DH et al.	1990	M&B 46,030 Toxicity to rats by dietary administration for 4 weeks. Huntingdon Research Centre Ltd; Report No: M&B 327/891321; GLP (unpublished) (BASF DocID R010256)	Y	BASF
A6.3.2/01	Hermansky SJ, Wagner CL	1993	M&B 46030: Twenty-one day repeated cutaneous dose toxicity study in New Zealand White rabbits #2. Bushy Run Research Center USA, Report No: 92/N1165 GLP (unpublished) (BASF DocID R010329)	Y	BASF
A6.4.1/01	Holmes P	1991	M&B 46030: Toxicity study by dietary administration to CD rats for 13 weeks. Pharma LSR Ltd; Report No: 90/RHA298/0781 GLP (unpublished) (BASF DocID R010262)	Y	BASF
A6.4.1/02	Holmes P	1991	M&B 46030: Toxicity by oral (capsule) administration to Beagle dogs for 13 weeks. Life Science Research Ltd, UK; Report No: 90/RHA310/0842; GLP (unpublished) (BASF DocID R010274)	Y	BASF
A6.4.1/03	Holmes P	1992	M&B 46030: Toxicity by oral (capsule) administration to Beagle dogs for 52 weeks. Life Science Research Ltd, UK; Report No: 92/RHA311/0464 GLP (unpublished) (BASF DocID R010290)	Y	BASF

A6.4.1/04	Holmes P	1993	M&B 46030: Toxicity study by dietary administration to Beagle dogs for 52 weeks. Life Science Research Ltd, UK; Report No: 93/RHA465/0243; GLP (unpublished) (BASF DocID R010342)	Y	BASF
A6.5/01	Aughton P	1993	M&B 46030: Combined oncogenicity and toxicity study by dietary administration to CD rats for 104 weeks including a 13 week reversibility period on completion of 52 weeks of treatment. Final Report. Pharmaco-LSR Ltd; Report No: 93/RHA432/0166 GLP (unpublished) (BASF DocID R010327)	Y	BASF
A6.6.1/01	Clare CB	1988	Study to determine the ability of M&B 46030 to induce mutation in four histidine-requiring strains of *Salmonella typhimiurim*. Microtest Research Limited; Report No: MAB 20/S GLP (unpublished) (BASF DocID R010263)	Y	BASF
A6.6.1/02	Engelhardt G, Leibold E	2005	Escherichia coli reverse mutation assay (standard plate test and preincubation test) with BAS 350 I (Fipronil) BASF AG, Ludwigshafen/Rhein, Germany Fed. Rep., Report no: 40M0018/044164 GLP (unpublished) (BASF DocID 2005/1011567)	Y	BASF
A6.6.2/01	Marshall RR	1988	Study to evaluate the chromosome damaging potential of M&B 46030 by its effects on cultured human lymphocytes using an in vitro cytogenetics assay. Microtest Research Limited; Report No: MAB 20/HLC GLP (unpublished) (BASF DocID R010266)	Y	BASF
A6.6.2/02	Wright NP	1995	Fipronil: Chromosome aberration test in CHL cells *in vitro*. Safepharm Laboratories Ltd, UK; Report No: 282/456 GLP (unpublished) (BASF DocID R010423)	Y	BASF

