

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
International application No. PCT/US2015/037327	International filing date (day/month/year) 24.06.2015	Priority date (day/month/year) 24.06.2014
International Patent Classification (IPC) or both national classification and IPC INV. A01N25/02 A01N25/04 A01N25/16 A01N53/00 A01P7/04		
Applicant FMC CORPORATION		

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 Klaver, Jos 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>9, 10, 21, 25-31</u>
	No: Claims	<u>1-8, 11-20, 22-24</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-31</u>
Industrial applicability (IA)	Yes: Claims	<u>1-31</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). The subject-matter of claims 1 - 8, 11 - 20 and 22 - 24 is not novel (Art. 33 (2) PCT) in view of the citations of the International Search Report:

D1 = WO 2013/087430 A1 discloses storage stable emulsifiable concentrates (EC) comprising linear amides as defined by present claim 5 (D1: page 4, line 5 - 11 and Tables 3 and 4), an active ingredient such as bifenthrin (cf. D1: Table 3), (preferably blends of) nonionic and anionic surfactants, specifying alkoxylates and calcium or sodium dodecylbenzene sulfonate (D1: page 8, line 16 - 23 and Example 4) which contain less than 10% water (D1: page 7, line 25 - 26).

Upon dilution with water a stable emulsion is formed (D1: page 9, line 6 - 12).

Although it is not disclosed in D1 that the EC or its diluted embodiment forms a foam, it follows from the relative amounts of the various ingredients that the concentrate as well as the diluted embodiment may well be capable of forming foams. The formation of foams moreover also is highly dependent on spraying conditions such as nozzle construction or applied air pressure.

Therefore, D1 anticipates the subject-matter of present claims 1 - 7, 11 - 13, 20 and 22 - 24.

D2 = WO 2013/087430 also discloses such EC based on linear amide solvents in combination with a further organic solvent (ethylene or propylene carbonate) which may contain up to 12% (preferably up to 5%) water (D2: page 2, line 29 - 34). Exemplified EC's contain Fluxapyroxad or Pyraclostrobin in the solvent mixture 'Amid1' (a mixture of N,N-dimethyl-octanamide and N,N.-dimethyl decanamide as used in the examples of the application) in combination with nonionic surfactants, water and propylene glycol.

D2 does not mention the formation of foams, however, it is disclosed that foam inhibitors may be added to the concentrate (D2: page 8, line 20 and page 9, line 29/30) which indicates that the EC are prone to foam formation during application.

D2 hence anticipates the subject-matter of present claims 1, 2, 4 - 6, 8, 11 - 13, 20 and 22 - 24.

D3 = EP 488 668 A1 discloses a foam forming herbicidal composition which is obtained by diluting a herbicide surfactant combination and adding a low-boiling solvent as propellant. Further ingredients which may be added to this concentrate before it is further diluted include foam stabilizers such as glycerin or additional

solvents such as paraffin (D3: page 6, line 20 - 23). A further embodiment is a composition to be applied by a spraying apparatus which do not contain a propellant (D3: page 7, line 21 - 31). The surfactants in all embodiments generally comprise a combination of nonionic and anionic surfactants, including dodecylbenzene sulfonate or alkyl sulfates. It further is disclosed in D3 that raising the concentration of surfactant and/or addition of stabilizers results in an improved foam formation (D3: page 7, line 13 - 20; page 8, line 11 - 21).

D3 hence anticipates the foamable concentrate and foaming formulation as defined by present claims 1, 2, 4, 6 - 8, 11 - 20, 22 and 23.

(The expansion factor as defined by claims 17 - 19 strongly depends on the applied pressure in the spraying apparatus and is not considered a clear and unequivocal distinguishing feature since it is not necessarily a property that remains stable over a reasonable time.)

D4 = US 6,180,088 B1 discloses a foamable aerosol concentrate comprising an insecticide or fungicide, an organic solvent (glycol), a nonionic or anionic surfactant and up to 30% of a liquified gas propellant.

D4 hence anticipates the subject-matter of present claims 1, 2 and 6.

D5 = US 7,022,651 B1 discloses a foamable EC to be diluted with water comprising a vegetable oil, a foaming agent which is a anionic or nonionic surfactant (exemplifying lauryl sulfate), a stabilizer and optionally a pesticide or plant growth regulator (D5: col. 2). A (stable and tight) foam is formed by using spraying apparatus and forms a frost-protective layer on plants. It is further disclosed in D4 that the applied foam (e.g. with the apparatus of Figure 3) assists in the adhesion and spreading of actives on plant surface (D5: col. 7, line 49 - 57).

D5 hence anticipates the subject-matter of present claims 1, 2, 6, 7, 11 - 20 and 22 - 24.

D6 = WO 98/16106 A1 discloses a foamable O/W-emulsion comprising an insecticide (preferably a pyrethroid), a foaming agent selected from fatty acids fatty alcohols and lower alkanol amines, up to 10% organic solvent (preferably a hydrocarbon), a nonionic or anionic surfactant and preferably a propellant.

D6 hence anticipates the subject-matter of present claims 11 - 15, 17 - 20 and 22 - 24.

D7 = WO 2007/085899 A2 discloses a foamable O/W-emulsion comprising an insecticide (preferably a pyrethroid), an organic carrier (selected from a mineral oil, potent solvent, such as DMF, an insecticidal plant derived oil), emollients like glycols, nonionic and/or anionic surfactants, exemplifying lauryl sulfate), a foam stabilizer and a propellant.

