

PATENT SPECIFICATION

NO DRAWINGS

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COMPLETE SPECIFICATION

Herbicidal Compositions and their use

We, AGRIPAT S.A., a body Corporate organised according to the laws of Switzerland of 215, Schwarzwaldallee, Basle, Switzerland, do hereby decalre the invention, for which we
5 pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The present invention concerns processes and compositions for the control of weeds in grain fields using an s-triazine derivative.

In recent years a series of herbicidal active substances from the group of the s-triazines have become known for the control of weeds
15 in various plant cultivations, but none of these triazines is the ideal weed killer in grain fields such as wheat, rye, oats, and barley fields. Tests have shown that although the weeds can be completely eliminated by such triazines, the
20 cereals are damaged under the conditions necessary for their application. Generally such s-triazine active substances are applied to the field after emergence of the cultivated plants. Of all the previously known herbicides from
25 the most varied classes of substances, there is still no active substance known which can be used in grain fields before emergence of the plants for the general, all-embracing control of weeds. It is true that some carbamates are
30 recommended as so-called pre-emergence herbicides, but they have only a specific action on grass-type weeds. Thus, such active substances can only be used to a limited extent as herbicides in grain fields.

35 The preferred application of herbicides before emergence of the cultivated plants has great economic and technical advantages over the hitherto used post-emergence application. The active substance is applied immediately
40 after sowing of the cultivated plants; in this way the weeds are killed even in the germina-

tion. There is thus unhindered growth of the cultivated plants which leads to a considerable increase in the harvest. With this type of application, no damage of any kind is caused to
45 the developing cultivated plants by the treatment.

There is thus an urgent demand for a herbicidal active substance which can be applied in
50 cereal cultivation before emergence of the plants and which possesses a range of action as wide as possible.

Surprisingly, it has now been found that 2 - methylthio - 4 - ethylamino - 6 - tert.butyl-
55 amino - s - triazine, due to its being better tolerated by cereals, is suitable for the control of grass-type and broad leafed weeds in grain fields before emergence of the plants. The weeds in spring-sown
60 cereals, and also under suitable climatic conditions, those in winter-sown cereals, are killed with this herbicide. 2 - Methylthio - 4 - ethylamino 6 - tert.butylamino - s - triazine
65 is the sole herbicide from the triazine group up to the present which is tolerated by all types of cereals such as wheat, rye, barley and oats in high concentrations and which can be applied to cereals before their emergence.

To determine the tolerance, plots in fields were sown with wheat and barley and then
70 treated with:

- I 2 - methylthio - 4,6 - bis - isopropyl-
amino - s - triazine (Prometryne) and
II 2 - methylthio - 4 - ethylamino - 6 -
tert.butylamino - s - triazine (according
75 to the invention),

in the concentrations given below. Growth of the plants was evaluated after 53 days as follows:

- 10=normal growth 80
9—1=degree of inhibition of growth
0=no growth

substance	wheat		barley	
	concentration in kg/hectare			
	1.12	2.24	1.12	2.24
I	3	0—1	2—3	0—1
II	9—10	6	9—10	5—6

2 - Methylthio - 4 - ethylamino - 6 - tert.-butylamino - s - triazine is used in concentrations of 0.25 to 4.5 kg active substance per hectare depending on the soil type. Preferred dosages are between 0.75 and 2 kg of active substance per hectare.

The pre-emergence compositions usable according to the invention and containing 2 - methylthio - 4 - ethylamino - 6 - tert.butylamino - s - triazine as active ingredient can also comprise additives usual in weed killers such as carriers and distributing agents. The content of active substance in the compositions according to the invention varies within the range of 1 and 90 parts by weight of 2 - methylthio - 4 - ethylamino - 6 - tert.butylamino - s - triazine.

The compositions according to the invention can be in the form of and applied as solutions, dusts, sprinkling agents, particularly however, in the form of solutions which can be emulsified in water or powders which can be dispersed in water. A fine distribution of the active substances must be attained on application.

Dusts and sprinkling agents, which latter also embraces granulates, can be produced by mixing or milling the active substance with the usual solid carriers. Examples of such are: talcum, diatomaceous earth, kaolin, bentonite, calcium carbonate, tricalcium phosphate, sand, and also sawdust, ground cork and other materials of vegetable origin. The substance can also be applied to carriers by means of a volatile solvent.

Wettable powders are obtained by mixing and milling together the active substance with solid carriers such as chalk, kaolin, highly dispersed silicic acid and silicates, and also with the necessary amounts of wetting and dispersing agents to a particle size of 0.05 to 40 microns.

Also emulsifiable solutions serve for the production of aqueous application forms, e.g. solutions of the active substance in higher boiling organic solvents such as xylene, into which, if desired, suitable solubility promoters and/or suitable emulsifying agents are admixed.

In a similar way, liquid or paste-like concentrates can be produced by mixing the active substance with dispersing agents, organic sol-

vents and, optionally, pulverised solid carriers, in suitable apparatus until homogeneity is attained. These concentrates are then diluted with water before use.