A6.6.3/01	Lloyd JM	1993	M&B 46030: Investigation of mutagenic activity at the HGPRT locus in a Chinese hamster V79 cell mutation system - Amended final report. Life Science Research Limited; Report No: 93/RHA304/0566; GLP (unpublished) (BASF DocID R010265)	Y	BASF
A6.6.4/01	Edwards CN	1993	M&B 46030: Assessment of clastogenic action on bone marrow erythrocytes in the micronucleus test. Amended final report. Pharmaco-LSR Ltd, UK; Report No: 93/RHA305/0571 GLP (unpublished) (BASF DocID R010264)	Y	BASF
A6.6.4/02	Edwards CN	1995	M&B 46030: Mouse micronucleus test to comply with OECD Guideline 474 (1983) Pharmaco-LSR Ltd, UK; Report No: 95/RHA547/0432 GLP (unpublished) (BASF DocID R010360)	Y	BASF
A6.6.5/01	Engelhardt G, Leibold E	2004	In vivo unscheduled DNA synthesis (UDS) assay with BAS 350 I (Fipronil) in rat hepatocytes - single oral administration. BASF AG, Ludwigshafen/Rhein, Germany Fed. Rep., Report no: 80M0018/044004 GLP (unpublished) (BASF DocID 2004/1021187)	Y	BASF
A6.6.5/02	Engelhardt G	2005	Amendment No. 1 to the study report: In vivo unscheduled DNA synthesis (UDS) assay with BAS 350 I (Fipronil) in rat hepatocytes - single oral administration. BASF AG, Ludwigshafen/Rhein, Germany Fed. Rep., Report no: 80M0018/044004 Amendment No. 1, 21 November 2005 GLP (unpublished) (BASF DocID 2005/1027930)	Y	BASF
A6.7/01	Aughton P	1993	M&B 46030: Combined oncogenicity and toxicity study by dietary administration to CD rats for 104 weeks including a 13 week reversibility period on completion of 52 weeks of treatment. Final Report. Pharmaco-LSR Ltd; Report No: 93/RHA432/0166 GLP (unpublished) (BASF DocID R010327)	Y	BASF

A6.7/02	Broadmeadow A	1993	M&B 46030: Oncogenicity study by dietary administration to CD-1 mice for 78 weeks. Final Report. Life Science Research Limited; Report No: 92/RHA313/0971; GLP (unpublished) (BASF DocID R010316)	Y	BASF
A6.8.1/01	Brooker AJ, John DM	1991	The effect of M&B 46030 on pregnancy of the rat. Huntingdon Research Centre; Huntingdon; United Kingdom; Report No: M&B 335+326/90582 GLP (unpublished) (BASF DocID R010268)	Y	BASF
A6.8.1/02	King VC	1990	M&B 46030: Teratology study in the rabbit. Final Report. Life Science Research Limited; Report No: 90/RHA321/0772 (plus 4-page amendment to final report, GLP (unpublished) (BASF DocID R010271)	Y	BASF
A6.8.2/01	King VC	1993	M&B 46030: Reproductive performance study in rats treated continuously through two successive generations. Final report. Life Science Research Ltd., UK; Report No 92/RHA425/0309 GLP (unpublished) (BASF DocID R010283)	Y	BASF
A6.8.2/02	King VC	1993	M&B 46030: Reproductive performance study in rats treated continuously through two successive generations. Amendment to final report. Life Science Research Ltd., UK; First amendment No 93/RHA425/0093; 9 February 1993 GLP (unpublished) (BASF DocID 1993/1003784)	Y	BASF
A6.9/01	Gill MW et al.	1993	M&B 46030: Single Exposure Peroral (Gavage) Neurotoxicity Study in Sprague Dawley Rats. Bushy Run Research Centre; Report No: 91N0099 GLP (unpublished) (BASF DocID R010328)	Y	BASF

A6.9/02	Hughes EW	1997	Fipronil: Neurotoxicity to rats by acute oral administration (including a time to peak effect study). Huntingdon Life Sciences Ltd.; Huntingdon Cambridgeshire, UK; Report No: RNP 536/973345 GLP (unpublished) (BASF DocID R010419)	Y	BASF
A6.9/03	Driscoll CD, Hurley JM	1993	M&B 46030: Ninety-day dietary neurotoxicity study in Sprague Dawley rats. Bushy Run Research Center (BRRC); Report No: 92N1074 GLP (unpublished) (BASF DocID R010336)	Y	BASF
A7.1.1.1.1/01	Corgier, M.C; Plewa, A.P	1992.	[^{14}C] –MB46030, Hydrolysis at 25°C. Rhône-Poulenc Secteur Agro, Lyon, Study Number 91-25 GLP (unpublished) (BASF DocID R010574)	Y	BASF
A7.1.1.1.2/01	Corgier MMC; Plewa, A.P	1992	^{14}C –MB46030, Aqueous photolysis. RhonePoulenc Secteur Agro, Lyon, Study Number AG/CRLD/AN9215873 GLP (unpublished) (BASF DocID R010090)	Y	BASF
A7.1.1.2.1/01	Mead, C.	1997	Assessment of Ready Biodegradability: CO_2 Evolution Test . Safepharm Laboratories Limited, Study Number 238/042 GLP (unpublished) (BASF DocID R010175)	Y	BASF
A7.1.2.2.2/01	Roohi, A; Buntain I	2002.	[14C]-Fipronil: Degradation in Two Water/Sediment Systems Battelle AgriFood Ltd, Ongar, Essex, Study No CX/01/007 GLP (unpublished) (BASF DocID C016669)	Y	BASF

