

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
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PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing (day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference see form PCT/ISA/220

FOR FURTHER ACTION See paragraph 2 below
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International application No. PCT/EP2020/059924	International filing date (day/month/year) 07.04.2020	Priority date (day/month/year) 11.04.2019
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International Patent Classification (IPC) or both national classification and IPC INV. C07D401/04 C07D403/04 A01N43/26 A61P33/00

Applicant SYNGENTA CROP PROTECTION AG
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1. This opinion contains indications relating to the following items:
- ☒ Box No. I Basis of the opinion
 - ☐ Box No. II Priority
 - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - ☐ Box No. IV Lack of unity of invention
 - ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
 - ☐ Box No. VI Certain documents cited
 - ☐ Box No. VII Certain defects in the international application
 - ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Fax: +49 89 2399 - 4465	Date of completion of this opinion see form PCT/ISA/210	Authorized Officer Sáez Díaz, R Telephone No. +49 89 2399-0	
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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed.
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. ☐ forming part of the international application as filed:
 - ☐ in the form of an Annex C/ST.25 text file.
 - ☐ on paper or in the form of an image file.
 - b. ☐ furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
 - ☐ in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>1-11, 13</u>
	No: Claims	<u>12</u>
Inventive step (IS)	Yes: Claims	<u>5</u>
	No: Claims	<u>1-4, 6-13</u>
Industrial applicability (IA)	Yes: Claims	<u>1-13</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

- 1 The present application relates to pyrazine derivatives of formula (I), intermediates thereof of formula (IIaa)-(IIae) and their use as pesticides.
- 2 Claim 11 relates to subject-matter considered by this Authority to be covered by the provisions of Rule 39.1(iv) / 67.1(iv) PCT. The patentability can be dependent upon the formulation of the claims. The EPO, for example, does not recognise as patentable claims to the use of a compound in medical treatment, but may allow claims to a product, in particular substances or compositions for use in a first or further medical treatment.
- 3 Reference is made to the following documents; the numbering will be adhered to in the rest of the procedure.

D1 WO 2013/092943 A1

D2 WO 2017/174158 A1

D3 WO 2016/091776 A1

Document D2 has been cited by the applicant in the description (Rule 5.1(a)(ii) PCT).

- 4 Claim 12 defines a plant propagation material treated with a compound of formula (I). The subject-matter of said claim cannot, however, be distinguished from the one of a plant propagation material that underwent the same treatment and from which external phenomena removed the compound as such, therefore this claim as presently formulated cannot be considered novel (Article 33(2) PCT).

No prior art document discloses pyrazine derivatives of the present formula (I) nor of formula (IIaa)-(IIae). The structurally closest compound can be found in document D3 useful in the treatment of several disorders, such as parasitic infections (compound 324). This prior art compound shows, however, a different substitution pattern of the pyrazine and the phenyl ring as the presently claimed one (specially the pyrazine ring is not substituted by a six-membered heteroaryl ring).

Therefore, the subject-matter of claims 1-11 and 13 is novel and meets the requirements of Article 33(2) PCT.

Document D1 describes compound 2.47 as a pesticide, which differs from the present derivatives at least through the absence of a pyrazine ring (pyridine ring instead). Therefore, the subject-matter of claims 1-11 and 13 is novel over D1.

Document D2 sets forth the pesticidal example 57 in table 2, which differs from the present derivatives through the absence of a pyrazine ring (triazole ring instead). Therefore, the subject-matter of claims 1-11 and 13 is novel over D2.

- 5 Document D1 is considered to be the closest prior art to the subject-matter of claims 1-13 as it discloses heteroaryl derivatives of formula (I) and their use as pesticides (compound 2.47, claims 1-61). Insofar as novel-subject-matter is concerned, the following assessment in view of the requirements of Article 33(3) PCT is given: The difference between the example compounds of D1 and the presently claimed compounds resides at least in the absence of a pyrazine ring. The problem to be solved by the present application is seen in the provision of alternative heteroaryl derivatives as pesticides.

The applicant has shown in the examples that certain compounds of the application have pesticidal activity. Starting from D1 and even in the light of D2, which discloses further pesticides (example 57), it would not be obvious for the person skilled in the art wanting to solve the above-mentioned problem to introduce multiple structural modifications (which are not taught or suggested by the prior art related to pesticides) to arrive at the structural design of the presently claimed compounds, which is therefore based on inventive ingenuity. The intermediates of formula (IIa)-(IIe) are also inventive by consequence.

However, in order to fulfil the requirements of Article 33(3) PCT, according to the problem solution approach, all alternatives of a claim should solve the technical problem underlying the claimed invention. In the present case, the number of alternative compounds falling within the scope of the present claims is such that it is unlikely that all of them possess the type and level of activity required to achieve the technical effect essential for the resolution of the problem. The active compounds according to examples show $R_1 = H$, $R_3 = CH_3$ and very specific R_2 moieties defined as M-1 to M-9, M-11 to M-13 making not credible that all embodiments embraced by the scope of present claims solve the posed problem. Thus the skilled person would have a reasonable doubt that the above requirement is fulfilled.

Therefore, at present only the subject-matter of claim 5 meets the requirements of Article 33(3) PCT.