CONCLUSION ON PESTICIDE PEER REVIEW

Conclusion on the peer review of the pesticide risk assessment of the active substance picloram[1]

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SUMMARY

Picloram is one of the 84 substances of the third stage part B of the review programme covered by Commission Regulation (EC) No 1490/2002[3].

Picloram was included in Annex I to Directive 91/414/EEC on 1 January 2009 pursuant to Article 11b of the Regulation (EC) No 1490/2002 (hereinafter referred to as 'the Regulation'). In accordance with Article 12a of the Regulation the European Food Safety Authority (EFSA) is required to deliver by 31 December 2010 its view on the draft review report submitted by the Commission of the European Communities (hereinafter referred to as 'the Commission') in accordance with Article 12(1) of the Regulation. This review report has been established as a result of the initial evaluation provided by the designated rapporteur Member State in the Draft Assessment Report (DAR). The EFSA therefore organised a peer review of the DAR. The conclusions of the peer review are set out in this report.

The United Kingdom being the designated rapporteur Member State submitted the DAR on picloram in accordance with the provisions of Article 10(1) of the Regulation, which was received by the EFSA on 7 May 2007. The peer review was initiated on 24 September 2007 by dispatching the DAR for consultation of the Member States and the sole notifier Dow AgroSciences. Subsequently, the comments received on the DAR were examined and responded by the rapporteur Member State in the reporting table. This table was evaluated by the EFSA to identify the remaining issues. The identified issues as well as further information made available by the notifier upon request were evaluated in a series of scientific meetings with Member State experts in April – May 2009.

A final discussion of the outcome of the consultation of experts took place during a written procedure with the Member States in October – November 2009.

The conclusion was reached on the basis of the evaluation of the representative use as a herbicide, as proposed by the notifier, which comprise foliar spraying in oilseed rape for the control of broad-leaved weeds. Full details of the GAP can be found in the list of end points in Appendix A to this report.

1 On request from the European Commission, Question No EFSA-Q-2009-000241, issued on 25 November 2009.
2 Correspondence: praper@efsa.europa.eu
3 OJ L224, 21.08.2002, p.25, as amended by Regulation (EC) No 1095/2007 (OJ L246, 21.9.2007, p.19).

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The representative formulated product for the evaluation was 'GALERA (GF-224)', a soluble concentrate (SL), containing 67 g/L picloram and 267 g/L clopyralid, registered under different trade names in Europe.

Sufficient analytical methods as well as methods and data relating to physical, chemical and technical properties are available to ensure that quality control measurements of the plant protection product are possible.

There are methods available to monitor picloram residues in food/feed of plant and animal origin and environmental matrices, however, the experts at the PRAPeR 66 meeting (April 2009) could not agree on the acceptability of some methods. Following the finalisation of the residue definition for plant matrices a data gap concerning the monitoring analytical method will have to be set.

With regard to mammalian toxicology, picloram was rapidly and extensively absorbed but did not show any potential of bioaccumulation. With a low acute toxicity after ingestion or by inhalation, a sensitisation study with limitations supported by positive results with salts and esters led the PRAPeR 69 meeting of experts to propose a classification with **R43 "May cause sensitisation by skin contact"**. In repeated-dose toxicity studies, the primary target organ was the liver, but effects in the kidneys and blood were also observed in some studies. The relevant oral short-term No Observed Adverse Effect Levels (NOAEL) were 300 mg/kg bw/day in rats and 35 mg/kg bw/day in dogs. No potential for genotoxicity was demonstrated in a battery of studies *in vitro* and *in vivo*. In long-term studies with rats and mice picloram did not show any carcinogenic potential; the relevant NOAELs were 60 mg/kg bw/day in rats and 1000 mg/kg bw/day in mice. In a two-generation rat study, no evidence of reproductive or offspring toxicity was observed up to 1000 mg/kg bw/day, whereas some parental toxicity was noted at this dose level. In the developmental rat studies, performed with two salts of picloram, cranio-facial malformations were observed in single foetuses in a mid-dose and high-dose group, but were concluded to be unrelated to treatment. In the developmental rabbit studies, the incidences of a few foetal abnormalities were higher at the top dose level in each study, in the presence of maternal toxicity, and were considered to be substance-related. The relevant maternal NOAELs were 30 mg/kg bw/day for rabbits and 280 mg/kg bw/day for rats, whereas the relevant developmental NOAELs were 560 mg/kg bw/day for rats and 300 mg/kg bw/day for rabbits.

The agreed Acceptable Daily Intake (ADI) and Acceptable Operator Exposure Level (AOEL) are 0.3 mg/kg bw/day, and the agreed Acute Reference Dose (ARfD) is 0.3 mg/kg bw. These values are based on the rabbit developmental study supported by the 1-year dog study, with the use of a safety factor of 100. Based on an *in vivo* study with the representative formulation 'GALERA (GF-224)', the dermal absorption values are 0.1% for the dilution and 10% for the concentrate. The operator, worker and bystander exposure estimates are all providing exposure values below the AOEL (without the use of personal protective equipment for the operators and workers).

The metabolism and distribution of picloram was investigated in oilseed rape and wheat. Both studies demonstrate that picloram is not degraded but quickly forms conjugates in plant material. Hence, the residue definition for risk assessment was agreed as picloram, free and conjugated expressed as picloram. For monitoring, it is currently unclear whether the analytical method does fully or partially analyse any conjugated picloram, and whether conjugated picloram will have to be considered in the residue definition for monitoring and MRL setting.

Seven GAP (Good Agricultural Practice) conforming residue trials were performed on oilseed rape. It has however still to be demonstrated that the analytical method used in the supervised residue trials fully released the picloram conjugates.

In a confined crop rotation study metabolism in succeeding crops was found to be similar to that seen in primary crops. In the tested rotational cereal, oilseed and root crops the vast majority of radioactivity was present as picloram or conjugates of picloram. Residues above the limit of

quantification (LOQ) may be expected in rotational crops. On the basis of the confined study default levels were derived for several rotational crops to conduct a risk assessment and to propose maximum residue limits (MRLs). Nevertheless, rotational field crop studies should be submitted to confirm the proposed MRLs, or to modify the proposed MRLs if necessary.

The metabolism and distribution of picloram was investigated in lactating ruminants and poultry. Picloram was not metabolised to any significant degree in goats and poultry. However, further clarification is required on the composition of the non-polar fractions in the goat study. Based on the metabolism data submitted, residues in animal products should be defined as picloram for both risk assessment and monitoring purposes. A re-assessment of residues in food of animal origin after the experts' meeting (Addendum 6, July 2009, not peer reviewed) indicated that residues in products of animal origin are unlikely to be significant.

In a revised dietary risk assessment it could be demonstrated that the chronic and acute dietary intake is expected to be well below the toxicological reference values ADI (<1%) and ARfD (<5%).

In soil under aerobic conditions, picloram exhibits low to high persistence forming no major (>10% active radioactivity (AR)) metabolites. Mineralisation to carbon dioxide accounted for 10.2-24.4 % AR after 119 days. The formation of unextractable residues was a significant sink, accounting for 7.2-27.7% AR after 119 days. The degradation of picloram was considered as dose-dependent (the higher the application rate – the slower the degradation). No valid soil photolysis study was available in the dossiers, however, it cannot be excluded that photolysis is a relevant route of degradation of picloram, therefore a data gap was identified for a valid soil photolysis study. Picloram exhibits very high to high mobility in soil. There was no indication that adsorption was pH dependent.

In dark natural sediment water systems picloram degraded exhibiting high persistence. Two major degradates were formed; the 3,6-dichloro analogue of picloram, which is known as aminopyralid, and the 5,6-dichloro analogue of picloram. The terminal metabolite, CO_2, was a negligible sink in the material balance accounting for ≤ 0.1% AR. Residues not extracted from sediment were a sink, representing 5.1-11.9 % AR at the study end (102 days). The necessary surface water- and sediment exposure assessments were appropriately carried out using the agreed FOCUS scenarios approach for picloram and for the degradates, at steps 1-2 levels. It should be noted that some end points regarding the degradates, which were used for the calculations as input parameters, were taken from the DAR of aminopyralid. These values are the basis for the risk assessment discussed in this conclusion.

The potential for groundwater exposure from the applied for intended uses (single spring triennial application to spring or winter oilseed rape, at maximum application rate of 23.45 g/ha) by picloram above the parametric drinking water limit of 0.1 µg/L was concluded to be high in geoclimatic situations that are represented by the FOCUS groundwater scenarios for oilseed rape. Picloram was calculated to be present in the leachates leaving the top 1m soil layer at 80th percentile annual average concentrations >0.1µg/L in case of 5 out of the 6 modelled FOCUS scenarios, with the range of 0.241-0.338 µg/L (PELMO) or 0.228-0.345 µg/L (PEARL) for winter oilseed rape; and 2 out of the 3 modelled FOCUS scenarios with the range of 0.312-0.321 µg/L (PELMO) or 0.275-0.352 µg/L (PEARL) for spring oilseed rape. Only the Porto FOCUS scenario resulted in PECgw < 0.1 µg/L (0.076 µg/L or 0.079 µg/L for winter oil seed rape, and 0.056 µg/L or 0.066 µg/L for spring oil seed rape, depending on the used FOCUS model). The available lysimeter study indicated that contamination of groundwater by picloram is unlikely from the applied for intended uses assessed in this conclusion.

Picloram is not expected to be prone to long-range transport through the air compartment.

The risk to all non-target species (i.e. birds, mammals, aquatic organisms, bees, non-target arthropods, earthworms, soil macro- and micro-organisms, non-target plants and biological methods for sewage treatment) was expected to be low. According to the response provided by the rapporteur Member

State after the PRAPeR experts' meeting, the final end point recommended for risk assessment for mammals was the NOAEL of 300 mg a.s./kg bw/day.

The experts agreed that dicotyledonous aquatic species tested at a higher dose as well as rooted plants may be more representative than *Lemna*, due to the mechanism of action (i.e. systemic herbicide effective against dicotyledonous species) and the environmental fate and behaviour (i.e. 44% accumulation in sediment) of picloram. Nevertheless, a data gap was not considered necessary for the EU evaluation, however it was underlined to address the issue at Member State level.

KEY WORDS:

Picloram, peer review, risk assessment, pesticide, herbicide

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BACKGROUND

Commission Regulation (EC) No 1490/2002[4] lays down the detailed rules for the implementation of the third stage of the work programme referred to in Article 8(2) of Council Directive 91/414/EEC. This regulates for the European Food Safety Authority (EFSA) the procedure of evaluation of the Draft Assessment Reports (DAR) provided by the designated rapporteur Member State (RMS).

Picloram is one of the 84 substances of the third stage part B of the review programme covered by Commission Regulation (EC) No 1490/2002.

Picloram was included in Annex I to Directive 91/414/EEC on 1 January 2009 pursuant to Article 11b of the Regulation (EC) No 1490/2002 (hereinafter referred to as 'the Regulation'). In accordance with Article 12a of the Regulation the European Food Safety Authority (EFSA) is required to deliver by 31 December 2010 its view on the draft review report submitted by the Commission of the European Communities (hereinafter referred to as 'the Commission') in accordance with Article 12(1) of the Regulation. This review report has been established as a result of the initial evaluation provided by the designated rapporteur Member State in the DAR. The EFSA therefore organised a peer review of the DAR. The conclusions of the peer review are set out in this report.

In accordance with the provisions of Article 10(1) of the Regulation, the designated RMS, the United Kingdom submitted the DAR on picloram (The United Kingdom, 2007), which was received by the EFSA on 7 May 2007. Following an administrative evaluation, the DAR was distributed for consultation in accordance with Article 11(2) of the Regulation on 24 September 2007 to the Member States and to the sole notifier Dow AgroSciences, as identified by the rapporteur Member State.

The comments received on the DAR were evaluated and addressed by the rapporteur Member State. Based on this evaluation, the EFSA identified and agreed on lacking information to be addressed by the notifier, as well as issues for further detailed discussion at expert level.

Taking into account the requested information received from the notifier, a scientific discussion took place in expert meetings in April – May 2009. The reports of these meetings have been made available to the Member States electronically.

A final discussion of the outcome of the consultation of experts took place during a written procedure with the Member States in October – November 2009.

During the peer review of the DAR and the consultation of technical experts no critical issues were identified for consultation of the Scientific Panel on Plant Protection Products and their Residues (PPR).

This conclusion summarises the results of the peer review on the active substance and the representative formulation evaluated as finalised at the end of the examination period provided for by the same Article. A list of the relevant end points for the active substance as well as the formulation is provided in Appendix A.

The documentation developed during the peer review was compiled as a Peer Review Report (EFSA, 2009) comprising of the documents summarising and addressing the comments received on the initial evaluation provided in the rapporteur Member State's DAR:

- the comments received,
- the resulting reporting table (revision 1-1; 12 February 2009),

[4] OJ L224, 21.08.2002, p.25, as amended by Regulation (EC) No 1095/2007 (OJ L246, 21.9.2007, p.19).

as well as the documents summarising the follow-up of the issues identified as finalised at the end of the commenting period:

- the reports of the scientific expert consultation,
- the evaluation table (revision 2-1; 24 November 2009).

Given the importance of the DAR including its addendum (compiled version of October 2009 containing all individually submitted addenda) (The United Kingdom, 2009) and the Peer Review Report with respect to the examination of the active substance, both documents are considered respectively as background documents A and B to this conclusion.

THE ACTIVE SUBSTANCE AND THE FORMULATED PRODUCT

Picloram is the ISO common name for 4-amino-3,5,6-trichloropyridine-2-carboxylic acid or 4-amino-3,5,6-trichloropicolinic acid (IUPAC).

Picloram belongs to the class of picolinic acid herbicides or pyridine herbicides. It is a foliar and root absorbed systemic herbicide that deregulates plant growth. It is translocated both acropetally and basipetally and accumulates in meristematic tissues of plants. Picloram has an 'auxinic' mode of action such as 2,4-D, dicamba, clopyralid, fluroxypyr. It is used to control a narrow spectrum of broad-leaved weed species in agricultural crops.

The representative formulated product for the evaluation was 'GALERA (GF-224)', a soluble concentrate (SL), containing 67 g/L picloram and 267 g/L clopyralid, in the form of the monoethanolamine salts, registered under different trade names in Europe.

The representative uses evaluated comprise foliar spraying to control broad-leaved weeds in winter and spring oilseed rape, at growth stages of BBCH 14-31, in northern European countries, at a single application, at maximum application rate of 23.45 g a.s./ha.

SPECIFIC CONCLUSIONS OF THE EVALUATION

1. Identity, physical/chemical/technical properties and methods of analysis

The minimum purity of technical picloram is 920 g/kg (dry weight basis), which meets the requirements of the existing FAO specification 174/TK (July 2005) of minimum 920 g/kg picloram on a dry weight basis, and a maximum content of the relevant impurity hexachlorobenzene (HCB) of 0.005% of the picloram content. The PRAPeR 69 meeting of experts (May 2009) considered also sulphuric acid as a relevant impurity, but not of concern at the proposed level of 0.9%. The PRAPeR 66 meeting of experts (April 2009) agreed that based on the QC data the proposed specification is acceptable. The experts also agreed that HCB is not formed on storage.

The assessment of the data package revealed no issues that need to be included as critical areas of concern with respect to the identity, physical, chemical and technical properties of picloram or the respective formulation, however the following data gaps were identified:

- determination of the pK_a according to OECD 112
- determination of the water solubility at pH 5, 7 and 9

The main data regarding the identity of picloram and its physical and chemical properties are given in Appendix A.

Adequate analytical methods are available for the determination of picloram in the technical material and in the representative formulation (HPLC-DAD, HPLC-UV), as well as for the determination of the relevant impurities in the technical material (HPLC-UV, titration). CIPAC methods also exist for the determination of the active substance in the technical material and the formulation (174/TC/M/3 and 174/SL/M2/3).

Sufficient test methods and data relating to physical, chemical and technical properties are available to ensure that quality control measurements of the plant protection product are possible.

Only single methods for the determination of residues are available. Residues of picloram in food of plant origin can be monitored by GC-MS with a LOQ of 0.01 mg/kg in oilseed rape. It should be noted however that the experts at the PRAPeR 66 meeting (April 2009) concluded that in the method GRM 00.19 only one fragment ion has been validated and an additional one for identification, and could not agree on the acceptability of the method. It should also be noted, that following the

finalization of the residue definition for monitoring, a data gap will have to be set: either to demonstrate that the methods analyse only for picloram or to demonstrate that the extraction procedures cover the picloram conjugates, too.

Residues in foodstuff of animal origin can be determined by GC-MS with a LOQ of 0.01 mg/kg in all relevant animal products.

Residues of picloram in soil can be monitored by GC-MS with a LOQ of 0.0005 mg/kg.

GC-MS method is available to monitor residues of picloram in surface water and drinking water with LOQs of 0.05 µg/L. It should be noted however, that the experts at the PRAPeR 66 meeting (April 2009) concluded that in the methods GRM 00.18 for soil and GRM 00.17 for water only one fragment ion has been validated and an additional one for identification, and could not agree on the acceptability of the methods. It was however considered not necessary to set a data gap for these methods at EU level.

