



PATENT SPECIFICATION

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NO DRAWINGS.

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COMPLETE SPECIFICATION.

Improvements relating to Herbicides.

We, HERCULES GLUE COMPANY LIMITED, a Corporation organised and existing under the laws of the State of California, United States of America, of 100 Gate 5 Road, Sausalito, California, United States of America, do hereby declare the invention, for which we 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:—

This invention relates to herbicides and more particularly to novel herbicide formulations containing monosodium acid methanearsonate in concentrated aqueous solution together with a surfactant.

Monosodium acid methanearsonate has been recognized as a highly effective selective herbicide for use on grasses or grassy weeds and is particularly valuable as a herbicide for use on cotton and also in non-crop applications such as the controlling of certain grasses and weeds on ditch banks, right-of-ways, storage yards and the like.

It has been found that monosodium acid methanearsonate is much more effective if it is used in conjunction with a surfactant. Thus, although the monosodium acid methanearsonate is an effective herbicide by itself, it can be used in smaller quantities if it is used in connection with a surfactant.

The surfactants heretofore employed for this purpose have not been soluble in monosodium acid methanearsonate solutions, so it has been necessary to mix the surfactant and the solution of monosodium acid methanearsonate in a spray tank with agitation just before application. Since this involves the handling and measuring of two different chemicals and the necessity of continuous agitation, the employment of a separate surfactant is inconvenient and it would be

highly desirable to have a single solution which contains both the active herbicide and the surfactant.

In accordance with the present invention, it has been found that a chemical available under the trade mark BENAX 2AO is an effective surfactant for, and is compatible with, solutions of monosodium acid methanearsonate, so that for the first time it is possible to provide a single solution which contains a large amount of monosodium acid methanearsonate together with a surfactant. Preferably BENAX 2AO, which is a 40% aqueous solution of an 85%—15% mixture by weight of dodecyldiphenyl ether disulphonic acid and didodecyldiphenyl ether disulphonic acid, respectively, is employed. Although BENAX 2AO by itself forms an effective surfactant, the effectiveness can be even further improved by the incorporation of other materials with it. Thus, triethanolamine or another water-soluble amine can be added to the BENAX 2AO; it is desirable to add sufficient amine to adjust the pH to about 6.4, say from 6.1—6.7, the approximate acidity of a monosodium acid methanearsonate solution containing no surfactant. Other water soluble amines which can be used include isopropyl amine and butyl amine, and aliphatic amines generally which have a chain length of at most four carbon atoms.

In this specification, the percentages are by weight.

Further, an additional wetting agent such as a material available under the trade mark TERGITOL ANIONIC O8 helps to solubilize the mixture and aids in the formulation. Preferably TERGITOL ANIONIC O8, which is a 40% solution in water of ethylhexyl sulphate, is used. In addition, a small

[Price 4s. 6d.]



amount of ethylene glycol can be added to the solution to act as a humectant to prevent the solution from drying out on the plant surface, since it is more effective if it remains in liquid form for a considerable time. All these components are regarded, for the purpose of this specification, as being part of the surfactant.

Thus, although the BENAX 2AO can be used as the sole surfactant, it is preferred to combine it with TERGITOL ANIONIC O8, triethanol amine and ethylene glycol. The amount of BENAX 2AO can vary from about 40—100%, the amount of triethanol amine or other amine can vary from about 0 to 35%, the amount of TERGITOL ANIONIC O8 can vary from about 0 to 40%, and the amount of ethylene glycol can vary from about 0 to 5%. It is preferred to employ a surfactant containing about 58.2% by weight BENAX 2AO, 17.8% triethanol amine, 21% TERGITOL ANIONIC O8 and 3% ethylene glycol. This composition is soluble in a 50% by weight solution of monosodium acid methanearsonate to an extent of 15—80%. Normally, it is preferred to employ a solution containing about equal parts of the surfactant and the monosodium acid methane-arsenate. When such a concentrate is diluted for application, the solution will contain optimum amounts of both herbicide and surfactant for effective weed control.

The following Examples illustrate the invention; all proportions are by weight unless otherwise stated.

EXAMPLE 1.

A surfactant solution was prepared containing the following:

	BENAX 2AO (40% solids)	58.2%
40	Triethanolamine	17.8%
	TERGITOL ANIONIC O8	21.0%
	Ethylene glycol	3.0%

This surfactant solution was then added to an aqueous herbicide solution containing about 50% of monosodium acid methanearsonate. The surfactant solution was soluble in the herbicide solution in proportions of from 15% to 80% by volume, and sufficient was added to give a solution containing equal weights of herbicide and surfactant.

EXAMPLE 2.

A composition was made by adding a 40% solids aqueous solution of BENAX 2AO to the 50% solution of monosodium acid methanearsonate. Again the surfactant solution was soluble in the herbicide solution in proportions of about 15% to 80% by volume. Thus, herbicide concentrates could be blended containing from 10% to 45% of monosodium acid methanearsonate and from

6% to 35% of the surfactant. A particular solution contained equal parts (i.e. 35%) of each of the two components.

The herbicidal compositions formulated in accordance with Examples 1 and 2 were clear solutions and were stable to a temperature down to about 29°F. Although at lower temperatures a small amount of material crystallized out, it went back into solution on rewarming. In use, it has been found that the surfactant greatly increased the effectiveness of the monosodium acid methanearsonate.

The compositions of the Examples are concentrates which are diluted with water prior to application.

