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COLOR AND STAIN REMOVERS FOR FABRICS

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This invention relates to color removers and more particularly to dry, solid, color and stain removers for fabrics.

An object of this invention is to remove color from dyed fabrics preparatory to redyeing.

Another object of this invention is to provide a color and stain remover which is particularly adapted for household use and which may be utilized effectively by the non-professional.

While there are numerous dye removers adapted and sold for home use, many of these color removers do not remove color from all fabrics preparatory to redyeing. For example, some color removers due to the presence of alkali, attack wool and swell and disintegrate some synthetic cellulosic fabrics. Other household color removers do not remove the color from fabrics made of cellulose esters, particularly if the cellulose ester fabric is dyed with a dark color. These deficiencies of commercial household color removers are particularly disadvantageous when it is required to remove color from a garment composed of two different fabrics such as wool and rayon.

In accordance with this invention, color and stain removers are provided which are adapted for household use and which effectively remove color from all types of fabrics whether the fabric be composed, for example, of cotton, cellulose esters, rayon or wool. The color of a wool garment having a rayon lining, for example, can be effectively removed by the compositions of this invention from both fabrics simultaneously and without substantial damage to either fabric. Certain stains may likewise be removed by the compositions of this invention.

The compositions of this invention comprise 100 parts of basic zinc sulfoxylate formaldehyde, 45 to 200 parts of a solid dry α -hydroxy carboxylic acid having a dissociation constant within the range of 5×10^{-2} to 5×10^{-5} , and preferably 15×10^{-4} to 1×10^{-4} , at 25°C ., and 1 to 20 parts of a solid, nitrogenous, organic cationic material, substantive to cellulosic material such as cellulose acetate, and having a substituent containing at least 12 carbon atoms. The quantitative values of the dissociation constant throughout this description and claims are those of the dissociation constant of the first hydrogen ion, if the α -hydroxy acid has more than one carboxylic group. When the dissociation constant of the α -hydroxy carboxylic acid is relatively low, such as 5×10^{-4} to 1×10^{-4} , the amount of α -hydroxy carboxylic acid per 100 parts of basic zinc sulfoxylate formaldehyde is preferably from

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60 to 200 parts, while when the dissociation constant is relatively high, such as from 15×10^{-4} to 6×10^{-4} , the amount of α -hydroxy carboxylic acid is preferably from 45 to 150 parts of α -hydroxy carboxylic acid for each 100 parts of basic zinc sulfoxylate formaldehyde.

The compositions of this invention may be produced by dry mixing the basic zinc sulfoxylate formaldehyde, the α -hydroxy carboxylic acid and the solid, nitrogenous organic cationic material. The compositions are adapted to be readily dispersible in water by a housewife to produce a color and stain removing solution. Until the compositions are dispersed in water, they are not effective, and to facilitate the relatively quick dispersion of the color removing compositions, they are preferably dry mixed. Since the three gallon pail is a common household article, conveniently, the amount of composition contained in a household package is sufficient to form an effective color removing dispersion with about two and a half gallons of water, although other concentrations may be used. The composition, after dispersion in the water, is preferably heated to a temperature above 175°F ., and the fabric is immersed completely in that solution. After the color has been sufficiently removed, the article is withdrawn from the bath, permitted to drain and thoroughly washed and rinsed in cold water.

By a cationic material is meant a material which, when dissolved in water, is capable of producing a relatively large organic cation, either by dissociation of the molecule per se or by hydrolysis of the material combined with the α -hydroxy carboxylic acid. For example, certain solid amine salts on dissolving in water produce these cations, and certain amine bases in water solution sometimes hydrolyze directly or combine with the α -hydroxy acid to form an amine salt which in turn produces these cations. Solid organic ammonium salts having at least 16 carbon atoms are satisfactory for use as the cationic material component of the compositions of this invention. Solid, water soluble cationic aryloxy alkoxy alkylene quaternary ammonium salts having at least 16 carbon atoms and in which the alkoxy group has at least two carbon atoms, such as aryloxy alkoxy alkylene ammonium chlorides having at least 16 carbon atoms, for example, para diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride, are especially satisfactory for this purpose.

The principal factors involved in determining the relative proportions required to produce a satisfactory dry color remover in accordance with

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this invention are the quantity of water in which the composition is to be dissolved, the temperature of the water solution during the color removing, the period of time that the dyed fabric is immersed in the solution and the relative fastness of the dye. In the marketing of color removers adapted for household use, the proportions of constituents may be varied to produce a composition which would be satisfactory for the removal of color from dyed fabrics and which would be adapted for dispersion in a definite quantity of water at a definite temperature, the dyed fabric being immersed in the solution for a definite period of time. These latter three factors of quantity of water, time and temperature could be fixed for a particular composition and indicated in the directions accompanying that composition. The compositions of this invention are capable of removing most dyes from fabrics regardless of the kind of fabric. While basic zinc sulfoxylate formaldehyde is capable of stripping a great number of fabrics, the presence of the defined α -hydroxy acids within the concentration limits specified accelerates this stripping action and extends the stripping ability of the basic zinc sulfoxylate formaldehyde to include certain dark-colored cellulose acetates which are only very difficultly or not at all stripped by basic zinc sulfoxylate formaldehyde alone. This effect is particularly marked in the case of dark-dyed acetates. The use of the cationic material specified extends this acceleration of stripping ability and improves the speed and extent of action on the most difficultly stripped dark-dyed acetates. While the compositions of this invention are capable of stripping a great many fabrics, there are some fabrics or dyes which cannot be stripped by the compositions of this invention or by any other known means. Included in this latter category are fast-dyed cottons and resin-pigment printed textiles.

