



EUROPEAN COMMISSION  
HEALTH & CONSUMER PROTECTION DIRECTORATE-GENERAL

Directorate E – Food Safety: plant health, animal health and welfare, international questions  
**E1 - Plant health**

Quinoxifen

6781/VI/97-Final.

27 November 2003

**COMMISSION WORKING DOCUMENT - DOES NOT NECESSARILY REPRESENT  
THE VIEWS OF THE COMMISSION SERVICES**

Review report for the active substance **quinoxifen**

Finalised in the Standing Committee on the Food Chain and Animal Health at its meeting on 28 November 2003 in view of the inclusion of quinoxifen in Annex I of Directive 91/414/EEC.

**1. Procedure followed for the evaluation process**

This review report has been established as a result of the evaluation of the new active substance quinoxifen, made in the context of the work provided for in Articles 5 and 6 of Directive 91/414/EEC concerning the placing of plant protection products on the market, with a view to the possible inclusion of this substance in Annex I to the Directive.

In accordance with the provisions of Article 6(2) of Directive 91/414/EEC, the United Kingdom authorities received on 1 August 1995 an application from Dow Elanco Europe (now Dow Agro Sciences), hereafter referred to as the applicant, for the inclusion of the active substance quinoxifen in Annex I to the Directive. The United Kingdom authorities indicated to the Commission on 18 January 1996 the results of a first examination of the completeness of the dossier, with regard to the data and information requirements provided for in Annex II and, for at least one plant protection product containing the active substance concerned, in Annex III to the Directive. Subsequently, and in accordance with the requirements of Article 6(2), a dossier on quinoxifen was distributed to the Member States and the Commission.

The Commission referred the dossier to the Standing Committee for Plant Health in the meeting of the working group 'legislation' thereof on 20 March 1996, during which the Member States confirmed the receipt of the dossier.

In accordance with the provisions of Article 6(3), which requires the confirmation at Community level that the dossier is to be considered as satisfying, in principle, the data and information requirements provided for in Annex II and, for at least one plant protection product containing the active substance concerned, in Annex III to the Directive and in accordance with the

procedure laid down in Article 20 of the Directive, the Commission confirmed in its Decision 96/457/EEC<sup>1</sup> of 28 June 1996 that these requirements were satisfied.

Within the framework of that decision and with a view to the further organisation of the works related to the detailed examination of the dossier provided for in Article 6(2) and (4) of Directive 91/414/EEC, it was agreed between the Member States and the Commission that the United Kingdom would, as rapporteur Member State, carry out the detailed examination of the dossier and report the conclusions of its examination accompanied by any recommendations on the inclusion or non-inclusion and any conditions relating thereto, to the Commission as soon as possible and at the latest within a period of one year.

The United Kingdom submitted to the Commission on 11 October 1996 the report of its detailed scientific examination, hereafter referred to as the draft assessment report, including, as required, a recommendation concerning the possible inclusion of quinoxifen in Annex I to the Directive.

On receipt of the draft assessment report, the Commission forwarded it for consultation to all the Member States as well as to Dow Elanco Europe being the sole applicant on 11 February 1997.

The Commission organised further an intensive consultation of specialised scientific experts from a representative number of Member States, to review the draft assessment report and the comments received thereon (peer review), in particular on each of the following disciplines :

- identity and physical /chemical properties;
- fate and behaviour in the environment;
- ecotoxicology;
- mammalian toxicology;
- residues and analytical methods;
- regulatory questions.

The meetings for this consultation were organised on behalf of the Commission by the Biologische Bundesanstalt für Land und Forstwirtschaft (BBA) in Braunschweig, Germany, from April to June 1997.

The report of the peer review (i.e. full report) was circulated, for further consultation, to Member States and the sole applicant on 30 July 1997.

The dossier, draft assessment report and the peer review report (i.e. full report) including in particular an outline resumé of the remaining technical questions, were referred to the Standing Committee on the Food Chain and Animal Health, and specialised working groups of this Committee, for final examination, with participation of experts from the 15 Member States. This final examination took place from February 1999 to November 2003.

In view of the characteristics of the substance with regard to the screening criteria for persistence, bioaccumulation and toxicity in Annex D to the Stockholm Convention on Persistent Organic Pollutants, a tripartite meeting was organised on 13 February 2003 between the Commission, the notifier and the Rapporteur Member State. There, the notifier provided data and arguments as to why the substance should not be considered as a persistent organic pollutant.

---

<sup>1</sup> OJ No L189, 30.07.96, p. 112.

The review of the substance was finalised in the meeting of the Standing Committee on 28 November 2003.

The present review report contains the conclusions of this final examination; given the importance of the draft assessment report, the peer review report (i.e. full report) and the comments and clarifications submitted after the peer review as basic information for the final examination process, these documents are considered respectively as background documents A, B and C to this review report and are part of it.

These documents were also submitted to the Scientific Committee for Plants for separate consultation. The Committee was asked to comment on the potential accumulation of the substance in soil and on its potential environmental impact. In its opinion<sup>2</sup>, the Committee noted that the available field study on organic matter degradation (“litter bag study”) did not convincingly demonstrate an acceptable impact on the environment, mainly due to insufficient statistical power of the experimental design. The field study on organic matter breakdown was subsequently repeated with an upgraded test protocol. No effect of quinoxifen on organic matter decomposition was detected.

The Committee further noted that a fraction of the applied quinoxifen may volatilise after application to a crop. Although available results indicate a rapid decomposition of the substance in air, the Committee suggested that measurements of the half-life should be repeated after appropriate schemes have been developed for assessing the environmental risks of atmospheric transport of plant protection products. This recommendation of the Committee is taken into account in the current Review Report.

## **2. Purposes of this review report**

This review report, including the background documents and appendices thereto, have been developed and finalised in support of the Directive 2004/60/EC<sup>3</sup> concerning the inclusion of quinoxifen in Annex I to Directive 91/414/EEC, and to assist the Member States in decisions on individual plant protection products containing quinoxifen they have to take in accordance with the provisions of that Directive, and in particular the provisions of article 4(1) and the uniform principles laid down in Annex VI.

This review report provides also for the evaluation required under Section A.2.(b) of the above mentioned uniform principles, as well as under several specific sections of part B of these principles. In these sections it is provided that Member States, in evaluating applications and granting authorisations, shall take into account the information concerning the active substance in Annex II of the directive, submitted for the purpose of inclusion of the active substance in Annex I, as well as the result of the evaluation of those data.

In parallel with the provisions of Article 7(6) of Regulation 3600/92 for existing active substances, the Commission and the Member States will keep available or make available this review report for consultation by any interested parties or will make it available to them on their

---

<sup>2</sup> Opinion of the Scientific Committee on Plants regarding the inclusion of quinoxifen in Annex I to Council Directive 91/414/EEC concerning the placing of plant protection products on the market. SCP/QUINOX/002-Final Adopted 7 March 2001

<sup>3</sup> OJ No L 120, 24.04.2004, p. 39.

specific request. Moreover the Commission will send a copy of this review report (not including the background documents) to the applicant.

The information in this review report is, at least partly, based on information which is confidential and/or protected under the provisions of Directive 91/414/EEC. It is therefore recommended that this review report would not be accepted to support any registration outside the context of Directive 91/414/EEC, e.g. in third countries, for which the applicant has not demonstrated possession of regulatory access to the information on which this review report is based.