Residues of picloram in air can be monitored by GC-MS method with a LOQ of 6 µg/m^3.

Analytical methods for the determination of residues in body fluids and tissues are not required as picloram is not classified as toxic or highly toxic.

2. Mammalian toxicity

Picloram was discussed by the PRAPeR 69 meeting of experts on mammalian toxicology (round 14, May 2009) on the basis of the Draft Assessment Report, and Addendum 1 (July 2007) and Addendum 2 (April 2009) from the Final Addendum to the DAR. After the experts' meeting, an Addendum 4 (June 2009) was provided and compiled in the Final Addendum.

Most studies were conducted with picloram. However, the toxicokinetics and the 21-day dermal studies were performed with the potassium salt, whereas the developmental studies were performed with the potassium and triisopropanolamine (TIPA) salts. The tested doses were converted to picloram equivalents and expressed as picloram.

Considering the proposed technical specification (Addendum 3 to Vol.4, April 2009), the experts agreed that the impurities hexachlorobenzene and sulphuric acid are toxicologically relevant, but not of concern at the proposed levels. Based on a revision of point C.1.2.d of Addendum 3 to Vol.4 distributed during the meeting (and provided after the meeting in Addendum 5 to Vol.4, June 2009), the experts agreed that the proposed levels for all impurities were acceptable from a toxicological point of view, without the need for further genotoxicity studies with the currently manufactured product.

2.1. Absorption, distribution, excretion and metabolism (toxicokinetics)

After oral administration in rats (of the soluble potassium salt), picloram was absorbed rapidly (C_{max} attained within 5 minutes) and extensively. Based on urinary excretion, cagewash and biliary contribution, the oral absorption was estimated to be ≥ 80% (within 72 hours). These results were confirmed in a supplementary study with the sodium salt administered to human volunteers, showing a rapid oral absorption (T_{max} = 30 min) with extensive urinary excretion (>80% within 72 hours). No potential for bioaccumulation was demonstrated, and no metabolites were detected in urine or faecal extracts indicating that picloram is excreted unchanged.

2.2. Acute toxicity

Picloram is of low acute toxicity by the oral route in rats and by dermal administration in rabbits. In the acute inhalation study, the maximum technically attainable concentration was low and showed little evidence of toxicity in rats (LC_{50} > 0.0351 mg/L). Picloram did not induce skin irritation, but a mild irritation after ocular administration in rabbits (without the need of classification). The available Buehler study did not show any evidence of skin sensitisation, but presented several limitations. As a

precaution, the experts proposed to classify picloram as **R43 "May cause sensitisation by skin contact"**, because of the positive results obtained with the salts and ester of picloram published in the US EPA evaluation (see DAR, Vol.3 B6.2.7; The United Kingdom, 2007).

2.3. Short-term toxicity

The short-term toxicity of picloram has been investigated in rats (13-week), mice (90-day) and dogs (28-day, 6-month and 1-year) after oral exposure, and in rabbits (21-day) after dermal exposure. In the dietary studies, the liver was identified as the primary target in all three species; effects were mainly characterised by increased liver weight and associated histopathology (increased size of hepatocytes with altered staining properties or altered appearance). Further details on the histopathological changes observed in the liver in the 13-week rat study were provided in Addendum 2 to Volume 3 (April 2009).

The relevant oral short-term NOAELs were 300 mg/kg bw/day in rats and 35 mg/kg bw/day in dogs, but could not be determined in mice (liver effects were observed in females at the lowest dose tested of 1000 mg/kg bw/day).

In the rabbit study with repeated dermal application, no evidence of systemic toxicity was seen at the highest dose level of 650 mg/kg bw/day; signs of local dermal irritation at the application site were noted in all treated groups (including the lowest dose level of 65 mg/kg bw/day).

2.4. Genotoxicity

In vitro testing of picloram did not reveal any evidence of mutagenicity in an Ames test or in a mammalian cell mutation study (CHO/HPRT), and no evidence of UDS was seen in cultured primary rat hepatocytes. Similarly, no genotoxicity was observed in a mouse micronucleus *in vivo* study. Even though no study of clastogenicity *in vitro* had been submitted, this was considered to be acceptable due to the negative results obtained in the *in vivo* micronucleus study.

2.5. Long-term toxicity and carcinogenicity

The chronic toxicity and carcinogenicity of picloram has been investigated in two rat studies and one mouse study. Additional results of two carcinogenicity studies (in rats and mice) evaluated under the US National Toxicology Program (NTP) were also summarised. During the meeting, the rapporteur Member State mentioned that the design of the NTP studies had limitations (further details were provided in Addendum 4 to Vol.3 of June 2009). The experts agreed that only the more recent studies provided by the notifier and evaluated in the DAR should be taken into consideration.

In the second rat study provided by the notifier, a NOAEL could not be determined, because findings of chronic glomerulonephropathy were observed in the kidneys of males at the low dose level (250 mg/kg bw/day). In the first rat study provided by the notifier, a NOAEL of 60 mg/kg bw/day was agreed based on effects in the liver (increased weight and hepatocyte hypertrophy), and haematological changes (indicative of mild macrocytic anaemia) at the top dose level of 200 mg/kg bw/day. Further details were provided during the meeting by the RMS about the incidences of pancreas atrophy in these rat studies (as well as in the rat subchronic study, see Addendum 4 to Vol.3, June 2009), and the experts concluded that this was not a substance-related effect. Some evidence of carcinogenicity was observed in the females of the second study at the highest dose level (500 mg/kg bw/day). This was a slightly increased incidence of benign liver tumours, within the historical control range. The experts agreed that picloram has no carcinogenic potential.

In the mouse study provided by the notifier, there was no significant systemic toxicity or carcinogenicity up to the highest dose level (1000 mg/kg bw/day).

2.6. Reproductive and developmental toxicity

In a two-generation rat study, no evidence of reproductive or offspring toxicity was seen. The parental toxicity was only observed at the high dose level (1000 mg/kg bw/day) and consisted of reduced weight gain in males and renal toxicity (haematuria and increased kidney weight in males; histopathological findings of tubular and/or papillary degeneration/regeneration with inflammation in both sexes). Therefore the parental NOAEL was 200 mg/kg bw/day; and the reproductive and offspring NOAEL was 1000 mg/kg bw/day.

Four developmental studies were presented in the DAR, performed with rats and rabbits, and using the potassium- and TIPA-salts of picloram for both species. It was agreed that these salts were not affecting the intrinsic toxicity of picloram, therefore these studies were considered as relevant for picloram (and the dose levels were converted to picloram equivalents and expressed as picloram).

For the rat developmental studies, the RMS provided during the meeting further details about the incidences of cranio-facial malformations, occurring in a single foetus in both studies, either at the mid- or high-dose level, but also observed in the control group and sporadically in historical control data (see Addendum 4 to Vol.3, June 2009). Based on this, the experts agreed that these malformations did not indicate a teratogenic effect of picloram. Using a worst-case approach and taking into account that the maternal LOAEL with the TIPA-salt (560 mg/kg bw/day) was quite close to the maternal NOAEL with the K-salt (430 mg/kg bw/day), the experts agreed that the overall NOAELs for rats should be derived from the study with the TIPA-salt, i.e. 560 mg/kg bw/day (highest dose tested) for the developmental NOAEL, and 280 mg/kg bw/day (based on clinical signs) for the maternal NOAEL.

For the rabbit developmental studies, the incidences of a few foetal abnormalities were increased at the top dose level. Although historical control data provided some reassurance, the experts were concerned about the number of foetal abnormalities at the top dose in both studies, which were seen in the presence of maternal toxicity. The maternal toxicity was manifested by a loss of bodyweight during the first days of the study (and by decreased body weight gain). Using also a worst-case approach for the maternal toxicity in the rabbit studies, the experts agreed to derive the overall NOAELs from the results with the TIPA salt, i.e. a maternal NOAEL of 30 mg/kg bw/day and a developmental NOAEL of 300 mg/kg bw/day were agreed.

It was agreed during the meeting that no classification for teratogenicity (R63) was required for picloram.

2.7. Neurotoxicity

No studies were submitted. Since no evidence of specific neurotoxicity or neuropathology was seen in the standard toxicity studies, no specific neurotoxicity study was required.

2.8. Further studies

No additional toxicological studies were submitted.

2.9. Medical data

No adverse health effects were observed during the medical surveillance of 17 plant employees between 2001 and 2004. Incident reports to the manufacturer alleging exposure to picloram included skin rash, eye irritation, nausea, diarrhoea, vomiting, abdominal pain, myalgia/arthralgia, headache, fever, cough, shortness of breath and throat irritation. Only one was judged to have moderate effects actually related to pesticide exposure. No other poisoning cases were found in the open literature.

2.10. Acceptable daily intake (ADI), acceptable operator exposure level (AOEL) and acute reference dose (ARfD)

Acceptable Daily Intake (ADI) and Acceptable Operator Exposure Level (AOEL)

The values proposed in the DAR were accepted by the experts. Based on the maternal NOAEL in the rabbit developmental study with the TIPA salt of picloram (i.e. 30 mg/kg bw/day), and supported by the NOAEL from the 1-year dog study (i.e. 35 mg/kg bw/day), the agreed ADI and AOEL are 0.3 mg/kg bw/day, with the use of a safety factor of 100. No correction for oral absorption was necessary for calculating the AOEL.

Acute Reference Dose (ARfD)

The derivation of an ARfD was considered needed by the experts. The decision was based on the maternal effects during the first three days of the developmental rabbit studies, supported by the weight loss observed during the first week of treatment in the 1-year dog study. As proposed in the DAR, the agreed ARfD is 0.3 mg/kg bw, with the use of a safety factor of 100.

2.11. Dermal absorption

In the DAR, the results of an *in vivo* dermal absorption study with male rats were presented. The study was performed with the representative formulation 'GALERA (GF-224)', either with the concentrate (61.05 mg picloram/mL) or with a 500-fold aqueous dilution (0.126 mg picloram/mL). For the dilution, considering that the amount present in the skin was not bioavailable, the experts confirmed the dermal absorption value of 0.1% (as proposed in the DAR). For the concentrate, in order to correct for a low recovery, they agreed on a default value of 10% (instead of 3% as proposed in the DAR).

2.12. Exposure to operators, workers and bystanders

The representative plant protection product 'GALERA (GF-224)' is a soluble concentrate formulation containing picloram (67 g/L, acid equivalents) and clopyralid (267 g/L, acid equivalents) as the monoethanolamine salts.

EFSA note: in the DAR an assessment of the toxicological interaction between picloram and clopyralid was provided by the rapporteur Member State. This will have to be considered at Member State level.

During the experts' meeting the RMS was asked to re-calculate operator- and worker exposure estimates according to the new dermal absorption value for the concentrate (the bystander exposure was not affected as bystanders are mainly exposed to the diluted product). The re-calculations were provided in Addendum 4 to Volume 3 (June 2009) and are presented below.

Operator exposure

The representative use of 'GALERA (GF-224)' is by spraying with conventional field crop boom sprayer on winter/spring oilseed rape, with an application rate of 23.45 g a.s./ha in a minimum spray volume of 100 L water/ha. The exposure estimates were performed based on the German and UK POEM models.

Estimated exposure presented as % of AOEL (0.3 mg/kg bw/day), according to calculations with the German and UK POEM models. The default for body weight of operator is 70 kg in the German model and 60 kg in the UK-POEM model.

Use	Model	**% of AOEL** No PPE	**% of AOEL** PPE*
Winter/spring oilseed rape	German BBA	0.5	0.01
	UK POEM	2	0.2

*PPE (personal protective equipment): gloves during mixing/loading

Bystander exposure

In the DAR, an estimate of exposure for unprotected bystanders was based on direct measurements of simulated bystander exposure for boom sprayers. The average potential exposure for a bystander, positioned 8 metres downwind from the sprayer was < 0.1% of the AOEL.

Additionally, the residential exposure of children playing in gardens adjacent to treated areas was estimated with the approach used by the United States Environmental Protection Agency, and resulted in a value lower than 1% of the AOEL. Exposure of residents to picloram vapour, post application, is estimated to be <1% of the AOEL.

Worker exposure

The German worker re-entry model was used to predict exposure from re-entry into crops treated with 'GALERA (GF-224)' (during crop inspection). The dislodgeable foliar residue (DFR) and transfer coefficient (TC) values were 3 µg/cm² per kg as/ha and 5,000 cm²/hour, as agreed for the EUROPOEM database. A work period of 2 hours/day and a body weight of 60 kg were considered. The resulting exposure estimate was 0.4% of the AOEL for unprotected workers entering and handling treated crops.

3. Residues

Picloram was discussed at the PRAPeR 70 meeting of experts on residues (round 14, May 2009), on the basis of the Draft Assessment Report and Addendum 2 (April 2009) from the Final Addendum to the DAR. After the experts' meeting, an Addendum 6 (July 2009) was provided but not peer reviewed.

3.1. Nature and magnitude of residues in plant

3.1.1. Primary crops

The metabolism and distribution of picloram was investigated in oilseed rape and wheat. Picloram labelled in the 2, 6 position of the ring was applied to oilseed rape at a rate of 1.7 fold the intended rate, and to wheat at the normal field rate (1N) as well as twice the intended rate (2N).

Total residues in oilseed rape plants at harvest (PHI 84 days) were accounting for 0.1 mg/kg and in the seeds for less than 0.01 mg/kg. Hence, no further attempt was made to characterise or identify residues in the seed. In stem and chaff samples the main components identified were picloram (28% to 54% TRR), and a conjugated residue which released unchanged picloram (24% to 56%) when subjected to basic or acidic hydrolysis. A metabolite PYR was present in stem and chaff samples at very low levels (<0.005 mg/kg).

Total residues in wheat grain at harvest (PHI 104 days) were 0.05 mg/kg (1N) and 0.09 mg/kg (2N), and in straw 0.34 mg/kg (1N) and 0.52 mg/kg (2N), respectively. The majority of the TRR (75-90%) in straw and grain could be extracted with successive extraction steps. Hydrolysis of extracts using acid, alkali or β-glucosidase released parent picloram. Direct hydrolysis of samples of straw, grain and forage revealed the major component found in all samples to be parent picloram. The 6-OH metabolite and PYR were found at trace levels (≤ 0.002 mg/kg).

Both the oilseed rape and wheat studies demonstrate that picloram is not degraded but quickly forms conjugates in plant material. Hydrolysis of these conjugates releases picloram.

Hence, the residue definition for risk assessment was agreed as picloram, free and conjugated expressed as picloram. For monitoring, it was discussed whether picloram conjugates should be included. Currently it is unknown whether the analytical method proposed for monitoring does fully or partially analyse any conjugated picloram. If this were the case, conjugated picloram will have to be considered in the residue definition for monitoring and MRL setting.

The proposed formulation contains picloram formulated as the monoethanol amine (MEA) salt. To address the fate of the alkanolamine moiety, metabolism and distribution of radio-labelled tri-isopropanol amine (TIPA) formulated as the amine salt of picloram was investigated. It is assumed that TIPA and MEA would be metabolised in the same manner. TIPA was metabolised completely in wheat, adding to the carbon pool used by normal synthetic routes of the plant, resulting in radioactivity being incorporated into natural plant constituents such as glucose and amino acids.

Seven GAP conforming trials were performed on spring oilseed rape, in northern European countries in 2000 and 2001. It is considered that the trials data generated are acceptable to cover both spring and winter oilseed rape uses.

Residues of picloram were quantified using a validated method. However, the PRAPeR 70 meeting of experts had doubts whether the analytical method used in the supervised residue trials fully released the picloram conjugates. It was agreed that the notifier should demonstrate that the analytical method used in the residue trials has been suitable to analyse for the residue as defined by the residue definition for risk assessment.

In seeds sampled at maturity residues of picloram were all below the LOQ of 0.01 mg/kg. This is consistent with the findings in the oilseed rape metabolism study.

Residues in the remainder of the plant samples at maturity ranged up to 0.03 mg/kg for picloram. As to what extent conjugated picloram was covered in the determined levels is currently unknown and has to be addressed by the notifier.

For the oil seeds, the storage stability study covers the storage period in the residue trials. The forage analyses were carried out at a slightly later time point than covered by the storage stability data, but the experts agreed that for this short period the study is acceptable taking into account the overall stability of the active substance.

Data on the effects of industrial- and household processing on residues were not required.

3.1.2. Succeeding and rotational crops

The longest laboratory DT_{90} was greater than 700 days and the longest DT_{90} field in soil was found to be 163 days. It is therefore possible that > 10% of the applied active substance as its relevant metabolites or degradation products could still remain in the soil at replanting of succeeding crops.

