

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 81451-WO-ORG-P1	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/EP2018/081257	International filing date (<i>day/month/year</i>) 14 November 2018 (14-11-2018)	(Earliest) Priority Date (<i>day/month/year</i>) 16 November 2017 (16-11-2017)
Applicant SYNGENTA PARTICIPATIONS AG		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 6 sheets.

☒

It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language**, the international search was carried out 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))

b. ☐

This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6**bis**(a)).

c. ☐

With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐

Certain claims were found unsearchable (See Box No. II)

3. ☒

Unity of invention is lacking (see Box No III)

4. With regard to the **title**,

☒

the text is approved as submitted by the applicant

☐

the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒

the text is approved as submitted by the applicant

☐

the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. _____

☐

as suggested by the applicant

☐

as selected by this Authority, because the applicant failed to suggest a figure

☐

as selected by this Authority, because this figure better characterizes the invention

b. ☐

none of the figures is to be published with the abstract

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International application No.
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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

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International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. C07C209/26 C07C211/40 C07C45/44 C07C45/35 C07C45/54 C07C49/467 C07D213/803 ADD. According to International Patent Classification (IPC) or to both national classification and IPC								
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) C07C C07D Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data, CHEM ABS Data								
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>Y</td> <td>US 2016/157485 A1 (A.C. O'SULLIVAN, ET AL.) 9 June 2016 (2016-06-09) paragraphs [0458] - [0583]; claim 1; examples P2-P5, P17 and P24 & WO 2015/003951 A1 (SYNGENTA PARTICIPATIONS) 15 January 2015 (2015-01-15) cited in the application ----- -/--</td> <td>14 1-13,15</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	Y	US 2016/157485 A1 (A.C. O'SULLIVAN, ET AL.) 9 June 2016 (2016-06-09) paragraphs [0458] - [0583]; claim 1; examples P2-P5, P17 and P24 & WO 2015/003951 A1 (SYNGENTA PARTICIPATIONS) 15 January 2015 (2015-01-15) cited in the application ----- -/--	14 1-13,15
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Y	US 2016/157485 A1 (A.C. O'SULLIVAN, ET AL.) 9 June 2016 (2016-06-09) paragraphs [0458] - [0583]; claim 1; examples P2-P5, P17 and P24 & WO 2015/003951 A1 (SYNGENTA PARTICIPATIONS) 15 January 2015 (2015-01-15) cited in the application ----- -/--	14 1-13,15						
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.								
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family								
Date of the actual completion of the international search 31 January 2019		Date of mailing of the international search report 12/02/2019						
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer English, Russell						

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International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	M. TRUONG, ET AL.: "First synthesis of (1S,2S)- and (1R,2R)-1-amino-2-isopropylcyclobutanecarboxylic acids by asymmetric Strecker reaction from 2-substituted cyclobutanones", TETRAHEDRON: ASYMMETRY, vol. 14, no. 8, 1 April 2003 (2003-04-01), pages 1063-1072, XP004417917, Elsevier Science Publishers, Amsterdam, NL ISSN: 0957-4166, DOI: 10.1016/s0957-4166(03)00073-9 scheme 3; paragraphs 4.1, 4.2 and 4.3; compounds 3b, 3c -----	1-6, 11-13,15
A	M. YAMASHITA, ET AL.: "A new synthesis of cyclopentanones by the ring expansion of 1-acyl-1-[p-tolyl(or methyl)thio]cyclobutanes", TETRAHEDRON LETTERS, vol. 24, no. 1, January 1983 (1983-01), pages 79-82, XP055531499, Elsevier Science Publishers, Amsterdam, NL ISSN: 0040-4039, DOI: 10.1016/s0040-4039(00)81332-5 page 80; table 3; compounds 1a, 2a -----	1-6, 11-13,15
Y	WO 2015/178846 A1 (SP PROCESS DEVELOPMENT) 26 November 2015 (2015-11-26) -----	14
A	claim 1; example 25 -----	1-3,7-10
A	M. YAMASHITA, ET AL.: "A convenient ring formation of 3-aryl-2,2-dialkyl-2,3-dihydrobenzofurans from phenols and 2-aryl-2,2-dialkylacetaldehydes", TETRAHEDRON, vol. 60, no. 12, 18 February 2004 (2004-02-18), pages 2843-2849, XP004494265, Elsevier Science Publishers, Amsterdam, NL ISSN: 0040-4020, DOI: 10.1016/j.tet.2004.01.077 paragraph 4.2.5; compound 31 -----	1-3

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2018/081257

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2016157485	A1	09-06-2016	
		AU 2014289431 A1	21-01-2016
		CA 2917264 A1	15-01-2015
		CL 2016000017 A1	10-06-2016
		CN 105431414 A	23-03-2016
		DK 3019476 T3	16-04-2018
		EA 201600091 A1	30-06-2016
		EP 3019476 A1	18-05-2016
		ES 2664302 T3	19-04-2018
		HU E037057 T2	28-08-2018
		JP 2016528201 A	15-09-2016
		KR 20160029089 A	14-03-2016
		LT 3019476 T	10-04-2018
		PH 12015502814 A1	21-03-2016
		PL 3019476 T3	30-05-2018
		PT 3019476 T	27-03-2018
		UA 117251 C2	10-07-2018
		US 2016157485 A1	09-06-2016
		UY 35643 A	27-02-2015
		WO 2015003951 A1	15-01-2015

WO 2015178846	A1	26-11-2015	NONE

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-15

Processes involving the preparation and/or reaction of 2-substituted cyclobutanones.

1.1. claims: 1-10

Process for the preparation of enantiomerically and diastereomerically enriched N-(1-substituted cyclobutyl) amides in three steps from 1-substituted cyclopropanenitriles.

1.2. claims: 11-13

Process for the preparation of 2-substituted cyclobutanones from 1-substituted cyclopropanecarbaldehydes.

1.3. claim: 14

Process for the preparation of enantiomerically and diastereomerically enriched 2-substituted cyclobutylamines from 2-substituted cyclobutanones.

1.4. claim: 15

Process for the preparation of 2-substituted N-cyclobutenyl amides from 1-substituted cyclopropanecarbaldehydes.
