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STABILIZED WAX COMPOSITION

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This invention relates to the stabilization of fats of animal and vegetable origin and of waxes of animal, vegetable and mineral origin for the purpose of partially or completely preventing or retarding the development of discoloration or rancidity therein. It has particular reference to the treatment of these materials to render them more suitable for use as textile finishes. It relates further to textiles, composed of natural or artificial fibers, and compositions of matter containing the fats or waxes in the partially or completely stabilized form.

It is known that the fats and waxes of the class described, in general, have the tendency to undergo undesirable change which results in discoloration or rancidity of the same. The mechanism whereby the change is brought about in these materials is not wholly or clearly understood but it has been observed that heat is an important factor, and that most probably also air and light.

In accordance with the present invention partial or complete protection or stabilization may be afforded to fats and waxes of the character described by incorporating therein a small amount of the addition compound obtainable by reacting a metal bisulfite with formaldehyde.

Of particular interest is the stabilization of fats and waxes to be used in the treatment of textiles. In the art of finishing textiles these materials are applied to the fabric as finishes in the form of emulsions or solutions of the sulfonated product, which is usually a mixture of sulfonated and unsulfonated fat or wax, and of the waxes in their partial or completely saponified form. The cloth which has been impregnated with the finishing agent and consequently is wet, is thereafter dried by the application of heat. It has been found that as a result of this drying operation discoloration and rancidity in the finishing agent and consequently in the cloth frequently occur. This is likewise the case in the stored textiles.

While the fats and waxes for textile use may be stabilized with the addition compound of any metal bisulfite and formaldehyde better results may be had by employing those obtainable by reacting an alkali metal bisulfite with formaldehyde. This is true because the alkali metals form soluble soaps with the fatty acids, whereas certain of the other metals will form insoluble soaps therewith which if deposited in the fabric would cause gumminess and spotting, and in the case of the colored insoluble soaps, such as would be formed with iron, discoloration of the fabric also. An example of the alkali metal bisulfite formaldehyde addition compounds, and preferred from the standpoint of cost and availability, is sodium bisulfite-formaldehyde.

The addition compounds constituting stabilizers of the present invention may be prepared by reacting a metal bisulfite with formaldehyde. Their preparation is exemplified by the preparation of sodium bisulfite-formaldehyde. 10 parts by weight of sodium bisulfite are slowly added with stirring to 8 parts by weight of 38% formaldehyde. The mixture becomes warm and may be cooled if too much heat is developed. The product is a thick white paste containing about 70–72% of sodium bisulfite-formaldehyde. The product so prepared may be used either in paste or powder form, and in the latter case water is added to the material to be stabilized at least in amounts sufficient to dissolve the powder.

The amount of the stabilizing compound to be added to the fat or wax will, in general, be comprised within the limits of about 1% to 6% by weight on the fat or wax, the latter being taken on the moisture-free basis. The amounts here given are not, however, to be construed as a limitation on the invention since the use of larger amounts for the purpose is contemplated and is within the scope of the invention.

The addition compound may be incorporated in the fat or wax when the latter is in the concentrated or manufactured state, or it may be admixed with emulsions or solutions of the materials such as are prpeared for application to textiles.

Although they may be incorporated in any suitable manner, a preferred method is to stir a small quantity of the stabilizer in paste form with the fat or wax in fluid condition. In the case of the normally solid fats and waxes, these may be warmed slightly to obtain a partially fluid condition before incorporating the stabilizer.

The fats and waxes which have been partially or completely protected or stabilized may be used in admixture with each other or with unstabilized oils, fats and waxes or with mineral oils and in the form of emulsions or solutions or they may be employed with other textile finishing or treating agents such as the soluble starches, soluble gums, blueings and the like.

In the following examples, which are intended as illustrative of the invention and not as a limitation thereon, sodium bisulfite-formaldehyde was used to stabilize the materials. The parts are by weight calculated on the moisture-free weight of the materials unless otherwise noted.

Example 1

Samples of cotton cloth were impregnated with a 5% emulsion of sulfonated tallow. Other samples were impregnated with a 5% emulsion of sulfonated tallow which had been intimately mixed with 5% of sodium bisulfite-formaldehyde. All the samples were dried.

