Evaluation of confirmatory data following the Article 12 MRL review for propiconazole

European Food Safety Authority (EFSA), Maria Anastassiadou, Giovanni Bernasconi, Alba Brancato, Luis Carrasco Cabrera, Lucien Ferreira, Luna Greco, Samira Jarrah, Aija Kazocina, Renata Leuschner, Jose Oriol Magrans, Ileana Miron, Stefanie Nave, Ragnor Pedersen, Hermine Reich, Alejandro Rojas, Angela Sacchi, Miguel Santos, Alessia Pia Scarlato, Anne Theobald, Benedicte Vagenende and Alessia Verani

Abstract

The applicant Syngenta Crop Protection AG submitted a request to the competent national authority in Finland to evaluate the confirmatory data that were identified for propiconazole in the framework of the MRL review under Article 12 of Regulation (EC) No 396/2005 as not available. Following the decision on the non-renewal of the approval of propiconazole and the decision to lower the maximum residue levels (MRLs) for propiconazole to the limit of quantification (LOQ) for all commodities, the data gaps identified in the MRL review are no longer relevant. EFSA summarised some new studies on the toxicological profile of propiconazole metabolites CGA91305, SYN547889 and NOA436613, which were assessed by the rapporteur Member State. Overall, the available information is not sufficient to characterise the toxicological profile of metabolites convertible to 2,4-dichlorobenzoic acid as data gaps still exist for SYN547889, NOA436613, CGA118244, CGA118245, CGA91304 and CGA91305.

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Correspondence: pesticides.mrl@efs.europa.eu
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Summary

In 2015, when the European Food Safety Authority (EFSA) reviewed the existing maximum residue levels (MRLs) for according to Article 12 of Regulation (EC) No 396/2005, EFSA identified some information as unavailable (data gaps) and derived tentative MRLs for those uses which were not fully supported by data but for which no risk to consumers was identified. The following data gaps were noted:

1) a validated analytical method for enforcement of the residues in tea;
2) further investigation on the toxicological properties of the metabolites convertible to 2,4-dichlorobenzoic acid;
3) clarifications on the European good agricultural practices (GAPs) for almonds (SEU), strawberries (NEU), currants (NEU), gooseberries (NEU) and peppers (NEU);
4) additional trials supporting the authorisations on citrus fruits, almonds, apples, peaches, apricots, cherries, plums, grapes, strawberries, currants, gooseberries, bananas, peppers, cucumbers, sweet corn, globe artichokes, peanuts, rapeseed, maize, barley, oats, rice, wheat, rye, tea, sugar beet and grass, including analysis of parent and metabolites convertible to 2,4-dichlorobenzoic acid in accordance with the proposed residue definition for risk assessment.

Tentative MRL proposals have been implemented in the MRL legislation by Commission Regulation (EU) No 2016/452, including footnotes related to data gap number 2; as regards data gap 4, footnotes requesting additional residue trials were implemented for some of the commodities (citrus fruits, apples, apricots, grapes, bananas, rapeseed, barley, oats, rice, wheat, rye and sugar beet), while for the remaining products, risk management decisions were taken to lower the MRL to the LOQ or to set the EU MRL at the level of the Codex MRLs. Data gaps number 1 and 3 were not implemented in Commission Regulation (EU) No 2016/452 because also for these products risk managers decided to lower the MRLs to the LOQ for these commodities.

Any parties having an interest in maintaining the tentative MRLs were requested to address the confirmatory data requirement by 30 March 2018.

On 28 March 2018, in accordance with the agreed procedure set out in the working document SANTE/10235/2016, Syngenta Crop Protection AG submitted an application to the competent national authority in Finland (rapporteur Member State, RMS) to evaluate the confirmatory data identified during the MRL review. The newly submitted information was related to data gap number 2 (toxicological properties of the propiconazole metabolites convertible to 2,4-dichlorobenzoic acid) and data gap number 4 (additional residue trials supporting the authorised uses on sweet corn, maize, barley, oats, wheat, rye and sugar beet).

The RMS assessed the new information in an evaluation report, which was submitted to the European Commission and forwarded to the EFSA on 5 June 2020. When assessing the evaluation report, EFSA requested additional information. On 24 September 2020, the RMS informed that the applicant will not submit the information requested. Hence, EFSA resumed the assessment of the available data.