Examples of α -hydroxy carboxylic acids having a dissociation constant within the range of 5×10^{-2} to 5×10^{-5} are hydroxy acetic acid, malic acid, tartaric acid and citric acid.

Examples of solid, nitrogenous organic cationic materials, being substantive to cellulosic materials, and having a substituent containing at least 12 carbon atoms are stearyl dimethyl benzyl ammonium chloride, stearyl dibutyl benzyl ammonium chloride, stearyl tris (hydroxy ethyl) ammonium chloride, diisobutyl cresoxy ethoxy ethyl dimethyl benzyl ammonium chloride, lauryl pyridinium chloride, salts of lauryl amine, para diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride, 1 - hydroxyethyl-2-heptadecenyl glyoxalidine hydrochloride, salts of aminoethyl stearamide, stearyl amine hydrochloride, salts of para diisobutyl phenoxy ethoxy ethyl dimethyl amine, and salts of diisobutyl cresoxy ethoxy ethyl dimethyl amine.

A more comprehensive understanding of this invention is obtained by reference to the following examples:

Example 1

A dry household color and stain remover for fabrics was prepared by dry mixing the following in the quantities indicated:

50 grams basic zinc sulfoxylate formaldehyde
25 grams anhydrous citric acid
2 grams para diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride

This color and stain remover is adapted to be

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dispersed preferably in about two and one half gallons of water. For effective results, the solution is heated to a temperature above 175° F. The color of dyed fabrics whether composed of cotton, wool, nylon or synthetic cellulosic esters was effectively removed by such solution before redyeing without any substantial detriment to the fabric.

Example 2

A dry household color and dye remover was prepared by dry mixing the following ingredients: 50 grams of basic zinc sulfoxylate formaldehyde, 50 grams of citric acid monohydrate and 6 grams of diisobutyl cresoxy ethoxy ethyl dimethyl benzyl ammonium chloride. This dry composition may be dispersed in about two and one half gallons of water to form an effective color and stain removing solution.

When citric acid was utilized as the α -hydroxy acid, it was found that the preferred ratio of citric acid was 45 to 150 parts of citric acid per 100 parts of basic zinc sulfoxylate formaldehyde. Little advantage, however, is obtained by using more than 100 parts of citric acid per 100 parts of basic zinc sulfoxylate formaldehyde.

Example 3

A dry household color and stain removing composition was prepared by dry mixing the following: 50 grams of basic zinc sulfoxylate formaldehyde, 34 grams of tartaric acid and 4 grams of lauryl pyridinium chloride. This composition was adapted for dispersion in about two and one half gallons of water to produce an effective color and stain removing solution.

The most desirable proportions of tartaric acid in the composition is from 50 to 90 parts of tartaric acid per 100 parts of basic zinc sulfoxylate formaldehyde.

Example 4

A dry household color and stain remover for fabrics was prepared by dry mixing the following: 50 grams of basic zinc sulfoxylate formaldehyde, 65 grams of malic acid and 5 grams of 1-hydroxy ethyl-2-heptadecenyl glyoxalidine hydrochloride. This composition was adapted for dispersion in about 2½ gallons of water.

Instead of employing 65 grams of malic acid, 65 grams of hydroxyacetic acid was used in the formula given in this example to produce an effective color and stain remover. The most effective proportion of malic acid in the color remover is 60 to 200 parts of malic acid to 100 parts of basic zinc sulfoxylate formaldehyde. The most effective proportion of hydroxyacetic acid is 70 to 200 parts of hydroxyacetic acid to 100 parts of basic zinc sulfoxylate formaldehyde.

The terms and expressions which we have employed are used as terms of description and not of limitation, and we have no intention, in the use of such terms and expressions, of excluding any equivalents of the features described or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

What is claimed is:

1. A solid dry color and stain remover for fabrics consisting essentially of 100 parts by weight of basic zinc sulfoxylate formaldehyde, 45 to 150 parts by weight of citric acid and 1 to 20 parts by weight of para diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride.

2. A solid dry color and stain remover for fabrics consisting essentially of 100 parts by weight

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of basic zinc sulfoxylate formaldehyde, 50 parts by weight of citric acid and 4 parts by weight of para diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride.

3. A solid dry color and stain remover for fabrics consisting essentially of 100 parts of basic zinc sulfoxylate formaldehyde, a solid dry α -hydroxy carboxylic acid and 1 to 20 parts of para diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride, the solid dry α -hydroxy carboxylic acid and the amount thereof being selected from the class consisting of 45 to 150 parts of citric acid, 50 to 90 parts of tartaric acid, 60 to 200 parts of malic acid and 70 to 200 parts of hydroxyacetic acid.

4. A solid dry color and stain remover for fabrics consisting essentially of 100 parts of basic zinc sulfoxylate formaldehyde, 50 to 90 parts of tartaric acid and 1 to 20 parts of para diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride.

5. A solid dry color and stain remover for fabrics consisting essentially of 100 parts of basic zinc sulfoxylate formaldehyde, 60 to 200 parts of malic acid and 1 to 20 parts of para diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride.

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6. A solid dry color and stain remover for fabrics consisting essentially of 100 parts of basic zinc sulfoxylate formaldehyde, 70 to 200 parts of hydroxyacetic acid and 1 to 20 parts of para diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride.

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