### **3. Overall conclusion in the context of Directive 91/414/EEC**

The overall conclusion from the evaluation is that it may be expected that plant protection products containing quinoxifen will fulfil the safety requirements laid down in Article 5(1)(a) and (b) of Directive 91/414/EEC. This conclusion is however subject to compliance with the particular requirements in sections 4, 5, 6 and 7 of this report, as well as to the implementation of the provisions of Article 4(1) and the uniform principles laid down in Annex VI of Directive 91/414/EEC, for each quinoxifen containing plant protection product for which Member States will grant or review the authorisation.

Furthermore, these conclusions were reached within the framework of the following uses which were proposed and supported by the sole submitter:

- fungicide for foliar application in wheat and barley at a maximum annual use rate of 300 g a.i. per ha.

Extension of the use pattern beyond those described above will require an evaluation at Member State level in order to establish whether the proposed extensions of use can satisfy the requirements of Article 4(1) and of the uniform principles laid down in Annex VI of Directive 91/414/EEC.

### **4. Specific conclusions which are highlighted in this evaluation**

#### **4.1 Residues of quinoxifen in foodstuffs**

The review has established that the residues arising from the proposed uses, consequent on application consistent with good plant protection practice, have no harmful effects on human or animal health. The Theoretical Maximum Daily Intake (TMDI) for a 60 kg adult is 0.4 % of the Acceptable Daily Intake (ADI), based on the FAO/WHO European Diet (August 1994).

#### **4.2 Exposure of operators, workers and bystanders**

The review has identified acceptable exposure scenarios for operators, workers and bystanders, which require, however, confirmation for each plant protection product in accordance with the relevant sections of the above mentioned uniform principles.

### **4.3 Ecotoxicology**

The review has also concluded that under the proposed and supported conditions of use there are no unacceptable effects on the environment, as provided for in Article 4 (1) (b) (iv) and (v) of Directive 91/414/EEC, provided that certain conditions are taken into account as detailed in section 7 of this report.

## **5. Identity and Physical/chemical properties**

The main identity and the physical/chemical properties of quinoxifen are given in Appendix I.

The active substance shall have a minimum purity of 970 g/kg technical product.

The review has established that for the active substance notified by the applicant, with the exception of 4,5,7-trichloroquinoline (TCQ), none of the manufacturing impurities considered are, on the basis of information currently available, of toxicological or environmental concern. The impurity 4,5,7-trichloroquinoline (TCQ) must not exceed 0.2% (wet basis, 0.25% dry basis) in the technical specification.

## **6. Endpoints and related information**

In order to facilitate Member States, in granting or reviewing authorisations, to apply adequately the provisions of Article 4(1) of Directive 91/414/EEC and the uniform principles laid down in Annex VI of that Directive, the most important endpoints as identified during the evaluation process are listed in Appendix II.

## **7. Particular conditions to be taken into account on short term basis by Member States in relation to the granting of authorisations of plant protection products containing quinoxifen**

On the basis of the proposed and supported uses, the following particular issues have been identified as requiring particular and short term (within 12 months at the latest) attention from the Member States, in the framework of any authorisations to be granted, varied or withdrawn, as appropriate:

Member States must pay particular attention to the protection of aquatic organisms and must ensure that the conditions of authorisation include, where appropriate, risk mitigation measures.

## **8. List of studies to be generated**

No further studies were identified which were at this stage considered necessary in relation to the inclusion of quinoxifen in Annex I.

However, in view of the remaining doubts about the validity of the estimated atmospheric half-life of quinoxifen of 1.9 days, environmental monitoring in Nordic regions will have to be envisaged. For this purpose, the authorisation holders are requested to provide to the Member States and the Commission until 31 March 2004 a proposal for a monitoring scheme to assess the

long-range atmospheric transport of quinoxifen and related environmental risks. The Commission will refer the proposal to the Working Group Legislation for comments and possible harmonisation. The results of the monitoring itself shall be submitted as a monitoring report to the Commission until 31 December 2006; the Commission will then refer the report to the Working Group Legislation for discussion and, where relevant, appropriate action.

The purpose of addressing the environmental impact of residues of quinoxifen in soil and aquatic sediment, monitoring is considered necessary. The authorisation holders are therefore requested to provide to the Member States and the Commission until 31 March 2004 a proposal for a monitoring scheme assessing the environmental impact of residues of quinoxifen in soil and aquatic sediments. The Commission will refer the proposal to the Working Group Legislation for comments and possible harmonisation. The results of the monitoring shall be submitted as monitoring report to the Commission until 31 December 2006; the Commission will refer the report to the Working Group Legislation for discussion and, where relevant, appropriate action."

In addition, Member States may require the generation/submission of additional studies, in order to support authorisations for use under certain vulnerable conditions or to support extensions of the use pattern beyond the uses described under Point 3 above.

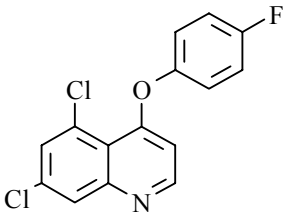
This may be the case in particular for studies to address

- The risk of particle transport in run-off water.
- Residues trials data in support of the Southern European GAP for barley.
- Confirmatory data or information on the minor metabolite DCHQ.
- Further monitoring and batch analyses to monitor the maximum limit of the impurity TCQ (0.2%, wet basis).

## **9. Updating of this review report**

The technical information in this report may require periodic updating to take account of technical and scientific developments as well as of the results of the examination of any information referred to the Commission in the framework of Articles 7, 10 or 11 of Directive 91/414/EEC. Such adaptations will be examined and finalised in the Standing Committee on the Food Chain and Animal Health, in connection with any amendment of the inclusion conditions for quinoxifen in Annex I of the Directive.

**APPENDIX I****Identity, physical and chemical properties****QUINOXYFEN**

|                              |  |
|------------------------------|--|
| <b>Common name (ISO)</b>     | Quinoxifen   |
| <b>Developmental Code</b>    | XDE-795  |
| <b>Chemical name (IUPAC)</b> | 5, 7-dichloro-4 (p-fluorophenoxy) quinoline  |
| <b>Chemical name (CA)</b>    | 5, 7-dichloro-4 (fluorophenoxy) quinoline  |
| <b>CIPAC No</b>              | 566  |
| <b>CAS No</b>                | 124495-18-7  |
| <b>EEC No</b>                | -  |
| <b>FAO SPECIFICATION</b>     | -  |
| <b>Minimum purity</b>        | 970 g/kg<br>maximum. 0.2% (wet basis), 0.25% (dry basis) of the<br>impurity: 4,5,7-trichloroquinoline, (TCQ) |
| <b>Molecular formula</b>     | C <sub>15</sub> H <sub>8</sub> Cl <sub>2</sub> FNO   |
| <b>Molecular mass</b>        | 308.14   |
| <b>Structural formula</b>    |                          |

