(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
01 October 2020 (01.10.2020)

WIPO | PCT

(10) International Publication Number
WO 2020/194164 A1

(51) International Patent Classification:
A01N 47/36 (2006.01) *A01N 25/08* (2006.01)
A01N 25/22 (2006.01) *A01N 25/12* (2006.01)
A01N 43/54 (2006.01)

(21) International Application Number:
PCT/IB2020/052677

(22) International Filing Date:
23 March 2020 (23.03.2020)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
201921012064 27 March 2019 (27.03.2019) IN

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report (Art. 21(3))*
— *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*

WO 2020/194164 A1

(54) Title: STABLE HERBICIDE FORMULATION OF PYRAZOSULFURON ETHYL

(57) Abstract: The present invention provides a stabilizing system for preparing stable herbicide formulation comprising pyrazosulfuron ethyl.

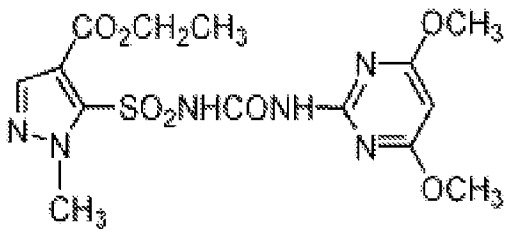
STABLE HERBICIDE FORMULATION OF PYRAZOSULFURON ETHYL

FIELD OF INVENTION

The present invention relates to a stable herbicide formulation comprising pyrazosulfuron ethyl. The present invention also relates to a stabilising system for formulation comprising pyrazosulfuron ethyl and method of preparation the formulation.

BACKGROUND OF THE INVENTION

Pyrazosulfuron ethyl is a pyrimidinylsulfonylurea herbicide having IUPAC name 5-[(4,6 dimethoxypyrimidin-2-ylcarbamoyl) sulfamoyl]-1-methyl pyrazole-4-carboxylic acid and chemical structure as follows:



Pyrazosulfuron ethylis a systemic herbicide used to control annual and perennial broad-leaved weeds and sedges, pre- or post-emergence, wet sown and transplanted rice crops.

Various agrochemical compositions comprising pyrazosulfuron ethyl as active ingredient are available in the market, but they are known to be degrading during the shelf life of the product. The degradation of the active ingredient is not suitable for formulation and will result in ineffective dose application when applied in the field thus resulting in poor control of weeds.

Hence, there is an urgent and unmet need of the stable formulation comprising pyrazosulfuron ethyl which is stable prevent degradation during its shelf life.

OBJECT OF THE INVENTION

It is an object of the present invention to provide a storage stable composition comprising pyrazosulfuron ethyl.

It is another object of the present invention to provide a process for preparing a storage stable composition comprising pyrazosulfuron ethyl.

It is an object of the present invention to to provide a stable composition comprising pyrazosulfuron ethyl that does not undergo degradation.

SUMMARY OF INVENTION

In an aspect the present invention provides a storage stable agrochemical composition comprising:

a) pyrazosulfuron ethyl; and

b) astabilising system comprising silicaand china clay

In another aspect the present invention provides a process for preparation of storage stable composition comprising herbicidally effective amount of pyrazosulfuron ethyl and a stabilising system comprising silica and china clay, said process comprising:

Step-1: Pre-blending of pyrazosulfuron ethyl and stabilising system comprising silica and china clay optionally with agrochemically acceptable excipients;

Step-2: Milling; and

Step-3: Post-blending and/or drying to get a compositionwith predefined % moisture.

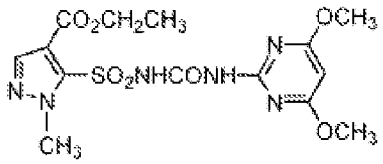
In another aspect the present invention provides a method of controlling undesired weeds, said method comprising applying to the weeds or to their locus an herbicidally effective amount of astorage stable agrochemical composition according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides an agrochemical composition and in particular a storage stable agrochemical composition.

It is surprising to found that a stabilising system comprising silica and china clay, helps to increase shelf life of the product comprising pyrazosulfuron ethyl of formula-1.

Formua-1:



Surprisingly the present inventors found a stabilizing system which is effective in increasing stability and shelf life of agrochemical compositions comprising pyrazosulfuron ethyl.

In an embodiment there is provided a storage stable composition comprising:
a) pyrazosulfuron ethyl; and
b) astabilising system comprising silicaand china clay.