One set of these samples together with a blank (untreated cotton cloth) was steamed for 45 minutes at 15 pounds pressure. The other set was exposed for 26 hours to dry heat (100° C.) in circulating air. All the samples were analyzed in a spectrophotometer for reflectance at 4000 Angstrom units before and after the steam and heat tests. The percent discoloration was recorded as follows:

	Steaming test	Dry heat test
Blank	4.7	7.5
Sulfonated tallow	8.9	19.0
Sulfonated tallow plus 4% bisulfite-formaldehyde	5.0	8.7

From these results it is seen that the bisulfite-formaldehyde remarkably improved the resistance of the sulfonated tallow to discoloration both by steaming and by dry heat. A further analysis of the above results shows that, after steaming, the cotton cloth treated with the sulfonated tallow containing bisulfite-formaldehyde was about 44% less discolored than the cloth treated with the sulfonated tallow alone. Where dry heat was applied to the cloth samples, 54% less discoloration was obtained over the non-stabilized sulfonated tallow.

Rancidity tests were conducted on samples of cloth impregnated respectively with the sulfonated tallow and the sulfonated tallow containing 4% sodium bisulfite-formaldehyde. The samples were stored in sealed glass jars at 50° C. with the result that while the sulfonated tallow alone became rancid in two weeks that containing the sodium bisulfite-formaldehyde showed no rancidity at the end of a month. In this respect similar tests carried out with another type of sulfonated tallow showed the sulfonated tallow alone to become rancid after 217 hours whereas the one containing the sodium bisulfite-formaldehyde was not rancid after 624 hours.

Samples of cotton cloth were sized respectively with the sulfonated tallow containing and not containing sodium bisulfite-formaldehyde and stored exposed to the air for two weeks and then steamed at 15 pounds pressure. The bisulfite-formaldehyde protected sample gave a better white than the control. Further samples of the cloth were then examined after storage for six months. The samples sized with the stabilized sulfonated tallow were whiter than those containing the unprotected sulfonated tallow. Portions of these samples were then subjected to the steaming test and it was found that the bisulfite-formaldehyde had retained its effectiveness and gave a better white than the non-stabilized sulfonated tallow.

Any of the tallows now known to the textile trade as finishes, whether of animal or vegetable origin, may be stabilized in accordance with the invention and therefore the term sulfonated tallow as used in the claims is intended to include such tallows.

Example 2

Tests similar to those of Example 1 were conducted on a fabric softener which consisted of Japan wax and beeswax emulsified with sodium hydroxide, stearic acid and water. In these tests samples of unfinished bleached cotton cloth were impregnated in each case with 5% emulsions of the softener, one emulsion being used for the control and containing no stabilizer, whereas the saponified waxes of the other emulsions contained 2.5% and 5%, respectively, of sodium bisulfite-formaldehyde. The samples were then dried and submitted to three types of severe ageing tests. These tests consisted in (1) subjecting samples to a ¾ hour steaming at 15 pounds pressure and a temperature of 250° F.; (2) exposing samples in a current of air for five hours at a temperature of 250° F.; and (3) sealing cloth samples in glass jars for 5 hours at a temperature of 250° F.

These tests showed the control to be yellow whereas the samples containing the bisulfite-formaldehyde were of improved color. The sample treated with the softener to which the higher percentage of the stabilizing agent had been added showed a clear bright white.

It is to be understood that the invention is not limited to the stabilization of Japan wax and beeswax, given in Example 2, but may be extended to other waxes, whether of animal, vegetable or of mineral origin, such as, scale wax, carnauba wax, montan wax, ceresin wax, condelilla wax. Briefly, then, the metal bisulfite-formaldehyde compounds, and more particularly the alkali metal bisulfite-formaldehyde compounds, may be employed to partially or completely protect or stabilize any of the waxes which tend to become discolored or rancid.

This application is a continuation-in-part of our copending application, Serial No. 321,272, filed February 28, 1940.

What we claim is:

1. A wax having incorporated therein stabilizing amounts of a metal bisulfite-formaldehyde addition compound.

2. A wax having incorporated therein stabilizing amounts of an alkali-metal bisulfite-formaldehyde addition compound.

3. A wax having incorporated therein stabilizing amounts of sodium bisulfite-formaldehyde addition compound.

4. An emulsified wax having incorporated therein stabilizing amounts of sodium bisulfite-formaldehyde addition compound.

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