

PATENT COOPERATION TREATY

From the:
INTERNATIONAL SEARCHING AUTHORITY

To:

MAJUMDAR, Subhatosh
S. Majumdar & Co.,
5, Harish Mukherjee Road, West Bengal,
700 025 Kolkata
India

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing (*day/month/year*)
29 January 2019

Applicant's or agent's file reference
PCT00790

FOR FURTHER ACTION

See paragraph 2 below

International application No.
PCT/IB2018/058897

International filing date (*day/month/year*)
13 November 2018

Priority date (*day/month/year*)
17 November 2017

International Patent Classification (IPC) or both national classification and IPC

A01N 59/00 (2006.01) A01N 61/00 (2006.01) A01N 57/20 (2006.01) A01N 37/48 (2006.01) A01P 13/00 (2006.01)
A01P 15/00 (2006.01) A01P 21/00 (2006.01)

Applicant

UPL LTD

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 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

AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606,
AUSTRALIA
Email address: pct@ipaustalia.gov.au

Date of completion of this opinion

29 January 2019

Authorised Officer

Giuseppe Zagari
AUSTRALIAN PATENT OFFICE
(ISO 9001 Quality Certified Service)
Telephone No. +61262833130

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/IB2018/058897

Box No. I	Basis of this 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 (under 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 43 <i>bis</i> .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:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/IB2018/058897

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has, within the applicable time limit:
- ☐ paid additional fees
- ☐ paid additional fees under protest and, where applicable, the protest fee
- ☐ paid additional fees under protest but the applicable protest fee was not paid
- ☒ not paid additional fees
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- ☐ complied with
- ☒ not complied with for the following reasons:

See Supplemental Box for Details

4. Consequently, this opinion has been established in respect of the following parts of the international application:
- ☒ all parts
- ☐ the parts relating to claims Nos.

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY		International Application No. PCT/IB2018/058897									
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 <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; vertical-align: top;"> Novelty (N) </td> <td style="width: 40%; vertical-align: top;"> Claims 9, 12-13 Claims 1-8, 10-11, 14-19 </td> <td style="width: 30%; vertical-align: top; text-align: center;"> YES NO </td> </tr> <tr> <td style="vertical-align: top;"> Inventive step (IS) </td> <td style="vertical-align: top;"> Claims NONE Claims 1-19 </td> <td style="vertical-align: top; text-align: center;"> YES NO </td> </tr> <tr> <td style="vertical-align: top;"> Industrial applicability (IA) </td> <td style="vertical-align: top;"> Claims 1-19 Claims NONE </td> <td style="vertical-align: top; text-align: center;"> YES NO </td> </tr> </table>			Novelty (N)	Claims 9, 12-13 Claims 1-8, 10-11, 14-19	YES NO	Inventive step (IS)	Claims NONE Claims 1-19	YES NO	Industrial applicability (IA)	Claims 1-19 Claims NONE	YES NO
Novelty (N)	Claims 9, 12-13 Claims 1-8, 10-11, 14-19	YES NO									
Inventive step (IS)	Claims NONE Claims 1-19	YES NO									
Industrial applicability (IA)	Claims 1-19 Claims NONE	YES NO									
2. CITATIONS AND EXPLANATIONS: <u>CITATIONS</u> D1: Pesticide Information Profile, 'Sodium Chlorate' EXTTOXNET, Cornell University, Extension Toxicology Network, Published September 1995 [online], [retrieved from internet on 18/12/2018] <URL: http://pmep.cce.cornell.edu/profiles/exttoxnet/pyrethrins-ziram/sodium-chlorate-ext.html D2: US 3130036 A (John T. Young et al.) 21 April 1964 D3: Harvade[®]-5F, Harvest Growth Regulant for Cotton, product technical information, 2006, CHEMTURA Corporation, www.chemtura.com D4: Bennett, A.C. and Shaw, D.R.: "Effect of preharvest dessicants on weed seed production and viability" <i>Weed Technology</i>, 2000. Vol.14:530-538 D5: Art Gover, "Use and characteristics of herbicides for non-crop weed control", Pennsylvania State University, December 2008, pp1-52. D6: US 4613354 A (Rusch) 23 September 1986 D7: CN 105410016 A (QINGDAO HAIYICHENG MANAGEMENT TECHNOLOGY CO., LTD.) 23 March 2016 D8: CN 107212019 A (SUZHOU XINGCHUAN GARDENING GREENING CO., LTD.) 29 September 2017 D9: CN 106259438 A (QINGDAO YUEBANGNONG SEED INDUSTRY CO., LTD.) 04 January 2017 D10: CN 104255786 A (NANTONG SHI ZHUANG CHEMICAL CO., LTD.) 07 January 2015 D11: Ahma Faiz, M.A.: "Control of stenochlanea palustris with herbicides under rubber plantation" Proceedings, 13th Asian-Pacific Weed Science Society Conference. (1991), No. 1, pp. 127-141 D12: Ahmad Ramadhan, M.N. et al: "Strategy to manage herbicide resistant Eleusine indica in an oil palm nursery in jerantut area" Planter (2010) Vol86, No.1012, pp459-466 D13: GB 970968 A (Unites States Rubber Company) 23 September 1964 <u>NOVELTY (N)</u> The claims are nebulous as presently drafted and the meaning of the term 'combinations' is broad and may include compounds used separately/subsequently and may be applied at different times/stages of a crop or weed locus, and will inherently have an inhibitory mode of action effect in most circumstances. Note claim 7 recites the PSII may be selected from but not limited to, and therefore any PS-II is considered to fall within the scope of claim 7. The art is replete in combinations of well known dessicant/defoliant/harvest aid, sodium chlorate, among other alkaline earth or alkali metal chlorates in combination with other/another herbicides for the contemplated quick injury or defoliant purpose, as well											