In another embodiment the storage stable compositions according to the present invention further comprises other agrochemically acceptable surfactants.

Thus, in an embodiment there is provided a storage stable composition comprising:
a) pyrazosulfuron ethyl;
b) astabilising system comprising silicaand china clay; and
c) optionally an agrochemically acceptable surfactant.

In an embodiment storage stable composition comprises pyrazosulfuron ethyl as anactive ingredient.

In another embodiment storage stable composition comprises herbicidally effective amount of pyrazosulfuron ethyl as active ingredient.

In another embodiment storage stable composition according to the present invention comprisespyrazosulfuron ethyl in the concertation of from about 0.1% to about 25%.

In another embodiment storage stable composition comprises herbicidally effective amount of pyrazosulfuron ethyl in combination with other agrochemically active ingredient.

In another embodiment, according to the present invention, degradation of pyrazosulfuron ethyl is controlled.

In another embodiment, according to the present invention, degradation of pyrazosulfuron ethyl is controlled to <5% of pyrazosulfuron ethyl present in the composition.

In an embodiment storage stable composition of pyrazosulfuron ethyl according to the present invention comprises a stabilising system.

In another embodiment stabilising system of storage stable composition of pyrazosulfuron ethyl according to the present invention comprisessilica and china clay.

In another embodiment,stabilising system of storage stable composition of pyrazosulfuron ethyl comprises silica selected from precipitated silica and fumed silica.

In another embodiment stabilising system of storage stable composition of pyrazosulfuron ethyl comprises silica in the concertation of from about 0.1% to about 10%.

In another embodiment stabilising system of storage stable composition of pyrazosulfuron ethyl comprises silica in the concertation of from about 0.1% to about 7%.

In another embodiment stabilising system of storage stable composition of pyrazosulfuron ethyl comprises china clay.

In an embodiment china clay of stabilising system has water holding capacity of up to 75% by weight.

In another embodiment stabilising system of storage stable composition of pyrazosulfuron ethyl comprises china clay in the concertation of 10% to 90%.

In another embodiment stabilising system of storage stable composition of pyrazosulfuron ethyl comprises precipitated silica and china clay, in a ratio from about1:5 to about 1:30.

In another embodiment stabilising system of storage stable composition of pyrazosulfuron ethyl comprises precipitated silica and china clay, in a ratio from about 1:7 to about 1:20.

In an embodiment, the storage stable composition of pyrazosulfuron ethyl according to the present invention comprises an agrochemically acceptable surfactant.

Thus, in an embodiment, there is provided a storage stable composition comprising:
a) pyrazosulfuron ethyl;
b) astabilising system comprising silica and china clay; and
c) an agrochemically acceptable surfactant.

In an embodiment, the stabilising system of storage stable composition of pyrazosulfuron ethyl comprises silica selected from precipitated silica and fumed silica.

In another embodiment stabilising system of storage stable composition of pyrazosulfuron ethyl comprises silica in the concertation of from about 0.1% to about 10%.

In another embodiment stabilising system of storage stable composition of pyrazosulfuron ethyl comprises silica in the concertation of from about 1% to about 7%.

In another embodiment stabilising system of storage stable composition of pyrazosulfuron ethyl comprises china clay.

In another embodiment stabilising system of storage stable composition of pyrazosulfuron ethyl comprises china clay in the concertation of from about 10% to about 90%.

In another embodiment stabilising system of storage stable composition of pyrazosulfuron ethyl comprises china clay in the concertation of from about 50% to about 90%.

In another embodiment stabilising system of storage stable composition of pyrazosulfuron ethyl comprises china clay in the concertation of from about 60% to about 80%.

In an embodiment of the present invention, agrochemically acceptable surfactant may be selected from dispersing agents, wetting agents, fillers and the like.

