Modification of the existing maximum residue level for acibenzolar-S-methyl in kiwi fruits

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Abstract

In accordance with Article 6 of Regulation (EC) No 396/2005, the applicant Syngenta France SAS submitted a request to the competent national authority in France to modify the existing maximum residue level (MRL) for the active substance in kiwi fruits. The data submitted in support of the request were found to be sufficient to derive a MRL proposal for the crop under consideration. Adequate analytical methods for enforcement are available to control the residues of acibenzolar-S-methyl in the plant matrix under consideration. Based on the risk assessment results, EFSA concluded that the short-term and long-term intake of residues resulting from the use of acibenzolar-S-methyl according to the reported agricultural practice is unlikely to present a risk to consumer health.

Keywords: acibenzolar-S-methyl, kiwi fruits, pesticide, MRL, consumer risk assessment

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Summary

In accordance with Article 6 of Regulation (EC) No 396/2005, Syngenta France SAS submitted an application to the competent national authority in France (evaluating Member State, EMS) to modify the existing maximum residue level (MRL) for the active substance acibenzolar-S-methyl in kiwi fruits. The EMS drafted an evaluation report in accordance with Article 8 of Regulation (EC) No 396/2005, which was submitted to the European Commission and forwarded to the European Food Safety Authority (EFSA) on 10 November 2016. To accommodate for the intended use of acibenzolar-S-methyl, the EMS proposed to raise the existing MRL from the limit of quantification (LOQ) 0.01 mg/kg to 0.4 mg/kg.

EFSA based its assessment on the evaluation report submitted by the EMS, the renewal assessment report (RAR) (and its final addendum) prepared under Regulation (EC) 1107/2009, the Commission review report on acibenzolar-S-methyl, the conclusion on the peer review of the pesticide risk assessment of the active substance acibenzolar-S-methyl, as well as the conclusions from previous EFSA opinions on acibenzolar-S-methyl including the review of the existing MRLs for acibenzolar-S-methyl according to Article 12 of Regulation (EC) No 396/2005 and the Codex Committee on Pesticide Residues (CCPR) Report.

The metabolism of acibenzolar-S-methyl following foliar application was investigated in crops belonging to the groups of fruiting vegetables, leafy vegetables and cereals. Based on these studies, the residue definitions for plant products were proposed as the sum of acibenzolar-S-methyl and acibenzolar-acid (free and conjugated), expressed as acibenzolar-S-methyl for enforcement and risk assessment. This residue definition is limited to tobacco, cereals and fruit crops. Studies investigating the effect of processing on the nature of acibenzolar-S-methyl (hydrolysis studies) demonstrated that the active substance is relatively stable. The parent compound partially hydrolysed into acibenzolar-acid. The same residue definition as for raw agricultural commodities (RAC) can be applied for processed commodities.

Sufficiently validated analytical methods to monitor acibenzolar-S-methyl and acibenzolar-acid residues in kiwi fruits at the LOQ of 0.01 mg/kg are available. The available residue trials are sufficient to calculate a MRL proposal of 0.4 mg/kg for kiwi fruits. Available trials also allow to derive a peeling factor for kiwi fruits.

As the proposed use of acibenzolar-S-methyl is on permanent crops and since kiwi fruit is not fed to livestock, the residues in rotational crops and in commodities of animal origin were not assessed under the current application.

The toxicological profile of acibenzolar-S-methyl was assessed in the framework of the European Union (EU) pesticides peer review under Regulation (EC) 1107/2009 and the data were sufficient to derive an acceptable daily intake (ADI) of 0.03 mg/kg body weight (bw) per day and an acute reference dose (ARfD) of 0.03 mg/kg bw.

The consumer risk assessment was performed with revision 2 of the EFSA Pesticide Residues Intake Model (PRIMO). A long-term consumer intake concern was not identified for any of the European diets incorporated in the EFSA PRIMO. The total chronic intake accounted for up to 13% of the ADI (DE child). The contribution of residues in kiwi fruits to the total consumer exposure accounted for less than 1% of the ADI. Additionally, the highest acute consumer exposure was calculated to be 23% of the ARfD for kiwi fruits, showing no concern in an acute exposure scenario for European consumers related to the MRL proposal.

EFSA concluded that the proposed use of acibenzolar-S-methyl on kiwi fruits will not result in a consumer exposure exceeding the toxicological reference values and therefore is unlikely to pose a risk to consumers health.

EFSA proposes to amend the existing MRL as reported in the summary table below.

| Code(a) | Commodity | Existing EU MRL (mg/kg) | Proposed EU MRL (mg/kg) | Comment/justification |
|---------|-----------|------------------------|-------------------------|-----------------------|
| 0162010 | Kiwi fruits (green, red, yellow) | 0.01* | 0.4 | MRL proposal supported by residue data. Unlikely to pose consumer health risk |

MRL: maximum residue level.

