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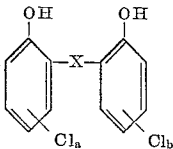
3,085,066
COLOR STABILIZERS FOR DETERGENTS
CONTAINING BACTERIOSTATS
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No Drawing. Filed Nov. 24, 1953, Ser. No. 775,730
9 Claims. (Cl. 252-107)

This invention relates to compositions comprising a detergent, a bacteriostat and a stabilizing compound to minimize the tendency of the bacteriostat to discolor the detergent.

Recent developments in the detergent industry, and particularly with respect to soaps, have resulted in the incorporation of bacteriostats in detergents for the purpose of inhibiting or destroying the growth of bacteria, fungi, and related organisms. However, there has been a tendency on the part of certain of these bacteriostats of a phenolic nature to discolor under alkaline conditions such as are present in detergents, especially when exposed to light.

It is accordingly a primary purpose of this invention to provide compounds which will eliminate or minimize the tendency of the above phenolic type bacteriostats to discolor the soap. A further object is to provide various formulations which will prove effective in preventing or decreasing detergent discoloration under alkaline conditions when exposed to light. Further objects will be evident from the description that follows.

According to this invention it has been found after investigation of a large number of compounds that when small amounts of certain dicarboxylic acids are added to a mixture of a detergent and a bacteriostat within the scope of the following formula



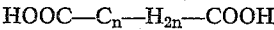
where X is a member selected from the group consisting of sulphur and methylene, a is an integer from 1 to 4, and b is an integer from 1 to 4, the discoloration of the detergent due to the presence of the bacteriostat is greatly reduced with a resulting increased whitening of the detergent.

Bacteriostats of the above structure include as representatives thereof the 2,2'-thiobis(dichlorophenols), the 2,2'-thiobis(chlorophenols), 2,2'-thiobis(trichlorophenols), the bis(trichlorohydroxy) methanes, the bis(dichlorohydroxy) methanes, the bis(chlorohydroxy) methanes, and the like. In this connection see U.S. Patents 2,535,077 and 2,250,480.

In this connection by detergent is meant the well-known organic non-ionic surface active compounds (see U.S. 1,970,578 and U.S. 2,213,477 for examples) and the anionic surface active compounds which latter group includes the surface active alkali metal sulfonates and sulfates in addition to the preferred alkali metal fatty acid soaps (see U.S. 2,295,594) and mixtures thereof. In addition by the term bacteriostat is meant any compound which is active either in inhibiting the growth of or destroying micro-organisms, such as bacteria and fungi, although the term has particular reference to bacteria.

Specifically it has been found that detergent formula-

tions containing, for example, 99.5 parts by weight of soap and 0.5 part by weight of a bacteriostat of the above described formula compounded with 0.01 part to 0.5 part by weight of dicarboxylic acids of the following structure:



where n has a value from 0 to 8 results in less discoloration of the detergent composition. Representative of the acids which are effective in this respect are oxalic, malonic, succinic, glutaric, adipic, pimelic, suberic, azelaic, and sebacic.

The suitability of these compounds for minimizing discoloration is demonstrated by exposing soaps containing a bacteriostat and the color stabilizer compound to ultraviolet light. Representative of the results obtained from these experiments are the data set forth in the following tables. In each instance the number given in these tables represents percent reflectance with magnesium oxide taken as the standard at 100 percent. It will be noted that there are two reflectance values given for each soap or soap formulation. These values represent an initial reading and a reading after 30 minutes of ultraviolet ray exposure. Each soap sample tested contained 99.5 parts by weight of soap and 0.5 part by weight of the bacteriostat selected from the group consisting of 2,2'-thiobis(4,6-dichlorophenol); bis-(3,5,6-trichloro-2-hydroxy-phenyl) methane; and 2,2'-thiobis(p-chlorophenol). The parts by weight of stabilizer employed usually varies from 0.01 to 0.5.

