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- with international search report (Art. 21(3))
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(54) Title: IMPROVEMENTS IN AND RELATING TO FERTILISER COMPOSITIONS

(57) Abstract: An aqueous urease inhibitor and/or nitrification inhibitor formulation including: i) an aqueous wax dispersion comprising: substantially 10-50% by weight high melting point emulsifying wax; water to make up to 100%; ii) at least one inhibitor active; wherein the amount of inhibitor active(s) is/are: 1wt% -30wt% of the aqueous wax dispersion at i); iii) a dispersing clay; wherein the amount of dispersing clay is 5wt% -50wt% of the aqueous wax dispersion at i).

PATENT COOPERATION TREATY

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

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3240 Hamilton
New Zealand

PCT

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

Date of mailing
(day/month/year) 16 September 2021

Applicant's or agent's file reference
312012PCT

IMPORTANT NOTIFICATION

International application No.
PCT/NZ2020/050087

International filing date (day/month/year)
10 August 2020

Priority date (day/month/year)
08 August 2019

Applicant
SOUTHSTAR TECHNOLOGIES LIMITED

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translations to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

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PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 312012PCT	FOR FURTHER ACTION See Form PCT/IPEA/416																	
International application No. PCT/NZ2020/050087	International filing date (<i>day/month/year</i>) 10 August 2020	Priority date (<i>day/month/year</i>) 08 August 2019																
International Patent Classification (IPC) or national classification and IPC C05G 3/90 (2020.01) C05G 5/30 (2020.01) C05C 9/00 (2006.01) C09D 191/06 (2006.01)																		
Applicant SOUTHSTAR TECHNOLOGIES LIMITED																		
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of 4 sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☒ (<i>sent to the applicant and to the International Bureau</i>) a total of 9 sheets, as follows: ☒ sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions). ☐ sheets containing rectifications not taken into account by this Authority because they were not available at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4bis, 70.2(e), 70.16 and 91.2). ☐ Superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application filed, as indicated in item 4 of Box No. I and the Supplemental Box (see Rule 70.16(b)). b. ☐ (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing, in the form of an Annex C/ST.25 text file, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 3ter of Annex C of the Administrative Instructions). 4. This report contains indications relating to the following items: <table style="width: 100%; border: none;"> <tr><td>☒ Box No. I</td><td>Basis of the report</td></tr> <tr><td>☐ Box No. II</td><td>Priority</td></tr> <tr><td>☐ Box No. III</td><td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td></tr> <tr><td>☐ Box No. IV</td><td>Lack of unity of invention</td></tr> <tr><td>☒ Box No. V</td><td>Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement</td></tr> <tr><td>☐ Box No. VI</td><td>Certain documents cited</td></tr> <tr><td>☐ Box No. VII</td><td>Certain defects in the international application</td></tr> <tr><td>☐ Box No. VIII</td><td>Certain observations on the international application</td></tr> </table>			☒ Box No. I	Basis of the report	☐ 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 Article 35(2) 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
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Date of submission of the demand 02 June 2021	Date of completion of this report 16 September 2021																	
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaaustralia.gov.au		Authorised officer Karl Heys AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. +61262832725																

Box No. I

Basis of the report

1. With regard to the **language**, this report 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)).
- ☐ publication of the international application (under Rule 12.4(a)).
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a) and (b)).
2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):
- ☐ the international application as originally filed/furnished, or
- ☒ the description: pages **1-17** , as originally filed/furnished
pages , received by this Authority on with the letter of
- ☒ the claims: Nos. , as originally filed/furnished
Nos. , as amended (together with any statement) under Article 19,
Nos. **1-16** , received by this Authority on **23 August 2021** with the letter of **23 August 2021**
- ☒ the drawings: pages **1/4-4/4** , as originally filed/furnished
pages , received by this Authority on with the letter of
- ☐ a sequence listing - see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (specify):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (*c-bis*)):
- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (specify):
5. ☐ This report has been established:
- ☐ taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-*bis*) and 70.2(e)).
- ☐ without taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.4*bis* and 70.2(e)).
6. With regard to top-up searches (Rules 66.1*ter* and 70.2(f)):
- ☒ A top-up search was carried out by this Authority on 30 June 2021.
- ☐ Additional relevant documents have been discovered during the top-up search.
- ☐ No top-up search was carried out by this Authority because it would serve no useful purpose.
7. ☐ Supplementary international search report(s) from Authority(ies)
has/have been received and taken into account in establishing this report (Rule 45*bis*.8(b) and (c)).