Suitable emulsifying and dispersing agents are, e.g. anionic surface active alkali metal salts of sulphuric acid monoesters of long chain aliphatic alcohols, or aliphatic-aromatic sulphonic acids or of long chain alkoxyacetic acids, and non-ionic emulsifying and dispersing agents from the classes of polyethylene glycol ethers of fatty alcohols or alkyl phenols, higher polycondensation products of ethylene oxide, and aliphatic-aromatic polyglycol ethers, as well as mixtures thereof with anionic surface active emulsifying agents.

All compositions according to the invention can also contain additives to increase the stability to rain and light as required. In addition they can also contain additives which facilitate adhesion and, thus, the penetration into the substrate, e.g. animal, vegetable and mineral oils.

The following examples illustrate the production of some typical forms for application of the compositions according to the invention. Parts are given therein as parts by weight.

EXAMPLE 1

The following components are used to produce 50% wettable powders:

- 50 parts of 2 - methylthio - 4 - ethylamino - 6 - tert.butylamino - s - triazine,
5 parts of hexadecyl glycol ether-sulphate sodium salt
5 parts of calcium-lignin sulphonate
20 parts of kieselguhr
20 parts of kaolin.
- 50 parts of 2 - methylthio - 4 - ethylamino - 6 - tert.butylamino - s - triazine,
5 parts of the ammonium salt of a formaldehyde condensation product of naphthalene sulphonic acid and phenol
10 parts of kieselguhr
30 parts of kaolin.

The active substance is mixed with the carriers and additives and the mixture is finely milled on suitable rollers and mills. Diluted with water, the 50% wettable powders obtained produce very stable suspensions which are excellently suitable for the pre-emergence treatment of spring-sown cereals.

EXAMPLE 2

The following substances are used to produce a 25% emulsion concentrate:

- 25 parts of 2 - methylthio - 4 - ethylamino - 6 - tert.butylamino - s - triazine
 5 parts of an emulsifier consisting of a combination of the Ca salt of dodecylbenzene sulphonate and nonylphenol eicosaglycol ether
 70 parts of xylene.

The active substance is dissolved in xylene and the emulsifier is then added to this solution. Emulsions can be produced from this concentrate by dilution with water. They are particularly suitable for the control of weeds in spring-sown cereals before emergence.

The following example describes the application of the active substance for the control of grass-type and broad leafed weeds before emergence of spring-sown cereals:

EXAMPLE 3

Spring-sown wheat "Svenno" was treated before emergence with

- I 2 - methylthio - 4,6 - bis - isopropylamino - s - triazine (Prometryne) and
 II 2 - methylthio - 4 - ethylamino - 6 - tert.butylamino - s - triazine.

For this purpose, plots of land in which chiefly *Chenopodium*, *Polygonum persicaria*, *Polygonum convulvolus* were growing as weeds, were prepared for sowing with a rotary hoe. The seeds were sown at a depth of 2 to 3 cm. One day after sowing the plots were treated with the active substances sprayed as a suspension, which was produced by diluting the 50% wettable powders prepared according to example 1 with water. The test was evaluated 15 days after treatment according to the following scale:

- 10 = normal growth
 9—1 = degree of inhibition of growth
 0 = no growth

Substance	Spring-sown wheat			weed		
	concentration in kg/hectare					
	1	1.5	2	1	1.5	2
I	6	3—4	2—3	0—1	0—1	0—1
II	10	10	8—9	0—1	0—1	0—1

WHAT WE CLAIM IS:—

1. Process for controlling grass-type and broad leafed weeds in cereals, which comprises treating grain fields before emergence of the cereals with 2 - methylthio - 4 - ethylamino - 6 - tert.butylamino - s - triazine.

2. Process according to claim 1, which comprises treating the grain fields with 0.25 to 4.5 kg per hectare of 2 - methylthio - 4 - ethylamino - 6 - tert.butylamino - s - triazine.

3. Herbicidal composition for controlling grass-type and broad leafed weeds in grain fields, comprising 2 - methylthio - 4 - ethylamino - 6 - tert.butylamino - s - triazine.

4. Herbicidal composition according to claim 3, which contains from 1 to 90 parts by weight of 2 - methylthio - 4 - ethylamino - 6 - tert.butylamino - s - triazine.

5. Process for the production of a herbicidal composition, in the form of a wettable powder, according to claim 4, characterised by milling 2 - methylthio - 4 - ethylamino - 6 - tert.butylamino - s - triazine with a solid carrier and wetting and dispersing agents to a particle size of 0.05 to 40 microns.

6. Process as claimed in claim 1 substantially as hereinbefore described in Example 3.

7. A herbicidal composition as claimed in claim 3 substantially as hereinbefore described in Example 1 or 2.

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EXAMPLE 2

The following substances are used to produce a 25% emulsion concentrate:

- 25 parts of 2 - methylthio - 4 - ethylamino - 6 - tert.butylamino - s - triazine
 5 parts of an emulsifier consisting of a combination of the Ca salt of dodecylbenzene sulphonate and nonylphenol eicosaglycol ether
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	concentration in kg/hectare					
	1	1.5	2	1	1.5	2
I	6	3—4	2—3	0—1	0—1	0—1
II	10	10	8—9	0—1	0—1	0—1

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