

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
see form PCT/ISA/220

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
International application No. PCT/EP2019/055753	International filing date (day/month/year) 07.03.2019	Priority date (day/month/year) 16.03.2018
International Patent Classification (IPC) or both national classification and IPC INV. C07D405/12 A01N43/38 A01N43/76 A01N43/90 C07D417/14 C07D491/048		
Applicant SYNGENTA PARTICIPATIONS AG		

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 Bedel, Christian 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>4-12</u>
	No: Claims	<u>1-3</u>
Inventive step (IS)	Yes: Claims	<u>4-12</u>
	No: Claims	<u>1-3</u>
Industrial applicability (IA)	Yes: Claims	<u>1-12</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

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

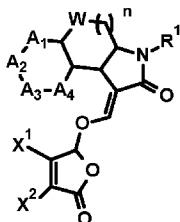
1 Reference is made to the following document:

Reference is made to the following documents:

- D1 WO 2013/139949 A1 (BAYER IP GMBH [DE]; CENTRE NAT RECH SCIENT [FR] ET AL.) 26 September 2013 (2013-09-26)
- D2 WO 2012/080115 A1 (SYNGENTA PARTICIPATIONS AG [CH]; LACHIA MATHILDE DENISE [CH] ET AL.) 21 June 2012 (2012-06-21)
- D3 WO 2013/174846 A1 (SYNGENTA PARTICIPATIONS AG [CH]) 28 November 2013 (2013-11-28)

2 The present application concerns :

A compound of formula (I)

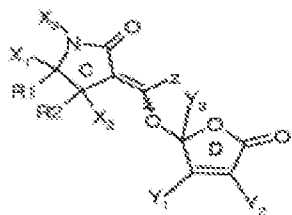


growth regulator.

and its use as a plant

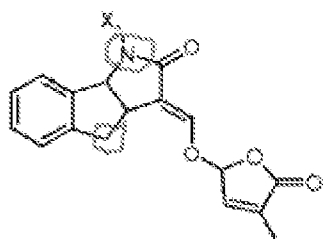
3 Novelty (Art. 33(2) PCT)

D1 discloses compounds of formula (I)

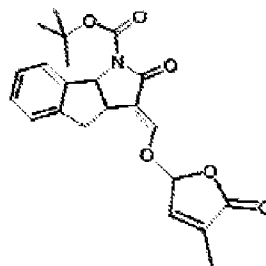


which scope overlaps with the present application in so far as in D1 (see claim 9) "*R1 and R2 can form an unsaturated non aromatic ... 5 membered carbocycle fused to another unsaturated, aromatic ... 6 membered carbocycle*", which encompasses the compounds as defined in present claim 1, the other substitution patterns being equivalent.

There is 2 possibilities to arrange this fused carbocycle ; one is as presently claimed when W is CH₂ and n=0 with the free carbone of the pentene ring on the same side as the nitrogen of the pyrrole ring and the other wherein the free carbon of the pentene is opposite to the nitrogen of the pyrrole as in the examples of D1, see for example on page 8:



(a) and cpd B, p.32



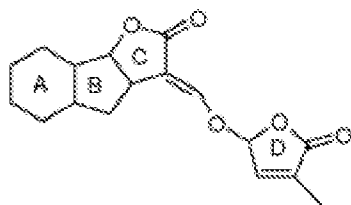
It is however clear that D1 in the wording of claim 9 encompasses the 2 possibilities. The compounds as presently claimed are a selection into one list of 2 possibilities, which cannot confer novelty.

Consequently the subject-matter of claims 1-3 is not novel as far as R₂ is H, W is CH₂ and n=0 because no new chemical teaching is provided.

The subject-matter of claim 4 is not disclosed because it is a selection in a further list of particular values of alkyl/alkoxy from more generic values (as disclosed in claim 10 of D1). Since no example of D1 falls within the scope of claim 4, its subject-matter can be considered as novel, as well as claims 5-8. Claims 9-12 can be considered as novel as far as they refer to compounds claims 4-8.

4 Inventive step (Art. 33(3) PCT).

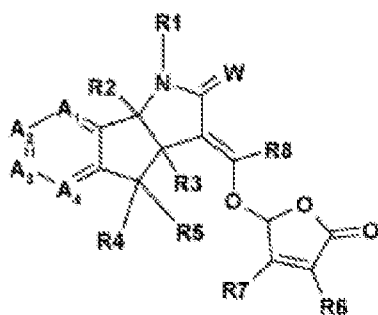
The present application aims at providing natural strigolactone phytohormones lactam derivatives for plant growth regulation.



strigolactone

D2 can be considered as the closest prior art as it discloses a whole series of examples with varied substitution pattern whereas D1 cites only one example.

D2 discloses the following compounds :



see also examples p.58-59, table B.

The compounds differ from the presently claimed compounds by the inversion of the free pentene carbon of the tri-cycle.

The biological tests provided by the applicant seem to hint towards an increase of activity when some compounds of the invention are tested compared to the corresponding compounds of D2 that are structurally the closest (see table 6 p.38-39, I-5 vs Z1Me of D1 or I-9 vs Z2 or I-13 vs Z2-M2).

The technical problem can be construed as how to provide enhanced plant growth regulators.

There is no hint in the prior art towards this structural modification.

Indeed, although the wording of claim 9 of D1 includes the theoretical possibility that the free carbon of the pentene and the pyrrole nitrogen are on the same side of the fused tri-cycle, there is no hint for the skilled person to think that the plant growth would be retained let alone enhanced in that case. The only example of D1 focuses on the other structural possibility as well as the prior art D2 and D3, by analogy with natural strigolactone phytohormone.

A skilled person would have no reason to think that such a structural modification is possible.

Therefore the subject-matter of claim 4 should be considered as inventive.

5 Claims 5-12 can be considered as inventive as far as they refer to claim 4.

Re Item VII

Certain defects in the international application

Claim 3 comprises all the features of claim 1 and is therefore not appropriately formulated as a claim dependent on the latter (Rule 6.4 PCT).

Re Item VIII

Certain observations on the international application

The term "acetonitrile" used in claims 1,3,7 and 8 generally designates the solvent CH₃CN and not the chemical group -CH₂CN which is the intended meaning. Clarification is required.