* If item 4 applies, some or all of those sheets may be marked "superseded."

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1-16	YES
	Claims NONE	NO
Inventive step (IS)	Claims 1-16	YES
	Claims NONE	NO
Industrial applicability (IA)	Claims 1-16	YES
	Claims NONE	NO

2. CITATIONS AND EXPLANATIONS:**CITATIONS**

D1: WO 2015/034375 A1 (SOUTH STAR FERTILIZERS LIMITED) 12 March 2015
D2: US 2764499 A (ROTHERUS B. PORTER Jr) 25 September 1956
D3: US 5743949 A (KAINZ) 18 April 1998
D4: WO 2018/134765 A1 (KOCH AGRONOMIC SERVICES, LLC) 26 July 2018
D5: US 2018/0208513 A1 (SABIC GLOBAL TECHNOLOGIES B.V.) 26 July 2021
D6: EP 2456737 B1 (SKW STICKSTOFFWERKE PIESTERITZ GMBH) 19 April 2017

NOVELTY (N)

Claims 1-16 are novel and therefore comply with PCT Article 33(2).

Claim 1 defines an aqueous coating composition of the urease inhibitors/nitrification inhibitors NBPT, DMPP, NPPT and/or DMPSA containing a high melting point emulsifying wax in the form of an aqueous dispersion and a dispersing clay.

D1 discloses a coating composition for fertilizers containing an amount of water and clay where the water component is mixed with a hydrophobic carrier in the form of an emulsion which may be a wax (abstract, claims). Example 8 includes a wax as the hydrophobic component including palm wax (99g of 765g of emulsion so 12%), kaolin 330g, guar gum 3g and the remains water. Additionally, throughout this citation it discusses the addition of a metallic oxide layer outside the clay containing coating layer, where this is discussed as being any suitable trace element containing material. The two most discussed and exemplified are MgO or SiO₂ (see page 19 final paragraph and first paragraph of page 20). The clay as discussed in D1 (sub 20 micron and inert) (D1 claims 16, 19 & 25), and most preferred size ranges of MgO coating materials (sub 45 micron) (D1 page 19 final paragraph, claim 8 & 23), are both identified in D1. The coating composition contains xanthan gum or guar gum to stabilise the composition. D1 does not disclose the inclusion of nitrification/urease inhibitors let alone the specific ones as defined in the present inventions of the present invention as a result it does not anticipate the present claims.

D2 discloses a method of forming wax based aqueous dispersions containing clay components, where it is discussed that the clay would be below 1 micron but up to 10-15 microns (see col 1 lines 63-67, abstract, claims). It discusses heating the wax component to 10-15 °F above the liquifying point before addition to water and forming into emulsion (see top of col 3) with this liquifying point being preferably between 110 °F (43.3 °C) to 200 °F (93.3 °C). D2 discusses that any waxes would be expected to achieve a suitable result such as montan and carnauba waxes (see col 3 lines 27-36). Multiple examples apply paraffin waxes and montan waxes within the preferred ranges to form a stable wax emulsion which is subsequently combined with clay materials. D2 fails to disclose the inclusion of the specific nitrification/urease inhibitors of the present invention as a result it does not anticipate the present claims.

D3 discloses the formation of stable wax dispersion involving micronized wax being combined with a dispersing agent to form a stable aqueous dispersion (abstract). The examples involve the use of cellulose ethers as this dispersion agent (see claims, examples). The dispersing agent are a range of known derivatives of polymeric carbohydrate derivatives such as cellulose derivatives or bean flour derivatives such as guar (col 3 lines 11-21). D3 does not disclose the inclusion of nitrification/urease inhibitors let alone the specific ones as defined in the present inventions of the present invention as a result it does not anticipate the present claims.

