COMPOSITIONS AND METHOD FOR PROTECTING MATERIALS AGAINST BIOLOGICAL ATTACK


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6 Claims. (Cl. 167—38.7)

This invention relates to compositions for the protection of materials, particularly textile materials, against biological attack and to a method of protecting textile materials.

For many years, compositions have been used for protecting textile materials against biological attack which contain as active ingredient a mixed fatty acid ester of pentachlorophenol. Furthermore, in British patent specification No. 897,208 there is described a composition of this type in which efficiency is enhanced by incorporating various amounts of free pentachlorophenol into the mixed fatty acid ester of pentachlorophenol.

However, under very damp conditions, textile and other materials treated with the aforesaid compositions are still prone to biological attack, especially by fungi, and it is an object of the invention to provide compositions of increased efficiency which are effective even when the treated material is exposed to atmospheres of high humidity.

According to the invention, a composition for protecting material, particularly textile material, against biological attack comprises at least 80% of pentachlorophenol fatty acid ester, up to 10% by weight of pentachlorophenol and up to 10% by weight of thymol.

For practical purposes it has been found that at least about 1% of thymol should be present in the mixture. The preferred amount of pentachlorophenol is between 0.5 and 3%.

The fatty acid esters are usually derived from a mixture of C6 to C22 aliphatic carboxylic acids which may include some unsaturated acids, e.g., oleic acid.

Further according to the invention, a process for protecting textile material against biological attack comprises applying to the material an aqueous emulsion of a mixture comprising at least 80% by weight of pentachlorophenol fatty acid ester, up to 10% by weight of pentachlorophenol and up to 10% by weight of thymol.

The textile material may be in fibre, yarn or fabric form and the term also includes piece goods made from the fabric.

The compositions of the invention may be packaged in bulk form or as concentrated emulsions. When it is desired to apply the compositions in admixture with other miscible substances conventionally used in the textile industry, it is convenient to have the compositions in bulk form so that they can be premixed with these substances before emulsifying. Such substances include, for example, mineral oils and special emulsifying agents such as are used in the jute industry.

In addition to their increased efficiency under atmospheric conditions of high humidity, the compositions of the invention have the advantage that when stored for long periods of time at temperatures below room temperature, they will not solidify.

Furthermore when such compositions are formulated into emulsions these may safely be packed in wooden barrels without the risk of unpleasant bacterial odours being produced.

Although the compositions of the invention are highly effective for rotproofing textile materials their usefulness is not limited to this. They may, for example, be mixed with adhesive compositions of the kind used for hanging water-impervious wall covering materials. Such adhesive compositions are particularly prone to fungal attack when in use because of the accumulation of moisture behind the impervious wall covering. In time the growth of the fungi leads to discoloration of the wall covering material itself. The adhesives are normally marketed in the form of a dry powder to be mixed with water before application and the compositions of the invention may be mixed with the dry powdered adhesive in small amounts which do not materially affect the powdery nature of the adhesive which may then be packaged and used in the same way as the untreated adhesive. Alternatively, a concentrated emulsion of the composition may be added to an aqueous solution or dispersion of the adhesive just before application to the wall covering material.

The compositions of the invention will now be described, by way of example, in the following non-limitative examples.

Example 1

To a mixture of 98% commercial pentachlorophenol laurate and 2% pentachlorophenol is added 3% thymol. The mixture, along with a control containing 98% pentachlorophenol laurate and 2% pentachlorophenol, is stored in a refrigerator at -10°C. After four hours the control had set solid, but after forty-eight hours the admixture was still a completely mobile liquid.

Example 2

To a mixture of 98.5% commercial pentachlorophenol laurate plus 1.5% pentachlorophenol is added 10% thymol. The mixture, along with a control containing 1.5% pentachlorophenol plus 98.5% pentachlorophenol laurate, is stored in a refrigerator set at -2°C. After seventeen hours thirty minutes the control had set solid, after fourteen days the admixture was still a completely mobile liquid.

Example 3

12 pounds pentachlorophenol and 12 pounds of thymol were dissolved in 600 pounds of the pentachlorophenol ester of a mixture of C6-C22 fatty acids by heating with stirring to 70°C. 72 pounds of a branched chain fatty alcohol/ethylene oxide condensate available under the trade name of Texolform T45 were added with stirring followed by 550 pounds hot water stirring being continued until a uniform emulsion was produced. The mixture was then made up to a total volume of 2,930 pounds with cold water and after adjusting the temperature of the mix to 55°C the mixture was emulsified through a high pressure emulsifier at a pressure of 2000 pounds per square inch. After cooling the resultant emulsion was made up to 2,460 pounds total weight by the addition of water and packed as required. Cotton Dousie (7-7½ ounces per square yard) was impregnated with a 10% solution of the above emulsion by passage through a padding mangle so that after drying the fabric contained 2% of the active substance related to the weight of the fabric. A specimen of this treated fabric together with a similar piece of untreated Dousie was exposed to a 14 day burial test. The control piece was removed from the soil in small deteriorated pieces which had lost their fabric strength and hence were not tested. In contrast the treated piece was substantially free from any staining and showed only 20% loss in tensile strength.

Example 4

A solution of the mixture as given in Example 1 was prepared at 5% concentration in white spirit and brushed onto PVC wall covering, then air dried. Samples of this treated PVC coated wall covering together with samples of untreated wall covering were exposed to mould tests on the surface of mineral agar in petri dishes (a) with
adhesive side uppermost and (b) with PVC coating uppermost. The specimens were sprayed with a spore suspension in distilled water of the following organisms before installing in an incubator at 26° C.

Aspergillus Tamarri
A. niger
Cladosporium sphaerospermum
Sphymphiuni

Infected strips were also installed in a saturated atmosphere over water and incubated at 26° C. Mould growth ratings after three weeks were as follows:

<table>
<thead>
<tr>
<th></th>
<th>Samples Exposed in Petri dishes at 26° C.</th>
<th>Samples exposed over water at 26° C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Treated PVC coated wall covering.</td>
<td>(a) No growth .............................</td>
<td>(a) No growth.</td>
</tr>
<tr>
<td>2. Untreated PVC coated wall covering.</td>
<td>(b) No growth .............................</td>
<td>(b) No growth.</td>
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<tr>
<td></td>
<td>(a) Protrude growth ........................</td>
<td>(a) Protrude growth.</td>
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<td></td>
<td>(b) Protrude growth ........................</td>
<td>(b) Protrude growth.</td>
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Note.—Percentages throughout the specification and claims are expressed as percentages by weight.

I claim:

1. A composition for protecting material against biological attack comprising at least 80% of pentachlorophenol fatty acid ester, 1 to 10% of pentachlorophenol and 0.5 to 10% of thymol.

2. A composition according to claim 1 containing 0.5 to 3% pentachlorophenol.

3. A composition according to claim 1 wherein the pentachlorophenol fatty acid ester is derived from a mixture of fatty acids of from 6 to 22 carbon atoms.

4. A composition according to claim 1 in the form of an aqueous emulsion.

5. A method of protecting material against biological attack comprising applying to the material a composition according to claim 1.

6. A method of protecting textile material against biological attack comprising applying to the material a composition according to claim 4.

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