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International Application No.

PCT/IB2018/058897

as herbicidal purpose. Almost all combinations of a chlorate with another co-herbicide imparts some synergistic effect improving the observable effect of chlorate alone or by the co-herbicide alone.

D1 discloses the active ingredient sodium chlorate (a non-selective contact herbicide; defoliant, dessiccant, harvest aid) is found in a variety of commercial herbicides. Some trade names for products containing sodium chlorate include Atlacide, Defol, De-Fol-Ate, Drop-Leaf, Fall, Harvest-Aid, Kusatol, Leafex, and Tumbleleaf, for use in crops as per claim 14, which are also known to defoliate as well as control weeds within the meaning of claims 16-17. The compound may be used in combination with other herbicides such as atrazine, 2,4-D, bromacil, diuron, and sodium metaborate (whole document). These combinations disclosed in D1 fall within the scope of claims 1-3, 7, 10-11, 14-17, 19 and therefore are not novel over D1.

D2 discloses compositions of sodium chlorate and sodium metaborate co-crystals with additional herbicides, such as auxin inhibitors among other PS-II inhibitors for the purpose contemplated in the present specification. These combinations are so well known for their purpose that application to weeds or crops is implicit in the disclosure, and falling within the scope of claims 1-3, 7, 10-11, 14-17, 19 (abstract; col.3, lns 3-70; claims) and therefore these claims not novel over D2.

D3 discloses combinations of dimethipin (Harvade®-5F plus sodium chlorate for dessicating/defoliating cotton crops (see whole document, pg 4of 5, item 2 under heading Tank mix combinations for stripper and other irrigated cotton). Therefore claims 1, 2, 14-16, 19 are not novel over D3.

D4 discloses combinations of sodium chlorate with either glyphosate, oxyfluorfen, paraquat or bromoxynil for controlling weeds and dessication of species such as pitted morningglory among others (abstract; Tables; whole document). Glufosinate is reported in the citation, however there is no mention of any combinations of glufosinate with any other active ingredient or chlorate. Therefore claims 1-4, 6-7, 11, 14-19 are not novel over D4.

D5 discloses Pramitol 5 PS, combinations of sodium metaborate + sodium chlorate + prometon + simazine (Tables 12-13; p.47 rhc - p.48, lhc Pramitol 5 PS combination products), for weed control, highlighting prometon (PS-II inhibitor) to have quicker control from postemergence applications, then tank-mix a burn-down herbicide (i.e. sodium chlorate). Therefore, claims 1-3, 7, 14-15, 17, 19 are not novel over D5.