D4 discloses the formation of herbicides combining urea with an acidic fertilizer such as phosphates (abstract, page 3 lines 5-8, claims). This document discusses that it is known that the ability of the nitrification/urease inhibitor to function in the presence of Form PCT/IPEA/409 (Box V) (revised January 2019)

such acidic environments so aims to solve this problem and extend shelf life of such materials (see background). The solution is to form a coating layer on the urea surface with agents leading to a basic (above pH7 conditions) which is applied to both the urea and the acidic fertilizer or potentially only one of the other (page 20 lines7- page 21 line 2). The basic material may be substituted or unsubstituted carboxylic acid or sulphonic acid salts or alternatively metal oxides, hydroxides or alkoxides or amines. However, in many examples MgO is identified as the preferred option (see examples, disclosure page 22 line 24- page 23 line 19). The coating layers on the fertilizer can contain a wax component (page 25 lines 24-28). The examples include combinations where the MgO is coated outside of the layer containing NBPT or are coated in a layer composing both the MgO and NBPT. D4 differs from the present claims by failing to explicitly disclose that the coating must have the nitrification/urease inhibitor in an aqueous wax emulsion with clay, so D4 does not anticipate the present claims.

D5 discloses a granular fertilizer material containing urea and urease/nitrification inhibitors to control the breakdown and release of the urea [0073]-[0075]. It notes that patents already apply inhibitors although do not solve the issue of inhibitors such as NBPT being sensitive to temperature and pH [0075]-[0076]. It discloses that a range of inhibitor agents are known ([0097], claim 3), and the application of a wax component to protect the inhibitor components is established in the art [0079], [0081]. It discloses using the combination of a buffering agent to stop the pH changing too dramatically and a wax material to protect the inhibitor component, where one of the most preferred “buffering agents” is MgO ([0160], [0261], claim 4). Although D5 discloses that the inhibitor component is applied in the presence of a wax, it fails to anticipate the present claims as it does not disclose the inhibitor component as envisaged by the current application being applied in an aqueous wax dispersion.

D6 (viewed as a translation from google patent on 16/11/2020) discloses a treatment of urea particles by coating with a wax and an inhibitor compound based on phosphoric acid amide derivative to enhance storage stability and reduce urea loss. The examples exemplify a wax which is melted at 80 degrees before being sprayed in the presence of the inhibitor compound to treat the surface of the fertilizer particles (see examples and claims 1 & 10-11). The disclosure of D6 is not considered to anticipate the present claims as it does not apply an aqueous dispersion of wax to form the coated fertilizer.

Claims 1-16 are novel as none of documents D1-D6 individually disclose the combination of an inhibitor component selected from NBPT, DMPP, NPPT or DMPSA in the form of a wax based aqueous suspension based on high melting point emulsifying waxes combined with clay.

INVENTIVE STEP (IS)

The closest prior art to the aqueous coating composition of the present invention appears to be D1 as it only lacks the specific inhibitor agents of the present invention. Prior art documents in the art of fertilizer protection (see D4 or D5) teach the applications of agents such as NBPT as fertilizer ureas/nitrification inhibitors. However, both D4 and D5 do not apply this inhibitor agent in the form of an aqueous emulsion/suspension but in the presence of wax-based carriers to protect this inhibitor agent from degradation. The present description discusses how the present combination results in a situation where inhibitors such as NBPT form a stable emulsion in the presence of the high melting point wax and clay components which is further stabilised by thickeners resulting a stable aqueous suspension which can be stored and applied to fertilizer components when required (see present description page 3 lines 21-23, page 17 lines10-16). This is discussed as being surprising as agents such as NBPT are known to be unstable in water and crystallise (page 17 line 13). As a result, it is considered that this aqueous inhibitor dispersion of claim 1 and narrower independent claims 6 & 7 are not obvious in light of the prior art and therefore involve an inventive step. The remaining claims 2-5 & 8-16 are dependent on claim 1 and embody further aspects of the inventive concept and therefore also meet the requirements of Article 33(3) of the PCT.