In stated embodiment, agrochemically accepted excipients may be selected from, but not limited to, following stated agrochemically accepted excipients:

Dispersing agents may include lignosulfonate, calcium lignin iodate, sodium lauryl polyoxyethylene ether sulfate, alkyl naphthalene condensate sulfonate, sodium dodecyl benzene sulfonate, sodium lauryl sulfate, Alkyl polyoxyethylene ether sulfonate, alkylphenol polyoxyethylene ether formaldehyde condensate, alkylphenol polyoxyethylene ether nonylphenol polyoxyethylene ether, polyoxyethylene polyoxypropylene ether block copolymer , pull-open powder, high molecular carboxylate, sodium methylene biguanide sulfonate, polyvinyl alcohol, modified naphthalene sulfonate, polycarboxylate, alkylnaphthalene sulfonate, alkylphenol polyoxyl Vinyl ether, EO/PO block polyether, JFC, unrolled powder, nonylphenol ethoxylate, octylphenol polyoxyethylene sulfate, fatty alcohol sulfate, alkylnaphthalene sulfonate, fatty amide N- Methanesulfonate, fatty alcohol sodium polyoxyethylene sulfate, fatty acid sulfate, fatty alcohol polyoxyethylene ether, alkylphenol polyoxyethylene ether, alkylbenzyldimethylammonium chloride, alkylamine oxide, etc. or mixture thereof.

Wetting agents may include alkyl sulfates, alkyl sulfonates, naphthalene sulfonates, sodium lignosulfonate, fatty alcohol polyoxyethylene ethers, alkylphenol ethoxylates, short chain EO/PO block polyethers , nonylphenol ethoxylate, nonionic ethoxylate, sodium alkyl sulfate, sodium dodecyl sulfate, TERSPERSE 2700, TERSPERSE 1004, sodium lignosulfonate, NNO, polyoxyethylene polyoxypropylene one or a combination of two or more of an ether block copolymer, an alkylphenol polyoxyethylene ether phosphate, or a water-soluble polymer compound CMC or PVA, etc. or mixtures thereof.

Fillers may includean organic or inorganic solid inert substance such as talc, clay, diatomaceous earth, magnesium aluminum silicate, white carbon black, pyrophyllite, light calcium carbonate, high clay, organic bentonite, etc. or mixtures thereof.

Surfactants may include sodium dodecylbenzenesulfonate, calcium dodecylbenzenesulfonate, sodium alkyl sulfate, fatty alcohol sulfate, alkyl ethylsulfonate, Sodium methylnaphthalene sulfonate formaldehyde condensate, naphthalene sulfonate, formaldehyde condensate, polycarboxylic acid, lignosulfonate, alkylphenol polyoxyethylene ether phosphate, fatty alcohol polyoxyethylene ether or a variety, etc. or mixtures thereof.

In another embodiment the surfactant is selected from sodium alkyl sulfate, formaldehyde condensates, sodium dodecylbenzenesulfonate, calcium dodecylbenzenesulfonate, fatty

alcohol sulfate, alkyl ethylsulfonat, Sodium methylnaphthalene sulfonate, naphthalene sulfonate formaldehyde condensate, polycarboxylic acid, lignosulfonate, alkylphenol polyoxyethylene ether phosphate, fatty alcohol polyoxyethylene ether, etc. or mixtures thereof.

In another embodiment there is provided a process for preparation of storage stable composition comprising herbicidally effective amount of pyrazosulfuron ethyl and astabilising system comprising silica and china clay.

In an embodiment the composition is formulated as a solid composition.

In a preferred embodiment the composition is formulated as powder (WP).

lInan embodiment there is provided a process for preparation of storage stable composition comprising herbicidally effective amount of pyrazosulfuron ethyl and a stabilising system comprising silica and china clay, said process comprising:

Step-1: Pre-blending of pyrazosulfuron ethyl and stabilising system comprising silica and china clayoptionally with agrochemically acceptable excipients;

Step-2: Milling; and

Step-3: Post-blending and/or drying to get a composition with predefined % moisture.

In another embodiment there is provided a process for preparation of storage stable composition comprising herbicidally effective amount of pyrazosulfuron ethyl and a stabilising system comprising silica and china clay, said process comprising:

Step-1: Pre-blending of pyrazosulfuron ethyl and stabilising system comprising silica and china clay optionally with agrochemically acceptable excipients;

Step-2: Milling;

Step-3: Post-blending and/or drying to get a composition with predefined % moisture; and

Step-4: Formulating to a suitable form using a suitable equipment

In above stated embodiment, in step-1, the term 'stabilising system' refers to stabilising system comprising silica and china clay, in stabilizing effective ratio.

In above stated embodiment, in step-1, the term 'agrochemically accepted excipients' refers to additives of the composition that may be selected from dispersing agents, wetting agents, fillers, surfactants, etc.