In a confined crop rotation study, radio-labelled picloram was applied to the soil at a rate 25-fold the intended application rate. The soil was allowed to age for 30, 120 and 365 days and was lightly cultivated prior to planting. Crops of wheat, maize, mustard green and turnip were planted for each plant back interval. The TRR in cereal forage and straw were generally seen to decline with longer plant back intervals. The TRR for cereal grain and turnip tops for the 120 day plant back interval were higher than those found at the other plant back intervals. The TRR in turnip roots remained relatively stable across all plant back intervals.

Generally, the residue profile was similar across all crops. In most cases parent picloram was the major residue found. Acid hydrolysis of extracts released further picloram, indicating that metabolites A, B and C were most likely conjugates of picloram. Metabolite PYR was found in wheat, maize and turnip samples, but in all cases it was present at low levels.

It has been concluded that picloram, and possibly any conjugates formed in the soil, are readily transported into succeeding crops. The vast majority of radioactivity is present as picloram or conjugates of picloram. The metabolism in succeeding crops is similar to that seen in primary crops. Thus, the same residue definition as for primary crops is appropriate.

Residues above the LOQ may be expected in rotational crops. The PRAPeR 70 meeting of experts agreed that the confined crop rotation study could be used to conduct a risk assessment and to propose MRLs for certain rotational crops. Nevertheless, rotational field crop studies should be submitted to either confirm the proposed MRLs, or to modify the proposed MRLs if necessary. The TRR observed in the ether partition fraction in the rotational crop study is considered to be a worst-case assumption for the residues of free and conjugated picloram. On this basis, the PRAPeR 70 meeting of experts proposed provisional MRLs for fruiting vegetables, brassica vegetables, leafy vegetables, stem vegetables, herbal infusion and spices, legume vegetables, pulses, cereal grains, root vegetables and oilseeds (refer to section 3.4).

3.2. Nature and magnitude of residues in livestock

On the basis of the proposed MRLs in rotational crops the experts considered livestock intake that was found to be significant for ruminants.

The metabolism and distribution of picloram was investigated in lactating ruminants and poultry.

One lactating goat was dosed daily by capsule for four consecutive days at a dose rate of 1200 mg/kg diet as received (17.4 mg/kg bw). The majority (*ca* 90%) of the dose administered was excreted, mainly in urine. Residues in milk were seen to increase after dosing, declining rapidly prior to the next dose. The higher residue levels seen after dosing did not increase significantly with successive doses, indicating that a steady-state was reached by the second day of dosing. The highest levels of the TRR were found in the kidney.

The major component identified in all tissues was the parent picloram accounting for 88% TRR (0.16 mg/kg) for milk, 97% TRR (0.25 mg/kg) for muscle, 88% TRR (3.03 mg/kg) for kidney, 56% TRR (0.076 mg/kg) for liver and 45% TRR (0.01mg/kg) for fat. In both fat and liver a significant proportion of the radioactivity was initially assigned as non-polar residues (47% TRR, 0.011 mg/kg for fat and 21% TRR, 0.028 mg/kg for liver). Further analysis by HPLC showed the non-polar fractions to consist of many components with a chromatographic profile similar to the non-polar impurities found in the original test material. This radioactivity is considered by the notifier to be due to impurities and not to metabolites of picloram. The PRAPeR 70 meeting of experts agreed that further clarification on this issue is required (data gap).

Laying hens were dosed orally by capsule for seven consecutive days at a rate of 45 mg/kg diet as received. The majority (*ca* 85 - 90%) of the dose administered was excreted. Residues in egg whites

reached a plateau after 2-3 days, however residues in egg yolks did not reach a plateau during the dosing period studied. The highest levels of the TRR in tissues consumed by humans were found in the kidney.

Extractability was high for all tissues studied (> 95%). In all tissues the major component identified was unchanged parent picloram. No further work was conducted to identify or characterise the remaining radioactivity, since the corresponding TRR values were low (ranging from < 0.01 – 0.024 mg/kg).

Picloram was not metabolised to any significant degree in goats and poultry. Based on the metabolism data submitted, residues in animal products should be defined as picloram for both risk assessment and monitoring purposes.

The MRL for picloram of 0.2 mg/kg in kidney proposed by the experts in PRAPeR 70 was subjected to a re-evaluation by the RMS after the meeting. A re-assessment of the livestock dietary burden considering residues in rotational crops was provided in Addendum 6 to the DAR; moreover the RMS clarified a misreporting in the DAR of the administered dose (erred by a factor of thousand) in the goat metabolism study that was used to derive the MRL. As a result of the re-assessment the RMS proposed that no MRL is necessary for animal products since residues are unlikely to be significant. The addendum has not been peer reviewed, however EFSA has verified the assessment provided and agrees with the conclusion that residues in animal products are expected to be less than 0.01 mg/kg.

3.3. Consumer risk assessment

Following the PRAPeR 70 meeting, the rapporteur Member State submitted a revised risk assessment in Addendum 6 of July 2009 (not peer reviewed). In accordance with the decisions of the experts, the commodities considered in the risk assessment cover both the use on primary crop (oilseeds) as well as potential residues arising in following crops.

The TMDIs for picloram from the consumption of a number of crops have been calculated using the WHO European diet. Based on chronic exposure estimates for long-term dietary exposure, TMDIs for the cluster diets are all well below (< 1%) the ADI of 0.3 mg/kg bw/day. In addition, the long-term dietary intakes for residues of picloram from the consumption of a number of crops have been calculated on the basis of UK consumption data for adults, young people, toddlers, infants, vegetarians and elderly adults. Based on chronic exposure estimates for long-term dietary exposure, intakes are all below 1% of the ADI for all consumer groups considered.

In an acute dietary intake assessment, the UK NESTIs for residues of picloram from the consumption of a number of crops have been calculated for adults, young people, toddlers, infants, vegetarians and elderly adults. Based on acute exposure estimates for short-term dietary exposure, intakes are all below the ARfD of 0.3 mg/kg bw. The individual NESTIs vary according to different commodities/consumer groups, although the values range from < 0.1% (several consumer groups for several crops) to 1.4% (infants, NESTI of 0.0041 mg/kg bw/day for cauliflower) of the ARfD.

The RMS did not conduct a risk assessment with the EFSA PRIMo that includes consumption data for a number of European Member States in addition to the WHO European cluster diets. EFSA conducted the assessment (not peer reviewed) with the proposed MRLs. In particular, the results of the acute risk assessment conducted by EFSA are slightly different from the results for UK consumers. However, for the different commodities/consumer groups the acute exposure did not exceed 5% of the ARfD.

3.4. Proposed MRLs

The following provisional MRLs are proposed based on a residue definition as picloram, free and conjugated expressed as picloram equivalents:

Fruiting vegetables, brassica vegetables, leafy vegetables, stem vegetables, herbal infusion and spices	0.07 mg/kg
Legume vegetables, pulses, cereal grains	0.02 mg/kg
Root vegetables and oilseeds	0.01* mg/kg

4. Environmental fate and behaviour

Picloram was discussed at the PRAPeR 67 meeting of experts on environmental fate and behaviour (April 2009) on the basis of the Draft Assessment Report and Addendum 2 to Vol3 B.8 (April 2009) from the Final Addendum to the DAR. After the PRAPeR 67 experts' meeting, the RMS prepared an Addendum 4 (June 2009) and included the updated calculations of predicted environmental concentrations in surface water, sediment and groundwater (FOCUS PECsw/sed, FOCUS PECgw).

4.1. Fate and behaviour in soil

4.1.1. Route of degradation in soil

Soil experiments (4 EU soils, OC 0.8-1.9%, pH 6.1-8.0, clay 5-27%) were carried out under aerobic conditions in the laboratory (20°C, 40% of pF0[5] soil moisture) in the dark. The formation of residues not extracted (NER) was a sink for the applied ^{14}C-picloram (7.2-27.7% of the applied radioactivity (AR) after 119 days). Mineralisation to carbon dioxide of this radiolabel accounted for 10.2-24.4 % AR after 119 days. No breakdown products were found in the soil extracts.

One experiment was repeated at 10°C (NER 3.5% AR, CO_2 formation 0.5 % AR after 119 days) and in another experiment (20°C) sterilized soil was used (NER 2.2% AR, no CO_2 formation after 120 days). No metabolites were formed in these supplemental experiments.

Another soil degradation study at 25°C was available, which used seven soils of US origin for aerobic incubations, moreover one soil was used for anaerobic (and aerobic/anaerobic) incubations as well. The rapporteur Member State did not use the results of this non-GLP study from 1978 in the further evaluations, as it was considered that the high application rate used in the study (750 g/ha, which is more than 30 times more than the application rate for the applied for use) slowed significantly down the degradation of picloram. This issue is further explained in chapter 4.1.2 below. Indeed, slow degradation (compared with other available end points) was observed in this study without any metabolites being formed (< 4% unidentified AR found in the soil extracts). Picloram was stable in the anaerobic experiment (NER 0.2% AR, no CO_2 formation after 100 days).

In a study included in the chapter for rate of degradation (4.1.2), a fraction of unidentified radioactivity (called Largest Unknown), which increased in the final parts of the soil incubations, was observed. This radioactivity peaked at 5.7% AR and was argued to be an analytical artefact in the DAR and in Addendum 2. The PRAPeR 67 meeting of experts discussed and agreed that this category of extracted radioactivity was an artefact and any unknown compound would be < 5% AR.

[5] Soils at pF0 are assumed to be slightly wetter than at maximum water holding capacity (MWHC)

* MRL is proposed at the limit of quantification (LOQ)

No valid soil photolysis study was available in the dossiers, therefore the PRAPeR 67 meeting of experts agreed that a data gap should be set for a soil photolysis study in order to identify any metabolites which may be formed via photolysis.

4.1.2. Persistence of the active substance and their metabolites, degradation or reaction products

The rate of degradation of picloram was estimated from the results of the accepted studies (on 4 EU soils) described in 4.1.1 above, but three additional studies were considered as well. In the second study (dark laboratory incubation at 20°C, 40% of pF0 soil moisture), the degradation of picloram in the top layer of a lysimeter soil (OC 1.3%, pH 5.2, clay 7%) was found to be biphasic (hockey stick (HS)). However, the end point from this study was not used in the subsequent evaluations. Prior to the experts' meeting the RMS refitted the picloram soil residues of this incubation using single first-order (SFO) and first-order multi-compartment (FOMC) kinetics, based on the FOCUS recommendations (FOCUS, 2006) (for details see Addendum 2). The PRAPeR 67 meeting of experts agreed that there is no reason to exclude the results of this soil incubation, and concluded that the HS slow phase DT_{50} value, which was included already in the DAR, should be used in the exposure assessment. In the third study, four soils of US origin (OC 0.98-8.19%, pH 5.4-7.6, clay contents were not reported) were incubated at 25°C at 75% of 1/3 bar soil moisture in the dark. Five application rates (52.5–390 g/ha) were applied in separate experiments for each soil. Since a dose-dependent degradation (higher dose – slower degradation) was observed in this study, and because all the doses used in the study were higher than the application rate for the applied for use, in the exposure assessment the RMS used only the DT_{50} values derived from the smallest dose. The PRAPeR 67 meeting of experts agreed with this approach. However, it was highlighted that using this data set of DT_{50} values will not be valid in any assessment where the application of picloram results in a concentration in the soil of higher than 0.07 mg picloram/kg dry weight soil. This was the lowest soil concentration used in this study, which is equivalent to an application rate of 52.5 g/ha (assuming even mixing in the top 5 cm of soil and bulk density of 1.5 kg/L).

In the last study, from which degradation end points were available (described in chapter 4.1.1 above), even higher application rate was used than in the previous experiments. Therefore the RMS did not use this end point in the subsequent assessments. The PRAPeR 67 meeting of experts agreed with this approach.

DT_{50} values from the nine reliable experiments (at 20°C or 25°C and 40% of pF0 or 75% of 1/3 bar soil moisture) were calculated to be 5.0 - 295.6 days (8 values derived from SFO kinetics, one value derived from the slow phase of HS fit). After normalization of these values to FOCUS reference conditions (20°C and pF2 soil moisture content), the range became 5.2 - 292.2 days. The median of this data set that was considered by the PRAPeR 67 meeting of experts as appropriate for use in FOCUS modelling is 82.8 days.

Field soil dissipation studies were provided from 4 sites in Europe (one each in UK, Poland, France and Germany), where spray applications (one for each site) were made on bare soil in April, May or September. Due to the design, the field study conducted in Germany was considered as a semi-field trial. Since at the UK site the number of sampling times, where residues of picloram were above the LOQ, was low, no reliable dissipation end points (DT_{50}/DT_{90}) could be derived. Therefore the PRAPeR 67 meeting of experts agreed that the calculated end points from this site should not be reported or used further.

Using the residue levels of picloram determined over the soil cores where residues were found (> LOQ) (0-30 cm at the Polish site, 0-10 cm at the French site and 0-20 cm at the German site), single first-order DT_{50} values were between 20-49 days (n=3).

The longest available single first-order field DT_{50} of 49 days was used for PECsoil calculations.

4.1.3. Mobility in soil of the active substance and their metabolites, degradation or reaction products

The adsorption/desorption of picloram was investigated in 8 soils at ambient temperature in satisfactory batch adsorption experiments. K_{doc} values varied from 20 to 60 mL/g (arithmetic mean 35 mL/g), indicating that picloram exhibits very high to high mobility in soil. Freundlich coefficients were not established. Therefore the PRAPeR 67 meeting of experts agreed that 1/n of 1 should be used in FOCUS calculations assuming a linear adsorption to soil. There was no indication of any relationship between adsorption and any soil characteristics including pH.

In another study, the adsorption of picloram to three layers of a lysimeter soil was studied. However, the results of this study were not used further. The PRAPeR 67 meeting of experts agreed with the exclusion of these results, since the soils were dried at high temperature (> 100°C) prior to the equilibrium tests, which can invalidate the results of adsorption/desorption experiments.

A BBA guideline lysimeter study (two soil monoliths of 1.1 m depth of loamy sand/sand soil) was carried out in Germany, where an application of 25 g picloram/ha was made in the middle of March. Oilseed rape was grown in the lysimeters in the first year, and the subsequent crop rotation was winter wheat and winter barley. Since the annual average radioactivity recovered in the leachates of the lysimeters was basically low, identification of the radioactive residues was not performed. Annual average radioactivity in lysimeter leachate was in the range 0.003-0.006 µg picloram equivalents/L (maximum value 0.023 µg/L).

4.2. Fate and behaviour in water

4.2.1. Surface water and sediment

Picloram was essentially stable under hydrolysis conditions at 45°C at pH 5, 7 and 9. The hydrolytical DT_{50} at 25°C can be estimated to be greater than one year.

The aqueous photolysis of picloram was investigated in a laboratory study under sterile pH 5 conditions and in a non-sterile natural water system. In both systems significant degradation was observed in the irradiated samples. The rate of degradation (single first-order DT_{50}) of 3.5 days equated to summer sunlight at 40°N was determined for the sterile pH 5 buffer, and 2 days was calculated for the natural water system. The quantum yield for picloram calculated from this study was 2.98×10^{-3}. Beside CO_2, two major (>10 % AR) photo-degradation products were identified as oxamic acid and 3-oxo-β-alanine. These photolytic metabolites were however regarded as 'non-relevant' breakdown products.

A ready biodegradability test (OECD 301B) indicated that picloram is 'not readily biodegradable' using the criteria defined by the test.

Information on degradation of picloram in water sediment systems was available from a water-sediment study, where two systems were used at 20°C in the laboratory (water pH 5.9 and 8.2, sediment pH 6.1 and 7.9). The dissipation of picloram from the water phase (single first-order DT_{50}) was estimated to be 48.4-135 days. The maximum amount of picloram in sediment reached 19.2-43.9 % AR (after 61 or 21 days). Degradation in the whole systems occurred with estimated non-linear single first-order DT_{50} of 149.9 and 256.6 days (DT_{90}: 498 - 852 days). The degradation of picloram led to the formation of two degradates, which accounted for > 10% AR in the total systems. The metabolite 3,6-dichloro analogue of picloram reached a maximum concentration of 8.7 % AR in the aqueous phase and 5.2 % AR in the sediment (after 102 days). The 5,6-dichloro analogue of picloram reached a maximum concentration of only 1.1 % AR in the aqueous phase (after 61 days), but 19 % AR in the sediment phase at day 102 after the application. Mineralization to CO_2 was a

negligible process (≤ 0.1% AR). Residues not extracted from sediment were a sink, representing 5.1-11.9 % AR at the study end (102 days). Degradation rates for the metabolites were not estimated.

FOCUS surface water modelling was evaluated up to step 3 for picloram and step 2 for the metabolites (FOCUS, 2001), however the risk assessment passed at step 1 level for all the compounds. Some of the input parameters to be used in these FOCUS calculations were discussed at the PRAPeR 67 meeting of experts, and the simulations using the agreed input parameters up to FOCUS step 2 were repeated in an addendum (Addendum 4, June 2009) after the meeting. It should be noted that some end points regarding the metabolites were taken from the DAR of aminopyralid, as the metabolite 3,6-dichloro analogue of picloram is aminopyralid. As for the calculations for the metabolite 5,6-dichloro analogue of picloram, it was assumed that this metabolite has the same properties as metabolite 3,6-dichloro analogue of picloram (aminopyralid), therefore the same values (DT_{50} in soil, Koc, solubility in water) were used for both metabolites. The only value from the values taken from the aminopyralid DAR, which has a significant impact on the results of these metabolites (only formed in W/S systems), is the Koc value, which was found to be sufficiently conservative by the experts. The relevant information from the aminopyralid DAR was included by the RMS in Addendum 2 to the picloram DAR and compiled in the Final Addendum.