TABLE I
Color Degradation of Bar Soap Containing
2,2'-Thiobis-(4,6-Dichlorophenol) (A)
[Percent reflectance (MgO=100%)]

Acid Color Stabilizer	Test Item	Tri-stimulus Filters			Monochromatic Filters		
		Green	Blue	Amber	Red	Green	Blue
None.....	Soap.....	78-76	61-58	80-77	86-83	74-71	68-64
Do.....	Soap+ 0.5A.	75-60	63-42	80-64	85-75	74-55	67-48
0.10 Oxalic.....	do.....	73-61	52-42	83-73	79-72	68-57	62-48
0.25 Sebacic.....	do.....	81-69	65-49	83-73	87-81	77-64	69-56
0.01 Adipic.....	do.....	78-63	61-44	83-66	87-76	76-57	71-50
0.05 Adipic.....	do.....	81-69	64-50	84-73	89-80	78-63	72-56
0.10 Adipic.....	do.....	81-70	64-52	84-73	89-91	79-65	72-58
0.25 Adipic.....	do.....	81-74	64-57	84-77	89-84	79-69	73-62
0.5 Adipic.....	do.....	81-73	64-54	84-74	89-93	79-68	72-60
0.10 Malonic.....	do.....	78-67	64-49	80-71	87-80	75-62	69-56
0.25 Malonic.....	do.....	81-75	67-48	83-79	90-85	78-71	73-63

TABLE II
Color Degradation of Bar Soap Containing Bis-(3,5,6-Trichloro-2-Hydroxyphenyl) Methane (B)
[Percent reflectance (MgO=100%)]

Acid Color Stabilizer	Test Item	Tri-stimulus Filters			Monochromatic Filters		
		Green	Blue	Amber	Red	Green	Blue
None.....	Soap.....	78-76	61-58	80-77	86-83	74-71	68-64
Do.....	Soap+ 0.5B.	78-67	61-48	81-70	85-80	74-63	67-56
0.1 Oxalic.....	do.....	80-72	69-55	82-75	83-81	76-68	69-60
0.25 Sebacic.....	do.....	78-69	62-50	81-72	83-80	74-64	67-56
0.10 Adipic.....	do.....	81-76	66-58	84-78	85-83	78-71	72-64
0.25 Adipic.....	do.....	82-75	66-58	84-78	86-84	77-72	71-64

TABLE III

Color Degradation of Bar Soap Containing 2,2'-Thiobis(p-Chlorophenol) (C)

[Percent reflectance (MgO=100%)]

Acid Color Stabilizer	Test Item	Tri-stimulus Filters			Monochromatic Filters		
		Green	Blue	Amber	Red	Green	Blue
None	Soap	78-76	61-58	80-77	86-83	74-71	68-64
Do.	Soap+0.5C.	72-56	54-36	75-59	78-70	68-51	61-41
0.10 Oxalic	do.	76-61	61-40	80-65	82-75	72-57	66-47
0.25 Oxalic	do.	73-65	63-43	80-69	83-78	73-60	66-50
0.10 Sebacic	do.	77-59	61-40	79-64	82-75	72-55	66-46
0.25 Sebacic	do.	78-65	62-44	81-69	87-79	76-59	68-51
0.10 Adipic	do.	79-66	64-45	82-71	87-79	76-60	69-53
0.25 Adipic	do.	80-69	65-48	82-74	88-81	76-64	70-56

From the above tables it will be apparent that although the presence of the bacteriostat markedly reduces the whiteness of the soap, the addition of the color stabilizer improves the whiteness of the soap in spite of prolonged exposure to ultraviolet light. In some instances it will be noted that the formulation of detergent, color stabilizer, and bacteriostat exhibits as much or more whiteness than the soap alone, where the formulation and the soap have each been exposed to 30 minutes of ultraviolet light (see tables I and II).

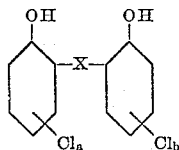
In general the parts by weight used of the color stabilizer varies from 0.01 to 0.5 part by weight for every 99.5 parts by weight of detergent and 0.5 part by weight of bacteriostat. While larger amounts of color stabilizer up to 10.0 parts by weight may be used, the upper limit will be determined by practical consideration.