*: Indicates that the MRL is set at the limit of analytical quantification (LOQ).
(a): Commodity code number according to Annex I of Regulation (EC) No 396/2005.
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Background

Regulation (EC) No 396/2005 (hereinafter referred to as 'the MRL regulation') establishes the rules governing the setting of pesticide maximum residue levels (MRLs) at European Union (EU) level. Article 6 of the MRL regulation lays down that any party having a legitimate interest or requesting an authorisation for the use of a plant protection product in accordance with Council Directive 91/414/EEC, repealed by Regulation (EC) No 1107/2009, shall submit an application to a Member State to modify a MRL in accordance with the provisions of Article 7 of the MRL regulation.

The applicant Syngenta France SAS submitted an application to the competent national authority in France, hereafter referred to as the evaluating Member State (EMS), to modify the existing MRL for the active substance acibenzolar-S-methyl in kiwi fruits. This application was notified to the European Commission and the European Food Safety Authority (EFSA) and was subsequently evaluated by the EMS in accordance with Article 8 of the MRL regulation.

The EMS summarised the data provided by the applicant in an evaluation report which was submitted to the European Commission and forwarded to EFSA on 10 November 2016. The application was included in the EFSA Register of Questions with the reference number EFSA-Q-2016-00715 and the following subject:

Acibenzolar-S-methyl: MRLs in kiwi

France proposed to raise the existing MRL of acibenzolar-S-methyl in kiwi fruits from the limit of quantification (LOQ) 0.01 mg/kg to 0.4 mg/kg.

EFSA assessed the application and the evaluation report as required by Article 10 of the MRL regulation.

Terms of Reference

In accordance with Article 10 of Regulation (EC) No 396/2005, EFSA shall assess the application and the evaluation report and give a reasoned opinion on the risks to the consumer and where relevant to animals associated with the setting of the requested MRLs. The opinion shall include:

- an assessment of whether the analytical method for routine monitoring proposed in the application is appropriate for the intended control purposes;
- the anticipated LOQ for the pesticide/product combination;
- an assessment of the risks of the acceptable daily intake (ADI) and acute reference dose (ARfD) being exceeded as a result of the modification of the MRL;
- the contribution to the intake due to the residues in the product for which the MRLs was requested;
- any other element relevant to the risk assessment.

In accordance with Article 11 of the MRL regulation, EFSA shall give its reasoned opinion as soon as possible and at the latest within 3 months from the date of receipt of the application.

The evaluation report submitted by the EMS (France, 2016) and the exposure calculations using the EFSA Pesticide Residues Intake Model (PRIMo) are considered as supporting documents to this reasoned opinion and, thus, are made publicly available as background documents to this reasoned opinion. Furthermore, a screenshot of the Report sheet of the PRIMo is presented in Appendix C.

The active substance and its use pattern

The detailed description of the intended uses of acibenzolar-S-methyl in kiwi fruits, which are the basis for the current MRL application, is reported in Appendix A.

Acibenzolar-S-methyl is the ISO common name for S-methyl benzo[1,2,3]thiadiazole-7-carbothioate (IUPAC). The chemical structures of the active substance and its main metabolites are reported in Appendix E.

1 Regulation (EC) No 396/2005 of the Parliament and of the Council of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin and amending Council Directive 91/414/EEC. OJ L 70, 16.3.2005, p. 1–16.
2 Council Directive 91/414/EEC of 15 July 1991 concerning the placing of plant protection products on the market. OJ L 230, 19.8.1991, p. 1–32.
3 Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC. OJ L 309, 24.11.2009, p. 1–50.
4 Syngenta France SAS, Avenue des Prés 1, CS 10537, 78286 Guyancourt Cedex, France.
Acibenzolar-S-methyl was evaluated in the framework of Directive 91/414/EEC with France acting as the designated Rapporteur Member State (RMS). Acibenzolar-S-methyl was included in Annex I of Directive 91/414/EEC by Directive 2001/87/EC\(^5\) which entered into force on 1 November 2001. Acibenzolar-S-methyl has been evaluated for renewal of approval in the framework of Regulation (EC) No 1107/2009 according to Commission Regulation (EU) No 1141/2010\(^6\), as amended by Commission Implementing Regulation (EU) No 380/2013\(^7\), with France as designated RMS for the representative uses as foliar spraying on pomefruit, tomato and tobacco. The renewal assessment report (RAR) prepared by the RMS has been peer reviewed by EFSA (2014). The renewal of acibenzolar-S-methyl was approved\(^8\) for the use as plant activator on 1 April 2016.