4.2.2. Potential for ground water contamination of the active substance, their metabolites, degradation or reaction products

The applied for representative use of spring applications (15th February) to winter oilseed rape and spring applications (2 weeks after emergence) to spring oilseed rape once in every three years were simulated using FOCUS PEARL v. 3.3.3 and FOCUS PELMO v. 3.3.2 (FOCUS, 2000), using the following input parameters for picloram: DT_{50} = 82.8 days, K_{oc} 35 mL/g, 1/n =1. These simulations are included in Addendum 4 (June 2009), which was prepared after the experts' meeting, using those input parameters which were agreed by the experts. See the Report from the PRAPeR 67 meeting of experts for more details on the input parameters agreed (Peer Review Report; EFSA, 2009).

Parent picloram was calculated to be present in the leachate leaving the top 1m soil layer at 80th percentile annual average concentrations > 0.1µg/L in case of 5 out of the 6 modelled FOCUS scenarios, with the range of 0.241 - 0.338 µg/L (PELMO) or 0.228 - 0.345 µg/L (PEARL) for winter oilseed rape; and 2 out of the 3 modelled FOCUS scenarios, with the range of 0.312 - 0.321 µg/L (PELMO) or 0.275 - 0.352 µg/L (PEARL) for spring oilseed rape. Only the Porto FOCUS scenario resulted in PECgw < 0.1µg/L (0.076 µg/L or 0.079 µg/L for winter oil seed rape, and 0.056 µg/L or 0.066 µg/L for spring oil seed rape, depending on the used FOCUS model).

4.3. Fate and behaviour in air

The vapour pressure of picloram (8 x 10^{-8} Pa at 25°C) means that picloram would be classified under the national scheme of The Netherlands as very slightly volatile, indicating that losses due to volatilisation might be expected to be minimal. Based on the results of laboratory wind tunnel experiments, where picloram formulations were applied to soils and dwarf runner beans, it was measured that from soil 3.7%, from bean leaves only 0.3% of applied picloram was lost to the air compartment in 24 hours. Calculations using the method of Atkinson (using the software APOWIN v.1.89) for indirect photo-oxidation in the atmosphere through reaction with hydroxyl radicals resulted in an atmospheric half-life estimated at 12.5 hours (assuming an atmospheric hydroxyl radical concentration of 1.5x10^{6} radicals cm^{-3} and a 12-hour day). This half-life indicates that the proportion of picloram which is volatilised is unlikely to be subject to long-range atmospheric transport.

5. Ecotoxicology

Picloram was discussed at the PRAPeR 68 meeting of experts on ecotoxicology (May 2009) on the basis of the Draft Assessment Report and Addendum 2 to Vol.3 B9 (April 2009) from the Final Addendum to the DAR.

The supported use evaluated was as a herbicide in winter and spring oilseed rape; the maximum application rate was 23.45 g a.s./ha, at a single application. The representative formulation was 'GALERA (GF-224)' containing a second active substance (i.e. clopyralid).

5.1. Risk to terrestrial vertebrates

Acute oral toxicity studies on birds were available for picloram acid, picloram potassium salt and the formulation product, indicating a low toxicity. Dietary and long-term toxicity studies were also available for picloram potassium salt and picloram acid, respectively. The LC_{50} was > 5620 mg picloram potassium salt/kg diet, equivalent to >1904 mg picloram acid/kg bw/day. The NOEC was established at 750 mg picloram acid/kg diet, equivalent to 65 mg picloram acid/kg bw/day. The end points from picloram potassium salt studies were converted to picloram acid by a conversion factor of 0.864. For further details refer to the list of end points in Appendix A of this conclusion.

On the basis of first-tier risk assessment, all the TER values for birds were above the Annex VI trigger values, indicating a low risk to birds.

On the basis of the mammalian toxicity data (i.e. acute oral toxicity and 2-generation study on rat), the first-tier risk assessment also indicated a low risk for other terrestrial vertebrates. During the PRAPeR 68 meeting of experts the chronic end point (NOAEL of 1000 mg a.s./kg bw/day) was questioned, since lower end points based on developmental studies were available in the mammalian toxicology section. In particular, in a developmental study with rabbits using picloram potassium salt, the experts noted that at 40 mg a.s./kg bw/day effects were observed on weight gain. Since these effects occurred only on day 6-8 of the study, they were considered not relevant and the NOAEL was set at the highest tested dose of 400 mg a.s./kg bw/day. However, in a second developmental study with rabbits using the TIPA salt, the NOAEL was established at 300 mg a.s./kg bw/day. The rapporteur Member State was requested to check if the latter value would be more appropriate to be used for the ecotoxicological risk assessment. According to the response provided by the RMS after the experts' meeting, the final end point recommended for risk assessment for mammals was the NOAEL of 300 mg a.s./kg bw/day. The outcome of the risk assessment did not change. The estimated TER values for mammals were above the Annex VI trigger values, indicating a low risk to mammals.

5.2. Risk to aquatic organisms

Several studies (both acute and long-term) were available on aquatic organisms (fish, daphnia, sediment-dwelling organisms, algae and higher plants) with picloram acid, the formulation product, metabolite XDE-750 (aminopyralid) and metabolite 5,6-dichloro analogue of picloram (see Appendix A). On the basis of the first-tier risk assessment, all the TER values were above the Annex VI trigger values, indicating a low risk to aquatic organisms.

During the PRAPeR 68 meeting of experts the need to test a second aquatic plant species was discussed. Picloram is effective in dicotyledonous species and at high concentrations. Therefore, *Lemna* may not be the most sensitive species and it was tested at low concentrations. In addition, the active substance occurred in the sediment in a maximum concentration of 44% of the applied dose, thus, it might be more appropriate to perform a test with a rooted plant. Finally, the experts concluded that further testing was not necessary for the EU risk assessment, however the issue should be considered at Member State level.

5.3. Risk to bees

Acute oral and contact toxicity study with the technical picloram and the formulation product indicated a low toxicity to bees (see Appendix A). The risk to bees was assessed as low for the representative uses evaluated (HQ values far below the Annex VI trigger of 50).

5.4. Risk to other arthropod species

Studies with the formulation product on the standard species *Aphidius rhopalosiphi* and *Typhlodromus pyri*, as well as on *Chrisoperla carnea* were available. No significant effects were observed compared to the control, except on *T.pyri*, where the fecundity was reduced by 40%. However, a low in-field and off-field risk was estimated according to ESCORT II (SETAC, 2001) for the representative uses evaluated (HQ values below the Annex VI trigger of 2).

5.5. Risk to earthworms

Acute studies were available with picloram acid (14-day LC_{50} > 5000 mg/kg, equivalent to > 4475 mg a.s./kg when corrected for purity) and the formulation product (14-day LC_{50} > 3468 mg product/kg). A chronic study with picloram technical was also provided (56-day NOEC = 0.167 mg a.s./kg). The first-tier assessment indicated a low risk to earthworms.

5.6. Risk to other soil non-target macro-organisms

No data were submitted even if the field DT_{90} of picloram was > 100 days. Based on the low risk to non-target arthropods, and considering that the available studies on soil micro-organisms and the long-term study on earthworms did not show any significant effects, a low risk to other soil non-target macro-organisms was foreseen. Therefore no further data were considered necessary.

5.7. Risk to soil non-target micro-organisms

No effects of > 25 % on soil respiration and nitrification were observed in tests with picloram and the formulation product when applied at 5 times the application rate of 23.45 g a.s./ha, indicating a low risk to soil non-target micro-organisms for the representative uses evaluated.

5.8. Risk to other non-target-organisms (flora and fauna)

Herbicidal effects of the formulation product on vegetative vigour and emergence were investigated in a test with 4 dicotyledonous plant species and with 2 monocotyledonous plant species. The lowest ER_{50} value was observed for *Glycine max* (ER_{50} = 76.9 mL product/ha). The TER value was 7.9 based on PECs from spray drift at 1m distance, indicating a low risk from picloram to non-target terrestrial plants.

5.9. Risk to biological methods of sewage treatment

Picloram did not inhibit the respiration of activated sewage sludge at a concentration of 100 mg a.s./L (the 3-hour EC_{50} was > 100 mg a.s./L). It is not expected that the concentrations of picloram in biological sewage treatment plants would reach a concentration of more than 100 mg a.s./L, if the product is applied according to the GAP. The risk to biological methods of sewage treatment is considered to be low.

6. Residue definitions

6.1. Soil

Definition for risk assessment:	picloram
Definition for monitoring:	picloram

6.2. Water

6.2.1. Ground water

Definition for exposure assessment:	picloram
Definition for monitoring:	picloram

6.2.2. Surface water

Definition for risk assessment

in surface water:	picloram, aminopyralid (= 3,6-dichloro analogue of picloram), 5,6-dichloro analogue of picloram
in sediment:	picloram, aminopyralid (= 3,6-dichloro analogue of picloram), 5,6-dichloro analogue of picloram
Definition for monitoring:	picloram

6.3. Air

Definition for risk assessment:	picloram
Definition for monitoring:	picloram

6.4. Food of plant origin

Definition for risk assessment:	picloram, free and conjugated expressed as picloram.
Definition for monitoring:	Open. Currently it is unknown whether the analytical method proposed for monitoring does fully or partially analyse any conjugated picloram. If this were the case, conjugated picloram will have to be considered in the residue definition for monitoring.

6.5. Food of animal origin

Definition for risk assessment:	picloram
Definition for monitoring:	picloram

6.6. Overview of the risk assessment of compounds listed in residue definitions for the environmental compartments

6.6.1. Soil

Compound (name and/or code)	Persistence	Ecotoxicology
picloram	Low to high persistence Single first order[(a)] DT_{50} 5.2-292.2 days (20°C, pF2 soil moisture) Single first order DT_{50} 20-49 days (European field studies)	The risk from picloram was assessed as low.

(a): DT_{50} values from eight experiments followed SFO kinetics. There is another value available, which falls within the range above, derived from the slower phase of HS kinetics.

6.6.2. Ground water

Compound (name and/or code)	Mobility in soil	>0.1 µg/L 1m depth for the representative uses (at least one FOCUS scenario or relevant lysimeter)	Pesticidal activity	Toxicological relevance	Ecotoxicological activity
picloram	very high to high mobility Koc 20 - 60 mL/g	FOCUS (PEARL, PELMO): Yes, trigger 0.1 µg/L exceeded in 5 out of 6 scenarios for winter oilseed rape, or 2 out of 3 scenarios for spring oilseed rape. Lysimeter: No (annual average concentration)	Yes	Yes	Yes

6.6.3. Surface water and sediment

Compound (name and/or code)	Ecotoxicology
picloram	Picloram is toxic for the aquatic organisms. The risk from picloram to aquatic organisms was assessed as low.
aminopyralid (= 3,6-dichloro analogue of picloram)	Aminopyralid is toxic for the aquatic organisms. The risk from aminopyralid to aquatic organisms was assessed as low.
5,6-dichloro analogue of picloram	The risk from 5,6-dichloro metabolite to aquatic organisms was assessed as low.

6.6.4. Air

Compound (name and/or code)	Toxicology
picloram	LC_{50} > 0.0351 mg/L (4 h, whole body)

LIST OF STUDIES TO BE GENERATED, STILL ONGOING OR AVAILABLE BUT NOT PEER REVIEWED

- Clarification whether the method GRM 00.19 does fully, partially or at all analyse any conjugated picloram (relevant for the representative use evaluated, data gap identified by the PRAPeR 70 meeting of experts (May 2009), submission date proposed by the notifier: unknown, see sections 1 and 3)
- Determination of the pK_a according to OECD 112 (relevant for the representative use evaluated, data gap identified by the PRAPeR 66 meeting of experts (April 2009), submission date proposed by the notifier: unknown, see section 1)
- Determination of the water solubility at pH 5, 7 and 9 (relevant for the representative use evaluated, data gap identified by the PRAPeR 66 meeting of experts (April 2009), submission date proposed by the notifier: unknown, see section 1)
- Validation data to demonstrate the efficiency of the analytical method used in the supervised residue trials in terms of the analysis of picloram conjugates (relevant for the representative use evaluated, data gap identified by the PRAPeR 70 meeting of experts (May 2009), submission date proposed by the notifier: unknown, see section 3.1.1)
- Field rotational crop study to confirm or if necessary to modify (refine) the proposed MRLs in rotational crops (relevant for the representative use evaluated, data gap identified by the PRAPeR 70 meeting of experts (May 2009), submission date proposed by the notifier: unknown, see section 3.1.2)
- Name of impurities and clarification on the possible impact of the impurities that showed the same chromatographic behaviour as the non-polar components in the goat metabolism study (relevant for the representative use evaluated, data gap identified by the PRAPeR 70 meeting of experts (May 2009), submission date proposed by the notifier: unknown, see section 3.2)
- Soil photolysis study using pertinent irradiation system (relevant for the representative use evaluated, data gap identified by the PRAPeR 67 meeting of experts (April 2009), submission date proposed by the notifier: unknown; see section 4.1.1)
- FOCUS PECgw calculations considering autumn application to winter oilseed rape, and applications more frequently than once in every three years (relevant for the representative use evaluated, the autumn application refers only to winter oilseed rape; submission date proposed by the notifier: unknown; data gap considered as not essential for the finalization of the EU risk assessment; see section 4.2.2)

CONCLUSIONS AND RECOMMENDATIONS

OVERALL CONCLUSIONS

The conclusion was reached on the basis of the evaluation of the representative use as a herbicide, as proposed by the notifier, which comprise foliar spraying to control broad-leaved weeds in oilseed rape, in northern EU countries, at a single application, at maximum application rate of 23.45 g a.s./ha.

The representative formulated product for the evaluation was 'GALERA (GF-224)', a soluble concentrate (SL), containing 67 g/L picloram and 267 g/L clopyralid, in the form of the monoethanolamine salts, registered under different trade names in Europe.

Sufficient analytical methods as well as methods and data relating to physical, chemical and technical properties are available to ensure that quality control measurements of the plant protection product are possible, however data gaps were identified for the determination of the pK_a and water solubility.

Adequate analytical methods are available for the determination of picloram in the technical material and in the representative formulation as well as for the determination of the relevant impurities in the technical material.

There are methods available to monitor picloram residues in food/feed of plant and animal origin and environmental matrices, however, the experts at the PRAPeR 66 meeting (April 2009) could not agree on the acceptability of the validation of some methods. Following the finalization of the residue definition for monitoring in plants, a data gap will have to be set: either to demonstrate that the methods are determining only picloram or to demonstrate that the extraction procedures cover the picloram conjugates, too.

With regard to mammalian toxicology, picloram was rapidly and extensively absorbed but did not show any potential for bioaccumulation. With a low acute toxicity after ingestion or by inhalation, a sensitisation study with limitations supported by positive results with salts and esters led the experts to propose a classification with **R43 "May cause sensitisation by skin contact"**. In repeated-dose toxicity studies, the primary target organ was the liver, but effects in the kidneys and blood were also observed in some studies. The relevant oral short-term NOAELs were 300 mg/kg bw/day in rats and 35 mg/kg bw/day in dogs. No potential for genotoxicity was demonstrated in a battery of studies *in vitro* and *in vivo*. In long-term studies with rats and mice, picloram did not show any carcinogenic potential; the relevant NOAELs were 60 mg/kg bw/day in rats and 1000 mg/kg bw/day in mice. In a two-generation rat study, no evidence of reproductive- or offspring toxicity was observed up to 1000 mg/kg bw/day, whereas some parental toxicity was noted at this dose level. In the developmental rat studies, performed with two salts of picloram, cranio-facial malformations were observed in single foetuses in a mid-dose and high-dose group, but were concluded to be unrelated to treatment. In the developmental rabbit studies, the incidences of a few foetal abnormalities were higher at the top dose level in each study in the presence of maternal toxicity, and were considered to be substance-related. The relevant maternal NOAELs were 30 mg/kg bw/day for rabbits and 280 mg/kg bw/day for rats, whereas the relevant developmental NOAELs were 560 mg/kg bw/day for rats and 300 mg/kg bw/day for rabbits.

The agreed ADI and AOEL are 0.3 mg/kg bw/day, and the agreed ARfD is 0.3 mg/kg bw. These values are based on the rabbit developmental study supported by the 1-year dog study, with the use of a safety factor of 100. Based on an *in vivo* study with the representative formulation 'GALERA (GF-224)', the dermal absorption values are 0.1% for the dilution and 10% for the concentrate. The operator, worker and bystander exposure estimates are all providing exposure values below the AOEL (without the use of personal protective equipment for the operators and workers).