A7.1.2.2.2/02	Feung C.S., Yenne S.P.	1997	Fipronil: Aerobic aquatic metabolism Rhone-Poulenc AG Company (RPAC); Research Triangle Park; United States of America 30-Oct-1995 – 27-Mar-1997 GLP Unpublished BASF DocID R010598 27 March 1997.	Y	BASF
A7.1.2.2.2/03	Ayliffe J.M.	1998	[14C]-Fipronil degradation and retention in two water/sediment systems Rhone-Poulenc Agriculture Ltd.; Ongar, Essex CM5 OHW; United Kingdom 14-Apr-1997 – 18-Nov-1997 GLP BASF DocID R010604 February 1998. (unpublished)	Y	BASF
A7.1.3/01	Godward P.J., Austin D.J., Quarmby D.L.	1992	MB46030-14C Adsorption/desorption on five soils Rhône-Poulenc Agriculture Ltd . Study Number P91/084. 4th June 1992. 112 Pages. GLP (unpublished) (BASF DocID R010566)	Y	BASF
A7.2.1/01	Waring, A. R	1993	[14C]-M&B 46030 : Aerobic Soil Metabolism Hazleton UK, Study Number: 68/109-1015 GLP (unpublished) (BASF DocID R010579)	Y	BASF
A7.2.1/02	Gottesbure n B.	2010	Thermograph records to address from RMS on the incubation temperature on the study Waring (1993) BASF Doc ID R010579 BASF SE 13 January 2010 Unpublished BASF Doc ID 2010/1009649	Y	BASF
A7.2.1/03	Gottesbure n B.	2010	Thermograph records to address from RMS on the incubation temperature on the study Waring (1993) BASF Doc ID R010579 BASF SE 09 April 2010 Unpublished BASF Doc ID 2010/1052297	Y	BASF

A7.2.2.1/01	Fitzmaurice, MJ. Mackenzie, E	2002	[14C]-Fipronil: Degradation in Four Soils at 20°C and Two Soils at 10°C Battelle Agrifood Ftd, UK, Study Number: CX/01/006 GLP (unpulished) (BASF DocID C018800)	Y	BASF
A7.2.2.2/01	Wicks R.	2005	Fipronil: Long term soil dissipation study in Northern Europe with repeated applications (final data after 6 years) Huntingdon Life Sciences Ltd.; Huntingdon Cambridgeshire; United Kingdom, Study Number: AES 073, 2 GLP (unpublished) (BASF DocID 2005/104794)	Y	BASF
A7.2.2.2/02	Wicks R.	2005	Fipronil: Long term soil dissipation study in Southern Europe with repeated applications (final data after 6 years) Huntingdon Life Sciences Ltd.; Huntingdon Cambridgeshire; United Kingdom, Study Number: AES 072, 18 GLP (unpublished) (BASF DocID 2005/1004793)	Y	BASF
A7.2.3.2/01	Godward, PJ; Quarmby, DL; Austin, D. J	1993.	M&B 46030^{14}C Leaching study with five soils Rhône-Poulenc Agriculture, UK, Study Number P91/089 GLP (unpublished) (BASF DocID R010565)	Y	BASF
A7.3.1/01	Van der Gaauw, A	2001	Estimation of the degradation of Fipronil by photo-oxidation in air RCC Ltd, Itingen, Switzerland, Study Number : 802157 GLP (unpublished) (BASF Doc ID C011469)	Y	BASF
A7.4.1.1/01	Scott-Ward, G	1990.	Acute Toxicity to Bluegill, *Lepomis macrochirus*, under Flow-Through Test Conditions Toxicon Environmental Sciences USA, Study number : J9005012b GLP (unpublished) (BASF Doc ID: R010444)	Y	BASF
A7.4.1.2/01	McNamara P.C	1990.	M&B 46030 -Acute toxicity to daphnids (*Daphnia magna*) during a 48-hour flow through exposure. Springborn Laboratories Inc. ,Report No. 89/11/3161 GLP (unpublished) (BASF Doc ID: R010450)	Y	BASF