The EU MRLs for acibenzolar-S-methyl are established in Annex II of Regulation (EC) No 396/2005. The review of existing MRLs according to Article 12 of Regulation (EC) No 396/2005 (MRL review) has been performed (EFSA, 2013) and the proposed modifications have been implemented in the MRL legislation.\(^9\)

**Assessment**

EFSA has based its assessment on the evaluation report submitted by the EMS (France, 2016), the RAR (and its final addendum) prepared under Regulation (EC) No 1107/2009 (France, 2013, 2014), the European Commission review report on acibenzolar-S-methyl (European Commission, 2016b), the conclusion on the peer review of the pesticide risk assessment of the active substance acibenzolar-S-methyl (EFSA, 2014), as well as the conclusions from previous EFSA opinions on acibenzolar-S-methyl (EFSA, 2009, 2012) including the review of the existing MRLs for acibenzolar-S-methyl according to Article 12 of Regulation (EC) No 396/2005 (EFSA, 2013) and the Codex Committee on Pesticide Residues (CCPR) Report (EFSA, 2017).

For this application, the data requirements established in Regulation (EU) No 544/2011\(^10\) and the guidance documents applicable at the date of submission of the application to the EMS are applicable (European Commission, 1997a,b,c,d,e,f,g, European Commission, 2000, 2010a,b, European Commission, 2016a,b; OECD, 2011, 2013). The assessment is performed in accordance with the legal provisions of the Uniform Principles for the Evaluation and the Authorisation of Plant Protection Products adopted by Commission Regulation (EU) No 546/2011\(^11\).

A selected list of end points of the studies assessed by EFSA in the framework of the MRL review, including the end points of studies submitted in support of the current MRL application, are presented in Appendix B.

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\(^5\) Commission Directive 2001/87/EC of 12 October 2001 amending Annex I to Council Directive 91/414/EEC concerning the placing of plant protection products on the market to include acibenzolar-s-methyl, cyclanilide, ferric phosphate, pymetrozine and pyraflufen-ethyl as active substances. OJ L 276, 19.10.2001, p. 17–20.

\(^6\) Commission Regulation (EU) No 1141/2010 of 7 December 2010 laying down the procedure for the renewal of the inclusion of a second group of active substances in Annex I to Council Directive 91/414/EEC and establishing the list of those substances. OJ L 322, 8.12.2010, p. 10–19.

\(^7\) Commission Implementing Regulation (EU) No 380/2013 of 25 April 2013 amending Regulation (EU) No 1141/2010 as regards the submission of the supplementary complete dossier to the Authority, the other Member States and the Commission. OJ L 116, 26.4.2013, p. 4–4.

\(^8\) Commission Implementing Regulation (EU) 2016/389 of 17 March 2016 renewing the approval of the active substance acibenzolar-S-methyl in accordance with Regulation (EC) No 1107/2009 of the European Parliament and of the Council concerning the placing of plant protection products on the market, and amending the Annex to Commission Implementing Regulation (EU) No 540/2011. OJ L 73, 18.3.2016, p. 77–80.

\(^9\) Commission Regulation (EU) No 703/2014 of 19 June 2014 amending Annexes II, III and V to Regulation (EC) No 396/2005 of the European Parliament and of the Council as regards maximum residue levels for acibenzolar-S-methyl, ethoxyquin, flusilazole, isoxaflutho, molinate, propoxycarbazone, pyraflufen-ethyl, quinoclamine and warfarin in or on certain products. OJ L 186, 26.6.2014, p. 1–48.

\(^10\) Commission Regulation (EU) No 544/2011 of 10 June 2011 implementing Regulation (EC) No 1107/2009 of the European Parliament and of the Council as regards the data requirements for active substances. OJ L 155, 11.6.2011, p. 1–66.

\(^11\) Commission Regulation (EU) No 546/2011 of 10 June 2011 implementing Regulation (EC) No 1107/2009 of the European Parliament and of the Council as regards uniform principles for evaluation and authorisation of plant protection products. OJ L 155, 11.6.2011, p. 127–175.
1. Residues in plants

1.1. Nature of residues and methods of analysis in plants

1.1.1. Nature of residues in primary crops

The metabolism of acibenzolar-S-methyl (CGA 245704) in primary crops belonging to the group of fruiting vegetables (tomato), leafy crops (tobacco) and cereals (wheat) has been investigated in the framework of the EU pesticides peer review (France, 1998). An additional metabolism study on lettuce was evaluated during a previous MRL application (France, 2009). The metabolic pathway of acibenzolar-S-methyl proceeds via hydrolysis of the parent compound to acibenzolar acid (CGA 210007) followed by hydroxylation and ester conjugation with sugars in tomato, wheat and tobacco. For other crops, depending on residue trials data and toxicological data, the metabolite 4-OH acibenzolar acid (CGA 323060) could be considered in the residue definition.

1.1.2. Nature of residues in rotational crops

As the proposed use of acibenzolar-S-methyl is on permanent crop, investigations of residues in rotational crops are not required.

1.1.3. Nature of residues in processed commodities

The effect of processing on the nature of acibenzolar-S-methyl was investigated in the framework of a previous MRL application (EFSA, 2012). These studies showed that acibenzolar-S-methyl is hydrolytically stable under the processing conditions representative of pasteurisation and baking/boiling/brewing while a significant degradation of the parent compound into acibenzolar acid accounting for 50.5% of the applied radioactivity was observed under sterilisation conditions. It was concluded that the same residue definition for raw agricultural commodities can be applied to processed commodities.