|   |   |
|---|---|
| <b>Melting point</b>                              | 100 - 106 °C (as manufactured, purity 97.4 %)   |
| <b>Boiling point</b>                              | Not determined  |
| <b>Appearance</b>                                 | Off white flocculent solid (purified as)  |
| <b>Relative density</b>                           | 1.49 (97.4 % purity), 1.56 (99.7 % purity)  |
| <b>Vapour pressure</b>                            | 1.2 x 10 <sup>-5</sup> Pa at 20 °C,<br>2.0 x 10 <sup>-5</sup> Pa at 25 °C (purified a.s.)   |
| <b>Henry's law constant</b>                       | 3.19 x 10 <sup>-2</sup> Pa·m <sup>3</sup> ·mol <sup>-1</sup>  |
| <b>Solubility in water</b>                        | pH 6.45      0.116 mg/l<br>pH 5          0.128 mg/l<br>pH 7          0.047 mg/l<br>pH 9          0.036 mg/l   |
| <b>Solubility in organic solvents</b>             | Hexane            9.64 g/l (purified active substance)<br>Methanol        21.5 g/l<br>Toluene          272 g/l<br>Dichloromethane 589 g/l<br>Acetone          116 g/l<br>Ethyl acetate    179 g/l   |
|   | n-Heptane        10.2 g/l (as manufactured)<br>Methanol        24.6 g/l<br>Xylene            200 g/l<br>Dichloroethane 236 g/l<br>Acetone          111 g/l<br>Ethyl acetate    138 g/l<br>Acetonitrile     22.8 g/l<br>n-Octanol        37.9 g/l  |
| <b>Partition coefficient (log P<sub>ow</sub>)</b> | log K <sub>ow</sub> = 4.66 ± 0.002 at 20 °C and pH 6.6  |
| <b>Hydrolytic stability (DT<sub>50</sub>)</b>     | THF (0.03 %) and aqueous buffer solutions at pH 4, 7 & 10 and 50 °C.<br>At all pH values the hydrolysis was < 10 %.<br>DT <sub>50</sub> > 1 y<br>50 °C pH 7 and 9    DT <sub>50</sub> > 1 y<br>50 °C pH 4          DT <sub>50</sub> ca 1 w<br>40 °C pH 4          DT <sub>50</sub> ca 2 w<br>25 °C pH 4          DT <sub>50</sub> ca 11 w<br>Confirmatory data to address the differences observed between the 2 hydrolysis studies demonstrated DT <sub>50</sub> ca. 5 d at pH4 and 50 °C. |
| <b>Dissociation constant</b>                      | At pH values greater than 3.6, quinoxifen does not  |

|  |  |
|--|--|
|  | contain an ionisable proton.<br>pKa of protonated quinoxifen = 3.56<br>equivalent Ka = $2.77 \times 10^{-4}$ |
| <b>Quantum yield of direct photo-transformation in water at <math>\lambda &gt; 290</math> nm</b> | 0.012 ( $\pm 0.002$ )  |
| <b>Flammability</b>  | non-flammable  |
| <b>Explosive properties</b>  | non-explosive  |
| <b>UV/VIS absorption (max.)</b>  | 298 nm   |
| <b>Photostability (DT<sub>50</sub>)</b>  | 1.7 - 23 hours   |

**APPENDIX II****END POINTS AND RELATED INFORMATION****QUINOXYFEN****1 Toxicology and metabolism****Absorption, distribution, excretion and metabolism in mammals**

|  |   |
|--|---|
| Rate and extent of absorption:         | Moderately rapid; about 70 % of 10 mg/kg bw in rats, lower at higher doses                                |
| Distribution:                          | Highest residues in peri-renal fat, ovaries, liver, GIT and kidneys                                       |
| Potential for accumulation:            | No signs of accumulation  |
| Rate and extent of excretion:          | Rapid. For quinoline label in rats at 2 d 13 - 20 % in urine; 68-78 % in faeces                           |
| Toxicologically significant compounds: | Extensive cleavage to form 4-fluorophenol and 5,7-dichloro-4-hydroxyquinoline with subsequent conjugation |
| Metabolism in animals:                 | No metabolites of concern identified  |

**Acute toxicity**

|   |   |
|---|---|
| Rat LD <sub>50</sub> oral:                        | > 5000 mg/kg bw   |
| Rat LD <sub>50</sub> dermal:                      | > 2000 mg/kg bw   |
| Rat LC <sub>50</sub> inhalation:                  | > 3.38 mg/kg bw (maximum achievable concentration)                    |
| Skin irritation:                                  | Not irritating  |
| Eye irritation:                                   | Slight irritant – not classifiable                                    |
| Skin sensitisation (test method used and result): | Positive in M & K, negative in Buehler. Classified as skin sensitiser |

**Short term toxicity**

|  |  |
|--|--|
| Target / critical effect:                | Food consumption/body weight gain; liver weight and histology; haemolytic anaemia in dog |
| Lowest relevant oral NOAEL / NOEL:       | 20 mg/kg bw/d in 1-year dog study  |
| Lowest relevant dermal NOAEL / NOEL:     | not required   |
| Lowest relevant inhalation NOAEL / NOEL: | not required   |

**Genotoxicity**

|   |
|---|
| Negative in a battery of <i>in vitro</i> & <i>in vivo</i> tests |
|---|

**Long term toxicity and carcinogenicity**

|                           |   |
|---------------------------|---|
| Target / critical effect: | Liver hypertrophy and glomerulonephrosis; clinical chemistry changes, reduced body weight |
| Lowest relevant NOAEL:    | 20 mg/kg bw/d in rat 2-year study   |
| Carcinogenicity:          | No evidence of treatment related tumorigenicity in rat or mouse                           |

**Reproductive toxicity**

|  |  |
|--|--|
| Target / critical effect - Reproduction:           | Slight reduction in bodyweight gain in pups during lactation |
| Lowest relevant reproductive NOAEL / NOEL:         | Overall NOAEL 20 mg/kg bw/d<br>Reproduction NOAEL 100 mg/kg  |
| Target / critical effect - Developmental toxicity: | No fetal effects   |
| Lowest relevant developmental NOAEL / NOEL:        | NOAEL 80 mg/kg bw/d for maternal toxicity in rabbits.        |

**Delayed neurotoxicity**

|  |
|--|
| 12 month chronic neurotoxicity study found no specific effects |
|--|

**Other toxicological studies**

|   |
|---|
| Liver enzyme induction:<br>NOAEL: 45 mg/kg bw/d in rats,<br>55 mg/kg bw/d in mice |
|---|

**Medical data**

|   |
|---|
| Sensitisation seen in a formulation chemist |
|---|

## Summary

|                              | Value                 | Study   | Safety factor |
|------------------------------|-----------------------|---|---------------|
| ADI:                         | 0.2 mg/kg bw          | 1 year dog, 2 year rat and two generation study     | 100           |
| AOEL systemic:               | 0.14 mg/kg bw/d       | 1 year dog study corrected for 70 % oral absorption | 100           |
| AOEL inhalation:             | no data, not required |   |               |
| AOEL dermal:                 | no data, not required |   |               |
| ARfD (acute reference dose): | no data, not required |   |               |

## Dermal absorption

|  |
|--|
| No data. 10 % default value assumed, based on properties of the molecule |
|--|

## 2 Fate and behaviour in the environment

### 2.1 Fate and behaviour in soil

#### Route of degradation

##### Aerobic:

Mineralisation after 100 days:

max. 1.9 % AR (after 200 days)

Non-extractable residues after 100 days:

max. 25 % AR (after 200 days)

Major metabolites above 10 % of applied active substance: name and/or code  
% of applied rate (range and maximum)

3-hydroxyquinoxifen: 27 % AR in Speyer 2.2 soil only.

DCHQ: only formed in acidic soils. Max. 6.4 % AR.