A7.4.1.2/02	Putt, A.E.	2003	Fipronil – Acute Toxicity to Mayfly Nymphs (*Hexagenia sp.)*under Static-Renewal Conditions Springborn Smithers Laboratories, USA, Report No: 986.6160 GLP (unpublished) (BASF Doc ID: 2003/5000542)	Y	BASF
A7.4.1.3/01	Handley, J. W.; Mead, C.; Bartlett, A. J	1991	The algistatic activity of M&B 46030. Laboratory : Safepharm Laboratories Ltd. , Report No. 282/95 GLP (BASF DocID: R010456)	Y	BASF
A7.4.1.4/01	Herti, J	2001	Toxicity of EXP60720A to Activated Sludge in a Respiration Inhibition Test. Institut für Biologische Analytik und Consulting IBACON GmbH, Rossdorf, Germany, Study No : 9496171 GLP(unpublished) (BASF DocID C016004)	Y	BASF
A7.4.2/01	Chapleo, S. Hall, B. E.	1992.	[^{14}C}-M&B 46030: Bioaccumulation Test in Bluegill Sunfish. Inveresk Research Centre, Project, Report No : 8892, (RPAL Ref. P. 91/116, Doc. No. 200212) including amendment to final report dated 31 May 1994 GLP (unpublished) (BASF Doc ID: R010561)	Y	BASF
A7.4.3.2/01	Machado, M W	1992	(M&B 46030) – The toxicity to rainbow trout (*Oncorhynchus mykiss*) during an early life-stage exposure) Springborn Laboratories Inc, USA GLP (unpublished) (BASF Doc ID: R010466)	Y	BASF
A7.4.3.4./02	Funk, M	2004	Effect of ^{14}C Fipronil on the Development of Sediment Dwelling Larvae of *Chironomus riparius* in a Water Sediment System BASF Aktiengesellschaft, Germany GLP (unpublished) (BASF Doc ID : 2004/1004394)	Y	BASF

A7.4.3.4/01	McNamara, PC	1995	The Chronic Toxicity of M&B 46030 to *Daphnia magna* under Flow-Through Conditions Springborn Laboratories, USA, Study Number : 90.Di3210 GLP (unpublished) (BASF Doc ID : R010452)	Y	BASF
A7.4.3.4/03	Machado M.W.	1995	**1 NON KEY STUDY** Fipronil - Chronic toxicity to mysids (*Mysidopsis bahia*) under flow-through conditions. Springborn Laboratories Inc., Wareham, United States of America. (unpublished) GLP (BASF DocID R010517)	Y	BASF
A7.4.3.4/04	Cafarella, M.A.	2005	**2 NON KEY STUDY** Fipronil – Life-Cycle Toxicity Test with Mysids (*Americamysis bahia*) Under Static Conditions in a Water-Sediment System. Springborn Laboratories Inc., Wareham, United States of America. (unpublished) GLP (BASF Doc ID: 2005/5000047)	Y	BASF
A7.4.3.5.1/01	Putt A.E.	2003	Fipronil - Toxicity to midge (*Chironomus tentans*) during a 10-day sediment exposure. Springborn Smithers Laboratories; Wareham MA 02571-1075; United States of America, Report No: 13798.6106 , 61 pages. GLP (unpublished) (BASF DocID 2003/1022432)	Y	BASF
A7.4.3.5.1/02	Backfisch, K. and Weltje, L.	2009	Chronic toxicity of BAS 350 I (Fipronil) to the non-biting midge Chironomus riparius - a spiked sediment study. BASF SE, BASF Agricultural Center Limburgerhof, Crop Protection Division, Ecology and Environmental Analytics, Limburgerhof, Germany. 38 pages GLP (unpublished) (BASF Doc ID 2009/1122509)	Y	BASF