1.1.4. Methods of analysis in plants

Analytical methods for the determination of acibenzolar-S-methyl residues and residues of acibenzolar acid and conjugates in plant matrices using high-performance liquid chromatography with tandem mass spectrometry detector (HPLC-MS/MS) were assessed during the EU pesticides peer review for the renewal (EFSA, 2014). It was concluded that for tobacco and high water content commodities validated methods are available to analyse residues of acibenzolar-S-methyl, acibenzolar acid and its conjugates. As samples with high water content are extracted at a controlled pH a particular method or validation for commodities in high acid content is not required (European Commission, 2010b; France, 2016). Thus, it was concluded that the same analytical methods can be accepted for high acid content commodities.

1.1.5. Stability of residues in plants

In the framework of the peer review, residues of acibenzolar-S-methyl were demonstrated to be stable in frozen conditions in dry commodities (wheat grain) for a period of 24 months and in high water commodities (cabbage, squash, lettuce, tomatoes and turnip roots) and in tobacco for 21 months. Acibenzolar acid was demonstrated to be stable in high water commodities (cabbage, squash, lettuce, tomatoes and turnip roots) and tobacco for 21 months. An additional storage stability study has been evaluated with the current MRL application on high acid content commodities (strawberry, France 2016). It was concluded that acibenzolar-S-methyl and acibenzolar acid are stable in high acid commodities for 317 days.

1.1.6. Proposed residue definitions

Based on the metabolic pattern identified in metabolism studies, the residue definitions for enforcement and risk assessment has been set as the sum of acibenzolar-S-methyl (parent compound) and acibenzolar-acid (free and conjugated), expressed as acibenzolar-S-methyl for cereals, fruits and fruiting vegetables, and tobacco. For other crops, depending on residue and toxicological data the metabolite 4-OH acibenzolar acid could be considered in the residue definition for risk assessment.
Modification of existing MRL for acibenzolar-S-methyl in kiwi fruits

(EFSA, 2014). The nature of residues was investigated in rotational crops and processed commodities and it was concluded that the same residue definition as primary crops can be applied for rotational crops and processed commodities. Fully validated analytical methods are available for enforcement of the residue definition in kiwi fruits with a LOQ of 0.01 mg/kg.

1.2. Magnitude of residues in plants

1.2.1. Magnitude of residues in primary crops

To support the MRL application of acibenzolar-S-methyl in kiwi fruits, two different good agricultural practices (GAPs) were submitted: a GAP with a foliar spray application done until 60 days before harvest and a second GAP where the active substance is applied by drench or fertigation up to 15 days before harvest.

In support of the intended uses, the applicant submitted eight residue decline trials for foliar spray application and eight residue trials for drenching/fertigation performed on kiwi fruits in southern Europe. In all available trials, samples were analysed for the parent compound and the metabolite included in the residue definitions for enforcement and risk assessment. The trials conducted with foliar spray were compliant with the GAP (8 × 100 g/ha preharvest interval (PHI) 60 days). The studies conducted with drench/fertigation were not compliant with the GAP as the samples were taken at PHI 0 instead of PHI 15. However, as this represents a worst-case scenario and no uptake from the roots have been shown after eight applications, the trials were considered suitable to support the intended GAP. Moreover, considering the overall residue data available, the use by drenching application is considered covered by the MRL derived from foliar spray application. According to the assessment of the EMS, the methods used were sufficiently validated and fit for purpose. The samples of these residue trials were stored under conditions for which integrity of the samples has been demonstrated.

At the intended PHI of 60 days following foliar spray application, the residues of acibenzolar-S-methyl were found in the range of 0.01–0.17 mg/kg. None of the eight residue decline studies shows any pattern of concern for increasing metabolites over time.

1.2.2. Magnitude of residues in processed commodities

Residue data allowing to calculate a peeling factor for kiwi fruits were submitted by EMS (France, 2016). The derived peeling factor is reported in Appendix B.1.2.2.

1.2.3. Proposed MRLs

The available data are considered sufficient to derive a MRL proposal as well as risk assessment values for kiwi fruits (see Appendix B.1.2.1). In Section 3, EFSA assessed whether residues on this crop resulting from the intended uses is likely to pose a consumer health risk.

2. Residues in livestock

Kiwi fruit is not used to fed livestock; therefore the impact of residues of acibenzolar-S-methyl in livestock from the intended use in kiwi fruit does not need to be assessed.

3. Consumer risk assessment

EFSA performed a dietary risk assessment using revision 2 of the EFSA PRIMo (EFSA, 2007). This exposure assessment model contains food consumption data for different subgroups of the EU population and allows the acute and chronic exposure assessment to be performed in accordance with the internationally agreed methodology for pesticide residues (FAO, 2016).

