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SOAP STABILIZATION

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The present invention relates to the light stability of soap and particularly to means of improving the light and color stability of soaps during storage and use conditions. Practically all soaps, even when wrapped in paper or enclosed in a box tend to discolor under normal storage conditions probably due to penetration by the shorter wave lengths of light and this tendency is most marked in the case of white soaps, which frequently, after shelf storage for a period of time, change to cream, to tan or at times to a light brown color particularly at the ends of the cake of soap and even all over the surface thereof.

The darkening or discoloration of soaps is frequently found among the higher priced toilet soaps many of which also contain small quantities of a phenolic compound which is used as an antiseptic or preventive of rancidity. While the discoloration of a soap does not adversely affect its utilitarian properties, it is none the less very objectionable from an esthetic viewpoint, and lowers the sales appeal of the product.

Many attempts have been directed to overcome the storage discoloration of soap. These have met with varying degrees of success but the problem has been intensified by the practice of incorporating phenolic compounds into soap. Unfortunately the materials known for stabilizing soap have not proved effective in the presence of a phenolic compound. However, it has now been found possible greatly to enhance the light stability of soap containing a phenolic compound by incorporating therein an ultra violet light absorber and a mild reducing agent, preferably an inorganic sulfite possessing mild reducing properties. Effective reducing agents for the objects desired comprise sodium sulfite, sodium bisulfite and sodium hydrosulfite. The various ingredients required for practicing the present invention may be compounded into a soap by any of the methods well known in the art.

One such method is to prepare test bars of soap by simulating the amalgamator stage in soap manufacture, that is, the stage wherein perfumes and other additives if required, are introduced and blended in the soap base. As a soap base in the following experiments, white high grade soap chips of a type commonly employed for toilet use or for washing delicate fabrics and containing approximately 6% water was employed. A portion of the base soap chips was blended in a Waring Blendor with 2% by weight of a phenolic antiseptic, for example 2,2'-thiobis(4,6-dichlorphenol) and also an ultra violet light absorber. The absorber employed in different experiments was 2% and 5% of 2-hydroxy-4-methoxy-benzophenone on the weight of the phenolic antiseptic or in other words 0.04% and 0.10% respectively of the weight of the base soap chips. Sodium sulfite in different experiments was added in quantities equal respectively to 5%, 12.5%, 25% and 100% by weight of the phenolic antiseptic. These quantities of sulfite correspond respectively to 0.10%, 0.25%, 0.50% and 2% of

the weight of the base soap chips where 2% by weight of the phenolic antiseptic was employed. The soap composition was blended in a mortar with sufficient water to bring the moisture content to 10% by weight. Test bars of the compounded soaps were then pressed from the moist mix by means of a suitable die operated by bench vise pressure. However, in the case of these experiments where concentrations of sodium sulfite in amount equal to and greater than 25% of the weight of the phenolic antiseptic were taken, it was preferred to add the sulfite as an approximately 13% water solution, then to add additional water to the mass to form approximately a 70% soap slurry and then to dry on a steam table of not more than 50 pounds per square inch gauge pressure. Thereupon the dried material was reblended, brought back to 10% water content and pressed into bars by the method previously mentioned. The light reflectance of these various test soap bars was then taken before and after exposure 15 minutes under a General Electric Type RS Sun Lamp 7 inches from the soap. During this period of exposure the test bars were maintained as nearly as possible at a temperature of 70° C. by means of air cooling.

In all cases it was noted that while increasing quantities of reducing agent up to 25% of the weight of the phenolic antiseptic showed lesser differences in the reflectance of unexposed and light exposed soap, further increases above 25% of the reducing agent failed to show any greatly marked improvement. The same phenomena was shown in the case of percent increase in light stability, the reference standard being pure soap. Thus, a 100% increase in stability is that which would bring the soap containing the phenolic antiseptic to the stability of pure soap. With a 12.5% dosage of sodium sulfite on the weight of the phenolic antiseptic but with no ultra violet light absorber, there was a 21% increase in stability, with 25% of sodium sulfite there was a 33% increase in light stability and the same increase with 100% sulfite. In another test portion containing 2% of the ultra violet light absorber on the weight of phenolic antiseptic, using 12.5% of the reducing agent in the manner described, there was noted a 27% increase in light stability, with 25% sulfite there was a 43% improvement while with a 100% dosage of sulfite there was a 49% improvement in light stability. In another series of tests containing 5% of the ultra violet light absorber on the weight of phenolic antiseptic, and using 12.5% of the sodium sulfite in the manner described, there was observed a 33% increase in light stability, with 25% sulfite there was a 59% improvement, while with a 100% dosage of sulfite there was an improvement of 62% in light stability. It is apparent that the addition of a mild reducing agent, specifically sodium sulfite, to the ultra violet light absorber has very materially improved the light stability of a white soap containing a phenolic antiseptic.

