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FUNGICIDAL COMPOSITION COMPRISING 5-CHLORO-SALICYLIC ACID AMYLAMIDE

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The invention concerns fungicidal agents, their use for the protection of organic material and possibly also of the skin of man and animals from attack by fungi and/or injury due to rot as the case may be, as well as, as industrial product, the organic material protected against attack by fungi and/or rot with the aid of these agents.

The use of salicylic acid phenylamides as well as derivatives of this compound halogenated in the anilide radical as fungicidal agents, e. g. in textile printing pastes, is known.

It has now been found that amides of salicylic acid halogen substituted in the benzene ring which are derived from aliphatic primary amines with hydrocarbon radicals having 5 carbon atoms have a stronger fungicidal action than the comparable aromatic amides. They are excellently suitable therefore as active ingredients in the production of fungicidal agents and for the protection of organic material from attack by fungi and/or damage due to rot. This superior fungicidal action is particularly apparent in the protection of cotton against damage by fungi.

The active ingredients usable according to the present invention are obtained by methods known per se either by amidation of the corresponding halogen substituted salicylic acid ester of lower alcohols with the aliphatic primary amines having alkyl radicals of 5 carbon atoms or by reacting halogen substituted salicylic acid halides with excess aliphatic primary amines having 5 carbon atoms. They can be purified by distillation, advantageously under reduced pressure, and are white, well crystallised compounds which dissolve only a little in water but easily in aqueous alkalies as well as in the usual organic solvents. This good solubility and the relatively good stability in alkaline solution enables the active ingredients to be used in textile treatment liquors which can contain for example, apart from soap in the usual meaning of the word and detergents, also the inorganic salts usual in washing and cleansing liquors such as Glauber's salt, pyro- or poly-phosphates, sodium silicates etc., or they can be used in the usual organic solvents such as are used for the dry cleaning of textiles or for the production of so-called sprays. They can also be mixed with soaps or synthetic washing agents which then produce washing liquors which give to the organic material washed therein, in particular cellulose textiles, good protection from attack by fungi, rot or mildew spots. Another type of use is the incorporation of salts and emulsions of the active ingredients to produce antiseptic soaps and pastes for human and veterinary purposes. The active ingredients can also be mixed into printing thickeners consisting of starch or cellulose derivatives, and also into lacquers and paints consisting chiefly of casein.

All these compositions characterised by a content of active ingredients of the type described are regarded as falling within the scope of the process according to the present invention.

The fungicidal active ingredients according to the present invention are applied to the organic material to be protected either by simple mixing or working in of solutions, emulsions or suspensions of the active ingredients or by spraying or impregnating with solutions, emulsions

or suspensions of the active ingredients. The solutions and dispersions can contain detergents for example as emulsifiers and can be used in the form of wetting, washing and rinsing liquors. According to the constitution of the active ingredient, contents of from 0.5 to 5 g. per litre of treatment liquor suffice for an effective protection of the sprayed, impregnated or washed material against attack by fungi, rot or formation of mildew spots. Organic material having a content of 0.05 to 0.5% active ingredient, calculated on its own weight, is generally effectively and relatively lastingly protected against attack by fungi.

Chiefly cellulose in textile form is meant by organic material to be protected. However, also other organic substances which tend to mould or rot can be protected, for example, paper, leather, vegetable or animal mucilage and gels, polyvinyl permanent finishes etc.

The following examples serve to illustrate the invention. Where not otherwise stated, parts are given as parts by weight. The temperatures are in degrees centigrade. The relationship of parts by weight to parts by volume is as that of kilogrammes to litres.

EXAMPLE 1

Calico is dipped for 30 seconds in an alcoholic solution which contains 5 g. of 3,5-dichlorosalicylic acid-n-amylamide per litre. After squeezing out to 100% of its weight and drying, the material treated is protected against mildew spots and rot.

(a) *Mildew spot test*

Rings of material of 9 cm. diameter are laid on an agar nutrient medium in petri dishes and inoculated with a suspension of the mixture of spores of *Penicillium expansum, Stachybotrys atra* and *Aspergillus niger* which contains 40,000 germs per ccm. The closed petri dishes are left for 10 days at 28° and then the number of fungi colonies is counted.

(b) *Rotting test*

Rings of fabric of 3.8 cm. diameter are laid on an agar nutrient medium in petri dishes which has been inoculated with 0.5 ccm. of a suspension of the spores of *Chaetomium globosum* which contains about 700,000 germs per ccm. The dishes are left for 10 days at 28°, the development of the germs is then interrupted with an alcoholic thymol solution, the rings of material are rinsed and dried. The material is then tested in the spot tester according to R. Burgess (Microorganisms and Textiles: The Journal of Applied Bacteriology, 17, 241 (1954)) to see if the strength of the material has been reduced.

(c) *Soil burial test*

Rings of fabric of 3.8 cm. diameter are buried for 14 days in an earth mixture of a moisture content of 30% and a temperature of 28° and consisting of 50% compost, 30% cow dung and 20% sand. The fabric is then rinsed and dried, and then tested in the spot tester according to Burgess to see if its strength has been reduced.

In the rotting and soil burial test, the value given is the average of 10 tests. The strength is given in percent of that of the original material.

The results of these tests can be seen from the table.

EXAMPLE 2

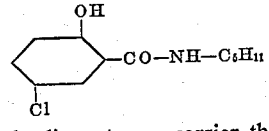
Calico is dipped in a 0.1% alcoholic solution of 5-chlorosalicylic acid isoamylamide for 30 seconds (liquor ratio 1:20), squeezed out to 100% of its weight and dried in a drying oven. The material so treated is protected against mildew spots and rot. On testing the treated samples by the methods given in Example 1, the results given in the table were obtained.

TABLE

Example	g. active substance per litre treatment liquor	mildew spot test—No. of fungi colonies			Rotting test—*Chaetomium globosum* strength	Soil burial test—strength
		Asp. n.	*Stach. a.*	*Pen. e.*		
					Percent	*Percent*
1	0.5	0	0	0	100	91
2	1	0	0	0	100	97
untreated fabric	0				11	12

What we claim is:

1. A fungicidal composition comprising as active ingredient a compound corresponding to the formula:



and a fungicidal adjuvant as a carrier therefor.

2. A fungicidal composition comprising as active ingredient 5-chloro-salicylic acid-n-amylamide and a fungicidal adjuvant as a carrier therefor.

3. A fungicidal composition comprising as active ingredient 5-chlorosalicylic acid-isoamylamide and a fungicidal adjuvant as a carrier therefor.

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