All of claims 1-16 involve an inventive step and therefore 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.

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23 August 2021
AUCKLAND OFFICE

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Australia

For: Karl Heys

RESPONSE TO WRITTEN OPINION

Southstar Technologies Limited

PCT Application No. PCT/NZ2020/050087

"Improvements in and Relating to Fertiliser Compositions"

Our Ref: 312012PCT

Dear Karl

We refer to the Written Opinion dated 30 June 2021 and in relation to the objections raised, we comment as follows.

Inventive Step

The examiner objects to claims 18-19 as not being inventive. In the interest of progressing receipt of a favourable IPRP only, the applicant has deleted these claims, but reserves its right to pursue these claims in future.

This objection is now rendered moot.

Further Observations

We have made further amendments to the claims to provide clarity to the claims, as suggested by the examiner. In particular:

Claims 4 and 10 (now claim 9) have been amended to be dependent of claim 3.

The applicant disagrees with the examiner. However solely to progress receiving a favourable Written Opinion Claim 9 has been deleted.

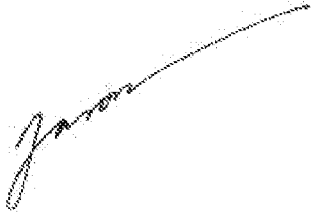
Conclusion

Having regard to the foregoing the applicant looks forward to a favourable further Written Opinion/ International Preliminary Report on Patentability.

JAMES & WELLS

CHAMPIONS
OF INNOVATION.

Yours sincerely
James & Wells

A handwritten signature in black ink, appearing to read 'Jason Rogers', written in a cursive style.

Jason Rogers
Partner
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Enclosure: Claim Amendments (tracked & clean)

WHAT WE CLAIM IS:

1. An aqueous urease inhibitor and/or nitrification inhibitor coating formulation including:
 - i) an aqueous wax dispersion comprising:
 - substantially 10-50% by weight high melting point emulsifying wax;
 - water to make up to 100%;
 - ii) at least one inhibitor active selected from NBPT, DMPP, NPPT and/or DMPSA;
 - wherein the amount of inhibitor active(s) is/are substantially: 1wt% - 30wt% of the aqueous wax dispersion at i);
 - iii) a dispersing clay
 - wherein the amount of dispersing clay is 5wt% -50wt% of the aqueous wax dispersion at i).
2. An aqueous urease inhibitor and/or nitrification inhibitor coating formulation as claimed in claim 1 further including:
 - a xanthan or guar gum

wherein the amount of xanthan or guar gum is 0.25wt% - 1wt% of the total aqueous wax dispersion at i).
3. An aqueous urease inhibitor and/or nitrification inhibitor coating formulation as claimed in claim 1 wherein the high melting point emulsifying wax is mineral wax or plant-based wax.
4. An aqueous urease inhibitor and/or nitrification inhibitor coating formulation as claimed in claim 3 wherein the mineral wax is a montan wax.
5. An aqueous urease inhibitor and/or nitrification inhibitor coating formulation as claimed in claim 1 wherein the clay is inert and has a particle size of substantially 20 microns or less.
6. An aqueous urease inhibitor and/or nitrification inhibitor coating formulation including:
 - i) an aqueous wax dispersion comprising:
 - 10% by weight high melting point emulsifying wax in the order of 70 kg;