In above stated embodiment, in step-1, agrochemically accepted excipients may be selected from, but not limited to, following stated agrochemically accepted excipients:

Dispersing agents may include lignosulfonate, calcium lignin iodate, sodium lauryl polyoxyethylene ether sulfate, alkyl naphthalene condensate sulfonate, sodium dodecyl benzene sulfonate, sodium lauryl sulfate, Alkyl polyoxyethylene ether sulfonate, alkylphenol polyoxyethylene ether formaldehyde condensate, alkylphenol polyoxyethylene ether nonylphenol polyoxyethylene ether, polyoxyethylene polyoxypropylene ether block copolymer , pull-open powder, high molecular carboxylate, sodium methylene biguanide sulfonate, polyvinyl alcohol, modified naphthalene sulfonate, polycarboxylate, alkylnaphthalene sulfonate, alkylphenol polyoxyl Vinyl ether, EO/PO block polyether, JFC, unrolled powder, nonylphenol ethoxylate, octylphenol polyoxyethylene sulfate, fatty alcohol sulfate, alkylnaphthalene sulfonate, fatty amide N- Methanesulfonate, fatty alcohol sodium polyoxyethylene sulfate, fatty acid sulfate, fatty alcohol polyoxyethylene ether, alkylphenol polyoxyethylene ether, alkylbenzyldimethylammonium chloride, alkylamine oxide, etc. or mixture thereof.

Wetting agents may include alkyl sulfates, alkyl sulfonates, naphthalene sulfonates, sodium lignosulfonate, fatty alcohol polyoxyethylene ethers, alkylphenol ethoxylates, short chain EO/PO block polyethers , nonylphenol ethoxylate, nonionic ethoxylate, sodium alkyl sulfate, sodium dodecyl sulfate, TERSPERSE 2700, TERSPERSE 1004, sodium lignosulfonate, NNO, polyoxyethylene polyoxypropylene one or a combination of two or more of an ether block copolymer, an alkylphenol polyoxyethylene ether phosphate, or a water-soluble polymer compound CMC or PVA, etc. or mixtures thereof.

Fillers may include an organic or inorganic solid inert substance such as talc, clay, diatomaceous earth, magnesium aluminum silicate, white carbon black, pyrophyllite, light calcium carbonate, high clay, organic bentonite, etc. or mixtures thereof.

Surfactants may include sodium dodecylbenzenesulfonate, calcium dodecylbenzenesulfonate, sodium alkyl sulfate, fatty alcohol sulfate, alkyl ethylsulfonate, Sodium methylnaphthalene sulfonate formaldehyde condensate, naphthalene sulfonate, formaldehyde condensate, polycarboxylic acid, lignosulfonate, alkylphenol polyoxyethylene ether phosphate, fatty alcohol polyoxyethylene ether or a variety, etc. or mixtures thereof.

In another embodiment the surfactant is selected from sodium alkyl sulfate, formaldehyde condensates, sodium dodecylbenzenesulfonate, calcium dodecylbenzenesulfonate, fatty alcohol sulfate, alkyl ethylsulfonat, Sodium methylnaphthalene sulfonate, naphthalene sulfonate formaldehyde condensate, polycarboxylic acid, lignosulfonate, alkylphenol polyoxyethylene ether phosphate, fatty alcohol polyoxyethylene ether, etc. or mixtures thereof.

In yet another embodiment, in step-1, pre-blending is carried out in a time period of about 15 minutes to 2 hours by charging pyrazosulfuron ethyl,stabilising system comprising precipitated silica and china clay and agrochemically accepted excipients if any simultaneously.

In anembodiment, step-2 provides a process for milling of pre-blended mixture of Step-1.
In another embodiment, Step-2 comprises grinding of the pre-blended mixture of Step-1 at pressure 6 to 8 Kg / cm^2 to obtain ground material with specific particle size.

In the present invention, the term 'specific particle size' refers to D90 - less than 15 micron and/or wet sieve - 99.8 % passing through 500 BSS test.

In another embodiment, step-3 provides a process for post-blending of ground pyrazosulfuron ethyl, stabilising system and agrochemically accepted excipients if any, obtained as product of step-2.

In another embodiment, step-3 comprises blending of ground pyrazosulfuron ethyl, stabilising system and agrochemically accepted excipients if any, obtained as product of step-2 for a time period of about 15 min to 2 hours in order to facilitate complete homogenisation of resulting powder composition.

In another embodiment, step-3 comprises drying of the blended mixture to get a product with predefined % moisture.