#### Supplemental studies

##### Anaerobic:

Negligible CO<sub>2</sub>. Non-extractable residues max. 19.1 % AR. 3-hydroxyquinoxifen max. 9.1 % AR

##### Soil photolysis:

Negligible CO<sub>2</sub>. Non-extractable residues max. 10.5 % AR. All metabolites < 10 % AR.

##### Remarks:

Significant chemical degradation indicated.

#### Rate of degradation

##### Laboratory studies

DT<sub>50</sub>lab (20 °C, aerobic):

224 - 508 days (mean 374 days, n= 4)

DT<sub>90</sub>lab (20 °C, aerobic):

not calculated

DT<sub>50</sub>lab (10 °C, aerobic):

874 days (3-4 fold decrease in half life for every 10 °C rise).

DT<sub>50</sub>lab (20 °C, anaerobic):

289 days

##### Field studies (country or region)

DT<sub>50f</sub> from soil dissipation studies (n=8):

150\* - 190 days (UK) \*estimate

50 days (S. Germany)

13 - 82 days (France)

DT<sub>90f</sub> from soil dissipation studies (n=8):

> 573 days (UK)  
> 540 days (S. Germany)  
> 380 - 750 days (France)

Soil accumulation studies:

Results of 3 soil accumulation studies in the UK, Germany & N. France (winter wheat) each conducted over 5 years did not indicate a trend towards accumulation of quinoxifen.

Slight accumulation of the metabolite 3-hydroxyquinoxifen in 0-10 cm layer during mid-stage of the studies i.e. approx. 750 days after the start, to reach plateau concentrations of approx. 0.05 mg/kg after around 2 years.

Soil residue studies:

13 European trials (UK, Germany, France, Greece) 0.02 - 0.07 mg/kg in 0 – 10 cm soil depth at harvest

**Remarks:**

e.g. effect of soil pH on degradation rate

Field DT<sub>50</sub> values 13 - 190 days**Adsorption/desorption**K<sub>f</sub>/K<sub>oc</sub>K<sub>foc</sub>: 18339 – 28897 ml/g (mean = 22929 ml/g)K<sub>d</sub>

<sup>1</sup>/n = 0.97 – 1.0 (mean = 0.99 ml/g)  
[K<sub>doc</sub>: 15415 - 34985 ml/g (mean = 22929 ml/g)  
for non-GLP studies]

ph dependence

Adsorption of 3-hydroxyquinoxifen metabolite not determined, but there was no evidence of mobility of the metabolite in the aged column leaching study.

Not determined

**Mobility****Laboratory studies:**

Column leaching:

No radioactivity in the leachate  
100 % AR in top 5 cm

Aged residue leaching:

0.2 - 0.3 % AR in leachate

|                       |
|-----------------------|
| 97 % in 0 - 5 cm soil |
|-----------------------|

**Field studies:**

Lysimeter/Field leaching studies:

|             |
|-------------|
| Not studied |
|-------------|

**Remarks:**

|   |
|---|
| Quinoxifen was shown to be non-mobile in an aged leaching study. There was no evidence of mobility of the metabolite, 3-hydroxyquinoxifen and this was not expected to be a significant metabolite. |
|---|

## 2.2 Fate and behaviour in water

### Abiotic degradation

Hydrolytic degradation:

|  |
|--|
| DT <sub>50</sub> at pH 4-5: 75 days (25 °C) - 7days (50 °C)<br>7: stable<br>9: stable<br>confirmatory study: DT <sub>50</sub> ca. 5 days at pH 4 (50 °C) |
|--|

Major metabolites:

|               |
|---------------|
| DCHQ at pH 4. |
|---------------|

Photolytic degradation:

|  |
|--|
| Predicted DT <sub>50</sub> 1.7 - 23 h (model calculation). |
|--|

Major metabolites:

|   |
|---|
| CFBPQ, (2-chloro-10-fluoro[1]benzopyrano[2,3,4-de-quinoline), was detected in a natural sediment water study (light conditions) with a DT50 of 1.2-3.6 days in water. Up to 27%AR found in sediment after 28 days irradiation, but this metabolite was not considered to be significant, given the questionable importance of photolysis in turbid water, and given that the risk to sediment dwelling organisms was addressed by a study investigating effects on chironomids, in which the sediment study water was spiked with quinoxifen in light conditions. |
|---|

### Biological degradation

Ready biodegradable:

|                           |
|---------------------------|
| Not readily biodegradable |
|---------------------------|

Water/sediment study:

|  |
|--|
|  |
|--|

|   |  |
|---|--|
| DT <sub>50</sub> water:                                     | 3 - 7 days   |
| DT <sub>90</sub> water:                                     | 9 - 22 days  |
| DT <sub>50</sub> whole system:                              | 42 - 211 days (in sediment)  |
| DT <sub>90</sub> whole system:                              | 117 - 498 days   |
| Distribution in water / sediment systems (active substance) | Total residues in the water phase<br>< 7 % AR after 7 days<br>Total residues in the sediment<br>> 50 % AR after 100 days |
| Distribution in water / sediment systems (metabolites)      | 3-hydroxyquinoxyfen (ca. 40 % AR in sediment, sandy loam system only).<br>Mineralisation to CO <sub>2</sub> < 1 % AR     |
| Accumulation in water and/or sediment:                      | Sediment radioactivity mainly quinoxyfen (clay loam system) or 3-hydroxyquinoxyfen (sandy loam system).                  |
| <b>Degradation in the saturated zone</b>                    | No data. None required.  |
| <b>Remarks:</b>   | None.  |

## 2.3 Fate and behaviour in air

### Volatility

Vapour pressure:

|                                    |
|------------------------------------|
| 2.0 x 10 <sup>-5</sup> Pa at 25 °C |
|------------------------------------|

Henry's law constant:

|  |
|--|
| 3.19 x 10 <sup>-2</sup> Pa·m <sup>3</sup> ·mol <sup>-1</sup> |
|--|

### Photolytic degradation

Direct photolysis in air:

|         |
|---------|
| No data |
|---------|

Photochemical oxidative degradation in air

|          |
|----------|
| 1.9 days |
|----------|

DT<sub>50</sub>:

Volatilisation:

|   |
|---|
| Limited volatilisation expected, (data showed 5% volatile losses from French bean plants), but quinoxifen not expected to persist in air. |
|---|

**Remarks:**

|   |
|---|
| SCP considered volatilisation from crop of up to 10% of dose could not be excluded. SCP requested the atmospheric DT50 of quinoxifen be remeasured once appropriate schemes are developed and internationally agreed guidance is available for assessing the environmental risks of atmospheric transport of plant protection products. |
|---|

### 3 Ecotoxicology

#### Terrestrial Vertebrates

|                                      |  |
|--------------------------------------|--|
| Acute toxicity to mammals:           | LD50 > 5000 mg a.s./kg bw (rat)                        |
| Acute toxicity to birds:             | LD50 > 2250 mg a.s./kg bw (bobwhite quail)             |
| Dietary toxicity to birds:           | LC50 > 5620 ppm a.s. (bobwhite quail and mallard duck) |
| Reproductive toxicity to birds:      | NOEC 1000 ppm a.s. (bobwhite quail).                   |
| Short term oral toxicity to mammals: | Not assessed   |