The toxicological reference values for acibenzolar-S-methyl used in the risk assessment (i.e. ADI and ARfD values) were derived in the framework of the EU pesticides peer review (EFSA, 2014). The input values used in the exposure calculations are summarised in Appendix C. The consumer risk assessment was performed considering the residues in the whole fruits, without applying the derived peeling factor.
3.1. Short-term (acute) dietary risk assessment

The short-term exposure assessment was performed only with regard to the commodity assessed in this application in accordance with the internationally agreed methodology (FAO, 2016). The acute exposure assessment has been performed assuming the consumption of a large portion of the food item as reported in the national food surveys (EFSA, 2007) and that kiwi fruits contained residues at the highest residue (HR) level as observed in supervised field trials (see Appendix D.1). The short-term exposure did not exceed the ARfD for the crop assessed in this application. It was calculated to account for a maximum of 23% of the ARfD (see Appendix C).

3.2. Long-term (chronic) dietary risk assessment

In the framework of the MRL review a comprehensive long-term exposure assessment was performed, taking into account the existing uses at EU level (EFSA, 2013). EFSA updated the calculation with the relevant STMR values derived from the residue trials submitted in support of this MRL application for kiwi fruits. The input values used in the exposure calculations are summarised in Appendix D.1. The estimated long-term dietary intake was in the range of 1–13% of the ADI. The contribution of residues due to the intended use in kiwi fruits to the overall long-term exposure accounted for less than 1% of the ADI (DE child) (Appendix C).

Conclusions and recommendations

The data submitted in support of this MRL application were found to be sufficient to derive MRL proposals for kiwi fruits.

Analytical methods to monitor acibenzolar-S-methyl and acibenzolar-acid residues in kiwi fruits at the LOQ of 0.01 mg/kg are available.

Based on the risk assessment results, EFSA concluded that the short-term and long-term intake of residues resulting from the use of acibenzolar-S-methyl according to the reported agricultural practice will not result in a consumer exposure exceeding the toxicological reference values and therefore is unlikely to pose a concern for public health in Europe.

The MRL recommendations are summarised in Appendix B.4.

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**Abbreviations**

| Abbreviation | Definition |
|--------------|------------|
| a.s. | active substance |
| ADI | acceptable daily intake |
| AR | applied radioactivity |
| ARfD | acute reference dose |
| BBCH | growth stages of mono- and dicotyledonous plants |
| Bw | body weight |
| CCPR | Codex Committee on Pesticide Residues |
| DAR | draft assessment report |
| DAT | days after treatment |
| EMS | evaluating Member State |
| FAO | Food and Agriculture Organization of the United Nations |
| GAP | Good Agricultural Practice |
| HPLC | high performance liquid chromatography |
| HPLC-MS/MS | high performance liquid chromatography with tandem mass spectrometry |
| HR | highest residue |
| 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 FAO/WHO Meeting on Pesticide Residues |
| LOQ | limit of quantification |
| MRL | maximum residue level |
| Acronym  | Full Form                                                                 |
|----------|---------------------------------------------------------------------------|
| MS       | Member States                                                             |
| MS/MS    | tandem mass spectrometry detector                                         |
| MW       | molecular weight                                                          |
| NEU      | northern Europe                                                           |
| OECD     | Organisation for Economic Co-operation and Development                    |
| PF       | processing factor                                                         |
| PHI      | preharvest interval                                                       |
| PRIMo    | (EFSA) Pesticide Residues Intake Model                                    |
| RA       | risk assessment                                                           |
| RAC      | raw agricultural commodity                                                |
| RAR      | renewal assessment report                                                 |
| RD       | residue definition                                                        |
| RMS      | rapporteur Member State                                                   |
| SANCO    | Directorate-General for Health and Consumers                              |
| SEU      | southern Europe                                                           |
| SMILES   | simplified molecular-input line-entry system                              |
| STMR     | supervised trials median residue                                          |
| WG       | water-dispersible granule                                                 |
| WHO      | World Health Organization                                                 |
Appendix A – Summary of intended GAP triggering the amendment of existing EU MRLs

| Crop and/or situation | NEU, SEU, MS or country | F or G or I<sup>(a)</sup> | Pests or Group of pests controlled | Preparation | Application | Application rate per treatment | PHI<sup>(d)</sup> | Remarks |
|-----------------------|-------------------------|--------------------------|----------------------------------|-------------|-----------------|-----------------------------|---------------|---------|
|                       |                         | F                        | Bacteria diseases (Pseudomonas syringae) | WG 500 g/kg Foliar spray | BBCH 12-79 and 89-95 | 8, 14 | 0.2 | 1,000–1,500 | 100 | 60 | – |
| Kiwi fruits South: IT, FR, ES |                         | F                        | Bacteria diseases (Pseudomonas syringae) | WG 500 g/kg Drench or fertigation | BBCH 12-89 | 8, 14 | 0.2 | 8,000–10,000 | 100 | 15 | Fertigation or application to soil |

GAP: good agricultural practice; MRL: maximum residue level; NEU: northern European Union; SEU: southern European Union; MS: Member State; a.s.: active substance; WG: water-dispersible granule.

