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EMULSIONS AND PROCESSES FOR THEIR PRODUCTION

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This invention relates to emulsions for use in treating textile materials or the like, to thereby improve the properties of the same.

The emulsions more particularly contemplated herein are adapted for application to textile materials, to simultaneously render the same water-proof, and immune to attack by moths or carpet beetles.

Conventional emulsions for imparting water-repellency to textiles, include essentially a water-repelling ingredient, a soap of a polyvalent metal, and a colloid such as glue or gelatine. Such conventional emulsions consist at first of saponified mixtures of soaps and unsaponified waxes, which, on the addition of a polyvalent metal, tend to form clumps of metallic soap intermixed with wax. After homogenization, these mixtures are not rapidly adsorbed when the emulsion is diluted and applied to textile materials.

Furthermore, emulsions containing glue or other gelatinous material have been found to "break" under the strong agitation employed in modern textile mill baths. Such "breaking" is very undesirable, because it results in the appearance of grease spots on the finished article.

I have discovered that, by a special method of compounding, emulsions may be prepared in which an insoluble aluminum soap is formed, not in the solvent phase, as heretofore, but as a substantially complete layer or sheath over the surface of colloidal particles which it is desired to have exhaust on the material being treated. I have also discovered that it is distinctly advantageous to utilize methyl cellulose as a protective colloid in preparing such emulsions, since it prevents "breaking" of the emulsion during agitation in the mill baths.

When it is desired to prepare an emulsion for water-proofing purposes, according to my invention, the steps briefly described, are as follows:

An insoluble material, such as a wax, oil, resin, or gum, synthetic or natural, is admixed with a water-insoluble material, such as a fatty acid or a wax containing acids or bodies, the insoluble salts of which can be precipitated. This mixture is emulsified, in water containing methyl cellulose and homogenized under high pressure, which results in the production of very small colloidal particles. To the homogenized emulsion, there is then added a compound of aluminum which is capable of forming insoluble products with the acid or acidic material admixed with the wax, resin, or gum, and the mixture is again homogenized.

In some instances, it may be desirable to add a

dispersing agent to the mixture, such as, for example, a cetylsulfuric acid salt, a quaternary ammonium base containing at least one long chain radical, morpholine oleate, or the like.

When the emulsion thus produced is applied to textiles in the mill bath, it has been found to exhaust completely on the textiles, leaving a clear transparent liquid.

It appears that the aluminum ions combine with the molecules of the acidic material which may exist naturally in certain waxes or which is admixed with the wax, gum, oil, or resin, at the interface between the emulsified particles, and the outside aqueous phase containing the protective colloid, as a result of diffusion of the acidic material to the surface of the colloidal particle. An insoluble aluminum soap is thus produced in situ on the surface of the particles, and forms an external electrically charged layer or sheath over the same. The wax-soap particles thus produced carry a positive electro-static charge, and are readily exhausted on textiles. This distinguishes over emulsions previously known, wherein the insoluble polyvalent metal soap is formed in the solvent phase.

The emulsions of my invention not only have the advantage that the more water-repellent wax, oil, resin, gum, or the like, is definitely adsorbed therefrom by textiles, but have the further advantage that they do not "break" under strong agitation. Such "breaking" is a function of the length of time during which the bath is subjected to agitation, as well as the amount and type of protective colloid employed. Due to the fact that in my improved emulsions, the wax-particles are enveloped by the electrically charged coating, the time required for adsorption of the wax or like water-repellent particles is greatly decreased, resulting in a shorter period of operation and consequent saving.

Emulsions prepared according to my invention remain stable indefinitely, do not jell on prolonged standing even at reduced temperatures, and mix perfectly with cold water. Textiles treated with my improved emulsion in a mill bath, under strong agitation, were found to have a high degree of water-repellency, and a soft finish or "hand," and to be entirely free of spots.

The emulsions of my invention have a further advantage in that the pH may be adjusted, by the addition of a suitable agent, so that they may be applied to all types of textiles of varying electrical charge.

Wax, oil, gums and resins may be embodied in emulsions prepared according to my inven-

tion, waxes and oils being more generally used. Where it is desired to treat textiles which are to be subjected to dry-cleaning, it may be advisable to replace the usual waxes or oils, partially or entirely by a synthetic resin which is not readily soluble in dry-cleaning fluids. The emulsion is prepared as described above. However, since in most cases the melting point of such resins is too high, a volatile solvent may be applied with the resin-emulsion, which will evaporate when the particles are adsorbed to the textile material, thereby rendering the synthetic resin deposited on the textile insoluble in dry cleaning fluids.