A7.4.3.5.2/01	Han Hoberg, J. R.	1991	MB 46030 Toxicity to Duckweed, *Lemna gibba* Springborn Laboratories, Massachusetts , USA, Report Number: 93-5-4794 GLP (unpublished) (BASF Doc ID : R010498)	Y	BASF
A7.5.1.1/01	Reis KH	2002	Effects of MB046030 on the activity of the soil microflora in the laboratory (AE F124964) Institut für Biologische Analytik und Consulting IBACON GmbH, Germany, Study number : 12691080 GLP (unpublished) (BASF Doc ID: C019589)	Y	BASF
A7.5.1.2/01	Handley, J.W Wetton, P. M	1991	The Acute Toxicity of M&B46030 to Earthworms (Eisenia foetida) Safepharm Laboratories, Derby, UK, Report Number: 282/94, 14 June 1991 GLP (unpublished) (BASF DocID: R010457)	Y	BASF
A7.5.1.3/01	Simoneit S	2004	Test to determine the effects of BAS 350 00 I on seedling emergence of terrestrial plants Dienstleistungszentrum Ländlicher Raum Rheinpfatz, Neustadt an der Weinstrasse, Germany, Study number : 196666, 30 November 2004 GLP (unpublished) (BASF DocID 2004/ 1027260 amended by 2005/1006512)	Y	BASF
A7.5.1.3/02	Simoneit S	2005	Final report amendment No. 01: Test to determine the effects of BAS 350 00 I on seedling emergence of terrestrial plants Dienstleistungszentrum Ländlicher Raum Rheinpfatz, Neustadt an der Weinstrasse, Germany, GLP (unpublished) (BASF DocID 2005/1006512)	Y	BASF
A7.5.2.1/01	McElligott A	1999	Effects on reproduction and growth of earthworms (*Eisenia andrei*) in artificial soil Rhône-Poulenc Agro, Sophia Antipolis, France, Report N° SA 99391, December 17, 1999. GLP (unpublished) (BASF Doc ID: R016269)	Y	BASF

A7.5.3.1.1/01	Pederson CA	1990	M&B 46030 technical: 21day acute oral LD50 study in bobwhite quail (*Colinius viginanus*) Bio-Life Associates, Ltd, Report N° BLAL#89 QD 0133, 21 May 1990 GLP (unpublished) (BASF Doc ID: R010437)	Y	BASF
A7.5.3.1.2/01	Pederson CA	1990	M&B46030 technical: 22 day Acute Dietary LC_{50} Study in Bobwhite Quail Bio-Life Associates, Ltd, Report No: BLAL # 89 QC 135, 7 August 1990. GLP (unpublished) (BASF Doc ID: R010442)	Y	BASF
A7.5.3.1.3/01	Pederson CA	1992	M&B46030 technical: Toxicity and reproduction study in bobwhite quail BioLife Associates, Ltd, Report No: BLAL 108-005-07, 19 June 1992. GLP (unpublished) (BASF Doc ID: R010462)	Y	BASF
A7.5.3.1/01	Simoneit S	2004	Test to determine the effects of BAS 350 00 I on seedling emergence of terrestrial plants Dienstleistungszentrum Ländlicher Raum Rheinpfatz, Neustadt an der Weinstrasse, Germany, Study number : 196666, 30 November 2004 GLP (unpublished) (BASF DocID 2004/ 1027260 amended by 2005/1006512)	Y	BASF
A7.5.3.1/02	Simoneit S	2005	Final report amendment No. 01: Test to determine the effects of BAS 350 00 I on seedling emergence of terrestrial plants Dienstleistungszentrum Ländlicher Raum Rheinpfatz, Neustadt an der Weinstrasse, Germany, GLP (unpublished) (BASF DocID 2005/1006512)	Y	BASF
A7.5.4.1/01	Cole H	1991	The acute oral and contact toxicity of M&B 46030 to honey bees. Huntingdon Research Centre, Report N°: RNP 391/911047, 8 October 1991 GLP (unpublished) (BASF Doc ID: R010458)	Y	BASF