- 90% water in the order of 630 kg;
 - ii) an inhibitor active selected from one of the following: 210 kg NBPT; 210 kg DMPP; 210kg NPPT; 210kg DMP SA; or a 210kg 50:50 mixture NBPT and DMPP;
 - iii) 100 kg dispersing clay;
 - iv) 2.5kg xanthan gum.
7. An aqueous urease inhibitor and/or nitrification inhibitor coating formulation
- i) an aqueous wax dispersion comprising:
 - 30% by weight high melting point emulsifying wax in the order of 210kg ;
 - 70% water in the order of 490kg;
 - ii) 200kg NBPT or 200kg DMPP;
 - iii) 100kg dispersing clay;
 - iv) 2.5kg guar gum.
8. An aqueous wax dispersion which includes NBPT therein 1wt% - 30wt% of the aqueous wax dispersion in claim 1.
9. An aqueous wax dispersion as claimed in claim 3 wherein the plant-based wax is selected from:
- carnauba wax;
 - rice bran wax.
10. A fertiliser composition which includes a nutrient source in the form of a fertiliser granule or chip, the granule or chip coated with an aqueous urease and/or nitrification inhibitor coating formulation as claimed in any one of the preceding claims.
11. A fertiliser composition as claimed in claim 10 wherein the composition comprises a further outer layer of MgO.
12. A fertiliser composition as claimed in claim 11 wherein the amount of MgO added is 2% of the total weight of the fertiliser composition including the MgO.
13. A fertiliser composition as claimed in claim 11 wherein the MgO has a particle size of substantially 45 micron or less.

14. A fertiliser composition as claimed in any one of claims 10 – 13 wherein the fertiliser chip or granule is urea.
15. A fertiliser blend including a quantity of a fertiliser composition as claimed in claim 13 together with a quantity of a fertiliser selected from granular or chip forms of:
- Single super phosphate;
 - Diammonium phosphate
 - Monoammonium phosphate;
 - Ammonium polyphosphate;
 - Ammonia sulphate;
 - Potassium chloride;
 - Potassium sulphate;
 - Potassium carbonate; or
 - Potassium hydrochloride.
16. A method of protecting NBPT and/or DMPP from reacting with an acidic fertiliser granule comprising the steps of:
- a) coating an aqueous urease inhibitor and/or nitrification inhibitor coating formulation as claimed in claim 1 as a first layer onto a fertiliser or mineral granule or chip;
 - b) coating a second layer of MgO onto said first layer.

WHAT WE CLAIM IS:

1. An aqueous urease inhibitor and/or nitrification inhibitor coating formulation including:
 - i) an aqueous wax dispersion comprising:
 - substantially 10-50% by weight high melting point emulsifying wax;
 - water to make up to 100%;
 - ii) at least one inhibitor active selected from NBPT, DMPP, NPPT and/or DMPSA;
 - wherein the amount of inhibitor active(s) is/are substantially: 1wt% - 30wt% of the aqueous wax dispersion at i);
 - iii) a dispersing clay
 - wherein the amount of dispersing clay is 5wt% -50wt% of the aqueous wax dispersion at i).
2. An aqueous urease inhibitor and/or nitrification inhibitor coating formulation as claimed in claim 1 further including:
 - a xanthan or guar gum

wherein the amount of xanthan or guar gum is 0.25wt% - 1wt% of the total aqueous wax dispersion at i).
3. An aqueous urease inhibitor and/or nitrification inhibitor coating formulation as claimed in claim 1 wherein the high melting point emulsifying wax is mineral wax or plant-based wax.
4. An aqueous urease inhibitor and/or nitrification inhibitor coating formulation as claimed in claim ~~1-3~~ wherein the mineral wax is a montan wax.
5. An aqueous urease inhibitor and/or nitrification inhibitor coating formulation as claimed in claim 1 wherein the clay is inert and has a particle size of substantially 20 microns or less.
6. An aqueous urease inhibitor and/or nitrification inhibitor coating formulation including:
 - i) an aqueous wax dispersion comprising:
 - 10% by weight high melting point emulsifying wax in the order of 70 kg;