<sup>(a)</sup>: Outdoor or field use (F), greenhouse application (G) or indoor application (I).

<sup>(b)</sup>: CropLife International Technical Monograph no 2, 6th Edition. Revised May 2008. Catalogue of pesticide formulation types and international coding system.

<sup>(c)</sup>: Growth stage range from first to 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.

<sup>(d)</sup>: PHI: minimum preharvest interval.
## Appendix B – List of end points

### B.1. Residues in plants

#### B.1.1. Nature of residues and methods of analysis in plants

#### B.1.1.1. Metabolism studies, methods of analysis and residue definitions in plants

| Primary crops (available studies) | Crop groups | Crop(s) | Application(s) | Sampling (DAT) |
|-----------------------------------|-------------|---------|----------------|----------------|
| Fruits and vegetables             | Tomato      | Foliar, G | 3 × 0.273 kg a.s./ha | At harvest     |
|                                   | Tobacco     | Foliar, G | 3 × 0.170 kg a.s./ha | At harvest     |
|                                   | Lettuce     | Foliar, G | 4 × 0.42 kg a.s./ha | At harvest     |
|                                   | Lettuce     | Foliar, G | 4 × 0.14 kg a.s./ha | At harvest     |
| Leafy crops                       |             |         |                 |                |
| Lettuce                           |             |         |                 |                |
| Cereals/grass                     | Wheat       | Foliar, F | 1 × 0.05 kg a.s./ha | At harvest     |
|                                   | Wheat       | Foliar, G | 1 × 0.05 kg a.s./ha | At harvest     |

Radiolabelled active substance: $[^{14}\text{C}-\text{U-phenyl}]-\text{acibenzolar-S-methyl}$
Reference: France (1998, 2009)

| Rotational crops (available studies) | Crop groups | Crop(s) | Application(s) | PBI (DAT) |
|--------------------------------------|-------------|---------|----------------|-----------|
| Root/tuber crops                     | Radish      | Soil spraying, F | 0.05 kg a.s./ha | 30, 113, 141, 337 |
| Leafy crops                          | Lettuce     | Soil spraying, F | 0.05 kg a.s./ha | 30, 113, 141, 337 |
| Cereal (small grain)                 | Wheat       | Soil spraying, F | 0.05 kg a.s./ha | 30, 113, 141, 337 |
| Cereal (small grain)                 | Wheat       | Soil spraying, F | 0.05 kg a.s./ha | 30, 113, 141, 337 |

Comments:
Radiolabelled active substance: $[^{14}\text{C}-\text{U-phenyl}]-\text{acibenzolar-S-methyl}$
Reference: France (1998)

| Processed commodities (hydrolysis study) | Conditions | Investigated? |
|------------------------------------------|------------|---------------|
|                                         | Pasteurisation (20 min, 90°C, pH 4) | Yes |
|                                         | Baking, brewing and boiling (60 min, 100°C, pH 5) | Yes |
|                                         | Sterilisation (20 min, 120°C, pH 6) | Yes |

Comment: Significant degradation into acibenzolar acid under sterilisation conditions
Reference: EFSA, 2012

DAT: days after treatment; a.s.: active substance; PBI: plant back interval.
B.1.1.2. Stability of residues in plants

| Plant products (available studies) | Category | Commodity | T (°C) | Stability (Months) |
|-----------------------------------|----------|-----------|--------|-------------------|
| High water content                | Tobacco, lettuce, tomato, cabbage, squash and turnips | −20     | 20     |
| Dry/high starch                   | Wheat grain | −18     | 24     |
| High acid content                 | Strawberry | −21     | 10     |

Source: EFSA (2013); France (2016)
B.1.2. Magnitude of residues in plants

B.1.2.1. Summary of residues data from the supervised residue trials

| Crop          | Region/Indoor(a) | Residue levels observed in the supervised residue trials (mg/kg) | Comments (OECD calculations) | MRL proposals (mg/kg) | HR<sub>Mo</sub><sup>(b)</sup> (mg/kg) | STMR<sub>Mo</sub><sup>(c)</sup> (mg/kg) |
|---------------|------------------|---------------------------------------------------------------|------------------------------|----------------------|---------------------------------|----------------------------------|
| Kiwi fruits   | SEU foliar       | 0.01; 0.02; 0.03; 0.03; 0.07; 0.12; 0.16; 0.17                | Residue trials compliant with GAP conducted on kiwi fruit | 0.4                  | 0.17                            | 0.05                             |
| Kiwi fruits   | SEU Drench/ fertigation | 6× < 0.01; 2× 0.01                                              | Trials with samples analysed at PHI 0 instead of PHI 15, acceptable since no uptake from the roots have been shown after eight applications | 0.02                 | 0.01                            | 0.01                             |

PHI: preharvest interval; GAP: good agricultural practice; MRL: maximum residue level.
(a): NEU: Outdoor trials conducted in northern Europe, SEU: Outdoor trials conducted in southern Europe, Indoor: indoor EU trials or Country code: if non-EU trials.
(b): Highest residue according to the residue definition for monitoring.
(c): Supervised trials median residue according to the residue definition for monitoring.
B.1.2.2. Processing factors

| Processed commodity | Number of valid studies\(^{(a)}\) | Processing Factor (PF) | \(\text{Median PF}\) |
|---------------------|----------------------------------|------------------------|----------------------|
| Kiwi fruits, peeled | 8                               | 0.3; 0.3; 0.3; 0.3; 0.5; 0.5; 0.7; 1 | 0.4                  |

\(^{(a)}\): Studies with residues in the RAC at or close to the LOQ were disregarded (unless concentration may occur).