D7 hence anticipates the subject-matter of present claims 11 - 15, 17 - 20 and 22 - 24.

2). Insofar as claims 1 - 31 define subject-matter that is novel with respect to D1 - D7 it is not considered to be based on an inventive step (Art. 33 (3) PCT) for the following reasons:

- Claims 9 and 10 define the presence of obvious ingredients of the concentrates as disclosed in D1 - D5 or obvious alternatives for the anionic surfactants as disclosed in these citations.
- It is furthermore pointed out that the preparation of emulsifiable concentrates as starting formulations for the diluted emulsions as disclosed in D6 or D7 is considered common practice in the art. The EC as defined by claims 1 - 10 - insofar as novel - hence also are considered obvious in view of D6/D7. See also Item VII below.
- It is also pointed out that the examples of the application only use bifenthrin as active ingredient with a particular solvent mixture. This specific combination is hardly representative for all possible combinations of solvent, active and/or surfactant combinations covered by the present claims. See also Item VII below.
- The use of the solvent systems as defined in present claim 5 as alternatives for the solvents envisaged in D7 is obvious in view of D1/D2, disclosing these linear amides as potent solvents for insecticides, in particular also for pyrethroids.
- Claim 21 defines a foaming W/O-emulsion whereas D1 - D7 generally disclose O/W-emulsions. It cannot be seen from the present application - in which the tested foaming formulations are O/W-emulsions- which particular non-obvious effect results from this in itself obvious alternative. Claim 21 hence is considered an obvious alternative for the foaming formulations of the prior art.
- Claims 25 - 31 define W/O-emulsions comprising bifenthrin, N,N-dimethylcapramide, glycerin and an alkyl sulfate.

The closest prior art of this formulation is defined by D2 which discloses an EC comprising an active ingredient,, a solvent system comprising N,N-dimethylcapramide ('Amid2': D2: examples) and a surfactant which concentrate contains in particular 1.5

to 5% water (D2: page 2, line 34). The active ingredient may be present in a concentration up to 60%, preferably up to 25%, most preferably 3 - 15% (D2: page 8, line 12 - 15).

The composition as defined by claims 25 - 31 differs from this citation in the specification of ingredients which is based on a selection from different possibilities disclosed in D2: bifenthrin is mentioned on page 6, line 42; alkyl sulfate on page 8, line 39 - 40, glycerin is mentioned as a antifreeze agent (D2: page 9, line 29) whereas the W/O emulsion follows from the low amount of water being present in the concentrate.

It cannot be seen from the examples on file which particular non-obvious effect results from the specific combination of ingredients or the W/O-formulation. The fact that a formulation within the scope of D2 is foaming is hardly surprising in view of the presence of surfactants and the indication in D2 that foam inhibitors may be necessary (D2: page 8, line 20 and page 9, line 29/30).

The compositions as defined by claims 25 - 31 hence are not considered to be based on an inventive step (Art. 33 (3) PCT).

3). The industrial applicability is evident (Art. 33 (4) PCT)

Re Item VII

Certain defects in the international application

1). Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in D1 - D7 is not mentioned in the description, nor are these documents identified therein.

2). In case the EC and the resulting diluted formulations of D1/D2 would not be foamable or foaming, it appears an undue burden for the skilled artisan to test all possible combinations of active ingredient, solvent system and surfactants in order to find formulations with the desired properties on the basis of the present disclosure. The examples only use bifenthrin in combination with a specific solvent system (known from D1/D2) and the description merely mentions ingredients to obtain foamable/foaming compositions which are generally known in the art for that purpose. The presently claimed formulations - insofar as novel - hence are either obvious from the prior art and obtainable by standard procedures or not obtainable without undue burden on the basis of the present disclosure (Art. 5 PCT).

3). It cannot be seen how the claimed concentrate as defined by claim 1 forms three phases, two of them comprising surfactants, the example forming a homogenous solution.

Re Item VIII

Certain observations on the international application

The following objections are raised under Art. 6 PCT (lack of clarity/ambiguous scope of protection):

- 1). The term 'foaming agent' in claim 1 is ambiguous: it follows from the description (par. [0042]) that surfactants are intended. However, in the art also other ingredients are within the scope of this term (see D6).
- 2). It cannot be seen how the claimed concentrate as defined by claim 1 forms three phases, two of them comprising surfactants, the example forming a homogenous solution.
- 3). Claim 11 defines a desired stability of "at least 90 days at ambient pressure". Apart from the fact that this defines a result to be achieved (without any clear indication how this result is to be obtained) it is not clear whether this stability refers to the stability of the foam (cf. claims 14 - 16) or to the stability of the emulsion (cf. claims 20 - 23).
- 4). The expansion factor as defined by claims 17 - 19 - which also is an unallowable result-to-be-achieved type of claim - is ambiguous insofar as it is not clear how stable this feature actually is.
- 5). The scope of claim 24 is not clear since the term 'insecticidally effective when administered at a rate of 1 gallon/acre (= 9,35 l/ha) or less' has no meaning without the indication of a concentration of the applied active. Moreover, it appears to be valid for virtually all insecticidal formulations of the prior art.