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PROCESS FOR SUPPRESSING THE GROWTH OF MICRO-ORGANISMS

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The invention relates to a process of inhibiting the growth of micro-organisms and comprises a composition of matter suitable for carrying out the same.

As is known many technical materials, particularly those containing constituents of vegetable or animal origin, such as glue, gelatine, dressing materials, printing roller compositions, fabrics, yarns, vegetable tanning extracts, cork and the like form a favorable nutrient medium for the growth of micro-organisms, such as fungi and bacteria and are consequently readily attacked by the same. The term "dressing materials" is meant to designate chemical dressing agents or mechanical stiffening liquids which are used in improving the properties of textiles coming from the weaving mill and thus to make these products saleable.

In accordance with the present invention mixtures of halogenated phenols or drivatives thereof are employed, the said mixtures retarding to a quite extraordinary extent or suppressing the growth of micro-organisms on the above named technical materials. Among those halogenated phenols are particularly suitable polychlorophenols, polychlorocresols and polychloronaphthols or the alkali compounds thereof; they are especially efficacious when applied in conjunction with benzoic acid or substituted benzoic acids, such as chlorobenzoic acids, hydroxybenzoic acids or the alkyl esters and salts thereof. Mixtures of trichlorophenol, trichlorophenolacetate, or tetrachlorophenol with p-hydroxybenzoic acid esters are preferably used; instead of the free phenols the alkali compounds or ethers thereof can be employed and in the same manner p-hydroxybenzoic acid esters can be replaced by the corresponding alkali compounds or ethers of the general formula

$$R''O—C_6H_4—CO—OR'$$

R' standing for an alkyl group and R'' standing for an alkali metal atom or an alkyl group.

The said mixtures possess the advantage of being considerably more soluble in water than the individual components, in particular the sparingly soluble polyhalogenated phenols dissolve more readily in the presence of carboxylic acids or esters or salts thereof. The efficacy of the mixed components on micro-organisms, fungi and bacteria is moreover considerably higher than corresponds to the combined effect attainable by the individual materials. For example, the concentrations at which the growth of penicillium glaucum is suppressed on agar-agar nutrition amount to, in the case of

	Per cent
Benzoic acid	0.28
Sodium benzoate	0.66
Salicylic acid	0.66
p-hydroxybenzoic-acid-methylester	0.100
2-4-5-trichlorophenol	0.004
2-4-5-trichlorophenolacetate	0.009
2-4-6-trichlorophenolacetate	0.035
Tetrachlorophenol	0.009
Trichlorocresol	0.015

Conversely the operative concentration in respect of the same fungus amounts to the following in the case of mixtures of:

	Per cent
1 part of 2-4-6-trichlorophenolacetate, 3 parts of p-hydroxybenzoic acid methylester	0.025
1 part of tetrachlorophenol, 3 parts of p-hydroxybenzoic acid-n-propyl-ester	0.02
2 parts of 2-4-5-trichlorophenolacetate, 3 parts of benzoic acid	0.008
1 part of tetrachlorophenol, 3 parts of benzoic acid	0.03
1 part of 2-4-5-trichlorophenolacetate, 3 parts of sodium benzoate	0.01
1 part of tetrachlorophenol, 3 parts of sodium benzoate	0.01
2 parts of 2-4-5-trichlorophenolacetate, 3 parts of salicylic acid	0.003

The increase in fungicidal and bactericidal power is similar when other combinations are employed.

The new mixtures can likewise be employed in the preserving of decomposable materials, conjointly with other materials, such as for example, formaldehyde, substances yielding formaldehyde, fluorides, boric acid and the like.

The mode of application varies according to the material to be protected. In the case of liquid materials the protective media can be added as such, while solid substances are with advantage impregnated or sprinkled with the solutions of the new mixtures.

The invention is further illustrated by the following examples, the parts being by weight:—

Example 1

Photographic gelatine is mixed with 0.05% of a mixture consisting of 1 part of trichlorophenolacetate and 3 parts of p-hydroxybenzoic acid methylester. Even after standing for many months no formation of fungus occurs.

Example 2

To a 25% solution of bone glue is added 0.025% of a mixture of 2 parts of tetrachlorophenol and 3 parts of p-hydroxybenzoic acid methylester. The solution thus treated remains free from mildew.

Example 3

A dressing material produced from potato starch and gelatinous glue is kept fresh and capable of use for many weeks by the addition of 0.1% of a mixture of 1 part of trichloronaphthol and 3 parts of salicylic acid.

Example 4

Roller compositions containing sugar are not attacked by mildew fungus after the application thereto of 0.02% of a mixture of 2 parts of 2-4-5-trichlorophenolacetate and 3 parts of sodium benzoate.

Example 5

Solutions of glue from hides or leather waste may be stored for months without being attacked by putrefactive bacteria and without changing their consistency if they contain 0.1% of a mixture of 2 parts of trichlorocresol and 3 parts of benzoic acid.

Example 6

An aqueous solution containing 0.1% of a mixture of 2 parts by weight of sodium trichlorophenate and 3 parts of p-hydroxybenzoic acid-n-propylester hinders the development of mildew on cotton wool or other textiles, which have been moistened with the said solution.

Example 7

Vegetable extracts containing tanning acids, which readily undergo fermentation, are kept free from germination by the addition of 0.05% of a mixture of 2 parts of trichlorophenol and 3 parts of the sodium salt of p-hydroxybenzoic acid-n-propylester.

We claim:

1. A composition of matter capable of preventing the growth of micro-organisms in technical materials liable to be decomposed by micro organisms comprising a compound containing a radicle of a halogenated phenol and a compound containing the radicle of an aromatic carboxylic acid.

2. A composition of matter capable of preventing the growth of micro-organisms in technical materials liable to be decomposed by micro organisms comprising a poly-halogenated compound corresponding to the general formula $C_6(X_3Y_2)OR$, (R standing for a hydrogen atom, an alkali metal, an alkyl or acyl group, X standing for hydrogen or halogen atoms and Y for halogen atoms) and a compound containing the radicle of an aromatic carboxylic acid.

3. A composition of matter capable of preventing the growth of micro-organisms in technical materials liable to be decomposed by micro organisms comprising a poly-chlorinated compound corresponding to the general formula $C_6(X_3Y_2)OR$, (R standing for a hydrogen atom, an alkali metal, an alkyl or acyl group, X standing for hydrogen or halogen atoms and Y for halogen atoms) and a compound containing the radicle of a substituted benzoic acid.

4. A composition of matter capable of preventing the growth of micro-organisms in technical materials liable to be decomposed by micro organisms comprising a polychlorinated phenol and an ester of a substituted benzoic acid.

5. A composition of matter capable of preventing the growth of micro-organisms in technical materials liable to be decomposed by micro organisms comprising a polychlorinated phenol and an ester of an hydroxy benzoic acid.

6. A composition of matter capable of preventing the growth of micro-organisms in technical materials liable to be decomposed by micro organisms comprising tetrachlorophenol and an ester of p-hydroxy-benzoic acid.

7. A composition of matter capable of preventing the growth of micro-organisms in technical materials liable to be decomposed by micro-organisms comprising tetrachlorophenol and p-hydroxy benzoic acid methylester.

8. A composition of matter capable of preventing the growth of micro-organisms in technical materials liable to be decomposed by micro organisms comprising 2 parts by weight of tetrachlorophenol and 3 parts by weight of p-hydroxybenzoic acid methylester.

In testimony whereof, we affix our signatures.

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