It is noted that on 28 November 2018, a decision on the non-renewal of the approval of propiconazole under Regulation (EC) No 1107/2009 has been taken, because the approval criteria were considered not fulfilled (propiconazole was classified as toxic for reproduction category 1B and it could not be excluded that the presence of metabolites in groundwater results in unacceptable effects on groundwater and in harmful effects on human health).

Following the decision on the non-renewal of the approval, the EU uses of plant protection products containing propiconazole had to be withdrawn by 19 June 2019; any grace period granted at Member State level has expiry by 19 March 2020 at the latest. Considering the new situation for EU authorisations, data gaps identified in the MRL review as related to the EU uses became obsolete.

In this reasoned opinion, EFSA summarised the newly submitted toxicological studies performed with some of the metabolites of propiconazole (i.e. CGA91305, SYN547889 and NOA436613) which were assessed by the RMS.

Overall EFSA concluded that the available information is insufficient to fully characterise the toxicological profile of metabolites convertible to 2,4-dichlorobenzoic acid as data gaps still exist for SYN547889, NOA436613, CGA118244, CGA118245, CGA91304 and CGA91305.

Considering the above and the recent decision of the Standing Committee on Plants, Animals, Food and Feed (Pesticide residues) to lower the MRLs for propiconazole at the level of LOQ for all commodities, EFSA concluded that no further follow-up actions are required for propiconazole.
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Assessment

The review of existing MRLs for propiconazole according to Article 12 of Regulation (EC) No 396/2005 (MRL review) has been performed in 2015 (EFSA, 2015). The European Food Safety Authority (EFSA) identified some information as unavailable (data gaps) and derived tentative MRLs for those uses not fully supported by data but for which no risk to consumers was identified. The following data gaps were noted:

1) a validated analytical method for enforcement of the residue in tea;
2) further investigation on the toxicological properties of the metabolites convertible to 2,4-dichlorobenzoic acid;
3) clarifications on the European GAPs for almonds (SEU), strawberries (NEU), currants (NEU), gooseberries (NEU) and peppers (NEU);
4) additional trials supporting the authorisations on citrus fruits, almonds, apples, peaches, apricots, cherries, plums, grapes, strawberries, currants, gooseberries, bananas, peppers, cucumbers, sweet corn, globe artichokes, peanuts, rapeseed, maize, barley, oats, rice, wheat, rye, tea, sugar beet and grass, including analysis of parent and metabolites convertible to 2,4-dichlorobenzoic acid in accordance with the proposed residue definition for risk assessment.

Following the review of existing MRLs, tentative MRL proposals have been implemented in the MRL legislation by Commission Regulation (EU) No 2016/452, including footnotes related to data gaps number 2 and 4 specifying the type of information that was identified as missing. Data gap number 4 was translated into footnotes for citrus fruits, apples, apricots, grapes, bananas, rapeseed, barley, oats, rice, wheat, rye and sugar beet. Data gaps number 1 and 3 were not implemented in Commission Regulation (EU) No 2016/452 because risk managers decided to lower the MRLs at the LOQ for these commodities. Any party having an interest in maintaining the tentative MRL was requested to provide the missing data by 30 March 2018.

It is noted that following the MRL review, the MRLs for barley, oats, wheat and rye were further amended with Regulation (EU) No 2017/626, implementing higher MRLs derived by Codex. Hence, for these commodities, the respective footnotes requesting for further data were deleted. For almonds, cherries, plums, strawberries, currants, gooseberries, peppers, cucumbers, globe artichokes, peanuts, maize and tea risk managers decided to lower the MRLs at the limit of quantification (LOQ). For peaches, sweet corn and maize, the Codex MRLs were maintained in the EU MRL legislation, without requesting further residue trials for EU uses.

On 28 March 2018, in accordance with the specific provisions set out in the working document of the European Commission SANTE/10235/2016 (European Commission, 2020) the applicant, Syngenta Crop Protection AG, submitted an application to the competent national authority in Finland (designated rapporteur Member State, RMS) providing confirmatory data identified during the MRL review as missing. To address the data gaps identified by EFSA, the applicant submitted new information related to data gap number 2 on the toxicological properties of the propiconazole metabolites convertible to 2,4-dichlorobenzoic acid and data gap number 4 related to additional trials supporting the authorisations on sweet corn, maize, barley, oats, wheat, rye and sugar beet.