- 90% water in the order of 630 kg;
 - ii) an inhibitor active selected from one of the following: 210 kg NBPT; 210 kg DMPP; 210kg NPPT; 210kg DMPA; or a 210kg 50:50 mixture NBPT and DMPP;
 - iii) 100 kg dispersing clay;
 - iv) 2.5kg xanthan gum.
7. An aqueous urease inhibitor and/or nitrification inhibitor coating formulation
- i) an aqueous wax dispersion comprising:
 - 30% by weight high melting point emulsifying wax in the order of 210kg ;
 - 70% water in the order of 490kg;
 - ii) 200kg NBPT or 200kg DMPP;
 - iii) 100kg dispersing clay;
 - iv) 2.5kg guar gum.
8. An aqueous wax dispersion which includes NBPT therein 1wt% - 30wt% of the aqueous wax dispersion in claim 1.
- ~~9. An aqueous wax dispersion as claimed in claim 1 which includes an inhibitor active or a combination of a nitrification inhibitor and a urease inhibitor.~~
10. An aqueous wax dispersion as claimed in claim 1 wherein the plant-based wax is selected from:
- carnauba wax;
 - rice bran wax.
11. A fertiliser composition which includes a nutrient source in the form of a fertiliser granule or chip, the granule or chip coated with an aqueous urease and/or nitrification inhibitor coating formulation as claimed in any one of the preceding claims.
12. A fertiliser composition as claimed in claim 11 wherein the composition comprises a further outer layer of MgO.
13. A fertiliser composition as claimed in claim 12 wherein the amount of MgO added is 2% of the total weight of the fertiliser composition including the MgO.

~~1413.~~ A fertiliser composition as claimed in claim ~~12-11~~ wherein the MgO has a particle size of substantially 45 micron or less.

~~1414.~~ A fertiliser composition as claimed in any one of claims ~~14-10~~ – ~~14-13~~ wherein the fertiliser chip or granule is urea.

~~1415.~~ A fertiliser blend including a quantity of a fertiliser composition as claimed in claim ~~14-13~~ together with a quantity of a fertiliser selected from granular or chip forms of:

- Single super phosphate;
- Diammonium phosphate
- Monoammonium phosphate;
- Ammonium polyphosphate;
- Ammonia sulphate;
- Potassium chloride;
- Potassium sulphate;
- Potassium carbonate; or
- Potassium hydrochloride.

~~1416.~~ A method of protecting NBPT and/or DMPP from reacting with an acidic fertiliser granule comprising the steps of:

- a) coating an aqueous urease inhibitor and/or nitrification inhibitor coating formulation as claimed in claim 1 as a first layer onto a fertiliser or mineral granule or chip;
- b) coating a second layer of MgO onto said first layer.

~~18.~~ A method for manufacturing an aqueous wax dispersion comprising the steps of:

- a) heating water to 95°C;
- b) adding powdered high melting point emulsifying wax to the heated water in a 50:50 ratio;
- c) stirring the wax/water mixture above slowly until homogenous dispersion is achieved;

~~d) adding water to the dissolved wax/water mixture to obtain the desired water to wax ratio whilst slowly stirring;~~

~~e) if required, cooling or allowing the aqueous wax dispersion to cool until it is at room temperature of 15°C-20°C.~~

~~19. A method of manufacturing an aqueous inhibitor formulation comprising the steps of:~~

~~a) adding powdered xanthate or powdered guar gum to the dispersing clay and blending together;~~

~~b) adding the gum/clay pre-mix to the aqueous wax dispersion made via the method of claim 18 whilst slowly stirring;~~

~~c) once viscosity gum/clay/wax dispersion increases adding the inhibitor active(s) thereto.~~

LO QUE REIVINDICAMOS ES:

1. Una formulación acuosa de recubrimiento de inhibidor de nitrificación y/o inhibidor de ureasa que incluye:

i) una dispersión de cera acuosa que comprende:

- sustancialmente 10-50% en peso de cera emulsionante de alto punto de fusión;

- agua hasta el 100%;

ii) al menos un activo inhibidor seleccionado de NBPT, DMPP, NPPT y/o DMPSA;

- en donde la cantidad de activo inhibidor es sustancialmente: 1% en peso - 30% en peso de la dispersión de cera acuosa en i);

iii) una arcilla dispersante

- en donde la cantidad de arcilla dispersante es 5% en peso -50% en peso de la dispersión de cera acuosa en i).

2. Una formulación acuosa de recubrimiento de inhibidor de nitrificación y/o inhibidor de ureasa como se reivindica en la reivindicación 1, que incluye además:

- una goma xantana o guar

en donde la cantidad de xantana o goma guar es 0.25% en peso - 1% en peso de la dispersión de cera acuosa total en i).