A7.5.4.1/02	Schmitzer S	2005	An Aged Residue Field Trial on the Effects of BAS 350 00 I on the Reproduction of Rove Beetles Aleochara bilineata, June 28, 2005 GLP (unpublished) (BASF Doc ID: 2005/1020069)	Y	BASF
A7.5.4.1/03	Drexler A.,	2001	**NON KEY STUDY** Effects of EXP60720A on the reproduction of Rove Beetles *Aleochara bilineata* Gyll. (Coleoptera, Staphylinidae) in the Laboratory. Institut für Biologische Analytik und Consulting IBACON GmbH, Rossdorf, Germany, 10401070, 30 June 2001 (unpublished) GLP Unpublished (BASF Doc ID: C015353	Y	BASF
A7.5.4.1/04	Richter T,	2005	Determination of BAS 350 I (Fipronil) and its metabolites MB45950, MB46136, MB46513 and RPA200766 in soil samples BASF Aktiengesellschaft, BASF Agricultural Center Limburgerhof, Crop Protection Division, Ecology and Environmental Analytics, Limburgerhof, Germany. GLP 47 pages Unpublished (BASF Doc ID 2005/1018553) and Report Amendment (BASF Doc ID 2005/1018558)	Y	BASF
B.6.2/02	Grunert B	1996d	Acute eye irritation/corrosion CEL 261 03 I RB. BioChem GmbH, Karlsruhe, Germany Report no. 96 10 42 807 C (unpublished) (BASF DocID 1996/1002807)	Y	BASF
B10	Anonymous	2009	Applicant comments on Environmental Risk Assessment BASF SE Agricultural Products Division Limburgerhof Germany BASF Doc ID 2009/1069352	Y	BASF
B3.1.1/01	Hogg A Brown W	2003	Goliath Gel: Stability testing with Goliath Gel Inveresk Research, Scotland BASF GLP (unpublished) (BASF ID 2003/1018274)	Y	BASF

B3.1.2/01	Hogg A Brown W	2003	Goliath Gel: Stability testing with Goliath Gel Inveresk Research, Scotland BASF GLP (unpublished) (BASF ID 2003/1018274)	Y	BASF
B3.10.2/01	Hogg A Brown W	2003	Goliath Gel: Stability testing with Goliath Gel Inveresk Research, Scotland BASF GLP (unpublished) (BASF ID 2003/1018274)	Y	BASF
B3.2/01	Bitterlich	2006	Evaluation of physical chemical properties according to Directive 94/37/EC BASF Ludwigshafen GLP (unpublished) (BASF ID 2006/1000661)	Y	BASF
B3.3/01	Bitterlich	2006	Evaluation of physical chemical properties according to Directive 94/37/EC BASF Ludwigshafen GLP (unpublished) (BASF ID 2006/1000661)	Y	BASF
B3.4/01	Bitterlich	2006	Evaluation of physical chemical properties according to Directive 94/37/EC BASF Ludwigshafen GLP (unpublished) (BASF ID 2006/1000661)	Y	BASF
B3.4/02	Bitterlich	2006	Evaluation of physical chemical properties according to Directive 94/37/EC BASF Ludwigshafen GLP (unpublished) (BASF ID 2006/1000661)	Y	BASF
B3.4/03	Bitterlich	2006	Evaluation of physical chemical properties according to Directive 94/37/EC BASF Ludwigshafen GLP (unpublished) (BASF ID 2006/1000661)	Y	BASF
B3.5/01	Hogg A Brown W	2003	Goliath Gel: Stability testing with Goliath Gel Inveresk Research, Scotland BASF GLP (unpublished) (BASF ID 2003/1018274)	Y	BASF

B3.6/01	Ziegler A	1996a	Goliath Gel; CEL 261 30IRB Celaflor, Germany BASF Non GLP (unpublished) (BASF ID 1996/1004337)	Y	BASF
B3.7/01	Hogg A Brown W	2003	Goliath Gel: Stability testing with Goliath Gel Inveresk Research, Scotland BASF GLP (unpublished) (BASF ID 2003/1018274)	Y	BASF
B3.7/02	Ziegler A.	1996b	Goliath Gel; CEL 261 30IRB Celaflor, Germany BASF Non GLP (unpublished) (BASF ID 1996/1004599)	Y	BASF
B4.1/01	Hogg A	2000	Fipronil. Validation of Analytical Method Suitable for the Analysis of the Active Ingredient of Goliath Gel BASF GLP (unpublished) (BASF ID C010378)	Y	BASF
B5.10/01	Anonymous	1996	Efficacy Testing under Realistic Conditions of Use of an Insecticidal Bait to Control German Cockroaches *(Blattella Germanica)* Laboratoire Techniques Environnement Consultants, Anglet, France Report no: 277/0895R (unpublished) (BASF DocID C014434)	Y	BASF
B5.10/02	Anonymous	1996	Semi-Realistic Efficacy Testing of the Efficacy Goliath Gel against German Cockroaches *(Blattella germanica)* Laboratoire Techniques Environnement Consultants, Anglet, France Report no : 390/0896R (unpublished) (BASF DocID 1996/1002800)	Y	BASF
B5.10/03	Anonymous	1996	Laboratory Testing of the Efficacy of Goliath Gel in comparison with Maxforce Gel and K-Othrine Spray against German Cockroaches *(Blattella germanica)* Laboratoire Techniques Environnement Consultants, Anglet, France Report no : 389/0896R (unpublished) (BASF DocID 1996/1002801)	Y	BASF