D6 discloses combinations of phenylurea derivatives and sodium chlorate, providing synergistic effects for dessicant/defoliant purpose in preparing crop for harvest setting contemplated in present specification (abstract; col.1, ln 40 - col.2, ln 66; Example 19; claims). Therefore, claims 1-3, 7, 14-16, 19 are not novel over D6.

D7 (and referring to machine translation) discloses combination/compositions of cotton defoliant consisting of ethephon, pyraflufen (a PPO-inhibitor and formulation equivalent to pyraflufen-ethyl), hydroxyquinoline, chlorate, carrageenan, water, and a synergist for pyraflufen such as thidiazuron (a well known inhibitor of cytokinin oxidase/dehydrogenase enzyme). Therefore, claims 1-3, 7, 14-16, 19 are not novel over D7.

D8 (and referring to machine translation) discloses herbicidal combination/compositions comprising sodium chlorate + bentazone (PS-II inhibitor) + oxyfluorfen (PS-II inhibitor), mefenacet (inhibits cell division/growth) + thifensulfuron (ALS inhibitor) as well as auxiliaries for weed control (abstract; summary; claims). Therefore, claims 1-3, 6-7, 11, 14-15, 17, 19 are not novel over D8.

D9 (and referring to machine translation) discloses combination/compositions of cotton defoliant comprising magnesium chlorate + thidiazuron + diuron (PS-II inhibitor) + hydroxyquinoline + pyraflufen (PPO inhibitor) as synergist + chlorate + calcium oxide (abstract; summary; embodiments; claims). Therefore, claims 1-3, 6-7, 14-16, 19 are not novel over D9.

D10 (and referring to machine translation) discloses a herbicide comprising butralin, trichloroacetic acid, sodium chlorate, proposichlor, acetochlor, lactofen, fomesafen, quizalofop-p-ethyl, bispyribac-sodium, auxiliary agent and water (abstract; embodiments; claims). Therefore claims 1-3, 6, 8, 11, 14-15, 17, 19 are not novel over D10.

D11 discloses control of weeds under rubber plantation using compositions/combinations of glufosinate and sodium chlorate, highlighting its glutamine synthetase inhibitor activity, and thus deprives claim 5 and the like in claim 11, from novelty. Moreover, D11 discloses combinations of 2,4-D with sodium chlorate and paraquat with sodium chlorate, and further describing 'slashing, scorching and regeneration' among the results and therefore indicative of both dessicating/defoliant as well as weed control (Tables 2, 4, 7; Trials 4, 5, 9, 10; Figs 4, 5, 7). Therefore, claims 1-3, 5, 11, 15-17, 19 are not novel over D11.

D12 discloses combinations of sodium chlorate with glufosinate derivative, as well as combinations of ametryn, atrazine in mixture with fluazifop-butyl and sodium chlorate (abstract; Tables 3, 5; Experiment 2; conclusion). Therefore, claims 1-3, 5, 7-8, 11, 15, 17, 19 are not novel over D12.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International Application No.

PCT/IB2018/058897

None of D1-D13 disclose combinations of a metal chlorate with specifically acifluorfen of claim 13, or specifically magnesium chlorate as per claim 12, or any of the specified ALS inhibitor herbicides recited in claim 9. Therefore claims 9, 12-13 are novel and therefore comply with PCT Article 33(2).

INVENTIVE STEP (IS)

Given the above novelty objection, claims 1-8, 10-11, 14-19 do not involve an inventive step for the reasons above.

All of the metal chlorates are known, and for their purpose as defoliant/dessicant and operate in their normal function to a variety of crops/weeds. For example, whilst D11 and D12 do not specify 'magnesium' chlorate as per claim 12, it is considered that alternative metal chlorates, such as magnesium chlorate represents an obvious alternative to sodium chlorate in the art. Therefore claim 12 is obvious over any one of D1-D12 and common general knowledge in the art.