The metabolism and distribution of picloram was investigated in oilseed rape and wheat. Both studies demonstrate that picloram is not degraded but quickly forms conjugates in plant material. Hence, the residue definition for risk assessment was agreed as picloram, free and conjugated expressed as picloram. For monitoring, it is currently unclear whether the analytical method does fully or partially analyse any conjugated picloram, and whether conjugated picloram will have to be considered in the residue definition for monitoring and MRL setting.

Seven GAP conforming residue trials were performed on oilseed rape. It has however still to be demonstrated that the analytical method used in the supervised residue trials fully released the picloram conjugates.

In a confined crop rotation study metabolism in succeeding crops was found to be similar to that seen in primary crops. In the tested rotational cereal, oilseed and root crops the vast majority of radioactivity was present as picloram or conjugates of picloram. Residues above the LOQ may be expected in rotational crops. On the basis of the confined study default levels were derived for several rotational crops to conduct a risk assessment and to propose MRLs. Nevertheless, rotational field crop

studies should be submitted to confirm the proposed MRLs, or to modify the proposed MRLs if necessary.

The metabolism and distribution of picloram was investigated in lactating ruminants and poultry. Picloram was not metabolised to any significant degree in goats and poultry. However, further clarification is required on the composition of the non-polar fractions in the goat study. Based on the metabolism data submitted, residues in animal products should be defined as picloram for both risk assessment and monitoring purposes. A re-assessment of residues in food of animal origin after the experts' meeting (Addendum 6, July 2009, not peer reviewed) indicated that residues in products of animal origin are unlikely to be significant.

In a revised dietary risk assessment it could be demonstrated that the chronic and acute dietary intake is expected to be well below the toxicological reference values ADI (< 1%) and ARfD (< 5%).

The information available on the environmental fate and behaviour is sufficient to carry out an appropriate environmental exposure assessment at EU level, with the exception of the soil photolysis. A valid soil photolysis study should be submitted and proper environmental assessment of any potential soil photolysis transformation products, if they are formed, should be provided. For the applied for intended uses (single spring triennial application to spring or winter oilseed rape, at maximum application rate of 23.45 g/ha), the potential for groundwater exposure by picloram above the parametric drinking water limit of 0.1 µg/L is high.

The risk to all non-target species (i.e. birds, mammals, aquatic organisms, bees, non-target arthropods, earthworms, soil macro- and micro-organisms, non-target plants and biological methods for sewage treatment) was expected to be low. According to the response provided by the RMS after the experts' meeting, the final end point recommended for risk assessment for mammals was the NOAEL of 300 mg a.s./kg bw/day.

The experts agreed that dicotyledonous aquatic species tested at a higher dose as well as rooted plants may be more representative than *Lemna*, due to the mechanism of action (i.e. systemic herbicide effective against dicotyledonous species) and the environmental fate and behaviour (i.e. 44% accumulation in sediment) of picloram. Although a data gap was not considered necessary for the EU evaluation, it was underlined to address the issue at Member State level.

PARTICULAR CONDITIONS PROPOSED TO BE TAKEN INTO ACCOUNT TO MANAGE THE RISK(S) IDENTIFIED

- The potential for the contamination of groundwater is not covered by the available information (FOCUS calculations) when picloram is used more frequently than once in every third year. Also, only spring applications were evaluated, however, based on the growth stages of the crops in the application period, autumn applications to winter oilseed rape would be possible. Therefore, the time of application would need to be restricted to spring application and the number of applications would need to be restricted to one in every third year in the same field, in the absence of an exposure assessment that addresses those situations (autumn application or yearly/bi-yearly applications). A data gap to consider those situations is therefore identified.
- The degradation of picloram in soil was concluded to be dose-dependent. The agreed DT_{50} end points for picloram in this conclusion are considered to only be valid for assessing use rates of products that result in a picloram soil concentration of up to 0.07 mg picloram/kg dry weight soil. If the application rates of picloram are not restricted such that a soil concentration above 0.07 mg/kg dry weight is excluded, an updated exposure and risk assessment would be necessary.

ISSUES THAT COULD NOT BE FINALIZED

- There is a data gap for a soil photolysis study. Therefore there is no environmental assessment of any potential soil photolysis transformation products if these are formed (see section 4.1.1).

CRITICAL AREAS OF CONCERN

- The potential for groundwater exposure by picloram above the parametric drinking water limit of 0.1 µg/L is high over a wide range of geo-climatic conditions represented by FOCUS groundwater scenarios. With triennial applications to winter oilseed rape, 5 out of the 6 modelled FOCUS scenarios resulted in PECgw higher than the trigger of 0.1 µg/L. This number was 2 out of the 3 FOCUS scenarios when spring oil seed rape was considered.

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APPENDICES

APPENDIX A – LIST OF END POINTS FOR THE ACTIVE SUBSTANCE AND THE REPRESENTATIVE FORMULATION

Identity, Physical and Chemical Properties, Details of Uses, Further Information

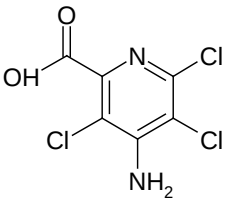
Active substance (ISO Common Name) ‡	Picloram
Function (*e.g.* fungicide)	Herbicide

Rapporteur Member State	United Kingdom
Co-rapporteur Member State	-

Identity (Annex IIA, point 1)

Chemical name (IUPAC) ‡	4-amino-3,5,6-trichloropyridine-2-carboxylic acid
Chemical name (CA) ‡	4-amino-3,5,6-trichloro-2-pyridinecarboxylic acid
CIPAC No ‡	174
CAS No ‡	1918-02-1
EC No (EINECS or ELINCS) ‡	217-636-1
FAO Specification (including year of publication) ‡	FAO 174/TK (July 2005) minimum declared purity: 920 g/kg on a dry weight basis hexachlorobenzene: maximum 0.005% of the picloram content
Minimum purity of the active substance as manufactured ‡	920 g/kg dry weight basis (782g/kg wet weight by calculation)
Identity of relevant impurities (of toxicological, ecotoxicological and/or environmental concern) in the active substance as manufactured	hexachlorobenzene: maximum 0.005 % dry weight basis sulphuric acid: maximum 0.9%
Molecular formula ‡	$C_6H_3Cl_3N_2O_2$
Molecular mass ‡	241.46

Structural formula ‡



Physical and chemical properties (Annex IIA, point 2)

Melting point (state purity) ‡	174 - 183 °C (99.4%) Decomposition occurs during melting
Boiling point (state purity) ‡	Not applicable
Temperature of decomposition (state purity)	174-183 °C (99.4%)
Appearance (state purity) ‡	Tan powder (98.5%)
	Light brown solid (93.9%)
Vapour pressure (state temperature, state purity) ‡	8×10^{-8} Pa at 25°C (99.4%)
Henry's law constant ‡	3×10^{-7} Pa m^3 mol^{-1} (99.4%)
Solubility in water (state temperature, state purity and pH) ‡	560 mg/L at 20°C (pH 3) (99.4%) dependence on pH (5, 7, 9) was not determined due to large decreases in the pH of the buffer after addition of picloram
Solubility in organic solvents ‡ (state temperature, state purity)	Solubility at 20°C in g/L (96.4%) n-heptane: < 0.01 xylene: 0.105 1,2-dichloroethane: 0.377 methanol: 19.1 acetone: 23.9 ethyl acetate: 5.11
Surface tension ‡ (state concentration and temperature, state purity)	72.0 mN/m at 20°C (90 % saturated solution) (96.4%)
Partition co-efficient ‡ (state temperature, pH and purity)	$\log P_{O/W}$ = -1.05 at 20 °C (pH = 5) $\log P_{O/W}$ = -1.92 at 20 °C (pH = 7) $\log P_{O/W}$ = -2.09 at 20 °C (pH = 10) (98.5%)
Dissociation constant (state purity) ‡	open

UV/VIS absorption (max.) incl. ε ‡ (state purity, pH)	solution in methanol: pH 4.42 (unbuffered) λ_{max} = 223 nm; ε = 28900 (L.mol^{-1}.cm^{-1}) (99.4%) acidic pH 1.66 λ_{max} = 223 nm; ε = 28700 (L.mol^{-1}.cm^{-1}) (99.4%) λ_{max} = 293 nm; ε = 2100 (L.mol^{-1}.cm^{-1}) (99.4%) alkaline pH 12.83 λ_{max} = 223 nm; ε = 30400 (L.mol^{-1}.cm^{-1}) (99.4%) ε at 293 nm: 2100 (L.mol^{-1}.cm^{-1}) pH 1.66 acidic methanol solution
Flammability ‡ (state purity)	not highly flammable (96.4%)
Explosive properties ‡ (state purity)	no sign of ignition or explosion (96.4%)
Oxidising properties ‡ (state purity)	not oxidising (96.4%)

Summary of representative uses evaluated (picloram)

('Galera' contains picloram 67 g/L and 267g/L clopyralid)

Crop and/ or situation (a)	Member State or Country	Product name	F G or I (b)	Pests or Group of pests controlled (c)	Preparation		Application				Application rate per treatment (for explanation see the text in front of this section)			PHI (days) (m)	Remarks
					Type (d-f)	Conc. of as (i)	method kind (f-h)	growth stage & season (j)	number min/ max (k)	interval between applications (min)	g as/hL min – max (l)	water L/ha min – max	Kg as/ha min – max (l)		
Winter or spring oilseed rape	Czech Republic Hungary Poland Slovakia UK	GALERA (GF-224)	Broad-leaved weeds	F	SL	Piclo. 67g/L + clopy. 267 g/L	Ground crop sprayer (hydraulic nozzles)	BBCH 14-31	1 in every 3 years	N/A	Piclo. 5.8 -23.5 clopy. 23.4 - 93.5	100-400	Piclo. 0.02345 + clopy. 0.09345	N/A *	* crop growth stage determines application timing Only triennial spring application has been assumed in the risk assessment for PECgw.

* For uses where the column "Remarks" is marked in grey further consideration is necessary. Uses should be crossed out when the notifier no longer supports this use(s).

(a) For crops, the EU and Codex classifications (both) should be taken into account; where relevant, the use situation should be described (e.g. fumigation of a structure)

(b) Outdoor or field use (F), greenhouse application (G) or indoor application (I)

(c) *e.g.* biting and suckling insects, soil born insects, foliar fungi, weeds

(d) *e.g.* wettable powder (WP), emulsifiable concentrate (EC), granule (GR)

(e) GCPF Codes - GIFAP Technical Monograph No 2, 1989

(f) All abbreviations used must be explained

(g) Method, e.g. high volume spraying, low volume spraying, spreading, dusting, drench

(h) Kind, *e.g.* overall, broadcast, aerial spraying, row, individual plant, between the plant- type of equipment used must be indicated

(i) g/kg or g/L. Normally the rate should be given for the active substance (according to ISO) and not for the variant in order to compare the rate for same active substances used in different variants (e.g. fluoroxypyr). In certain cases, where only one variant is synthesised, it is more appropriate to give the rate for the variant (e.g. benthiavalicarb-isopropyl).

(j) Growth stage at last treatment (BBCH Monograph, Growth Stages of Plants, 1997, Blackwell, ISBN 3-8263-3152-4), including where relevant, information on season at time of application

(k) Indicate the minimum and maximum number of application possible under practical conditions of use

(l) The values should be given in g or kg whatever gives the more manageable number (e.g. 200 kg/ha instead of 200 000 g/ha or 12.5 g/ha instead of 0.0125 kg/ha

(m) PHI - minimum pre-harvest interval

Methods of Analysis

Analytical methods for the active substance (Annex IIA, point 4.1)

Technical as (analytical technique)	HPLC - DAD
Impurities in technical as (analytical technique)	HPLC- DAD Relevant impurities: HPLC - UV
Plant protection product (analytical technique)	HPLC - UV

Analytical methods for residues (Annex IIA, point 4.2)

Residue definitions for monitoring purposes

Food of plant origin		open
Food of animal origin		Picloram
Soil		Picloram
Water	surface	Picloram
	drinking/ground	Picloram
Air		Picloram

Monitoring/Enforcement methods

Food/feed of plant origin (analytical technique and LOQ for methods for monitoring purposes)	GC-MS LOQ 1.0 mg/kg picloram, grass LOQ 0.01 mg/kg picloram, oilseed rape open
Food/feed of animal origin (analytical technique and LOQ for methods for monitoring purposes)	GC-MS LOQ 0.01 mg/kg for muscle, fat, liver, kidney, milk and eggs
Soil (analytical technique and LOQ)	GC-MS (picloram)– LOQ 0.0005 mg/kg LC-MS/MS (XDE-750)– LOQ 0.0015 mg/kg
Water (analytical technique and LOQ)	GC-MS(picloram)–: LOQ 0.05µg/l LC-MS/MS(XDE-750)–: LOQ 0.05µg/l
Air (analytical technique and LOQ)	GC-MS: LOQ 6 µg/m^3
Body fluids and tissues (analytical technique and LOQ)	Not required as picloram is neither toxic nor very toxic

Classification and proposed labelling with regard to physical and chemical data (Annex IIA, point 10)

	RMS/peer review proposal
Active substance	No classification required.

Impact on Human and Animal Health

All dose levels listed below refer to picloram (because some studies have been conducted with salts of picloram)

Absorption, distribution, excretion and metabolism (toxicokinetics) (Annex IIA, point 5.1)

Rate and extent of oral absorption ‡	Rapidly and extensively absorbed; Cmax attained within 5 minutes. Oral absorption >80% (based on urinary excretion and biliary contribution).
Distribution ‡	Rapid and extensive distribution; tissue levels low due to the rapid urinary excretion of picloram.
Potential for accumulation ‡	No potential for accumulation.
Rate and extent of excretion ‡	Rapidly excreted; largely in the urine (77.5 – 84.7%). Findings indicate active secretion by the kidney. Limited biliary excretion (5.5%).
Metabolism in animals ‡	No evidence for metabolism in the rat.
Toxicologically relevant compounds ‡ (animals and plants)	Picloram
Toxicologically relevant compounds ‡ (environment)	Picloram

Acute toxicity (Annex IIA, point 5.2)

Rat LD_{50} oral ‡	4012 mg/kg bw	-
Rat LD_{50} dermal ‡	>2000 mg/kg bw	-
Rat LC_{50} inhalation ‡	>0.0351 mg/l (the maximum attainable concentration); whole body – 4h	-
Skin irritation ‡	Non-irritant	-
Eye irritation ‡	Mild irritant	-
Skin sensitisation ‡	No evidence with picloram (Buehler study; limited validity) Positive results reported for salts and ester of picloram.	R43

Short term toxicity (Annex IIA, point 5.3)

Target / critical effect ‡	Rat, dog, mouse: liver (increased weight and

	histopathology). Dog: reduced weight gain and food consumption.	
Relevant oral NOAEL ‡	300 mg/kg bw/d (90-day rat) <1000 mg/kg bw/d (90-day mouse) 35 mg/kg bw/d (1-year dog)	-
Relevant dermal NOAEL ‡	650 mg/kg bw/d (21-day rabbit with potassium salt)	-
Relevant inhalation NOAEL ‡	No data – not required	-

Genotoxicity ‡ (Annex IIA, point 5.4)

	No evidence of genotoxic potential	-

Long term toxicity and carcinogenicity (Annex IIA, point 5.5)

Target/critical effect ‡	Rat: liver (increased organ weight, pathology & clinical chemistry) & kidney (histopathology & clinical chemistry)	
Relevant NOAEL ‡	60 mg/kg bw/d (2-year rat) 1000 mg/kg bw/d (2-year mouse)	
Carcinogenicity ‡	No evidence of carcinogenic potential	-

Reproductive toxicity (Annex IIA, point 5.6)

Reproduction toxicity

Reproduction target / critical effect ‡	Parental: body weight and renal toxicity Offspring: no adverse effects Reproductive: no adverse effects	-
Relevant parental NOAEL ‡	200 mg/kg bw/d	-
Relevant reproductive NOAEL ‡	1000 mg/kg bw/d	-
Relevant offspring NOAEL ‡	1000 mg/kg bw/d	-

Developmental toxicity

Developmental target / critical effect ‡	Maternal: clinical signs (rat), body	-

	weight (rabbit) Developmental: foetal toxicity at maternal toxic dose (rabbit), no adverse foetal findings (rat)	
Relevant maternal NOAEL ‡	30 mg/kg bw/d (rabbit – study with TIPA salt) 280 mg/kg bw/d (rat – study with TIPA salt)	-
Relevant developmental NOAEL ‡	300 mg/kg bw/d (rabbit – study with TIPA salt) 560 mg/kg bw/d (rat – study with TIPA salt)	-

Neurotoxicity (Annex IIA, point 5.7)

Acute neurotoxicity ‡	Not required	
Repeated neurotoxicity ‡	Not required	
Delayed neurotoxicity ‡	Not required	

Other toxicological studies (Annex IIA, point 5.8)

Mechanism studies ‡	-
Studies performed on metabolites or impurities ‡	-

Medical data ‡ (Annex IIA, point 5.9)

No effects reported in manufacturing workers or applicators. Rapid oral absorption and urinary excretion observed in humans.