The RMS assessed the new information in an evaluation report, which was submitted to the European Commission and forwarded to EFSA on 5 June 2020 (Finland, 2020). EFSA assessed the application as requested by the European Commission in accordance with Article 9 of Regulation (EC) No 396/2005. During the detailed assessment, EFSA requested additional information. Since on 24 September 2020 the RMS informed EFSA that the applicant will not submit additional data, EFSA resumed the assessment on the basis of the available information.

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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 Commission Regulation (EU) No 2016/452 of 29 March 2016 amending Annexes II and III to Regulation (EC) No 396/2005 of the European Parliament and of the Council as regards maximum residue levels for captan, propiconazole and spiroxamine in or on certain products. OJ L 79, 30.3.2016, p. 10–27.
3 Commission Regulation (EU) 2017/626 of 31 March 2017 amending Annexes II and III to Regulation (EC) No 396/2005 of the European Parliament and of the Council as regards maximum residue levels for acetamiprid, cyantraniliprole, cypermethrin, cyprodinil, difenoconazole, ethephon, fluopyram, flutriafol, flupyradquat, imazapic, imazapyr, lambda-cyhalothrin, mesotrione, profenofos, propiconazole, pyrimethanil, spirotetramat, tebuconazole, triazophos and trifloxystrobin in or on certain products. OJ L 96, 7.4.2017, p. 1–43.
It is noted that on 28 November 2018, a decision on the non-renewal of the approval of propiconazole under Regulation (EC) No 1107/2009 was taken, since the approval criteria of Article 4 (1) to (3) of Regulation (EC) No 1107/2009 were not fulfilled as the active substance was classified by the European Chemicals Agency propiconazole as toxic for reproduction category 1B in accordance with that Regulation and negligible exposure could not be demonstrated for the proposed use of propiconazole. In addition, it could not be excluded that the presence of metabolites in groundwater results in unacceptable effects on groundwater and in harmful effects on human health.

Following the decision on the non-renewal, the EU uses of plant protection products containing propiconazole had to be withdrawn by 19 June 2019; any grace period granted at Member State level has expiry by 19 March 2020 at the latest. As a consequence of the non-renewal decision, MRLs for propiconazole have been lowered to the level of LOQ for all commodities.

Considering the new situation for EU authorisations, the data gaps related to the EU uses became obsolete.

In its present assessment, EFSA summarised the newly submitted information on the toxicological profile of propiconazole metabolites CGA91305, SYN547889 and NOA436613 which was submitted by the applicant on 28 March 2018 to the RMS to address data gap number 2.

EFSA based its assessment on the evaluation report submitted by the RMS (Finland, 2020), the reasoned opinion on the MRL review according to Article 12 of Regulation (EC) No 396/2005 and the peer review conclusion of performed after the MRL review (EFSA, 2017).

The evaluation report submitted by the RMS (Finland, 2020) is considered a supporting document to this reasoned opinion and, thus, is made publicly available as a background document to this reasoned opinion.

1. Residue definitions

The following residue definition for enforcement was derived in the 2015 EFSA MRL review and 2017 EFSA peer review conclusion which is applicable for all plant commodities:

- Propiconazole (sum of isomers) (EFSA, 2015, 2017).

In the framework of the 2015 EFSA MRL review, a tentative residue definition for risk assessment was derived for primary and rotational crops and for processed commodities:

- Propiconazole and all the metabolites convertible to the 2,4-dichlorobenzoic acid, expressed as propiconazole (sum of isomers).

In the more recent EFSA peer review conclusions on propiconazole (EFSA, 2017), the following residue definitions for risk assessment were proposed for primary crops:

1) Propiconazole (sum of isomers);
2) CGA118244 free and glucoside conjugated – whether the parent compound and CGA118244 have to be considered together or separately is pending upon the submission of toxicological data to address the toxicity profile of CGA118244;
3) CGA142856 (TAA) and CGA131013 (TA).

The metabolic pathway of propiconazole in rotational crops was found to be mainly driven by the uptake of major soil metabolites (SYN547889 and NOA436613). The residue definition for risk assessment for propiconazole in rotational crops remained open (data gap) (EFSA, 2017).