All of the actives are known, as well as having an inhibitory mode of action, or well known auxin and therefore pose their normal function. Claims 9 and 13 are thus considered obvious alternative co-herbicides to be used in the art for both defoliation and weed control. It is expected that any co-herbicide, and based on its mode of action, will be understood by a person skilled in the art to place further stress on a weed/plant. Affecting other modes of action at the same time with a chlorate will produce expected results with no more than mere routine to determine the relative amounts of each to produce either quick injury, dessication or weed/plant death. For example, D13 discloses regrowth inhibitors which inhibit the regrowth of cotton foliage after defoliation will generally be applied to the plants in admixture with a conventional chemical defoliant such as magnesium chlorate among others (pg.3, lns 38-47).

When combined with non-selective chlorate, the art is replete in showing enhanced results against weeds or defoliation, and therefore alternative co-herbicides absent any surprising result merely amount to obvious combinations that a person skilled in the art may select as well as expect a weed control or defoliant/dessicant result. Therefore, claims 1-19 are obvious in the light of D1-D12 representative of many alternative co-herbicides that demonstrate the contemplated result when combined with a metal chlorate.

Claims 1-19 do not involve an inventive step and therefore do not comply with PCT Article 33(3).

INDUSTRIAL APPLICABILITY (IA)

The invention defined in the claims is considered to meet the requirements of Industrial Applicability under Article 33(4) of the PCT because it can be made by, or used in, industry.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International Application No.

Box No. VIII Certain observations on the international application

PCT/IB2018/058897

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:

Clarity

Glufosinate is a glutamine synthetase inhibitor. Claim 5 incorrectly groups glufosinate and bialaphos as EPSP synthase inhibitors (which should be for glyphosate). For the purpose of this search and opinion, Glufosinate, bialaphos and glyphosate EPSP synthase inhibitor herbicides have been searched in claims 4 and 5.

Claim 5 lacks clarity after the word bialaphos, it reads 'and the like'. It is not possible to determine what 'and the like' may constitute. For the purpose of this search and opinion, claim 5 is construed to only glufosinate or bialaphos or their combinations.

Acifluorfen of claim 13 is misspelt acilfuorfen.

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY Supplemental Box	International Application No. PCT/IB2018/058897
Continuation of: Box IV This International Application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. This Authority has found that there are different inventions based on the following features that separate the claims into distinct groups: 1. Claims 1-3, 11, 14-19 (in part) and claim 4 (in full). The feature of, glutamine synthetase inhibitors, is specific to this group of claims. 2. Claims 1-3, 11, 14-19 (in part) and claims 5, 12 (in full). The feature of, EPSP synthase (i.e. glufosinate), is specific to this group of claims. 3. Claims 1-3, 11, 14-19 (in part) and claims 6, 13 (in full). The feature of PPO inhibitors (e.e. acifluorfen), is specific to this group of claims. 4. Claims 1-3, 11, 14-19 (in part) and claim 7 (in full). The feature of PS-II inhibitors, is specific to this group of claims. 5. Claims 1-3, 11, 14-19 (in part) and claim 8 (in full). The feature of acetyl CoA carboxylase inhibitors, is specific to this group of claims. 6. Claims 1-3, 11, 14-19 (in part) and claim 9 (in full). The feature of ALS inhibitors, is specific to this group of claims. 7. Claims 1-3, 11, 14-19 (in part) and claim 10 (in full). The feature of auxins, is specific to this group of claims. PCT Rule 13.2, first sentence, states that unity of invention is only fulfilled when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding special technical features. PCT Rule 13.2, second sentence, defines a special technical feature as a feature which makes a contribution over the prior art. When there is no special technical feature common to all the claimed inventions there is no unity of invention. In the above groups of claims, the identified features may have the potential to make a contribution over the prior art but are not common to all the claimed inventions and therefore cannot provide the required technical relationship. The only feature common to all of the claimed inventions and which provides a technical relationship among them is metal chlorate and at least another herbicide. However this feature does not make a contribution over the prior art because it is disclosed in: CN106259438A (hormonal type, auxin ethylene production thidiazuron) cited by the Applicant on page 2, ln 10 of present specification. Therefore in the light of this document this common feature cannot be a special technical feature. Therefore there is no special technical feature common to all the claimed inventions and the requirements for unity of invention are consequently not satisfied <i>a posteriori</i>. Although the Applicant did not pay additional fees, all claims were subsequently searched.	