I have now discovered that substances which render textile materials immune to moth and carpet beetle attack may be incorporated in my new improved water-proofing emulsions.

According to my invention, the agent for moth-proofing or rendering textiles immune to carpet beetle attack, which, for example, may be a substance such as rotenone-containing extract, such as derris extract, quassin, or a dispersed substance containing quassin, is added to the mixture of water-repelling substance and acid, the mixture is emulsified in water containing methyl cellulose. An aqueous solution of an aluminum salt is then added, and the whole homogenized.

When the emulsion prepared according to my invention is suitably diluted, and the pH adjusted by the addition of a buffer agent, if desired, it may be applied to textiles, such as wool, for example, and will impart thereto excellent water-repellency and immunity to moth or carpet beetle attack.

The following examples illustrate methods of carrying out the present invention, but it is to be understood that these examples are given by way of illustration and not of limitation.

Example I

13.5 parts of derris extract are dissolved in 15 parts of hot benzol, and added to a melted mixture of 67.5 parts of candelilla wax, 50 parts of paraffin wax, and 17.5 parts of montan wax. The mixture of waxes and derris extract is emulsified, with stirring, in 350 parts of water containing 12 parts of methyl cellulose, at 70° C. The emulsion is homogenized under high pressure. To the homogenized emulsion there are then added 75 parts of an aqueous solution containing 16 parts of aluminum formate. The entire mixture is then homogenized at 4000 lbs./in.².

Example II

Five parts of quassin wetted with benzol are added to a melted mixture of 67.5 parts of candelilla wax, 50 parts of paraffin wax, and 17.5 parts of montan wax. The mixture of waxes and quassin is emulsified, with stirring, in 350 parts of water containing 12 parts of methyl cellulose, at 70° C. The emulsion is homogenized under high pressure. To the homogenized emulsion there are added 75 parts of an aqueous solution containing 16 parts of aluminum formate. The entire mixture is then homogenized at 4000 lbs./in.².

Modifications may be made in carrying out the present invention without departing from the spirit and scope thereof, but it is to be understood that I am to be limited only by the appended claims.

I claim:

1. The process that comprises emulsifying a wax, having admixed therewith an insecticidal substance selected from the group consisting of rotenone and quassin and a soap forming aliphatic carboxylic acid, in water containing methyl cellulose and homogenizing, thereby forming colloidal particles of the insecticide-wax composition having the acid associated therewith under conditions such that the acid component thereof is exposed at the surface of said particles, mixing the emulsion thus obtained with an aqueous solution of an aluminum salt, and homogenizing, thereby substituting aluminum in the acid component at the surface of said particles and imparting a positive electrical charge to said particles.

2. The process that comprises emulsifying a wax, having admixed therewith an insecticidal substance consisting of rotenone and a soap forming aliphatic carboxylic acid in water containing methyl cellulose and homogenizing, thereby forming colloidal particles of the insecticide-wax composition having the acid associated therewith under conditions such that the acid component thereof is exposed at the surface of said particles, mixing the emulsion thus obtained with an aqueous solution of an aluminum salt, and homogenizing, thereby substituting aluminum in the acid component at the surface of said particles and imparting a positive electrical charge to said particles.

3. The process that comprises emulsifying a wax, having admixed therewith an insecticidal substance consisting of quassin and a soap forming aliphatic carboxylic acid in water containing methyl cellulose and homogenizing, thereby forming colloidal particles of the insecticide-wax composition having the acid associated therewith under conditions such that the acid component thereof is exposed at the surface of said particles, mixing the emulsion thus obtained with an aqueous solution of an aluminum salt, and homogenizing, thereby substituting aluminum in the acid component at the surface of said particles and imparting a positive electrical charge to said particles.

4. The process that comprises emulsifying a wax, having admixed therewith oleic acid and an insecticidal substance selected from the group consisting of rotenone and quassin, in water containing methyl cellulose and homogenizing, thereby forming colloidal particles of the insecticide-wax composition having the acid associated therewith under conditions such that the acid component thereof is exposed at the surface of said particles, mixing the emulsion thus obtained with an aqueous solution of an aluminum salt, and homogenizing, thereby substituting aluminum in the acid component at the surface of said particles and imparting a positive electrical charge to said particles.

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