There was even less change in color after exposure to ultra violet light when the absorber was co-precipitated with the phenolic antiseptic and the composite mixture used to compound bar soap. Approximately 30 parts by weight of 2,2'-thiobis(4,6-dichlorphenol) (0.0842 molecular proportions) and 1.5 parts by weight of 2-hydroxy-4-methoxy-benzophenone (0.0066 molecular proportions) were dissolved in about 25 parts of acetone and sodium hydroxide added sufficient to form the monosodium salt of each ingredient. The mixture was diluted with water and the phenolic ingredients precipitated from solution by adding 10% sulfuric acid (0.102 gram moles per 100 grams). The solids were removed by filtration, washed and dried. The composite mixture was used to compound bar soap from high grade white soap chips as hereinbefore described. The amount added

was 2% of the weight of the soap. Also, 0.25% sodium bisulfite was added. After exposure to ultra violet light the color was almost indistinguishable from that of a bar of pure soap similarly exposed.

Similar improvements were observed in soap solutions. Tests were conducted by preparing solutions containing 5% soap (a mixture of 80% sodium soap and 20% potassium soap produced from a 70% tallow and 30% coconut oil glyceride), 0.1% of the phenolic antiseptic together with the stabilizer, and observing the color of the solutions after standing. The table summarizes typical results after 12 days in a sunny room.

2-Hydroxy-4-methoxy benzophenone, Percent Conc.	Sodium sulfite, Percent Conc.	Color of Solution After 12 days
0.05	—	brown.
0.05	0.1	light yellow.
0.05	0.5	off white.

The evidence indicates that the ultra violet light absorber selected should absorb strongly in the range of wave length absorbed by the phenolic antiseptic. For example, the absorption by 2,2'-thiobis(4,6-dichlorphenol) reaches a maximum at 320–340 mu and is quite strong over the entire range of 300–350 mu and the most effective screening agents exhibited strong absorption in the 300–350 mu range. The absorption by 2-hydroxy-4-methoxy-benzophenone reaches a maximum in this range. Still other suitable ultra violet light absorbers are 2-hydroxy-4,4'-dimethoxy-benzophenone, isobutyl p-aminobenzoate, n-butyl p-aminobenzoate. Many others are available under proprietary names.

Discoloration of soaps containing phenolic antiseptics is a general phenomenon and through application of the principles of this invention valuable properties imparted to soap by phenolic antiseptics can be secured without objectionable discoloration. Other phenolic antiseptics include 2,2'-thiobis-p-cresol, 2,2'-thiobis (p-chlorophenol), 2,2'-methylenebis(p-chlorophenol) and 2,2'-methylenebis (3,4,6-trichlorphenol).

It is intended to cover all changes and modifications of the examples of the invention herein chosen for purposes of disclosure which do not constitute departures from the spirit and scope of the invention.

What is claimed is:

1. The method of improving the light stability of an antiseptic detergent composition comprising a detergent soap containing a minor proportion of a phenolic antiseptic effective in the presence of soap and selected from the group consisting of thiobis(chloro phenol) antiseptics, methylene-bis(chloro phenol) antiseptics and 2,2'-thiobis p-cresol, which antiseptic discolors the soap when the composition is exposed to light which comprises incorporating therein a small amount sufficient to increase the light stability, of a mild reducing agent selected from the group consisting of sodium sulfite, sodium bisulfite and sodium hydrosulfite together with a small amount sufficient further to increase the light stability of an ultra violet absorber selected from the group consisting of 2-hydroxy 4-methoxy benzophenone, 2-hydroxy 4,4'-dimethoxy benzophenone, isobutyl p-amino benzoate and n-butyl p-amino benzoate.