The color stabilizer may be incorporated in the bacteriostatic detergent in the course of its manufacture. For example, in the case of a soap, the color stabilizer may be added during the crutching, milling, or similar operation. The color stabilizer may be dissolved in a suitable solvent prior to admixing with the soap. With frame soaps the color stabilizing compound may be added during the crutching operation. With milled soaps, the addition may take place during the milling operation. In general any method which results in the color stabilizer being uniformly incorporated into the detergent or soap is satisfactory. If desired, other components normally found in detergents or soaps and mixtures thereof may be added such as perfumes, water softeners, abrasives, and the like.

While this invention has been described with respect to certain embodiments, it is not so limited, and it is to be understood that variations and modifications thereof obvious to those skilled in the art may be made without departing from the spirit or scope of this invention.

What is claimed is:

1. An antiseptic detergent composition consisting essentially of an alkali metal fatty acid soap, a compound of the formula

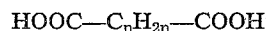


where X is selected from the group consisting of sulfur and methylene, a is an integer from 1 to 4 and b is an integer from 1 to 4, and from 0.01 to 10 percent by weight, based upon the combined weight of the soap and the compound, of a dicarboxylic acid of the formula



where n has a value from 0 to 8.

2. An antiseptic detergent composition consisting essentially of an alkali metal fatty acid soap, 2,2'-thiobis(4,6-dichlorophenol), and from 0.01 to 10 percent by weight, based upon the combined weight of the soap and the 2,2'-thiobis(4,6-dichlorophenol), of a dicarboxylic acid of the formula



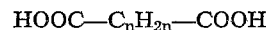
where n has a value from 0 to 8.

3. An antiseptic detergent composition consisting essentially of an alkali metal fatty acid soap, bis-(3,5,6-trichloro-2-hydroxy-phenyl) methane, and from 0.01 to 10 percent by weight, based upon the combined weight of the soap and the bis-(3,5,6-trichloro-2-hydroxy-phenyl) methane, of a dicarboxylic acid of the formula



where n has a value of from 0 to 8.

4. An antiseptic detergent composition consisting essentially of an alkali metal fatty acid soap, 2,2'-thiobis(p-chlorophenol), and from 0.01 to 10 percent by weight, based upon the combined weight of the soap and the 2,2'-thiobis(p-chlorophenol), of a dicarboxylic acid of the formula



where n has a value from 0 to 8.

5. An antiseptic detergent composition consisting essentially of an alkali metal fatty acid soap, 2,2'-thiobis(4,6-dichlorophenol), and from 0.01 to 10 percent by weight, based upon the combined weight of the soap and the 2,2'-thiobis(4,6-dichlorophenol), of adipic acid.

6. An antiseptic detergent composition consisting essentially of an alkali metal fatty acid soap, bis-(3,5,6-trichloro-2-hydroxyphenyl) methane, and from 0.01 to 10 percent by weight, based upon the combined weight of the soap and the bis-(3,5,6-trichloro-2-hydroxyphenyl) methane, of adipic acid.

7. An antiseptic detergent composition consisting essentially of an alkali metal fatty acid soap, 2,2'-thiobis(p-chlorophenol), and from 0.01 to 10 percent by weight, based upon the combined weight of the soap and the 2,2'-thiobis(p-chlorophenol), of adipic acid.

8. An antiseptic detergent composition consisting essentially of an alkali metal fatty acid soap, 2,2'-thiobis(chlorophenol), and from 0.01 to 10 percent by weight, based upon the combined weight of the soap and the 2,2'-thiobis(chlorophenol), of adipic acid.

9. An antiseptic detergent composition consisting essentially of an alkali metal fatty acid soap, bis(3,5-dichloro-2-hydroxyphenyl) methane, and from 0.01 to 10 percent by weight, based upon the combined weight of the soap and the bis(3,5-dichloro-2-hydroxyphenyl) methane, of adipic acid.

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