B5.10/04	Anonymous	1996	Laboratory Testing of the Efficacy of Goliath Gel against a Severe Infestation of German Cockroaches *(Blattella germanica)* Laboratoire Techniques Environnement Consultants, Anglet, France Report no : 388/0896 (unpublished) (BASF DocID 1996/1002799)	Y	BASF
B5.10/05	Anonymous	1996.	Arena-scale Testing of the Efficacy of Fipronil Baits and Gels against Three Species of Common Cockroaches (German cockroach : *Blattella germanica*, Oriental cockroach *: Blatta orientalis*, American cockroach : *Periplaneta Americana*) Laboratoire Techniques Environnement Consultants, Anglet, France Report no : 406/1096 (unpublished) (BASF DocID 1996/1002802)	Y	BASF
B5.10/06	Chapman P.	1995	Arena-scale Testing of the Efficacy of Fipronil Baits and Gels against Three Species of Common Cockroaches (German cockroach : *Blattella germanica*, Oriental cockroach *: Blatta orientalis*, American cockroach : *Periplaneta americana*) Central Science Laboratory, UK Report no : 406/1096 (BASF DocID 1995/1002981)	Y	BASF
B5.10/07	Lüpkes K.H.	2007	Efficacy of cockroach gels. Efficacy (including cascade effect and attractiveness) of various cockroach gels against German, Oriental and American cockroaches. BioGenius GmbH, Report no: BIO058/07a. 02 October 2007 (unpublished) (BASF DocID 2007/1057853)	Y	BASF
B5.11.2/01	Anonymous	2006	Section 5.7: Information on the occurrence or possible occurrence of the development of resistance and appropriate management strategies	Y	BASF
B6.1.1/01	Grunert B	1996a	Acute oral toxicity CEL 261 03 I RB. BioChem GmbH, Karlsruhe, Germany Report no. 96 10 42 807 A (unpublished) (BASF DocID 1996/1002792)	Y	BASF
B6.1.2/01	Grunert B	1996b	Acute dermal toxicity CEL 261 03 I RB. BioChem GmbH, Karlsruhe, Germany Report no. 96 10 42 814 A (unpublished) (BASF DocID 1996/1002806)	Y	BASF
B6.2/01	Grunert B	1996c	Acute dermal irritation/corrosion CEL 261 03 I RB. BioChem GmbH, Karlsruhe, Germany Report no. 96 10 42 807 B (unpublished) (BASF DocID 1996/1002808)	Y	BASF

B6.2/02	Grunert B	1996d	Acute eye irritation/corrosion CEL 261 03 I RB. BioChem GmbH, Karlsruhe, Germany Report no. 96 10 42 807 C (unpublished) (BASF DocID 1996/1002807)	Y	BASF
B6.3/01	Grunert B	1996e	Skin Sensitisation study according to Magnusson and Kligman CEL 261 03 I RB BioChem GmbH, Karlsruhe, Germany Report no. 96 10 42 814 B (unpublished) (BASF DocID 1996/1003073)	Y	BASF
B6.3/02	Grunert B	1997	Amendment to Report 96 10 42 814 B - Skin Sensitisation study according to Magnusson and Kligman CEL 261 03 I RB. BioChem GmbH, Karlsruhe, Germany Amendment to Report no. 96 10 42 814 B (unpublished) (BASF DocID 1997/1003738)	Y	BASF
B7.1/01	Mason P	2006	Environmental risk assessment for Goliath® Gel Cambridge Environmental Assessments – ADAS Report No CEA 115 Unpublished (BASF ID 2006/1010799)	Y	BASF
B8.1/01	Anonymous	2005a	Label Goliath Gel; BASF Germany; 18 March 2005 (BASF DocID 2005/1033896)	Y	BASF
B8.1/02	Anonymous	2005b	Safety data sheet Goliath Gel; BASF Germany; 27 June 2005 (BASF DocID 2005/1033915	Y	BASF