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4 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.
5 Commission Implementing Regulation (EU) 2018/1865 of 28 November 2018 concerning the non-renewal of approval of the active substance propiconazole, 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 Commission Implementing Regulation (EU) No 540/2011. OJ L 304, 29.11.2018, p. 6-9.
6 Commission Regulation (EU) 2018/1480 of 4 October 2018 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures and correcting Commission Regulation (EU) 2017/776. OJ L 251, 5.10.2018, p. 1–12.
7 Regulation not yet published, but Member-States voted for the lowering of the MRLs for propiconazole to the LOQ in all commodities in the framework of the PAFF meeting of September 2020. The revised MRLs are available in the EC database (SANTE/10482/2020).
For products of animal origin, the residue definition for enforcement was derived by the MRL review as propiconazole and all the metabolites convertible to the 2,4-dichlorobenzoic acid, expressed as propiconazole (sum of isomers) (EFSA, 2015). In the peer review, the residue definition for enforcement in products of animal origin was derived as CGA91305 (free and conjugated) (EFSA, 2017).

The following residue definition for risk assessment applicable for animal commodities was tentatively proposed by the MRL review:

- Propiconazole and all the metabolites convertible to the 2,4-dichlorobenzoic acid, expressed as propiconazole (sum of isomers) (EFSA, 2015).

A new residue definition for risk assessment in products of animal origin was derived in the more recent peer review conclusions (EFSA, 2017):

- Propiconazole, CGA91305 (free and conjugated) and CGA118244 (The way the residue definition shall be expressed is pending upon the requested toxicological profile of CGA91305 and CGA118244);
- CGA71019 (1,2,4-triazole).

Information on the toxicological profile of the propiconazole metabolites convertible to 2,4-dichlorobenzoic acid had been requested in the framework of the MRL review and the peer review conclusions (EFSA, 2015, 2017).

2. Mammalian toxicology

The following metabolites were identified under the EFSA MRL review in the relevant primary crop and livestock metabolism studies which contain the 2,4-dichlorobenzoic acid moiety (EFSA, 2015):

- CGA118244, CGA118245, CGA91304 and CGA91305.

Additional metabolites containing the relevant moiety were identified in rotational crop metabolism studies under the peer review, i.e. SYN547889 and NOA436613 (EFSA, 2017).

The applicant provided studies to address the genotoxicity and general toxicity of metabolites CGA91305, SYN547889 and NOA436613 which were assessed by the RMS in the evaluation report (Finland, 2020). For metabolites CGA91304, CGA118244 and CGA118245, no new data was provided and these metabolites have not been considered further in the context of the current application.

2.1. Genotoxicity of metabolites containing the 2,4-dichlorobenzoic acid moiety

In the previous evaluation, EFSA concluded that metabolites SYN547889 and its enantiomer NOA436613 are unlikely to be genotoxic (EFSA, 2017).

In the framework of the peer review, a data gap for further analysis of the results of the in vivo micronucleus test was set for metabolite CGA91305 (EFSA, 2017). An additional oral in vivo micronucleus test in mice (compliant with OECD TG 474 (OECD, 2016)) was submitted under this application and was negative. The RMS concluded that metabolite CGA91305 is unlikely to be genotoxic.

2.2. General toxicity of metabolites containing the 2,4-dichlorobenzoic acid moiety

Regarding general toxicity, further toxicological data for SYN547889 and NOA436613 in rats were submitted under this application: two single oral dose toxicity studies with toxicokinetic data, two 7-day oral studies and two oral dose range-finding prenatal developmental toxicity studies. According to the RMS, no conclusion on general toxicity of both metabolites SYN547889 and NOA436613 can be drawn because both enantiomers were tested together, and no relevant maternal and developmental no observed adverse effect level (NOAEL) could be derived. EFSA is of the opinion that testing both metabolites together could be considered appropriate.

Regarding general toxicity of CGA91305, an additional single oral dose toxicity study with toxicokinetic data, an oral 7-day and 14-day dose range-finding study and an oral prenatal developmental toxicity study in rats were provided under this application. The maternal and developmental NOAEL was set at 39.9 mg/kg body weight (bw) per day (Finland, 2020).
The RMS noted that according to the newly submitted prenatal developmental toxicity studies for metabolites SYN547889, NOA436613 and CGA91305, the metabolites could share the developmental toxicity potential (i.e. cranio-facial abnormalities including cleft palate) of the parent. EFSA is of the opinion that a more detailed qualitative and quantitative comparison to parent is missing for concluding on the toxicological profile of these metabolites.