Summary (Annex IIA, point 5.10)	Value	Study	Safety factor
ADI ‡	0.3 mg/kg bw/d	Rabbit developmental supported by 1-yr dog	100
AOEL ‡	0.3 mg/kg bw/d	Rabbit developmental supported by 1-yr dog	100
ARfD ‡	0.3 mg/kg bw	Rabbit developmental supported by 1-yr dog	100

Dermal absorption ‡ (Annex IIIA, point 7.3)

Formulation (GF-224; SC containing 67 g/l picloram and 267 g/l clopyralid as the monoethanolamine salts)	10% (concentrate, default value); 0.1% (1:500 dilution); study in the rat in vivo.

Exposure scenarios (Annex IIIA, point 7.2)

Operator	Use in winter/spring oilseed rape (exposure estimates in % of AOEL)		
	Model	**Without PPE**	**With PPE***
	German BBA (20 ha/day)	0.5	0.01
	UK POEM (50 ha/day)	2	0.2
Workers	Predicted levels of systemic exposure are 0.4% of the AOEL for unprotected workers.		
Bystanders	Predicted levels of systemic exposure for bystanders from spray drift are <0.1% of the AOEL. Predicted exposure for a small child playing on a lawn from spray drift fallout from nearby applications deposited in adjacent gardens is <1% of the AOEL. Predicted levels of exposure for residents to picloram vapour, post application, are <1% of the AOEL.		

***PPE** (personal protective equipment): gloves during mixing and loading

Classification and proposed labelling with regard to toxicological data (Annex IIA, point 10)

	RMS/peer review proposal
Substance classified (name)	R43 May cause sensitisation by skin contact

Residues

Metabolism in plants (Annex IIA, point 6.1 and 6.7, Annex IIIA, point 8.1 and 8.6)

Plant groups covered	Oilseed (oilseed rape), Cereals (wheat)
Rotational crops	Wheat, maize, mustard greens, turnip.
Metabolism in rotational crops similar to metabolism in primary crops?	Yes
Processed commodities	Not required.
Residue pattern in processed commodities similar to residue pattern in raw commodities?	-
Plant residue definition for monitoring	Open, pending clarification if the method of analysis used for monitoring analyses for Picloram, free and conjugated
Plant residue definition for risk assessment	Picloram, free and conjugated
Conversion factor (monitoring to risk assessment)	Open

Metabolism in livestock (Annex IIA, point 6.2 and 6.7, Annex IIIA, point 8.1 and 8.6)

Animals covered	Ruminant (goat), poultry (hen)
Time needed to reach a plateau concentration in milk and eggs	2 days (milk) 2- 3 days (egg white) Plateau not reached for egg yolk after 7 days
Animal residue definition for monitoring	Picloram
Animal residue definition for risk assessment	Picloram
Conversion factor (monitoring to risk assessment)	None
Metabolism in rat and ruminant similar (yes/no)	Yes
Fat soluble residue: (yes/no)	No

Residues in succeeding crops (Annex IIA, point 6.6, Annex IIIA, point 8.5)

Metabolism in rotational crops indicates that residues may be significant based on the notified uses. MRLs have been proposed on the basis of available metabolism data. Rotational crop residue trials as confirmatory data required.

Stability of residues (Annex IIA, point 6 introduction, Annex IIIA, point 8 Introduction)

Wheat forage, grain, straw:	24 months
Oilseed rape seed, hay:	24 months
Milk:	14 months
Egg Whites:	18 months

Residues from livestock feeding studies (Annex IIA, point 6.4, Annex IIIA, point 8.3)

	Ruminant:	Poultry:	Pig:
	Conditions of requirement of feeding studies		
Expected intakes by livestock ≥ 0.1 mg/kg diet (dry weight basis) (yes/no - If yes, specify the level)	No (primary crop only) Yes (based on rotational crop MRL proposals): 0.25 mg/kg DM	No (primary crop) No (based on rotational crop MRL proposals)	No(primary crop) Yes (based on rotational crop MRL proposals): 0.20 mg/kg DM
Potential for accumulation (yes/no):	No	No	No
Metabolism studies indicate potential level of residues ≥ 0.01 mg/kg in edible tissues (yes/no)	No (based on goat study conducted at 1200 mg/kg diet AR)	No	No (based on ruminant metabolism study – a separate pig metabolism study was not required)
	Feeding studies (Specify the feeding rate in cattle and poultry studies considered as relevant) Residue levels in matrices : Mean (max)		

	mg/kg		
Muscle	-	-	-
Liver	-	-	-
Kidney	-	-	-
Fat	-	-	-
Milk	-		
Eggs		-	

Summary of residues data according to the representative uses on raw agricultural commodities and feedingstuffs (Annex IIA, point 6.3, Annex IIIA, point 8.2)

Crop	Northern or Mediterranean Region, field or glasshouse, and any other useful information	Trials results relevant to the representative uses (a)	Recommendation/comments	MRL estimated from trials according to the representative use	HR (c)	STMR (b)
Oilseed rape seed	Northern EU, Field trials	7 x < 0.01.	Only 7 acceptable trials however these are sufficient to support MRL proposal as residues are < LOQ	0.01 (LOQ)*	0.01	0.01

(a) Numbers of trials in which particular residue levels were reported *e.g.* 3 x <0.01, 1 x 0.01, 6 x 0.02, 1 x 0.04, 1 x 0.08, 2 x 0.1, 2 x 0.15, 1 x 0.17
(b) Supervised Trials Median Residue *i.e.* the median residue level estimated on the basis of supervised trials relating to the representative use
(c) Highest residue

Consumer risk assessment (Annex IIA, point 6.9, Annex IIIA, point 8.8)

ADI	0.3 mg/kg bw/day
TMDI (% ADI) according to WHO European diet	Cluster diet B: 0.00052 mg/kg bw/day (0.17%) Cluster diet D: 0.00030 mg/kg bw/day (0.10%) Cluster diet E: 0.00022 mg/kg bw/day (0.07%) Cluster diet F: 0.00021 mg/kg bw/day (0.07%)
TMDI (% ADI) according to national (to be specified) diets	Not calculated
IEDI (WHO European Diet) (% ADI)	Not calculated – see TMDI
NEDI (specify diet) (% ADI)	Toddler (UK diet) 0.00074 mg/kg bw/day (<1%) Not calculated for other national diets
Factors included in IEDI and NEDI	None
ARfD	0.3 mg/kg bw/day
IESTI (% ARfD)	-
NESTI (% ARfD) according to national (to be specified) large portion consumption data	Intakes were all <1 % of ARfD for 10 consumer groups (UK diet) Infant consuming cauliflower (UK diet) 0.0041 mg/kg bw/day (1.4%) Not calculated for other national diets
Factors included in IESTI and NESTI	None

Processing factors (Annex IIA, point 6.5, Annex IIIA, point 8.4)

Crop/ process/ processed product	Number of studies	Processing factors		Amount transferred (%) (Optional)
		Transfer factor	Yield factor	
Not required	-	-	-	-

Proposed MRLs (Annex IIA, point 6.7, Annex IIIA, point 8.6)

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Rape seed: 0.01 mg/kg (LOQ)*

Based on the available rotational crops metabolism data the following MRLs are also required:

Fruiting vegetables, brassica vegetables, leafy vegetables, stem vegetables, herbal infusion and spices: 0.07 mg/kg

legume vegetables, pulses, cereal grains: 0.02 mg/kg

root vegetables and oilseeds: 0.01 mg/kg (LOQ)*

When the MRL is proposed at the LOQ, this should be annotated by an asterisk after the figure.

Environmental fate and behaviour

Route of degradation (aerobic) in soil (Annex IIA, point 7.1.1.1.1)

Mineralization after 100 days ‡	10.2 – 24.4 % after 119 d, [^{14}C-2,6]-label (n[6]= 4) Sterile conditions: 0.0 % after 120 d (n= 1)
Non-extractable residues after 100 days ‡	7.2 – 27.7 % after 119 d, [^{14}C-2,6]-label (n= 4) Sterile conditions: 2.2 % after 120 d (n= 1)
Metabolites requiring further consideration ‡ - name and/or code, % of applied (range and maximum)	No metabolites >5 % AR, none meet criteria in Sanco/22/2000 –rev.10 of 25 February 2003 (Guidance Document on the assessment of relevance of metabolites in groundwater of substances regulated under Council Directive 91/414/EEC)

Route of degradation in soil - Supplemental studies (Annex IIA, point 7.1.1.1.2)

Anaerobic degradation ‡

Mineralization after 100 days	0.0 % after 100 d, [^{14}C-2,6]-label (n= 1)
Non-extractable residues after 100 days	0.2 % after 100 d, [^{14}C-2,6]-label (n= 1)
Metabolites that may require further consideration for risk assessment - name and/or code, % of applied (range and maximum)	No metabolites >5 % AR Note: the high application rate used in the study might slow down the degradation process

Soil photolysis ‡

Metabolites that may require further consideration for risk assessment - name and/or code, % of applied (range and maximum)	Data gap

[6] n corresponds to the number of soils.

Rate of degradation in soil (Annex IIA, point 7.1.1.2, Annex IIIA, point 9.1.1)

Laboratory studies ‡

Parent	Aerobic conditions						
Soil type (UK/ BBA)	pH	Dose Rate (mg as/ kg dw soil; g as/ ha in brackets)	t. °C / % soil moisture	DT_{50} /DT_{90} (d) uncorrected	DT_{50} (d) 20°C pF2/10kPa	St. (r^2)	Method of calculation
Sandy clay loam	7.7 (w)	0.0333 (25)	20 °C / 40 % of pF0	82.8 / 274.9	82.8	0.950	SFO
Clay loam	6.3 (w)	0.0333 (25)	20 °C / 40 % of pF0	100.7 / 334.4	96.4	0.899	SFO
Sand	6.1 (w)	0.0333 (25)	20 °C / 40 % of pF0	220.6 / 732.7	193.2	0.897	SFO
Silty loam	8.0 (w)	0.0333 (25)	20 °C / 40 % of pF0	295.6 / 982.1	292.2	0.855	SFO
Sandy loam*	5.4 (†)	0.07 (52.5)	25 °C / 75 % 1/3 bar	24.5 / 81.6	21.7	0.986	SFO
Clay loam*	6.0(†)	0.07 (52.5)	25 °C / 75 % 1/3 bar	19.3 / 64.1	26.5	0.993	SFO
Clay*	7.6(†)	0.07 (52.5)	25 °C / 75 % 1/3 bar	18.3 / 60.7	22.0	0.984	SFO
Silty clay*	6.3(†)	0.07 (52.5)	25 °C / 75 % 1/3 bar	5.0 / 16.7	5.2	0.970	SFO
Sandy Loam	5.2 (w)	(25)	20 °C/ 40 % of pF0	22.0 (DT_{50fast}) 252.6 (DT_{50slow})	234 (DT_{50slow})	0.983 (fast) 0.999 (slow)	HS (inflection point on day 14)
Median					82.8 d		

* Soil classification scheme not reported
(w) pH measured in water
(†) pH measurement media not reported
‡ assuming a mixing depth of 5 cm and a soil density of 1.5 g/ cm^3

Field studies ‡

Parent	Aerobic conditions								
Soil type (indicate if bare or cropped soil was used).	Location (country or USA state).	pH (H_2O)	Dose Rate g as/ ha	Depth (cm)	DT_{50} (d) actual	DT_{90}(d) actual	St. (r^2)	DT_{50} (d) Norm	Method of calculation
Sandy loam, bare soil	Poland	6.6	25.0	0-30	39	129	0.956	-	SFO
Clay, bare soil	France	7.9	24.7	0-10	20	67	0.904	-	SFO
Sandy loam, bare soil	Germany	6.0	25.0	0-20	49	163	0.930	-	SFO
Geometric mean								-	

pH dependence ‡ (yes / no) (if yes type of dependence)	no
Soil accumulation and plateau concentration ‡	No data available – not required (DT90 field is < 1 year)

Laboratory studies ‡

Parent	Anaerobic conditions						
Soil type	pH	Dose Rate (mg as/ kg dw soil; g as/ ha in brackets)‡	t. °C / % MWHC	DT_{50} /DT_{90} (d)	DT_{50} (d) 20°C pF2/10kPa	St. (r^2)	Method of calculation
Loam	7.3	1 (750)	25 °C / 75 % 1/3 bar	stable			
Geometric mean/median				-			

‡ assuming a mixing depth of 5 cm and a soil density of 1.5 g/ cm^3

Soil adsorption/desorption (Annex IIA, point 7.1.2)

Parent ‡							
Soil Type	OC %	Soil pH	K_d (mL/g)	K_{doc} (mL/g)	K_F (mL/g)	K_{Foc} (mL/g)	1/n
Silty clay loam	1.9	7.0	0.76	40	-	-	-
Clay loam	1.0	5.4	0.33	33	-	-	-
Sandy silt loam	0.8	7.5	0.25	32	-	-	-
Sand	1.3	6.1	0.33	26	-	-	-
Sand	1.8	7.0	0.38	21	-	-	-
Sand	0.6	7.5	0.27	45	-	-	-
Sand	0.6	6.9	0.36	60	-	-	-
Silty loam	0.8	7.2	0.16	20	-	-	-
Arithmetic mean				35			
pH dependence, Yes or No			No				

Metabolite - 3,6-dichloro analogue (aminopyralid) *							
Soil Type	OC %	Soil pH	Kd (mL/g)	Koc (mL/g)	Kf (mL/g)	Kfoc (mL/g)	1/n
Dowling, MS, USA – Clay (UK)	1.5	6.9(†)	-	-	0.05	3.3	1.52
Norfolk, NC, USA – Loamy sand (UK)	0.6	4.5(†)	-	-	0.13	21.7	0.85
Barnes, ND, USA – Clay loam (UK)	3.6	4.8(†)	-	-	0.73	20.3	0.90
Ryerson, Canada – Silty clay (UK)	3.9	7.8(†)	-	-	0.26	6.7	0.87
Thessaloniki, Greece – Silty clay loam (UK)	1.0	7.8(†)	-	-	0.04	4.0	0.81
Cuckney, UK – Sand (UK)	1.6	6.6(†)	-	-	0.05	3.13	0.74
Charentilly, France – Clay loam (UK)	1.0	6.1(†)	-	-	0.07	7.0	0.81
Faringdon, UK – Clay (UK)	3.2	7.5(†)	-	-	0.01	0.31	0.32
Altluβheim, Germany – Loam (USDA)	1.7	7.5 (c)	-	-	0.09	5.3	0.63
Barrow-On-Trent, UK – Sandy loam (USDA)	4.6	6.3 (c)	-	-	0.20	4.4	0.80
Hertfordshire, UK. – Clay loam (USDA)	2.2	7.6(c)	-	-	0.05	2.1	0.44
Römenberg, Germany – sandy loam (USDA)	0.7	7.4(c)	-	-	0.11	15.2	0.78
Languedoc, France – Loam (USDA)	3.2	7.6(c)	-	-	0.09	2.7	0.68
Empingham, UK – Clay loam (USDA)	2.1	7.5(c)	-	-	0.11	5.0	0.67
Arithmetic mean				-	**0.14**	**7.22**	**0.77**
Arithmetic mean of soils pH > 5				-	**0.09 (0.10)**	**4.93 (5.19)**	**0.76 (0.78)**
pH dependence, Yes or No			Yes- soils with pH > 5 display lower Kfoc values.				

Values in brackets represent the mean values for soils of $r^2 > 0.7$ calculated by the UK RMS (i.e. the Hertforshire soil is excluded).

(c) – pH measured in $CaCl_2$

(†) - pH measurement media not reported

*: the origin of the values is the DAR of aminopyralid. The peer-review for aminopyralid had not been finalised at the time of the peer-review of picloram. For the FOCUS calculations the K_{Foc} of 4.07 mL/g was used, which was found as sufficiently conservative by the meeting of experts for the picloram peer-review.