3. Una formulación acuosa de recubrimiento de inhibidor de nitrificación y/o inhibidor de ureasa como se reivindica en la reivindicación 1, en donde la cera emulsionante de alto punto de fusión es cera mineral o cera de origen vegetal.

4. Una formulación acuosa de recubrimiento de inhibidor de nitrificación y/o inhibidor de ureasa como se reivindica en la reivindicación 3, en donde la cera mineral es una cera montana.

5. Una formulación acuosa de recubrimiento de inhibidor de nitrificación y/o inhibidor de ureasa como se reivindica en la reivindicación 1, en donde la arcilla es inerte y tiene un tamaño de partícula de sustancialmente 20 micras o menos.

6. Una formulación acuosa de recubrimiento de inhibidor de nitrificación y/o inhibidor de ureasa que incluye:

i) una dispersión de cera acuosa que comprende:

- 10% en peso de cera emulsionante de alto punto de fusión del orden de 70 kg;

- 90% de agua del orden de 630 kg;
 - ii) un activo inhibidor seleccionado de uno de los siguientes: 210 kg de NBPT; 210 kg de DMPP; 210 kg de NPPT; 210 kg de DMPSA; o una mezcla de 210 kg de NBPT y DMPP 50:50;
 - iii) 100 kg de arcilla dispersante;
 - iv) 2.5 kg de goma xantana.
7. Una formulación acuosa de recubrimiento de inhibidor de nitrificación y/o inhibidor de ureasa
- i) una dispersión de cera acuosa que comprende:
 - 30% en peso de cera emulsionante de alto punto de fusión del orden de 210 kg ;
 - 70% de agua del orden de 490 kg;
 - ii) 200 kg de NBPT o 200 kg de DMPP;
 - iii) 100 kg de arcilla dispersante;
 - iv) 2.5 kg de goma guar.
8. Una dispersión de cera acuosa que incluye NBPT en la misma 1% en peso - 30% en peso de la dispersión de cera acuosa en la reivindicación 1.
9. Una dispersión de cera acuosa como se reivindica en la reivindicación 3, en donde la cera de origen vegetal se selecciona de:
- cera de carnauba;
 - cera de salvado de arroz.
10. Una composición fertilizante que incluye una fuente de nutrientes en forma de un gránulo o chip de fertilizante, el gránulo o chip recubierto con una ureasa acuosa y/o una formulación de recubrimiento de inhibidor de nitrificación como se reivindica en cualquiera de las reivindicaciones anteriores.
11. Una composición fertilizante de conformidad con la reivindicación 10, en donde la composición comprende una capa externa adicional de MgO.
12. Una composición fertilizante de conformidad con la reivindicación 11, en donde la cantidad de MgO agregada es 2% del peso total de la composición fertilizante que incluye el MgO.
13. Una composición fertilizante de conformidad con la reivindicación 11, en donde el MgO tiene un tamaño de partícula de sustancialmente 45 micras o menos.

14. Una composición fertilizante de conformidad con cualquiera de las reivindicaciones 10 a 13, en donde el chip o gránulo de fertilizante es urea.

15. Una mezcla de fertilizantes que incluye una cantidad de una composición fertilizante como se reivindica en la reivindicación 13 junto con una cantidad de un fertilizante seleccionado de formas granulares o de chip de:

- Superfosfato simple;
- Fosfato de diamonio
- Fosfato de monoamonio;
- Polifosfato de amonio;
- Sulfato de amoníaco;
- Cloruro de potasio;
- Sulfato de potasio;
- Carbonato de potasio, o
- Clorhidrato de potasio.

16. Un método para proteger NBPT y/o DMPP de la reacción con un gránulo de fertilizante ácido que comprende los pasos de:

a) recubrir una formulación acuosa de recubrimiento de inhibidor de nitrificación y/o inhibidor de ureasa como se reivindica en la reivindicación 1 como una primera capa en un fertilizante o gránulo o chip mineral;

b) recubrir una segunda capa de MgO en la primera capa.