2.3. Conclusion on the toxicological profile of metabolites containing the 2,4-dichlorobenzoic moiety

Based on the data available, EFSA cannot confirm the RMS’ assessment on metabolites SYN547889, NOA436613 and CGA91305. Overall, the available information is considered insufficient to conclude on the toxicological profile of the metabolites containing the 2,4-dichlorobenzoic acid, as data gaps still exist for CGA118244, CGA118245, CGA91304, CGA91305, SYN547889 and NOA436613 (EFSA, 2017).

3. Residues in plants

3.1. Nature of residues and methods of analysis in plants

Not relevant for the current assessment.

3.2. Magnitude of residues in plants

Following the decision on the non-renewal of the approval of propiconazole, all EU uses of plant protection products containing propiconazole had to be withdrawn and the data gaps related to the EU uses that were identified in the framework of the MRL review became obsolete.

4. Residues in livestock

Considering that all uses of the active substance in animal feed have been revoked, propiconazole residues would not be expected to occur in animal feed produced in the EU. For food of animal origin, MRLs were lowered to the LOQ. No further assessment is therefore required.

5. Consumer risk assessment

In the light of the recent decision by the Standing Committee on Plants, Animals, Food and Feed (Pesticide residues) to lower the MRLs for propiconazole in all commodities at the level of LOQ, the estimation of the short- and long-term dietary risk assessment for propiconazole and its metabolites is no longer relevant.

6. Conclusion and Recommendations

To address the data gaps identified in the framework of the MRL review (EFSA, 2015), additional trials supporting the authorisations on sweet corn, maize, barley, oats, wheat, rye and sugar beet and some information on the toxicological properties of the propiconazole metabolites convertible to 2,4-dichlorobenzoic acid were submitted by the applicant.

Following the decision on the non-renewal of the approval of propiconazole and the decision to lower the EU MRLs for propiconazole to the LOQ for all commodities, the data gaps identified in the MRL review are no longer relevant.

EFSA assessed the new information on the toxicological profile of propiconazole metabolites convertible to 2,4-dichlorobenzoic acid and concluded that the data available are not sufficient to address the data gap identified in the MRL review.

Considering the recent decision of the Standing Committee on Plants, Animals, Food and Feed (Pesticide residues) to lower the MRLs for propiconazole at the level of LOQ for all commodities, EFSA concluded that no further risk management follow-up actions are required for propiconazole.

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OECD (Organisation for Economic Co-operation and Development), 2016. Test No. 474: Mammalian Erythrocyte Micronucleus Test, OECD Guidelines for the Testing of Chemicals, Section 4, OECD Publishing, Paris, 26 July 2016.

Abbreviations

bw body weight
CIRCA (EU) Communication & Information Resource Centre Administrator
CS capsule suspension
GAP Good Agricultural Practice
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
MS Member States
MW molecular weight
NEU northern Europe
NOAEL no observed adverse effect level
NPD nitrogen/phosphorous detector
OECD Organisation for Economic Co-operation and Development
PAFF Standing Committee on Plants, Animals, Food and Feed
PBI plant back interval
PF processing factor
PHI pre-harvest interval
P_{ow} partition coefficient between n-octanol and water
RMS rapporteur Member State
WHO World Health Organization
### Appendix A – Used compound codes