Mobility in soil (Annex IIA, point 7.1.3, Annex IIIA, point 9.1.2)

Column leaching ‡	No data submitted – not required
Aged residues leaching ‡	No data submitted – not required
Lysimeter/ field leaching studies ‡	Location: Germany, Münster-Handorf Study type: lysimeter Soil properties: loamy sand (UK), pH ($CaCl_2$) = 5.4 (0-30cm); sand (UK), pH ($CaCl_2$) 5.7 (30-85cm and 85-130cm), OC= 1.1 (0-30cm), 0.1 (30-85cm), 0.05 (85-130cm) Dates of application : Single application on 15 March 2001 to oilseed rape at a growth stage of BBCH 17 Crop: oilseed rape, winter wheat (sown on 29 Oct 2001), winter barley (sown on 23 Sept 2002) Interception estimated (OSR): 40 % Number of applications: 1 application in the first year Application rate: 25 g/ha Average annual rainfall (mm): 912 mm Average annual leachate volume (mm): 444.9 mm (lys 11), 443.4 mm (lys 12) % radioactivity in leachate (maximum/year): 0.09 %AR /1st and 2nd year (Lys 11), 0.06 %AR/ 2nd year (Lys 12) Individual annual maximum concentrations in parent equivalents: Lys 11: 1st yr: 0.023 µg/L, 2nd yr: 0.018 µg/L Lys 12: 1st yr: 0.012 µg/L, 2nd yr: 0.016 µg/L Individual annual average concentrations in parent equivalents: Lys 11: 1st yr: 0.005 µg/L, 2nd yr: 0.006 µg/L Lys 12: 1st yr: 0.003 µg/L, 2nd yr: 0.003 µg/L

	Amount of radioactivity in the soils at the end of the study = 12.45 % AR in lysimeter 11 and 15.92 % AR in lysimeter 12

PEC (soil) (Annex IIIA, point 9.1.3)

Parent	DT_{50} (d): 49 days
Method of calculation	Kinetics: SFO Field or Lab: representative worst case from field studies.
Application data	Crop: winter and spring oilseed rape (spring application) Depth of soil layer: 5 cm Soil bulk density: 1.5 g/ml % plant interception: no crop interception Number of applications: 1 Application rate(s): 23.45 g as/ha

$PEC_{(s)}$ (mg/kg)	Single application Actual	Single application Time weighted average	Multiple application Actual	Multiple application Time weighted average
Initial	0.031		x	
Short term	0.031	0.031	x	x
2d	0.030	0.031	x	x
4d	0.030	0.031	x	x
Long term	0.028	0.030	x	x
28d	0.021	0.026	x	x
50d	0.015	0.022	x	x
100d	0.008	0.017	x	x

Route and rate of degradation in water (Annex IIA, point 7.2.1)

Hydrolytic degradation of the active substance and metabolites > 10 % ‡	pH 5: stable at 25 °C
	pH 7: stable at 25 °C
	pH 9: stable at 25 °C
Photolytic degradation of active substance and metabolites above 10 % ‡	Sterile buffer at pH 5: DT_{50} : 3.5 days summer sunlight, 40°N Natural water: DT_{50}: 2 days summer sunlight, 40°N Photodegradates identified were oxamic acid, 3-oxo-β-alanine and CO_2, all of which were found at >10 % AR. The two metabolites oxamic acid and 3-oxo-β-alanine are considered non-relevant since both have a carbon chain < 4 C's and contain only C, H, N and O. There is also no chemical functionality within these substances of toxicological concern within these two metabolites so both are considered non-relevant metabolites.
Quantum yield of direct phototransformation in water at □ > 290 nm	$2.98 \cdot 10^{-3}$ mol · Einstein $^{-1}$
Readily biodegradable ‡ (yes/no)	Not ready biodegradable.

Degradation in water / sediment

Parent	Distribution (eg max in water 96.4 after 0 d. Max. sed 43.9 % after 21 d)									
Water / sediment system	pH water phase	pH sed	t. °C	DT_{50}-DT_{90} whole sys.	St. (r^2)	DT_{50}-DT_{90} water dissipation	St. (r^2)	DT_{50}-DT_{90} sed	St. (r^2)	Method of calculation
French Test System	5.9	6.1	20	149.9-498.1	0.962	48.4-160.7	0.904	Not calculated	-	SFO
Italian Test System	8.2	7.9	20	256.6-852.0	0.945	135-448.5	0.870	Not calculated	-	SFO
Geometric mean				196.1		80.8				

Metabolite 3,6-dichloro	Distribution (max in water 8.7 % after 102 d; max. sed. 5.2 % after 102 d)
Metabolite 5,6-dichloro	Distribution (max in water 1.1 % after 61 d; max. sed. 19 % after 102 d)
	Degradation rates for metabolites were not calculated due to increasing concentrations at the end of the study period.

Mineralization and non extractable residues					
Water / sediment system	pH water phase	pH sed	Mineralization x % after n d. (end of the study).	Non-extractable residues in sed. Max x % after n d	Non-extractable residues in sed. Max x % after n d (end of the study)
French Test System	5.9	6.1	0.0 % AR after 102 days	Max 5.1 % AR after 102 days	Max 5.1 % AR after 102 days
Italian Test System	8.2	7.9	0.1 % AR after 102 days	Max 11.9 % AR after 102 days	Max 11.9 % AR after 102 days

PEC (surface water) and PEC sediment (Annex IIIA, point 9.2.3)

Parent Parameters used in FOCUSsw step 1 & 2	Version control no. of FOCUS calculator: version 1.1 Molecular weight (g/mol): 241.5 Water solubility (mg/L): 560 K_{OC} (L/kg): 35 DT_{50} soil (d): 82.8 days, median of lab. data) DT_{50} water/sediment system (d): 196.1 (geometric mean) DT_{50} water (d): 1000 DT_{50} sediment (d): 196.1 Crop interception (%): no interception (0 %)
Application rate	Crop: winter and spring oilseed rape Number of applications: 1 Application rate(s): 23.45 g as/ha

FOCUS STEP 1	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
	0 h	7.7002		2.6194	
	24 h	7.6634	7.6818	2.6822	2.6508
	2 d	7.6364	7.6659	2.6727	2.6641
	4 d	7.5826	7.6377	2.6539	2.6637
	7 d	7.5026	7.5969	2.6259	2.6535
	14 d	7.3193	7.5037	2.5617	2.6236
	21 d	7.1404	7.4123	2.4991	2.5925
	28 d	6.9659	7.3224	2.4381	2.5615
	42 d	6.6296	7.1471	2.3203	2.5006

FOCUS STEP 2	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Northern EU Winter Oilseed Rape	0 h	3.8278	---	1.3339	---
	24 h	3.822	3.8249	1.3328	1.3334
	2 d	3.8189	3.8227	1.3317	1.3328
	4 d	3.8126	3.8192	1.3295	1.3317
	7 d	3.8033	3.8144	1.3263	1.3301
	14 d	3.7815	3.8034	1.3187	1.3263
	21 d	3.7599	3.7925	1.3111	1.3225
	28 d	3.7383	3.7816	1.3036	1.3187
	42 d	3.6957	3.7601	1.2888	1.3112
Southern EU Winter Oilseed Rape	0 h	3.104	---	1.0815	---
	24 h	3.0987	3.1014	1.0806	1.081
	2 d	3.0962	3.0994	1.0797	1.0806
	4 d	3.0911	3.0965	1.0779	1.0797
	7 d	3.0835	3.0926	1.0753	1.0784
	14 d	3.0659	3.0837	1.0691	1.0753
	21 d	3.0484	3.0748	1.063	1.0722
	28 d	3.0309	3.066	1.0569	1.0692
	42 d	2.9963	3.0485	1.0449	1.0631

FOCUS STEP 2	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
Northern EU Spring Oilseed Rape	0 h	1.6565	---	0.5766	---
	24 h	1.6522	1.6544	0.5762	0.5764
	2 d	1.6509	1.653	0.5757	0.5762
	4 d	1.6482	1.6512	0.5747	0.5757
	7 d	1.6441	1.6491	0.5733	0.575
	14 d	1.6347	1.6442	0.5701	0.5733
	21 d	1.6254	1.6395	0.5668	0.5717
	28 d	1.6161	1.6348	0.5636	0.5701
	42 d	1.5976	1.6255	0.5571	0.5668
Southern EU Spring Oilseed Rape	0 h	3.104	---	1.0815	---
	24 h	3.0987	3.1014	1.0806	1.081
	2 d	3.0962	3.0994	1.0797	1.0806
	4 d	3.0911	3.0965	1.0779	1.0797
	7 d	3.0835	3.0926	1.0753	1.0784
	14 d	3.0659	3.0837	1.0691	1.0753
	21 d	3.0484	3.0748	1.063	1.0722
	28 d	3.0309	3.066	1.0569	1.0692
	42 d	2.9963	3.0485	1.0449	1.0631

Metabolite 3,6-dichloro analogue (aminopyralid) and metabolite 5,6-dichloro analogue (assumed same as 3,6-dichloro as no measured data for 5,6-dichloro) Parameters used in FOCUSsw step 1	Molecular weight: 207 Water solubility (mg/L): 2480 Soil or water metabolite: water Koc (L/kg): 4.07 DT_{50} soil (d): 12.1 days (geometric mean of normalised field values. In accordance with FOCUS SFO) DT50 water/sediment system (d): 1001 (representative worst case from sediment water studies) DT_{50} water (d): 1001 DT_{50} sediment (d): 1001 Crop interception (%): no interception (0 %) Formation in W/S system: 3,6-dichloro analogue: 100 % 5,6-dichloro analogue: 100 % Formation in soil: 3,6-dichloro analogue: 0.0001 % 5,6-dichloro analogue: 0.0001 %
Application rate	Crop: winter and spring oilseed rape Number of applications: 1 Application rate(s): 23.45 g as/ha

FOCUS STEP 1 **3,6-dichloro analogue - aminopyralid**	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
	0h	0.1853		0	
	24h	0.1841	0.1847	0.0075	0.0037
	2d	0.184	0.1844	0.0075	0.0056
	4d	0.1837	0.1841	0.0075	0.0066
	7d	0.1834	0.1839	0.0075	0.0069
	14d	0.1825	0.1834	0.0074	0.0072
	21d	0.1816	0.1829	0.0074	0.0073
	28d	0.1807	0.1825	0.0074	0.0073
	42d	0.179	0.1816	0.0073	0.0073

FOCUS STEP 1 **5,6-dichloro analogue**	Day after overall maximum	PEC_{SW} (µg/L)		PEC_{SED} (µg/kg)	
		Actual	TWA	Actual	TWA
	0h	0.1853		0	
	24h	0.1841	0.1847	0.0075	0.0037
	2d	0.184	0.1844	0.0075	0.0056
	4d	0.1837	0.1841	0.0075	0.0066
	7d	0.1834	0.1839	0.0075	0.0069
	14d	0.1825	0.1834	0.0074	0.0072
	21d	0.1816	0.1829	0.0074	0.0073
	28d	0.1807	0.1825	0.0074	0.0073
	42d	0.179	0.1816	0.0073	0.0073

Note that aquatic risk assessment passes at Step 1; updated Steps 2 results are presented in Addendum 4 (June 2009) to the DAR.

PEC (ground water) (Annex IIIA, point 9.2.1)

Method of calculation and type of study (*e.g.* modelling, field leaching, lysimeter)	For FOCUS gw modelling, values used – Modelling using FOCUS model(s), with appropriate FOCUSgw scenarios, according to FOCUS guidance. Models used: FOCUS PELMO 3.3.2 and FOCUS PEARL v. 3.3.3 Scenarios (list of names): Châteaudun, Hamburg, Kremsmünster, Okehampton, Piacenza, Porto, Jokionen Crop: winter and spring oilseed rape Median parent DT_{50lab} 82.8 d (normalised to -10kPa or pF2, 20 °C with Q10 of 2.2). K_{OC}: parent, arithmetic mean 35, $^1/_n$= 1.0
Application rate	Application rate: 23.5 g/ha. No. of applications: 1 Time of application (month or season): Winter oilseed rape: 15 Feb Spring oilseed rape: 2 weeks after emergence

PEC(gw) - FOCUS modelling results (80th percentile annual average concentration at 1m)

	Scenario	Parent (µg/L)			
PELMO 3.3.2 /winter oilseed rape	Châteaudun	0.241			
	Hamburg	0.338			
	Kremsmünster	0.287			
	Okehampton	0.279			
	Piacenza	0.249			
	Porto	0.076			

	Scenario	Parent (µg/L)			
PELMO 3.3.2 /spring oilseed rape	Jokionen	0.321			
	Okehampton	0.312			
	Porto	0.056			

PEARL 3.3.3 /winter oilseed rape	Scenario	Parent (µg/L)			
	Châteaudun	0.305			
	Hamburg	0.345			
	Kremsmünster	0.272			
	Okehampton	0.270			
	Piacenza	0.228			
	Porto	0.079			

PEARL 3.3.3 /spring oilseed rape	Scenario	Parent (µg/L)			
	Jokionen	0.352			
	Okehampton	0.275			
	Porto	0.066			

Fate and behaviour in air (Annex IIA, point 7.2.2, Annex III, point 9.3)

Direct photolysis in air ‡	No information provided.
Quantum yield of direct phototransformation	active substance: 2.98×10^{-3} (in water at pH 5)
Photochemical oxidative degradation in air ‡	DT_{50} of 12.5 hours derived by the Atmospheric Oxidation Program (version 1.89). OH (12 h) concentration assumed = 1.5×10^6 molecules per cm^3
Volatilisation ‡	from plant surfaces (BBA guideline): 0.3 % after 24 hours
	from soil surfaces (BBA guideline): 3.7 % after 24 hours

PEC (air)

Method of calculation	No formal guidance is available on how to calculate PEC_{AIR}, and so no data are provided. However, some data are available to show that the volatilisation of picloram from soil and plant leaf surfaces is not significant.

$PEC_{(a)}$

Maximum concentration	negligible

Residues requiring further assessment

Environmental occurring metabolite requiring further assessment by other disciplines (toxicology and ecotoxicology).	Soil:	picloram
	Surface Water:	picloram, aminopyralid and 5,6-dichloro analogue of picloram
	Sediment:	picloram, aminopyralid and 5,6-dichloro analogue of picloram
	Ground water:	picloram
	Air:	picloram

Monitoring data, if available (Annex IIA, point 7.4)

Soil (indicate location and type of study)	No data provided - none requested
Surface water (indicate location and type of study)	France, 2000-2001, picloram was not detected Germany, 1993-1994, picloram was not detected UK, 1995-2002, found in 15 samples out of 525, picloram concentration above 0.1 µg/l was detected in eight samples, max. 0.4 µg/l
Ground water (indicate location and type of study)	France, 2001, picloram was not detected Germany, 1993-1994, picloram was not detected
Air (indicate location and type of study)	No data provided - none requested

Points pertinent to the classification and proposed labelling with regard to fate and behaviour data

Not readily biodegradable. Candidate for R53.

Ecotoxicology

Effects on terrestrial vertebrates (Annex IIA, point 8.1, Annex IIIA, points 10.1 and 10.3)

Species	Test substance	Time scale	End point (mg/kg bw/day)	End point (mg/kg feed)
Birds ‡				
Mallard duck	Picloram potassium salt	Acute	>1944ae (>2250 K-salt)	-
Bobwhite quail	Preparation 'GF-224'	Acute	>2250 product	-
Bobwhite quail	Picloram potassium salt	Short-term	>1904ae (>2204 K-salt)	>4856ae (>5620 K-salt)
Bobwhite quail	Picloram	Long-term	65	750
Mammals ‡				
Rat (female)	Picloram	Acute	4012	-
Rat	Preparation 'GF-224'	Acute	>5000 product	-
Rabbit	Picloram TIPA salt	Long-term	300ae	-
Additional higher tier studies ‡				
Not required.				

ae = acid equivalents (converted from potassium salt using correction factor of 0.864)

Toxicity/exposure ratios for terrestrial vertebrates (Annex IIIA, points 10.1 and 10.3)

Spring/winter oilseed rape at 1 x 23.45 g a.s./ha

Indicator species/Category	Time scale	ETE	TER	Annex VI Trigger
Tier 1 (Birds)				
Medium herbivorous bird	Acute	1.55	>1254	10
Insectivorous bird	Acute	1.27	>1530	10
Medium herbivorous bird	Short-term	0.71	>2682	10
Insectivorous bird	Short-term	0.71	>2682	10
Medium herbivorous bird	Long-term	0.38	171	5
Insectivorous bird	Long-term	0.71	92	5
Tier 1 (Mammals)				
Medium herbivorous mammal	Acute	0.57	7039	10

Indicator species/Category	Time scale	ETE	TER	Annex VI Trigger
Medium herbivorous mammal	Long-term	0.14	2143	5

Toxicity data for aquatic species (most sensitive species of each group) (Annex IIA, point 8.2, Annex IIIA, point 10.2)

Group	Test substance	Time-scale (Test type)	End point	Toxicity[1] (mg/L)
Laboratory tests ‡				
Fish				
Lepomis macrochirus	Picloram	96 hr (static)	Mortality, LC_{50}	26 mm
Oncorhynchus mykiss	Picloram	96 hr (static)	Mortality, LC_{50}	8.8 mm
Oncorhynchus mykiss	Picloram	Early life stage, 70 d (flow through)	NOEC	0.55 mm
Oncorhynchus mykiss	Preparation 'GF-224'	96 hr (flow-through)	Mortality, LC_{50}	265 nom product (15.4 mg picloram/L)
Oncorhynchus mykiss	Metabolite XDE-750 (aminopyralid)	96 hr (static)	Mortality, LC_{50}	>100 nom
Lepomis macrochirus	Metabolite XDE-750 (aminopyralid)	96 hr (static)	Mortality, LC_{50}	>100 nom
Pimephales promelas	Metabolite XDE-750 (aminopyralid)	Early life stage, 32d (flow-through)	NOEC	1.3 nom
Aquatic invertebrate				
Daphnia magna	Picloram	48 h (static)	EC_{50}	44.2 nom
Daphnia magna	Picloram	21 d (static)	Reproduction, NOEC	6.79 mm