B.2. Residues in livestock

Since kiwi fruit is not fed to livestock, this section does not need further consideration under the current MRL application.

B.3. Consumer risk assessment

| ARfD | 0.03 mg/kg bw (EFSA, 2014) |
|------|---------------------------|
| Highest IESTI, according to EFSA PRIMo | 23% ARfD |
| Assumptions made for the calculations | Only the residues at the highest residue (HR) level as observed in supervised field trials in kiwi fruits has been considered in the acute exposure scenario |

| ADI | 0.03 mg/kg bw per day (EFSA, 2014) |
|-----|-----------------------------------|
| Highest IEDI, according to EFSA PRIMo | 13% ADI (DE child) |
| Kiwi fruits contribution | < 1% ADI |
| Assumptions made for the calculations | The calculation is based on the median residue levels derived for raw agricultural commodities. The contributions of commodities where no GAP was reported in the framework of the MRL review were not included in the calculation. |

B.4. Recommended MRLs

| Code\(^{(a)}\) | Commodity | Existing EU MRL (mg/kg) | Proposed EU MRL (mg/kg) | Comment/justification |
|---------------|-----------|------------------------|-------------------------|-----------------------|
| 0162010       | Kiwi fruits (green, red, yellow) | 0.01*                  | 0.4                     | The submitted data are sufficient to derive a MRL proposal for the SEU use. No consumer health concern was identified |

MRL: maximum residue level.

\*: Indicates that the MRL is set at the limit of analytical quantification (LOQ).

\(^{(a)}\): Commodity code number according to Annex I of Regulation (EC) No 396/2005.
Appendix C – Pesticide Residue Intake Model (PRIMo)

Acibenzolar-s-methyl

| Status of the active substance: | Approved |
| Codes no.: | QOLdesoporP10.0: |

**Toxicological end points**

| ADI (mg/kg bw per day): | 0.03 |
| APRD (mg/kg bw): | 0.03 |

Source of ADI: Source of APRD:

Year of evaluation: Year of evaluation:

| No of diets exceeding ADI: | --- |

**Highest calculated TMDI values in % of ADI**

| Commodity/ group of commodities | DE child | NL child | WHO Cluster diet B | FR toddler | FR infant | UK Toddler | ES child | UK infant | DK child | IE adult | SE general population 90th percentile | WHO regional European diet | WHO Cluster diet E | ES adult | WHO Cluster diet D | NL general | LT adult | IT toddler | PT general population | PL general population | FR all population | IT adult | DK adult | UK vegetarian | UK Adult | FI adult |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12.0 | 10.2 | 6.3 | 6.3 | 5.4 | 5.4 | 4.9 | 4.8 | 4.8 | 4.4 | 4.4 | 4.3 | 3.8 | 3.7 | 3.3 | 3.2 | 3.7 | 3.1 | 2.9 | 2.7 | 2.7 | 2.6 | 2.4 | 2.4 | 2.0 | 1.8 | 1.6 | 1.6 | 1.4 |
| MS Diet | 8.5 | 4.5 | 1.3 | 1.0 | 1.0 | 1.3 | 1.1 | 1.3 | 2.0 | 1.0 | 0.9 | 0.6 | 0.7 | 0.5 | 0.7 | 0.5 | 0.9 | 1.4 | 0.8 | 0.9 | 0.5 | 1.5 | 0.4 | 0.7 | 0.4 | 0.3 | 0.3 |
| Commodity/ group of commodities | 0.8 | 1.0 | 0.9 | 1.3 | 0.9 | 0.8 | 0.4 | 0.4 | 0.4 | 0.2 | 0.3 | 0.5 | 0.3 | 0.3 | 0.4 | 0.4 | 0.2 | 0.3 | 0.6 | 0.4 | 0.4 | 0.2 | 0.5 | 0.2 | 0.3 | 0.2 | 0.3 |

**Chronic risk assessment – refined calculations**

| Commodity/ group of commodities | 0.5 | 1.0 | 0.3 | 0.9 | 0.6 | 0.3 | 0.6 | 0.4 | 0.4 | 0.2 | 0.2 | 0.3 | 0.6 | 0.3 | 0.7 | 0.3 | 0.5 | 0.7 | 1.1 | 0.1 | 0.7 | 0.1 | 0.5 |

**Conclusion:**

The estimated Theoretical Maximum Daily Intakes (TMDI), based on pTMRLs were below the ADI.