| Code/trivial name(a) | IUPAC name/SMILES notation/InChiKey(b) | Structural formula(c) |
|----------------------|-----------------------------------------|-----------------------|
| Propiconazole (CGA 64250) | (2R5,4RS;2RS,4SR)-1-{2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-ylmethyl}-1H-1,2,4-triazole | ![Structural formula](image1) |
|                       | Clc1ccc(c(Cl)c1)Cl(Cn2ncnc2)OCC(CCC)O1 STJLVHWMYQCPB-UHFFFAOYSA-N | |
| 2,4-DCBA (CGA 177291) | 2,4-dichlorobenzoic acid | ![Structural formula](image2) |
|                       | OC(=O)c1ccc(Cl)cc1Cl ATCRIUVQKHMXSH-UHFFFAOYSA-N | |
| β-hydroxy alcohol (CGA118244) | 3,5-dideoxy-1,2-O-{1-[1-(2,4-dichlorophenyl)-2-(1H-1,2,4-triazol-1-yl)ethylidene]pentitol | ![Structural formula](image3) |
|                       | CC(O)CC1COC(Cn2ncnc2)(O1)c1ccc(Cl)cc1Cl ACQHZORIRZCPLG-UHFFFAOYSA-N | |
| γ-hydroxy alcohol (CGA118245) | 3-{2-(2,4-dichlorophenyl)-2-[(1H-1,2,4-triazol-1-yl)methyl]-1,3-dioxolan-4-yl}propan-1-ol | ![Structural formula](image4) |
|                       | Clc1ccc(c(Cl)c1)Cl(Cn2ncnc2)OCC(CCC(CO)O1 GZZNFYOGUUPAEU-UHFFFAOYSA-N | |
| Ketone (CGA 91304)    | 1-(2,4-dichlorophenyl)-2-(1H-1,2,4-triazol-1-yl)ethanone | ![Structural formula](image5) |
|                       | O=C(Cn1cnnc1)c1ccc(Cl)cc1Cl XOHMICFWUQPTNP-UHFFFAOYSA-N | |
| Alkanol (CGA 91305)   | (1RS)-1-(2,4-dichlorophenyl)-2-(1H-1,2,4-triazol-1-yl)ethanol | ![Structural formula](image6) |
|                       | OC(Cn1cnnc1)c1ccc(Cl)cc1Cl XCWBJOPHSVLGU-UHFFFAOYSA-N | |
| Code/trivial name(a) | IUPAC name/SMILES notation/InChiKey(b) | Structural formula(c) |
|---------------------|--------------------------------------|----------------------|
| 1,2,4-triazole (CGA 71019) | 1H-1,2,4-triazole  
c1ncnn1  
NSPMIYGKQJPBQR-UHFFFAOYSA-N | ![1H-1,2,4-triazole](image1) |
| Triazole alanine TA (CGA131013) | 3-(1H-1,2,4-triazol-1-yl)-D,L-alanine  
NC(Cn1cncn1)(=O)O  
XVWTOJHOHJIMQ-UHFFFAOYSA-N | ![3-(1H-1,2,4-triazol-1-yl)-D,L-alanine](image2) |
| Triazole acetic acid TAA (CGA142856) | 1H-1,2,4-triazol-1-ylacetic acid  
O=C(O)Cn1cncn1  
RXDBSQXFIBJSPR-UHFFFAOYSA-N | ![1H-1,2,4-triazol-1-ylacetic acid](image3) |
| SYN547889 | I: (2R,4R)-2-(2,4-dichlorophenyl)-2-(1H-1,2,4-triazol-1-ylmethyl)-1,3-dioxolane-4-carboxylic acid  
O=C(O)[C@@H]1CO[C@@](Cn2ncnc2)(O1)c1ccc(Cl)cc1Cl  
NUAGPTNJVKDMOR-YPMHNXCESA-N  
II: (2S,4S)-2-(2,4-dichlorophenyl)-2-(1H-1,2,4-triazol-1-ylmethyl)-1,3-dioxolane-4-carboxylic acid  
O=C(O)[C@@H]1CO[C@@](Cn2ncnc2)(O1)c1ccc(Cl)cc1Cl  
NUAGPTNJVKDMOR-WCQYABFASA-N | ![I:](image4) ![II:](image5) |
| NOA436613 | I: (2S,4R)-2-(2,4-dichlorophenyl)-2-(1H-1,2,4-triazol-1-ylmethyl)-1,3-dioxolane-4-carboxylic acid  
O=C(O)[C@@H]1CO[C@@](Cn2ncnc2)(O1)c1ccc(Cl)cc1Cl  
NUAGPTNJVKDMOR-DGCLKSJQSA-N  
II: (2R,4S)-2-(2,4-dichlorophenyl)-2-(1H-1,2,4-triazol-1-ylmethyl)-1,3-dioxolane-4-carboxylic acid  
O=C(O)[C@@H]1CO[C@@](Cn2ncnc2)(O1)c1ccc(Cl)cc1Cl  
NUAGPTNJVKDMOR-AAEUAGOBASA-N | ![I:](image6) ![II:](image7) |
IUPAC: International Union of Pure and Applied Chemistry; SMILES: simplified molecular-input line-entry system; InChIKey: International Chemical Identifier Key.
(a): The metabolite name in bold is the name used in the conclusion.
(b): ACD/Name 2019.1.3 ACD/Labs 2019 Release (File version N05E41, Build 111418, 3 September 2019).
(c): ACD/ChemSketch 2019.1.3 ACD/Labs 2019 Release (File version C05H41, Build 111302, 27 August 2019).