Group	Test substance	Time-scale (Test type)	End point	Toxicity[1] (mg/L)
Daphnia magna	Preparation 'GF-224'	48 h (static)	EC_{50}	1440 nom product (73.5 mg picloram/L)
Daphnia magna	Metabolite XDE-750 (aminopyralid)	48 h (static)	EC_{50}	>100 nom
Daphnia magna	Metabolite XDE-750 (aminopyralid)	21 d (static)	Reproduction, NOEC	100 nom
Sediment-dwelling organisms				
Chironomus riparius	Picloram technical	28 d (static)	NOEC	100 nom
Chironomus riparius	Metabolite XDE-750 (aminopyralid)	28 d (static)	NOEC	130 nom
Chironomus riparius	5,6-dichloro metabolite	28 d (static)	NOEC	50 nom
Algae				
Pseudokirch subcap.	Picloram	96 h (static)	EC_{50}	60.2 mm
Pseudokirch subcap.	Picloram potassium salt	120 h (static)	EC_{50}	73.9 mm
Anabaena flos-aquae	Picloram technical	120 h (static)	EC_{50}	38.2 mm
Pseudokirch subcap.	Preparation 'GF-224'	96 h (static)	EC_{50}	67.5 nom product (3.81 mg picloram/L mm)
Pseudokirch subcap.	Metabolite XDE-750 (aminopyralid)	72 h (static)	Biomass: E_rC_{50}	30 mm
Navicula pelliculosa	Metabolite XDE-750 (aminopyralid)	72 h (static)	Biomass: E_bC_{50}	18 mm

Group	Test substance	Time-scale (Test type)	End point	Toxicity[1] (mg/L)
Higher plant				
Lemna gibba	Picloram (acid)	14 d (static)	Fronds, EC_{50}	102 nom
Lemna gibba	Preparation 'GF-224'	14 d (static)	Fronds, EC_{50}	191 mm product (11.8 mg/L picloram)
Lemna gibba	Metabolite XDE-750 (aminopyralid)	14 d (static)	Fronds, EC_{50}	>88 mm
Microcosm or mesocosm tests				
Not required				

[1] indicate whether based on nominal ($_{nom}$) or mean measured concentrations ($_{mm}$). In the case of preparations indicate whether end points are presented as units of preparation or a.s.

Toxicity/exposure ratios for the most sensitive aquatic organisms (Annex IIIA, point 10.2)

FOCUS Step1

Spring/winter oilseed rape at 1 x 23.45 g a.s./ha

Test substance	Organism	Toxicity end point (mg/L)	Time scale	PEC_i	PEC_{twa}	TER	Annex VI Trigger
picloram	Fish	8.8	Acute	0.0077	-	1143	100
picloram	Fish	0.55	Chronic	0.0077	-	71.4	10
picloram	Aquatic invertebrates	44.2	Acute	0.0077	-	5740	100
picloram	Aquatic invertebrates	6.79	Chronic	0.0077	-	882	10
picloram	Sediment-dwelling organisms	100	chronic	0.0077_{sw}	-	12987	10
picloram	Algae	38.2	Acute	0.0077	-	4961	10
picloram	Higher plants	102	Acute	0.0077	-	13247	10
Metabolite XDE-750	Fish	>100	Acute	0.000185	-	>540541	100
Metabolite XDE-750	Aquatic invertebrates	>100	Acute	0.000185	-	>540541	100
Metabolite XDE-750	Algae	18	Acute	0.000185	-	97297	10

Test substance	Organism	Toxicity end point (mg/L)	Time scale	PEC_i	PEC_{twa}	TER	Annex VI Trigger
Metabolite XDE-750	Higher plants	>88	Acute	0.000185	-	>475676	10
Metabolite XDE-750	Fish	1.3	Chronic	0.000185	-	7027	10
Metabolite XDE-750	Aquatic invertebrates	100	Chronic	0.000185	-	540541	10
Metabolite XDE-750	Sediment-dwelling organisms	130 mg/L (water phase) 46.7 mg/kg (sediment)	Chronic	0.000185 0.0000075	-	702703 6226667	10 10
5,6-dichloro metabolite	Sediment-dwelling organisms	50 (water phase)	Chronic	0.000185	-	270270	10
Product 'GF-224'	Fish	265	Acute	0.003776	-	70180	100
Product 'GF-224'	Aquatic invertebrates	1440	Acute	0.003776	-	381355	100
Product 'GF-224'	Algae	67.5	Acute	0.003776	-	17876	10
Product 'GF-224'	Higher plants[2]	191	Acute	0.003776	-	50582	10

(metabolite XDE-750 is the same as the 3,6-dichloro analogue or aminopyralid)

Bioconcentration				
	Active substance	Metabolite 1	Metabolite 2	Metabolite 3
$logP_{O/W}$	-1.92	-	-	-
Bioconcentration factor (BCF)[1] ‡	-	-	-	-
Annex VI Trigger for the bioconcentration factor	-	-	-	-
Clearance time (days) (CT_{50})	-	-	-	-
(CT_{90})	-	-	-	-
Level and nature of residues (%) in organisms after the 14 day depuration phase	-	-	-	-

[1] only required if log $P_{O/W}$ >3.

Effects on honeybees (Annex IIA, point 8.3.1, Annex IIIA, point 10.4)

Test substance	Acute oral toxicity (LD_{50} µg/bee)	Acute contact toxicity (LD_{50} µg/bee)
Picloram ‡	>74	>100
Preparation 'GF-224'[1]	>106	>100
Field or semi-field tests		
Not required		

[1] End point is expressed in units of preparation/bee

Hazard quotients for honey bees (Annex IIIA, point 10.4)

Spring/winter oilseed rape at 1 x 23.45 g a.s./ha

Test substance	Route	Hazard quotient	Annex VI Trigger
Picloram	Contact	<0.235	50
Picloram	oral	<0.317	50
Preparation 'GF-224'	Contact	<4.09	50
Preparation 'GF-224'	oral	<3.86	50

Effects on other arthropod species (Annex IIA, point 8.3.2, Annex IIIA, point 10.5)

Laboratory tests with standard sensitive species

Species	Test Substance	End point	Effect (LR_{50} g a.s./ha[1])
Typhlodromus pyri	'GF-224'[1]	Mortality	>23.45
Aphidius rhopalosiphi	'GF-224'[1]	Mortality	>23.45

[1] Value estimated from studies, represents the highest dose tested

Spring/winter oilseed rape at 1 x 23.45 g a.s./ha

Test substance	Species	Effect (LR_{50} g a.s./ha)	HQ in-field	HQ off-field[‡]	Trigger
'GF-224'	*Typhlodromus pyri*	23.45	<1	-	2
'GF-224'	*Aphidius rhopalosiphi*	23.45	<1	-	2

Field or semi-field tests
Not required

Effects on earthworms, other soil macro-organisms and soil micro-organisms (Annex IIA points 8.4 and 8.5. Annex IIIA, points, 10.6 and 10.7)

Test organism	Test substance	Time scale	End point[1]
Earthworms			
Eisenia foetida	picloram‡	Acute 14 days	LC_{50} > 4475 mg ae/kg d.w.soil
Eisenia foetida	picloram ‡	Chronic 8 weeks	NOEC = 0.167 mg ae/kg d.w.soil
Eisenia foetida	Preparation 'GF-224'	Acute	>3468 mg product/kg d.w.soil
Soil micro-organisms			
Nitrogen mineralisation	picloram ‡		< 25 % effect at 0.167 mg ae/kg d.w.soil (125 g ae/ha)
	Preparation 'GF-224'		< 25 % effect at 2.732 mg product/kg d.w.soil (1.75 L product/ha)
Carbon mineralisation	picloram ‡		< 25 % effect at 0.167 mg ae/kg d.w.soil (125 g ae/ha)
	Preparation 'GF-224'		< 25 % effect at 2.732 mg product/kg d.w.soil (1.75 L product/ha)
Field studies			
Not required			

[1] since log Pow < 2.0 there is no need to correct the toxicity endpoints

Toxicity/exposure ratios for soil organisms

Spring/winter oilseed rape at 1 x 23.45 g a.s./ha

Test organism	Test substance	Time scale	Soil PEC_i	TER	Trigger
Earthworms					
Eisenia foetida	picloram ‡	Acute	0.031 ae	>144355	10
Eisenia foetida	picloram ‡	Chronic	0.031 ae	5.387	5
Eisenia foetida	Preparation 'GF-224'	Acute	0.545 formulation	>6363	10

Effects on non target plants (Annex IIA, point 8.6, Annex IIIA, point 10.8)

Preliminary screening data

Not required for herbicides as ER_{50} tests should be provided

The risk to non target plants in the off-crop area from the proposed use of 'GF-224'

Most sensitive species	Test substance	Maximum application (mL product/ha)	Predicted exposure[1] concentration at 1 m (mL product/ha	ER_{50} (mL product/ha) post-emergence	TER	Trigger
Glycine max	'GF-224'	350	9.7	76.9	7.9	5

[1] exposure has been estimated on the basis of 2.77% drift at 1m

Additional studies (e.g. semi-field or field studies)

Not required.

Effects on biological methods for sewage treatment (Annex IIA 8.7)

Test type/organism	end point
Activated sludge	No effect at high concentrations

Ecotoxicologically relevant compounds (consider parent and all relevant metabolites requiring further assessment from the fate section)

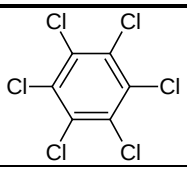
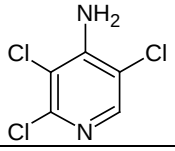
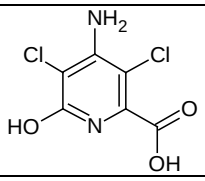
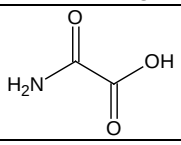
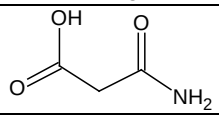
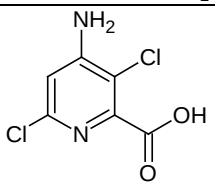
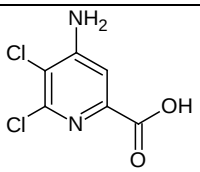
Compartment	
soil	Parent (picloram)
water	Parent (picloram), aminopyralid (= 3,6-dichloro analogue of picloram) 5,6-dichloro analogue of picloram
sediment	Parent (picloram)
groundwater	Parent (picloram)

Classification and proposed labelling with regard to ecotoxicological data (Annex IIA, point 10 and Annex IIIA, point 12.3)

	RMS/peer review proposal
Active substance picloram	R51/53, S60, S61

	RMS/peer review proposal
Preparation 'Galera' (GF-224)	R53, S35 or S60 and S57 or S61

APPENDIX B – USED COMPOUNDS CODES

Code/Trivial name*	Chemical name**	Structural formula**
hexachlorobenzene, HCB	hexachlorobenzene	
PYR K-041160	2,3,5-trichloropyridin-4-amine (4-amino-3,5,6-trichloropyridine)	
6-OH metabolite	4-amino-3,5-dichloro-6-hydroxypyridine-2-carboxylic acid	
oxamic acid	amino(oxo)acetic acid	
3-oxo-β-alanine	3-amino-3-oxopropanoic acid	
3,6-dichloro analogue of picloram (aminopyralid) XDE-750	4-amino-3,6-dichloropyridine-2-carboxylic acid	
5,6-dichloro analogue of picloram	4-amino-5,6-dichloropyridine-2-carboxylic acid	

* The metabolite name is the name used in the conclusion.

** ACD/ChemSketch, Advanced Chemistry Development, Inc., ACD/Labs Release: 12.00 Product version: 12.00 (Build 29305, 25 Nov 2008)

ABBREVIATIONS

1/n	slope of Freundlich isotherm
ε	decadic molar extinction coefficient
°C	degree Celsius (centigrade)
µg	microgram
µm	micrometer (micron)
a.s.	active substance
ADE	actual dermal exposure
ADI	acceptable daily intake
AF	assessment factor
AOEL	acceptable operator exposure level
AR	applied radioactivity
ARfD	acute reference dose
AV	avoidance factor
BCF	bioconcentration factor
bw	body weight
CAS	Chemical Abstract Service
CFU	colony forming units
CI	confidence interval
CIPAC	Collaborative International Pesticide Analytical Council Limited
CL	confidence limits
d	day
DAA	days after application
DAR	draft assessment report
DAT	days after treatment
DFR	dislodgeable foliar reside
DM	dry matter
DT_{50}	period required for 50 percent disappearance (define method of estimation)
DT_{90}	period required for 90 percent disappearance (define method of estimation)
dw	dry weight
EbC_{50}	effective concentration (biomass)
EC_{50}	effective concentration
ECHA	European Chemical Agency
EEC	European Economic Community
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of New Chemical Substances
EMDI	estimated maximum daily intake
ER_{50}	emergence rate/effective rate, median
ErC_{50}	effective concentration (growth rate)
EU	European Union
EUROPOEM	European Predictive Operator Exposure Model
f(twa)	time weighted average factor
FAO	Food and Agriculture Organisation of the United Nations
FIR	Food intake rate
FOCUS	Forum for the Co-ordination of Pesticide Fate Models and their Use
g	gram
GAP	good agricultural practice
GC	gas chromatography
GCPF	Global Crop Protection Federation (formerly known as GIFAP)
GGT	gamma glutamyl transferase
GM	geometric mean
GS	growth stage

h	hour(s)
ha	hectare
hL	hectolitre
HPLC	high pressure liquid chromatography or high performance liquid chromatography
HPLC-MS	high pressure liquid chromatography – mass spectrometry
HQ	hazard quotient
IEDI	international estimated daily intake
IESTI	international estimated short-term intake
ISO	International Organisation for Standardisation
IUPAC	International Union of Pure and Applied Chemistry
JMPR	Joint Meeting on the FAO Panel of Experts on Pesticide Residues in Food and the Environment and the WHO Expert Group on Pesticide Residues (Joint Meeting on Pesticide Residues)
K_{doc}	organic carbon linear adsorption coefficient
K_{dom}	organic matter linear adsorption coefficient
kg	kilogram
K_{Foc}	Freundlich organic carbon adsorption coefficient
L	litre
LC	liquid chromatography
LC_{50}	lethal concentration, median
LC-MS	liquid chromatography-mass spectrometry
LC-MS-MS	liquid chromatography with tandem mass spectrometry
LD_{50}	lethal dose, median; dosis letalis media
LDH	lactate dehydrogenase
LOAEL	lowest observable adverse effect level
LOD	limit of detection
LOQ	limit of quantification (determination)
m	metre
M/L	mixing and loading
MAF	multiple application factor
mg	milligram
mL	millilitre
mm	millimetre
MRL	maximum residue limit or level
MS	mass spectrometry
MSDS	material safety data sheet
MTD	maximum tolerated dose
MWHC	maximum water holding capacity
NESTI	national estimated short-term intake
ng	nanogram
NOAEC	no observed adverse effect concentration
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
OM	organic matter content
Pa	Pascal
PD	proportion of different food types
PEC	predicted environmental concentration
PEC_{air}	predicted environmental concentration in air
PEC_{gw}	predicted environmental concentration in ground water
PEC_{sed}	predicted environmental concentration in sediment
PEC_{soil}	predicted environmental concentration in soil

PEC_{sw}	predicted environmental concentration in surface water
pH	pH-value
PHED	pesticide handler's exposure data
PHI	pre-harvest interval
PIE	potential inhalation exposure
pK_a	negative logarithm (to the base 10) of the dissociation constant
P_{ow}	partition coefficient between *n*-octanol and water
PPE	personal protective equipment
ppm	parts per million (10^{-6})
ppp	plant protection product
PT	proportion of diet obtained in the treated area
QSAR	quantitative structure-activity relationship
QC	quality control
r^2	coefficient of determination
RPE	respiratory protective equipment
RUD	residue per unit dose
SL	soluble concentrate
SD	standard deviation
SFO	single first-order
SSD	species sensitivity distribution
STMR	supervised trials median residue
$t_{1/2}$	half-life (define method of estimation)
TER	toxicity exposure ratio
TER_A	toxicity exposure ratio for acute exposure
TER_{LT}	toxicity exposure ratio following chronic exposure
TER_{ST}	toxicity exposure ratio following repeated exposure
TIPA	triisopropanolamine
TK	technical concentrate
TLV	threshold limit value
TMDI	theoretical maximum daily intake
TRR	total radioactive residue
TWA	time weighted average
UDS	unscheduled DNA synthesis
UV	ultraviolet
W/S	water/sediment
w/v	weight per volume
w/w	weight per weight
WHO	World Health Organisation
wk	week
yr	year