#### Aquatic Organisms

|  |   |
|--|---|
| Acute toxicity fish:                         | LC <sub>50</sub> : 0.27 mg/l, 96 hours study (rainbow trout);<br>LC <sub>50</sub> : 0.41 mg/l, semi static study (carp)   |
| Long term toxicity:                          | NOEC: 0.014 mg/l, 21 days study (rainbow trout).<br>28 days post-hatch NOEC 0.0296 mg a.s./l,<br>(flow-through early life stage, fathead minnow)  |
| Bioaccumulation fish:                        | BCF rainbow trout: 5040   |
| Acute toxicity invertebrate:                 | LC <sub>50</sub> : 0.08 mg a.s./l, 48 hours study ( <i>Daphnia magna</i> )  |
| Chronic toxicity invertebrate:               | NOEC: 0.0278 mg a.s./l, 21 days study ( <i>Daphnia magna</i> )  |
| Acute toxicity algae:                        | EC <sub>50</sub> growth: 0.027 mg a.s./l, 5 days study<br>EC <sub>50</sub> biomass: 0.028 mg a.s./l, 5 days study<br>( <i>Pseudokirchneriella subcapitata</i> [syn. <i>Selenastrum capricornutum</i> ]) |
| Chronic toxicity sediment dwelling organism: | NOEC (27d) 0.128 mg a.s./l (emergence)<br>NOEC (based on sediment concentration) 0.548 mg a.s./kg. ( <i>Chironomus riparius</i> )   |

#### Honeybees

|                         |                   |
|-------------------------|-------------------|
| Acute oral toxicity:    | > 100 µg a.s./bee |
| Acute contact toxicity: | > 100 µg a.s./bee |

**Other arthropod species**

|                              |  |
|------------------------------|--|
| <i>Aphidius rhopalosiphi</i> | 63 % mortality, 85 % reduction in parasitised aphids (adult / Repro - coffin cell) <sup>(4)</sup>  |
| <i>Aphidius rhopalosiphi</i> | No effects (adult / Repro - extended lab.) <sup>(1)</sup>  |
| <i>Typhlodromus pyri</i>     | 93.3 % reduction in beneficial capacity (adult / Repro) <sup>(5)</sup>   |
| <i>Typhlodromus pyri</i>     | 37.3 % (30 g as/ha) and 55.2 % (60 g as/ha) mortality. 100 % reduction in beneficial capacity (adult / Repro) <sup>(2)</sup>   |
| <i>Poecilus cupreus</i>      | 13.9 % mortality, no effect on food consumption nor behaviour (adult) <sup>(1)</sup>   |
| <i>Aleochara bilineata</i>   | No reduction in beneficial capacity (adult / Repro) <sup>(1)</sup>   |
| <i>Orius insidiosus</i>      | 16 % effect on juvenile survival (adult / Repro) <sup>(1)</sup>  |
| <i>Episyrphus balteus</i>    | Fecundity not significantly effected (adult / Repro) <sup>(1)</sup>  |
| Soil mesofauna study         | Three year soil mesofauna study: Some transient indirect effects (short term population reductions) on a few prey (aphids, collembola) and predatory species (carabids: <i>Pterostichus melanarius</i> ; <i>Nebria brevicollis</i> and Lycosid spiders). |

**Earthworms**

|  |   |
|--|---|
| Acute toxicity:  | LC50: > 923 mg as/kg soil (14 d study)<br>NOEC: 923 mg as/kg soil (14 d study)  |
| Reproductive toxicity:                                   | NOEC: 2.67mg a.s kg soil  |
| Other soil non-target macro-organisms (Litter bag study) | Study performed to modern guideline showed no statistically sig. effect on litter breakdown at plateau conc. n + max. total dose. |

**Soil microbial function**

|                          |   |
|--------------------------|---|
| Nitrogen mineralisation: | No effects at approx. 2 and 20 x max. soil PEC                                |
| Carbon mineralisation:   | No effects at approx. 2 and 20 x max. soil PEC (0.53 and 5.3 mg a.s./kg soil) |

<sup>4</sup> dose: 250 g as/ha (SC formulation containing quinoxifen at 500 g/l)  
<sup>5</sup> dose 100 g as/ha (SC formulation containing quinoxifen at 250 g/l)

**APPENDIX III****QUINOXYFEN**

List of studies which were submitted during the evaluation process and were not cited in the draft assessment report:

Reports in *italics* not evaluated by the Rapporteur Member State.

**B.1 Identity, B.2 Physical and chemical properties, B.3 Data on application and further information, B.4 Proposals for classification and labelling, B.5 Methods of analysis**

| <b>Annex point/<br/>reference<br/>number</b> | <b>Author(s)</b>   | <b>Year</b> | <b>Title<br/>Source (where different from company)<br/>Company, Report No.<br/>GLP or GEP status (where relevant)<br/>Published or not</b>  |
|--|--|-------------|---|
| <i>IIA<br/>4.2.5/03</i>                      | <i>Nicholson, A.</i>   | <i>1995</i> | <i>Determination of XDE-795 Residues in Human Plasma.<br/>DowElanco Europe, ERC 95.09. OR20<br/>GLP: yes<br/>Published: no</i>  |
| <i>IIA<br/>4.2.1//11</i>                     | <i>Khoshab, A.,<br/>Boothroyd, S.,<br/>Gale, D. &amp;<br/>Frewer, N.</i> | <i>1998</i> | <i>Determination of Quinoxifen Residues in Eggs.<br/>Dow AgroSciences, ERC 98.05. OR30<br/>GLP: yes<br/>Published: no</i>   |
| <i>IIIA 2/01</i>                             | <i>Iossan, D.I.</i>  | <i>1995</i> | <i>Infra-Red Spectrum of EF-1186.<br/>DowElanco Europe, RC95-098. MA12.<br/>GLP: yes<br/>Published: no</i>  |
| <i>IIIA 2.5.3</i>                            | <i>Comb, A.L.</i>  | <i>1996</i> | <i>EF-1186: Surface Tension.<br/>Huntingdon Life Sciences Ltd<br/>GHE-P-4755. MA19 (Update of previously evaluated<br/>study)<br/>GLP: yes<br/>Published: no</i>                          |
| <i>IIIA 2.7.3</i>                            | <i>Turri, E. &amp; Olive,<br/>C</i>                                      | <i>1997</i> | <i>Packaging Storage Stability Trial for DE-795 500g/L<br/>SC Fungicide,<br/>DowElanco Europe, EF-1186. GHE-P-6400. MA55<br/>GLP: yes<br/>Published: no</i>                               |
| <i>IIA 6.5/04</i>                            | <i>Teasdale, R.</i>  | <i>1998</i> | <i>The Stability of Quinoxifen in Beer Stored at 7deg C.<br/>Dow AgroSciences, GHE-P-6426. NZ07<br/>GLP: yes<br/>Published: no</i>  |
| <i>IIIA<br/>2.9.1/2/02</i>                   | <i>Besserve, R. &amp;<br/>Flahive, E.</i>                                | <i>1996</i> | <i>Dilution compatibility of EF-1186 (DE-795 500 g/l SC)<br/>with Commercially Available Agrochemical Products.<br/>DowElanco Europe, GHE-P-4876. MA21<br/>GLP: yes<br/>Published: no</i> |