A long-term intake of residues of Acibenzolar-s-methyl is unlikely to present a public health concern.
The acute risk assessment is based on the ARfD.

Acute risk assessment/children – refined calculations

Acute risk assessment/adults/general population – refined calculations

The acute risk assessment is based on the ARfD.

For each commodity, the calculation is based on the highest reported MS consumption per kg bw and the corresponding unit weight from the MS with the critical consumption. If no data on the unit weight was available from that MS, an average European unit weight was used for the IESTI calculation.

In the IESTI 1 calculation, the variability factors were 10, 7 or 5 (according to JMPR manual 2002); for lettuce, a variability factor of 5 was used.

In the IESTI 2 calculations, the variability factors of 10 and 7 were replaced by 5. For lettuce, the calculation was performed with a variability factor of 3.

Threshold MRL is the calculated residue level which would leads to an exposure equivalent to 100% of the ARfD.

Highest % of ARfD/ADI Commodities pTMRL/ threshold MRL (mg/kg)

| No of critical MRLs (UESTI 1) | --- | --- |
|-------------------------------|-----|-----|
| No of critical MRLs (UESTI 2) | --- | --- |

No exceedance of the ARfD/ADI was identified for any unprocessed commodity.

Conclusion: For Acibenzolar-S-methyl, IESTI 1 and IESTI 2 were calculated for food commodities for which pTMRLs were submitted and for which consumption data are available.

For processed commodities, no exceedance of the ARfD/ADI was identified.

No exceedance of the ARfD/ADI was identified for any unprocessed commodity.

For processed commodities, no exceedance of the ARfD/ADI was identified.

Threshold MRL is the calculated residue level which would leads to an exposure equivalent to 100% of the ARfD.

Highest % of ARfD/ADI Commodities pTMRL/ threshold MRL (mg/kg)

| No of commodities for which ARfD/ADI is exceeded (UESTI 1): | --- | --- |
| No of commodities for which ARfD/ADI is exceeded (UESTI 2): | --- | --- |

In the IESTI 1 calculation, the variability factors were 10, 7 or 5 (according to JMPR manual 2002); for lettuce, a variability factor of 5 was used.

In the IESTI 2 calculations, the variability factors of 10 and 7 were replaced by 5. For lettuce, the calculation was performed with a variability factor of 3.

Acute risk assessment/children – refined calculations

Acute risk assessment/adults/general population – refined calculations

No exceedance of the ARfD/ADI was identified for any unprocessed commodity.

Conclusion: For Acibenzolar-S-methyl, IESTI 1 and IESTI 2 were calculated for food commodities for which pTMRLs were submitted and for which consumption data are available.

For processed commodities, no exceedance of the ARfD/ADI was identified.

No exceedance of the ARfD/ADI was identified for any unprocessed commodity.

For processed commodities, no exceedance of the ARfD/ADI was identified.

Threshold MRL is the calculated residue level which would leads to an exposure equivalent to 100% of the ARfD.

Highest % of ARfD/ADI Commodities pTMRL/ threshold MRL (mg/kg)

| No of commodities for which ARfD/ADI is exceeded (UESTI 1): | --- | --- |
| No of commodities for which ARfD/ADI is exceeded (UESTI 2): | --- | --- |
Appendix D – Input values for the exposure calculations

D.1. Consumer risk assessment

| Commodity                          | Chronic risk assessment | Acute risk assessment |
|-----------------------------------|-------------------------|-----------------------|
|                                   | Input value (mg/kg) | Comment | Input value (mg/kg) | Comment |
| Kiwi fruits                       | 0.05                   | STMR (Table B.1.2.1) | 0.17               | HR (Table B.1.2.1) |
| Other commodities of plant origin | See Table 4-1 in reasoned opinion on Art 12. MRLs review EFSA (2013) | | Acute risk assessment undertaken only with regard to the crop under consideration |

STMR: supervised trials median residue; HR: highest residue; MRL: maximum residue level.
### Appendix E – Used compound code(s)

| Code/trivial name          | Chemical name/SMILES notation<sup>(a)</sup> | Structural formula<sup>(a)</sup> |
|----------------------------|---------------------------------------------|-------------------------------|
| Acibenzolar-S-methyl       | S-Methyl benzo[1,2,3]thiadiazole-7-carbothioate | ![Structural formula](image) |
| CGA 245704                 |                                             |                               |
| Acibenzolar acid           | 1,2,3-Benzothiadiazole-7-carboxylic Acid    | ![Structural formula](image) |
| CGA 210007                 |                                             |                               |
| 4-OH acibenzolar acid      | 4-Hydroxy-1,2,3-benzothiadiazole-7-carboxylic acid | ![Structural formula](image) |
| CGA 323060                 |                                             |                               |

SMILES: simplified molecular-input line-entry system.

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