2. The method of improving the light stability of an antiseptic detergent composition comprising a detergent soap containing a minor proportion of a thiobis-(chlorophenol) antiseptic which discolors the soap when the composition is exposed to light which comprises incorporating therein a small amount sufficient to increase the light stability of sodium sulfite together with a small amount sufficient further to increase the light stability of an ultra violet light absorber selected from the group consisting of 2-hydroxy-4-methoxy benzophenone, 2 hydroxy 4,4'-dimethoxy benzophenone, isobutyl p-aminobenzoate and n-butyl p-aminobenzoate.

3. The method of improving the light stability of an antiseptic detergent composition comprising a detergent soap containing a minor proportion of 2,2'-thiobis(4,6-dichlorophenol) which composition is characterized by discoloration upon exposure to light which comprises incorporating therein a small amount sufficient to increase the light stability of sodium sulfite together with a small amount sufficient further to increase the light stability of 2-hydroxy-4-methoxy benzophenone.

4. In the method of claim 3 the step which comprises coprecipitating from aqueous alkaline solution the 2,2'-thiobis(4,6-dichlorophenol) and the 2-hydroxy-4-methoxy benzophenone and incorporating the composite mixture into the soap.

5. An antiseptic detergent composition comprising a detergent soap containing a minor proportion of a phenolic antiseptic selected from the group consisting of thiobis(chloro phenol) antiseptics, methylene bis(chloro phenol) antiseptics and 2,2'-thiobis p-cresol effective in the presence of soap which discolors the soap when the composition is exposed to light stabilized by having incorporated therein a small amount sufficient to increase the light stability, of a mild reducing agent selected from the group consisting of sodium sulfite, sodium bisulfite and sodium hydrosulfite together with a small amount sufficient further to increase the light stability, of an ultra violet absorber selected from the group consisting of 2-hydroxy 4-methoxy benzophenone, 2-hydroxy 4,4'-dimethoxy benzophenone, isobutyl p-amino benzoate and n-butyl p-amino benzoate.

6. An antiseptic detergent composition comprising a detergent soap containing a minor proportion of a thiobis (chloro phenol) antiseptic which discolors the soap when the composition is exposed to light stabilized by having incorporated therein a small amount sufficient to increase the light stability of sodium sulfite together with a small amount sufficient further to increase the light stability of an ultra violet light absorber selected from the group consisting of 2-hydroxy-4-methoxy benzophenone, 2-hydroxy 4,4'-dimethoxy benzophenone, isobutyl p-aminobenzoate and n-butyl p-aminobenzoate.

7. An antiseptic detergent composition comprising a detergent soap containing a minor proportion of 2,2'-thiobis(4,6-dichlorophenol) which composition is characterized by discoloration upon exposure to light stabilized by having incorporated therein a small amount sufficient to increase the light stability of sodium sulfite together with a small amount sufficient further to increase the light stability of 2-hydroxy-4,4'-dimethoxy benzophenone.

8. An antiseptic detergent composition comprising a detergent soap containing a minor proportion of the antiseptic 2,2'-thiobis-(4,6-dichlorophenol) which composition is characterized by having incorporated therein sodium sulfite within the range of 12.5%–500% by weight of the said antiseptic sufficient to increase the light stability together with 2-hydroxy-4-methoxy benzophenone within the range of 2%–50% by weight of the antiseptic sufficient further to increase the light stability.

9. An antiseptic detergent composition comprising a detergent soap containing a minor proportion of 2,2'-thiobis-(4,6-dichlorophenol) which composition is characterized by discoloration upon exposure to light stabilized by having incorporated therein a small amount sufficient to increase the light stability of sodium bisulfite together with a small amount sufficient further to increase the light stability of an ultra violet light absorber selected from the group consisting of 2-hydroxy 4-methoxy benzophenone, 2-hydroxy 4,4'-dimethoxy benzophenone, isobutyl-p-amino benzoate and n-butyl-p-amino benzoate.

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