In another embodiment, step-3 comprises drying of the blended mixture to get a product with % moisture <2%.

In a preferred embodiment, step-3 comprises drying of the blended mixture to get a product with % moisture <1%.

In another embodiment, in step-4, the process of formulating is not particularly limiting.

In a preferred embodiment tin step-4 the composition according to the present invention is formulated in the form of powder.

The present invention provides a method of controlling undesired weeds, said method comprising applying to the weeds or to their locus an herbicidally effective amount of a storage stable agrochemical composition comprising:
a) Pyrazosulfuron ethyl; and
b) astabilising system comprising silica and china clay.

In an embodiment, the present invention provides a method controlling annual and perennial broad-leaved weeds and sedges, pre- or post-emergence, in wet-sown and transplanted rice crops, said method comprising applying to the weeds or to their locus an herbicidally effective amount of a storage stable agrochemical composition comprising:
a) Pyrazosulfuron ethyl; and
b) a stabilising system comprising silica and china clay.

The invention will now be described further by reference to the following examples, which are intended to illustrate, but not limit, the scope of the appended claims.

Example 1

Exemplary composition was prepared as follows:

Sr.no	**Ingredients**	**Quantity (w/w)**
1	Pyrazosulfuron ethyl	10.9
2	Precipitated Silica	4.00
3	China Clay	78.1
4	Sodium alkyl sulphate	3.00
5	Formaldehyde condensate	4.00

Process conditions:

Step-1 (Pre-Blending): Pyrazosulfuron ethyl, precipitated Silica,china Clay, sodium alkyl sulphate and formaldehyde condensate were charged in required quantities in pre-blender. Blending was carried out for 20 Minutes.

Step-2 (Milling): The pre-blended material was ground to desired particle size under grinding pressure

Step-3 (Post-Blending): The ground material was blended in post blender for 15 min to achieve complete homogenization and dried to get the product having a moisture content <1%.

The stability results of the exemplary composition prepared according to above formula are:

Sr. No	Parameters	AMB	AHS 14 Days	AHS 28 Days
1	Assay of pyrazosulfuron ethyl (% w/w)	10.77	10.63	10.55
2	Suspensibility (% w/w)	94.40	89.10	95.00
3	pH (1% Aq.)	5.35	5.55	5.58

4	Wet Sieve Test*	100	100	100
5	Wettability (s)	15	15	15
6	Moisture Content	0.64	0.53	0.51
7	Bulk Density	0.256	NA	NA

*(material passing through 75-micron test Sieve) (% w/w)

% Degradationofpyrazosulfuron ethyl:

Sample	AMB(0days)	AHS 14 Days	AHS 28 Days
Example 1	0.00	1.30	2.04

Compositions according to the present invention are listed in the below table (Example 2 and 3)

Sr.no	Ingredients	Example 2	Example 3
1	Pyrazosulfuron-ethyl	5.3	15
2	Precipitated Silica	4.27	3.8
3	Formaldehyde condensate	4	4
4	Sodium alkyl sulphate	3	3
5	China Clay	83.43	74.2
	Total	100	100

% Degradation of pyrazosulfuron ethyl:

Sample	AMB (0days)	AHS 14 Days
Example 2	0.0	3.4
Example 3	0.0	4.1

Comparative example (Example 4): A comparative composition of pyrazosulfuron ethyl was prepared as follows:

Sr. no	Ingredients	Quantity (w/w)
1	Pyrazosulfuron-ethyl	10.9

2	arylsulfonic acid sodium salt	04.00
3	Anionic surfactant	04.00
4	Sodium Ligno sulphate	04.00
5	Pentab UF	01.00
6	Precipitated Silica	14.70
10	Kaolin	61.40

% Degradation of pyrazosulfuron ethyl:

Sample	AMB (0 days)	AHS 14 Days	AHS 28 Days
Example 4	0.0	12.69	24.87

Example 1-3 demonstrates inventions according to the present invention. Example 4 is a comparative example in which stabilizing system according to the invention is absent. Zero timedata was generated for all the samples. Studied were conducted by keeping the samples at 54°C for 14 days and 28 days. The results indicate that the stabilization system according to the present invention provides significant chemical stability to pyrazosulfuron ethyl in the composition.