| <b>Annex point/<br/>reference number</b> | <b>Author(s)</b>                             | <b>Year</b> | <b>Title<br/>Source (where different from company)<br/>Company, Report No.<br/>GLP or GEP status (where relevant)<br/>Published or not</b>   |
|--|--|-------------|--|
| III A<br>2.9.1/2/03                      | Latham, S.,<br>Fernandes, I. &<br>Fowles, A. | 1997        | <i>Dilution Compatibility of Fortress (quinoxifen 500g/L SC) with Commercially Available Agrochemical Products.</i><br>DowElanco Europe, GHE-P-6565. MA53<br>GLP: yes<br>Published: no           |
| III A<br>2.9.1/2/04                      | Fowles, A.                                   | 1997        | <i>Dilution Compatibility of Fortress (quinoxifen 500g/L SC) with Cosinus EC.</i><br>DowElanco Europe, GHE-P-6790. MA61<br>GLP: yes<br>Published: no   |
| III A<br>2.9.1/2/05                      | Fowles, A.M. &<br>Fernandes, I               | 1997        | <i>Dilution compatibility of Fortress (Quinoxifen 500 g/l SC; EF-1186) with Commercially Available Agrochemical Products.</i><br>DowElanco Europe, GHE-P-6579. MA63<br>GLP: yes<br>Published: no |
| III A<br>2.9.1/2/0<br>6                  | Fowles, A. &<br>Fernandes, I                 | 1998        | <i>Dilution compatibility of Fortress (Quinoxifen 500 g/l SC; EF-1186) with Commercially Available Agrochemical Products.</i><br>DowElanco Europe, GHE-P-7211. MA67<br>GLP: yes<br>Published: no |
| III A<br>5.1/03                          | Butler, R.E.                                 | 1997        | <i>Analytical Method XDE-795 Fungicidal Formulations GC Standard Method.</i><br>DowElanco Europe, EU-AM-94-12. O06<br>GLP: yes<br>Published: no  |
| III 1.4                                  | Henkel                                       | 1997        | Letter of 18 November 1997 (CAS and EINECs numbers of co-formulants).<br><br>GLP: no<br>Published: no  |
| III 1.4                                  | Adamson, J.                                  | 1997        | Letter dated 5 September 1997 to PSD from Akcros Chemicals. (Rate of ethoxylation of Monolan PC).<br><br>GLP: no<br>Published: no  |
| III 1.4                                  | Adamson, J.                                  | 1997        | Letter dated 12 November 1997 from Akcros Chemicals. (Rate of ethoxylation of Monolan PC).<br><br>GLP: no<br>Published: no   |

**B.6 Toxicology and metabolism**

| Annex point/<br>reference number | Author(s) | Year | Title<br>Source (where different from company)<br>Company, Report No.<br>GLP or GEP status (where relevant)<br>Published or not |
|----------------------------------|-----------|------|---|
|                                  |           |      |   |

**B.7 Residue data**

| Annex point/<br>reference number | Author(s)                               | Year        | Title<br>Source (where different from company)<br>Company, Report No.<br>GLP or GEP status (where relevant)<br>Published or not   |
|----------------------------------|---|-------------|---|
| <i>IIA.6.3/3<br/>1</i>           | <i>Khoshab, A &amp;<br/>Clements, B</i> | <i>1999</i> | <i>Residues of quinoxifen in Barley at Harvest following multiple applications of Fortress (EF-1186), Southern France, 1998.<br/>Dow AgroSciences, GHE-P-7972 NB36<br/>GLP: yes<br/>Published: no</i> |

**B.8 Environmental fate and behaviour**

| Annex point/<br>reference number | Author(s)                       | Year | Title<br>Source (where different from company)<br>Company, Report No.<br>GLP or GEP status (where relevant)<br>Published or not   |
|----------------------------------|---------------------------------|------|---|
| IIA<br>7.1.1.1.<br>1/1           | Reeves, G.L.                    | 1993 | The Aerobic Soil Degradation/ Metabolism of [ <sup>14</sup> C]-XDE-795 and the Effect of Environmental Conditions on its Degradation Rate.<br>DowElanco Europe, GHE-P-2990. K01<br>GLP: yes<br>Published: no                              |
| IIA<br>7.1.1.1.1/2               | Ghosh, D. &<br>Portwood D.      | 1994 | Identification of Soil Metabolism Products of XDE-795 by Particle Beam Liquid Chromatography Mass Spectrometry and Thermospray Liquid Chromatography Mass Spectrometry.<br>DowElanco Europe, GHE-P-3079. K05<br>GLP: yes<br>Published: no |
| IIA<br>7.1.1.1.<br>1/3           | Cracknell M., <i>et al</i>      | 1994 | Identification of Soil Metabolite of XDE-795 From Study 2Q.<br>DowElanco Europe, GHE-P-3889. K11<br>GLP: yes<br>Published: no   |
| IIA<br>7.1.1.1.<br>2/1           | Phillips, M. &<br>Hall, B.E.(a) | 1995 | The Degradation of Radiolabelled XDE-795 in Soil under Anaerobic Conditions.<br>IRI Ltd.<br>DowElanco Europe, GHE-P-4374. K09<br>GLP: yes<br>Published: no  |

| <b>Annex point/<br/>reference number</b> | <b>Author(s)</b> | <b>Year</b> | <b>Title<br/>Source (where different from company)<br/>Company, Report No.<br/>GLP or GEP status (where relevant)<br/>Published or not</b>   |
|--|------------------|-------------|--|
| IIA<br>7.1.1.1.<br>2/2                   | Reeves, G.L.     | 1995        | The Soil Photolysis of XDE-795.<br>DowElanco Europe, GHE-P-4111. K10<br>GLP: yes<br>Published: no  |
| IIA<br>7.1.1.2.<br>1/2                   | Reeves, G.L.     | 1994        | The Leaching Characteristics of Aged [ <sup>14</sup> C]-XDE-795<br>Soil Residues.<br>DowElanco Europe, GHE-P-3552. K06<br>GLP: yes<br>Published: no  |
| IIA<br>7.1.1.2.1/0<br>4                  | Yon, D.A.        | 1995        | <i>Evaluation of the Sorption and Degradation Data for<br/>DE-795.</i><br>DowElanco Europe, GHE-P-4387. K14<br>GLP: no<br>Published: no  |
| IIA<br>7.1.1.2.2/0<br>1                  | Gambie, A.(a).   | 1995        | The Dissipation of XDE-795 and its 3-hydroxy<br>Metabolite in Soil at Intervals following Application of<br>EF-1186, UK - 1993.<br>DowElanco Europe, GHE-P-4154. NS01<br>GLP: yes<br>Published: no   |
| IIA<br>7.1.1.2.<br>2/02                  | Gambie, A.(b)    | 1995        | The Dissipation of XDE-795 and its 3-hydroxy<br>Metabolite in Soil at Intervals following a Single<br>Application of EF-1186, UK - 1994 (INTERIM<br>REPORT).<br>DowElanco Europe, GHE-P-4166. NS10<br>GLP: yes<br>Published: no              |
| IIA<br>7.1.1.2.<br>2/03                  | Gambie, A.(c)    | 1995        | The Dissipation of XDE-795 and its 3-hydroxy<br>Metabolite in Soil at Intervals following Application of<br>EF-1186, Germany - 1993 (INTERIM REPORT).<br>DowElanco Europe, GHE-P-4153. NS02<br>GLP: yes<br>Published: no                     |
| IIA<br>7.1.1.2.<br>2/04                  | Gambie, A.(d)    | 1995        | The Dissipation of XDE-795 and its 3-hydroxy<br>Metabolite in Soil at Intervals following a Single<br>Application of EF-1186, Germany - 1993 (INTERIM<br>REPORT).<br>DowElanco Europe, GHE-P-4177. NS11<br>GLP: yes<br>Published: no         |
| IIA<br>7.1.1.2.<br>2/05                  | Gambie, A.(e)    | 1995        | The Dissipation of XDE-795 and its 3-hydroxy<br>Metabolite in Soil at Intervals following a Single<br>Application of EF-1186, Northern France - 1993<br>(INTERIM REPORT).<br>DowElanco Europe, GHE-P-4151. NS03<br>GLP: yes<br>Published: no |