WHAT WE CLAIM IS:—

1. A herbicidal composition containing in aqueous solution monosodium acid methanearsonate and a surfactant comprising as the sole or chief constituent an 85:15% mixture by weight of dodecyldiphenyl ether disulphonic acid and didodecyldiphenyl ether disulphonic acid.

2. A herbicidal composition according to claim 1, wherein the surfactant comprises also a water-soluble amine in amount sufficient to adjust the pH of the solution to approximately 6.4.

3. A herbicidal composition according to claim 2, wherein the water-soluble amine is triethanolamine or an aliphatic amine containing a chain of not more than 4 carbon atoms.

4. A herbicidal composition according to any one of the preceding claims, wherein the surfactant comprises also ethylhexyl sulphate and as humectant ethylene glycol.

5. A herbicidal composition according to any one of the preceding claims, containing approximately equal parts by weight of the sodium methanearsonate and the said surfactant.

6. A herbicidal composition according to any one of the preceding claims, wherein the surfactant comprises at least 40% of the mixture of dodecyldiphenyl ether disulphonic acid and didodecyldiphenyl ether disulphonic acid (reckoned as a 40% aqueous solution), 0—35% of water-soluble amine, 0—40% of ethylhexyl sulphate (reckoned as a 40% aqueous solution) and 0—5% of ethylene glycol.

7. A herbicidal composition according to claim 6, wherein the surfactant comprises 58.2% of the ether sulphonic acids (on the same basis), 17.8% of triethanolamine, 21.0% of ethylhexyl sulphate (on the same basis) and 3% of ethylene glycol.

8. A herbicidal composition according to any one of the preceding claims, being a concentrate containing 10—45% of monosodium acid methanearsonate, 6—35% of the surfactant, and the balance water.

weights

65

70

75

80

85

90

95

100

105

110

115

120

125



amount of ethylene glycol can be added to the solution to act as a humectant to prevent the solution from drying out on the plant surface, since it is more effective if it remains in liquid form for a considerable time. All these components are regarded, for the purpose of this specification, as being part of the surfactant.

Thus, although the BENAX 2AO can be used as the sole surfactant, it is preferred to combine it with TERGITOL ANIONIC O8, triethanol amine and ethylene glycol. The amount of BENAX 2AO can vary from about 40—100%, the amount of triethanol amine or other amine can vary from about 0 to 35%, the amount of TERGITOL ANIONIC O8 can vary from about 0 to 40%, and the amount of ethylene glycol can vary from about 0 to 5%. It is preferred to employ a surfactant containing about 58.2% by weight BENAX 2AO, 17.8% triethanol amine, 21% TERGITOL ANIONIC O8 and 3% ethylene glycol. This composition is soluble in a 50% by weight solution of monosodium acid methanearsonate to an extent of 15—80%. Normally, it is preferred to employ a solution containing about equal parts of the surfactant and the monosodium acid methane-arsenate. When such a concentrate is diluted for application, the solution will contain optimum amounts of both herbicide and surfactant for effective weed control.

The following Examples illustrate the invention; all proportions are by weight unless otherwise stated.

EXAMPLE 1.

A surfactant solution was prepared containing the following:

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6% to 35% of the surfactant. A particular solution contained equal parts (i.e. 35%) of each of the two components.

The herbicidal compositions formulated in accordance with Examples 1 and 2 were clear solutions and were stable to a temperature down to about 29°F. Although at lower temperatures a small amount of material crystallized out, it went back into solution on rewarming. In use, it has been found that the surfactant greatly increased the effectiveness of the monosodium acid methanearsonate.

The compositions of the Examples are concentrates which are diluted with water prior to application.

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2. A herbicidal composition according to claim 1, wherein the surfactant comprises also a water-soluble amine in amount sufficient to adjust the pH of the solution to approximately 6.4.

3. A herbicidal composition according to claim 2, wherein the water-soluble amine is triethanolamine or an aliphatic amine containing a chain of not more than 4 carbon atoms.

4. A herbicidal composition according to any one of the preceding claims, wherein the surfactant comprises also ethylhexyl sulphate and as humectant ethylene glycol.

5. A herbicidal composition according to any one of the preceding claims, containing approximately equal parts by weight of the sodium methanearsonate and the said surfactant.

6. A herbicidal composition according to any one of the preceding claims, wherein the surfactant comprises at least 40% of the mixture of dodecyldiphenyl ether disulphonic acid and didodecyldiphenyl ether disulphonic acid (reckoned as a 40% aqueous solution), 0—35% of water-soluble amine, 0—40% of ethylhexyl sulphate (reckoned as a 40% aqueous solution) and 0—5% of ethylene glycol.

7. A herbicidal composition according to claim 6, wherein the surfactant comprises 58.2% of the ether sulphonics acids (on the same basis), 17.8% of triethanolamine, 21.0% of ethylhexyl sulphate (on the same basis) and 3% of ethylene glycol.

8. A herbicidal composition according to any one of the preceding claims, being a concentrate containing 10—45% of monosodium acid methanearsonate, 6—35% of the surfactant, and the balance water.



9. A herbicidal composition according to claim 1 or 8 substantially as hereinbefore described. obtained by diluting with water a concentrate claimed in claim 8 or 9.

10. A process for inhibiting the growth of grasses and grassy weeds, which comprises applying thereto a herbicidal composition claimed in any one of claims 1—7 or 9 or

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