We Claim:

1. A storage stable agrochemical composition comprising:
    a) pyrazosulfuron ethyl; and
    b) astabilising system comprising silicaand china clay
2. A composition according to claim 1 wherein said pyrazosulfuron ethylis present in an amount from about 0.1% to about 25%by weight of the composition
3. A composition according to claim 1 wherein said silica is selected from precipitated silica and fumed silica
4. A composition according to claim 1 wherein said silica ispresent in an amount from about 0.1% to about 10% by weight of the composition.
5. A composition according to claim 1 wherein said china clay is present in an amount from about 10% to about 90% by weight of the composition.
6. A composition according to claim 1 wherein ratio of said precipitated silica and china clay varies from about 1:5 to about 1:30.
7. A composition according to claim 1 wherein degradation of pyrazosulfuron ethyl is controlled to <5% of pyrazosulfuron ethyl present in the composition
8. A process for preparation of storage stable composition comprising herbicidally effective amount of pyrazosulfuron ethyl and a stabilising system comprising silica and china clay, said process comprising:

    Step-1: Pre-blending of pyrazosulfuron ethyl and stabilising system comprising silica and china clay optionally with agrochemically acceptable excipients;

    Step-2: Milling;

    Step-3: Post-blending and/or drying to get a composition with predefined % moisture; and

    Step-4: Formulating to a suitable form using a suitable equipment
9. A process of claim 8 wherein said process provides said composition having a % moisture <2%.
10. A process of claim 8 wherein said process provides said composition in the form of powder.

11. A method of controlling undesired weeds, said method comprising applying to the weeds or to their locus an herbicidally effective amount of a storage stable agrochemical composition comprising:

    a) Pyrazosulfuron ethyl; and

    b) a stabilising system comprising silica and china clay.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2020/052677

A. CLASSIFICATION OF SUBJECT MATTER

A01N 47/36 (2006.01) A01N 25/22 (2006.01) A01N 43/54 (2006.01) A01N 25/08 (2006.01) A01N 25/12 (2006.01)

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)

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)

PATENW, AGRICOLA, CABA, JPFULL, CNFULL, INFULL, CAPLUS databases using IPC/CPC Marks and keywords (A01N47/36, A01N43/48, A01N25/22, CHINA_CLAY? OR KAOLIN+ , SI[O,0]2) OR (SILICON_DIOXIDE) OR QUARTZ OR SAND OR SILICA etc.) covering the full scope of the claims. Applicant and Inventor search also carried out.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	

[X] Further documents are listed in the continuation of Box C [X] 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

"D" document cited by the applicant in the international application

"E" earlier application or patent but published on or after the international filing date

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"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	Date of mailing of the international search report
12 June 2020	12 June 2020

Name and mailing address of the ISA/AU	**Authorised officer**
AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaustralia.gov.au	Ravi Ananthakrishnan AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. +61262850744

INTERNATIONAL SEARCH REPORT C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		International application No. **PCT/IB2020/052677**
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP H11-269016 A (KUMIAI CHEMICAL INDUSTRY CO) 15 October 1999 See Abstract, [0015], [0016], Claim 4, [0021], [0037], Example 5, [0043], Example 11, Table 1, [0053], [0054].	1-11
X	JP 2000072602 A (NISSAN CHEMICAL IND LTD) 07 March 2000 See Abstract, Table 6, [0028] to [0032], Table 8, Table 2, [0052].	1-11
X	CN 102246788 A (WANG HAILIN) 23 November 2011, WPI Accession Number 2017-632302 See WPI Abstract.	1-3, 5 & 7
X	CN 107129384 A (CHENG JUN) 05 September 2017 See Abstract, Example 6, Table 1	1-5, 7 & 11
A	JP 2011-144149 A (NISSAN CHEM IND LTD) 28 July 2011 See Abstract, Example, [0063]	1-11
A	Angiras N.N. et al; "Efficacy of Pyrazosulfuron-ethyl Against Weeds in Rice Nursery Under Mid Hill Conditions of Himachal Pradesh" *Indian. J. Weed. Sci.* 37 (3 & 4) : 202-204 (2005) See "Materials and Methods"	11

INTERNATIONAL SEARCH REPORT Information on patent family members	International application No. **PCT/IB2020/052677**

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document/s Cited in Search Report		Patent Family Member/s	
Publication Number	**Publication Date**	**Publication Number**	**Publication Date**
JP H11-269016 A	15 October 1999	JP H11269016 A	05 Oct 1999
		JP 4216363 B2	28 Jan 2009
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End of Annex

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.