| <b>Annex point/<br/>reference number</b> | <b>Author(s)</b>               | <b>Year</b> | <b>Title<br/>Source (where different from company)<br/>Company, Report No.<br/>GLP or GEP status (where relevant)<br/>Published or not</b>  |
|--|--------------------------------|-------------|---|
| IIA<br>7.1.1.2.<br>2/06                  | Gambie, A.(f)                  | 1995        | The Dissipation of XDE-795 and its 3-hydroxy Metabolite in Soil at Intervals following a Single Application of EF-1186, Northern France - 1994 (INTERIM REPORT).<br>DowElanco Europe, GHE-P-4174. NS04<br>GLP: yes<br>Published: no |
| IIA<br>7.1.1.2.<br>2/07                  | Gambie, A.(g)                  | 1995        | The Dissipation of XDE-795 and its 3-hydroxy Metabolite in Soil at Intervals following a Single Application of EF-1186, Southern France - 1993 (INTERIM REPORT).<br>DowElanco Europe, GHE-P-4152. NS06<br>GLP: yes<br>Published: no |
| IIA<br>7.1.1.2.<br>2/08                  | Gambie, A.(h)                  | 1995        | The Dissipation of XDE-795 and its 3-hydroxy Metabolite in Soil at Intervals following a Single Application of EF-1186, Southern France - 1994 (INTERIM REPORT).<br>DowElanco Europe, GHE-P-4173. NS05<br>GLP: yes<br>Published: no |
| IIA<br>7.1.1.2.<br>2/09                  | Gambie, A. &<br>Rickard, G.(a) | 1995        | Residues of XDE-795 and its 3-hydroxy Metabolite in Soil at Harvest following Application of EF-1186 to Cereal Crops, Europe - 1993 and 1994.<br>DowElanco Europe, GHE-P-4158. NS12<br>GLP: yes<br>Published: no                    |
| IIA<br>7.1.1.2.<br>2/10                  | Gambie, A. &<br>Rickard, G.(b) | 1995        | Residues of XDE-795 and its 3-hydroxy Metabolite, in Soil Following 5 Annual Applications of EF-1186, UK (INTERIM REPORT 1 year).<br>DowElanco Europe, GHE-P-4157. NS09<br>GLP: yes<br>Published: no                                |
| IIA<br>7.1.1.2.<br>2/11                  | Gambie, A. &<br>Rickard, G.(c) | 1995        | Residues of XDE-795 and its 3-hydroxy Metabolite, in Soil Following 5 Annual Applications of EF-1186, Germany (INTERIM REPORT 1 year).<br>DowElanco Europe, GHE-P-4156. NS08<br>GLP: yes<br>Published: no                           |
| IIA<br>7.1.1.2.<br>2/12                  | Gambie, A. &<br>Rickard, G.(d) | 1995        | Residues of XDE-795 and its 3-hydroxy Metabolite, in Soil Following 5 Annual Applications of EF-1186, Northern France (INTERIM REPORT 1 year).<br>DowElanco Europe, GHE-P-4155. NS07<br>GLP: yes<br>Published: no                   |

| <b>Annex point/<br/>reference number</b> | <b>Author(s)</b>                  | <b>Year</b> | <b>Title<br/>Source (where different from company)<br/>Company, Report No.<br/>GLP or GEP status (where relevant)<br/>Published or not</b>  |
|--|-----------------------------------|-------------|---|
| IIA<br>7.1.14                            | Gambie, A.<br>(a)                 | 1996        | The Dissipation of XDE-795 and its 3-hydroxy Metabolite in Soil at Intervals following Application of EF-1186, Germany - 1993.<br>DowElanco Europe, GHE-P-5135. NS14<br>GLP: yes<br>Published: no                       |
| IIA<br>7.1./15                           | Gambie, A.<br>(b)                 | 1996        | The Dissipation of XDE-795 and its 3-hydroxy Metabolite in Soil at Intervals following a Single Application of EF-1186, Southern France - 1993.<br>DowElanco Europe, GHE-P-5136. NS15<br>GLP: yes<br>Published: no      |
| IIA<br>7.1./16                           | Gambie, A.<br>(c)                 | 1996        | The Dissipation of XDE-795 and its 3-hydroxy Metabolite in Soil at Intervals following a Single Application of EF-1186, Northern France - 1993.<br>DowElanco Europe, GHE-P-5137. NS16<br>GLP: yes<br>Published: no      |
| IIA<br>7.1./17                           | Khoshab, A. &<br>Gambie, A<br>(a) | 1999        | Residues of Quinoxifen and its 3-Hydroxy Metabolite in Soil Following Five Annual Applications of EF-1186, UK - Interim Report - Year 5.<br>DowElanco Europe, GHE-P-7338. NS18<br>GLP: yes<br>Published: no             |
| IIA<br>7.1.18                            | Khoshab, A. &<br>Gambie, A<br>(b) | 1999        | Residues of Quinoxifen and its 3-Hydroxy Metabolite in Soil Following Five Annual Applications of EF-1186, Northern France.<br>DowElanco Europe, GHE-P-7336. NS19<br>GLP: yes<br>Published: no                          |
| IIA<br>7.1.9                             | Khoshab, A. &<br>Gambie, A<br>(c) | 1999        | Residues of Quinoxifen and its 3-Hydroxy Metabolite in Soil Following Five Annual Applications of EF-1186, Germany.<br>DowElanco Europe, GHE-P-7337. NS20<br>GLP: yes<br>Published: no                                  |
| IIA<br>7.1./20                           | Gambie, A.<br>(a)                 | 1999        | The dissipation of quinoxifen and its 3-hydroxyquinoxifen metabolite in soil at intervals following a single application of EF-1186, Germany - 1994.<br>DowElanco Europe, GHE-P-5439. NS21<br>GLP: yes<br>Published: no |
| IIA<br>7.1./21                           | Gambie, A.<br>(b)                 | 1999        | The dissipation of quinoxifen and its 3-hydroxyquinoxifen metabolite in soil at intervals following a single application of EF-1186, UK -1994.<br>DowElanco Europe, GHE-P-5440. NS22<br>GLP: yes<br>Published: no       |

| <b>Annex point/<br/>reference number</b> | <b>Author(s)</b>   | <b>Year</b> | <b>Title<br/>Source (where different from company)<br/>Company, Report No.<br/>GLP or GEP status (where relevant)<br/>Published or not</b>   |
|--|--|-------------|--|
| IIA<br>7.1.2/22                          | Gambie, A.<br>(c)  | 1999        | The dissipation of quinoxifen and its 3-hydroxyquinoxifen metabolite in soil at intervals following a single application of EF-1186, Southern France -1994.<br>DowElanco Europe, GHE-P-5441. NS23<br>GLP: yes<br>Published: no |
| IIA<br>7.1.2/23                          | Gambie, A.<br>(d)  | 1999        | The dissipation of quinoxifen and its 3-hydroxyquinoxifen metabolite in soil at intervals following a single application of EF-1186, Northern France -1994.<br>DowElanco Europe, GHE-P-5442. NS24<br>GLP: yes<br>Published: no |
| IIA<br>7.1.1.2.2/2<br>4                  | Gambie, A.<br>(e)  | 1999        | The Stability of XDE-795 and the 3-hydroxy metabolite in soil under frozen storage conditions (30 Months).<br>Dow AgroSciences, GHE-P-7935 NZ08<br>GLP: yes<br>Published: no   |
| IIA 7.1.2/1                              | Reeves, G.L.(a)  | 1994        | The Adsorption/Desorption of [ <sup>14</sup> C] XDE-795 in Soil.<br>DowElanco Europe, GHE-P-3592. K07<br>GLP: no (in accordance to GLP)<br>Published: no   |
| IIA 7.1.2/3                              | Baloch, R.,<br>Yon, D.A.,<br>Edge, M.<br>Morgan, D. &<br>Worth, M. | 1992        | Early Stage Environmental Fate Probe Studies for the Experimental Powdery Mildewicide - XDE-795.<br>DowElanco Europe, GHE-P-2716. K03<br>GLP: yes<br>Published: no   |
| IIA<br>7.2.1.1/03                        | Baloch, R.I.,<br>Paterson, G. &<br>Kamaludin, J                    | 1997        | Effects of Buffer and Co-Solvent on the Hydrolysis of DE-795.<br>DowElanco Europe, GHE-P 6328. K19<br>GLP: yes<br>Published: no  |
| IIA 7.2.1.2                              | Portwood, D.   | 1996        | Identification of DE-795 photolysis products.<br>DowElanco Europe, GHE-P-4721. K15<br>GLP: yes<br>Published: no  |
| IIA<br>7.2.1.2/<br>02                    | Portwood, D.E.   | 1996        | Identification of DE-795 Photolysis Products.<br>DowElanco Europe, GHE-P-4721. K15<br>GLP: yes<br>Published: no  |
| IIA<br>7.2.1.2/03                        | MacDonald, A.M.  | 1997        | The Photolysis of 14C-DE-795 under Natural Conditions.<br>DowElanco Europe, GHE-P-5932. K16<br>GLP: yes<br>Published: no   |

| <b>Annex point/<br/>reference number</b> | <b>Author(s)</b>                | <b>Year</b> | <b>Title<br/>Source (where different from company)<br/>Company, Report No.<br/>GLP or GEP status (where relevant)<br/>Published or not</b>                                 |
|--|---------------------------------|-------------|--|
| IIA 7.4.2                                | Yon, D.A.                       | 1996.       | Letter report on ABIWAS modelling.<br>DowElanco Europe, K17<br>GLP: no<br>Published: no  |
| IIA 7.4.2                                | Yon, D.A.                       | 1996        | Letter report on DE-795 Photolysis Product Modelling.<br>DowElanco Europe, K18<br>GLP: no<br>Published: no   |
| IIA<br>7.2.1.3.1                         | Jenkins, W.R.                   | 1993        | XDE 795 (pure): Assessment of its Ready Biodegradability. Modified Sturm Test.<br>L.S.R. Ltd.<br>DowElanco Europe, GHE-P-2911. A01<br>GLP: yes<br>Published: no            |
| IIA<br>7.2.1.3.2                         | Phillips, M. &<br>Hall, B.E.(b) | 1995        | The Aerobic Degradation of Radiolabelled XDE-795 in Natural Waters and Associated Sediments.<br>IRI Ltd.<br>DowElanco Europe, GHE-P-4373. K08<br>GLP: yes<br>Published: no |
| IIA 8.2<br>IIA 7.2.2                     | Douglas, M. &<br>Reeves, G.     | 2002        | Quinoxifen Position Statement (fish life cycle study and long range transport in air).<br>DowElanco Europe,<br>GLP: no<br>Published: no                                    |

**B.9 Ecotoxicology**

| <b>Annex point/<br/>reference number</b> | <b>Author(s)</b>            | <b>Year</b> | <b>Title<br/>Source (where different from company)<br/>Company, Report No.<br/>GLP or GEP status (where relevant)<br/>Published or not</b>  |
|--|-----------------------------|-------------|---|
| IIIA 10.6.2                              | M J Mallett                 | 2001        | The effects of quinoxifen on litter decomposition.<br>DowElanco Europe, CEMR-1527<br>GLP: yes<br>Published: no  |
| IIA 8.2<br>IIA 7.2.2                     | Douglas, M. &<br>Reeves, G. | 2002        | Quinoxifen Position Statement (fish life cycle study and long range transport in air).<br>DowElanco Europe,<br>GLP: no<br>Published: no   |
| IIA<br>8.1.3/01                          | Helston, B.R                | 1999        | Avian Reproductive Toxicity Study with Quinoxifen in Bobwhite Quail.<br>Bio-Life Associates Ltd, Rep. BLAL#153-017-07<br>DowElanco Europe, DR-0325-7474-046. J34<br>GLP: yes<br>Published: no |

| Annex point/<br>reference number   | Author(s)                                       | Year | Title<br>Source (where different from company)<br>Company, Report No.<br>GLP or GEP status (where relevant)<br>Published or not   |
|--|---|------|---|
| IIA<br>8.2.6/02  |   | 1999 | The Toxicity of 3-Hydroxy-Quinoxifen to the Freshwater Unicellular Green Alga, <i>Selenastrum capricornutum</i> .<br>CEM Analytical Services Ltd, CEMR 947<br>DowElanco Europe, GHE-T-902. C05<br>GLP: yes<br>Published: no         |
| IIA<br>8.4.2/01<br><br>IIIA<br>10.6.1.2                                  | Meinerling, M                                   | 1999 | Effects of EF-1186 on reproduction and growth of earthworms, <i>Eisenia fetida</i> (Savigny 1826), in artificial soil.<br>Ibacon, DEI-0059<br>DowElanco Europe, GHE-T-917. MJ50<br>GLP: yes<br>Published: no                        |
| IIA<br>8.3.2/11<br><br>IIIA<br>10.5.2,<br>10.6.1.3,<br>10.6.2,<br>10.7.2 | Brown, K.C                                      | 1998 | The Effects of XDE-795 on Meso-Fauna.<br>Ecotox, ER-97-10<br>DowElanco Europe, GHE-P-6527. J33<br>GLP: yes<br>Published: no   |
| IIA 8.2.1<br>IIA<br>8.2.6/03   | Sword, M.C.,<br>Bowman, J. &<br>Muckermann, M.  | 1996 | Acute Static Renewal Toxicity of XDE-795 Technical to Common Carp ( <i>Cyprinus carpio</i> ).<br>ABC Laboratories Inc., 42597<br>DowElanco Europe, GHE-T-621. J30.<br>GLP: yes<br>Published: no                                     |
| IIA<br>8.2.2.1/01<br><br>IIA 8.2.2.2                                     | Rhodes, J.E.,<br>Downing, J. &<br>Muckerman, M. | 1996 | Early Life-Stage Toxicity of XDE-795 Technical to the Fathead Minnow ( <i>Pimephales promelas</i> ) Under Flow-Through Conditions.<br>ABC Laboratories Inc., 42536<br>DowElanco Europe, GHE-T-590. J29<br>GLP: yes<br>Published: no |