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COLOR STABILIZERS FOR DETERGENTS CONTAINING BACTERIOSTATS

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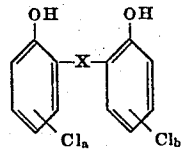
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This invention relates to compositions comprising a detergent, a bacteriostat, and a stabilizing compound to minimize the tendency of the bacteriostat to discolor the detergent.

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 these 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 organic sulfur-nitrogen compounds are added to a mixture of a detergent and 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.

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 microorganisms such as bacteria and fungi although the term has particular reference to bacteria.

Specifically it has been found that detergent formulations containing, for example, 99.5 parts by weight of soap and .5 part by weight of a bacteriostat of the above described formula compounded with 0.01 part to 0.5 part by weight of certain organic sulfur-nitrogen compounds will result in less discoloration of the detergent-bacteriostat composition. Representative of these sulfur-nitrogen compounds which are active as color stabilizers, are zinc dibutyl dithiocarbamate, zinc diethyl dithiocarbamate, zinc dimethyl dithiocarbamate, N,N'-diphenyl thiourea (thiocarbanilide), 2-mercaptobenzothiazole, sodium dibutyl dithiocarbamate, sodium diethyl dithiocarbamate, and sodium dimethyl dithiocarbamate with the first five mentioned being the preferred group. In general any zinc, sodium, or potassium dialkyl dithiocarbamate will be found satisfactory. The above dialkyl group may have from 1 to 6 carbon atoms and compounds contemplated include zinc dihexyl dithiocarbamate, potassium dipropyl dithiocarbamate, sodium diamyl dithiocarbamate, potassium dimethyl dithiocarbamate, and the like.

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%)

Color stabilizer	Test item	Monochromatic filters			Tri-stimulus filters		
		Green	Blue	Red	Amber	Green	Blue
None	Soap	74–71	68–64	86–83	80–77	78–76	61–58
Do	Soap+0.5 A	75–55	67–48	85–75	80–64	76–60	63–42
0.5 zinc dibutyl dithiocarbamate.	do	75–61	64–55	84–80	77–70	75–65	59–45
0.25 zinc dibutyl dithiocarbamate.	do	74–65	67–58	86–82	80–74	78–70	62–50
0.10 zinc dibutyl dithiocarbamate.	do	76–64	68–58	87–82	82–75	79–70	64–50
0.05 zinc dibutyl dithiocarbamate.	do	75–62	67–55	85–80	80–71	78–67	62–47
0.025 zinc dibutyl dithiocarbamate.	do	76–65	69–58	87–81	82–74	80–70	64–50
0.01 zinc dibutyl dithiocarbamate.	do	77–65	69–57	87–80	82–73	80–70	66–50
0.005 zinc dibutyl dithiocarbamate.	do	77–64	70–57	87–80	83–71	81–68	65–49
0.0025 zinc dibutyl dithiocarbamate.	do	77–63	69–55	86–79	82–71	80–67	64–49
0.25 zinc diethyl dithiocarbamate.	do	73–64	66–54	83–80	80–70	77–68	61–47
0.10 zinc diethyl dithiocarbamate.	do	74–61	67–52	84–79	81–69	77–65	62–45
0.25 zinc dimethyl dithiocarbamate.	do	75–66	67–56	82–82	81–73	79–70	62–49
0.10 zinc dimethyl dithiocarbamate.	do	75–66	66–55	85–82	81–73	78–70	62–49

TABLE II

Color Degradation of Bar Soap Containing 2,2'-Thiobis (4,6-Dichlorophenol) (A), Percent Reflectance (MgO=100%)

Color stabilizer	Test item	Monochromatic filters			Tri-stimulus filters		
		Green	Blue	Red	Amber	Green	Blue
None	Soap	74–71	68–64	86–83	80–77	78–76	61–58
Do	Soap+0.5 A	75–55	67–48	85–75	80–64	76–60	63–42
0.5 thiocarbanilide	do	78–63	69–56	86–81	82–71	80–68	63–47
0.25 thiocarbanilide	do	75–62	68–54	85–79	81–69	79–66	62–46
0.10 thiocarbanilide	do	77–66	70–58	86–82	83–73	81–70	64–51
0.05 thiocarbanilide	do	78–66	70–59	86–82	82–74	81–70	65–51
0.025 thiocarbanilide	do	76–61	69–54	81–70	81–70	80–66	63–47
0.01 thiocarbanilide	do	77–63	70–56	86–80	83–71	81–67	65–48
0.005 thiocarbanilide	do	77–59	70–51	84–77	81–67	80–63	63–43
0.0025 thiocarbanilide	do	76–59	69–57	84–77	81–67	79–63	63–45

TABLE III

Color Degradation of Bar Soap Containing 2,2'-Thiobis (4,6-Dichlorophenol) (A), Percent Reflectance (MgO=100%)

Color stabilizer	Test item	Monochromatic filters			Tri-stimulus filters		
		Green	Blue	Red	Amber	Green	Blue
None	Soap	74–71	68–64	86–83	80–77	78–76	61–58
Do	Soap+0.5 A	75–55	67–48	85–75	80–64	76–60	63–42
0.5 2-mercaptobenzothiazole.	do	75–67	65–53	84–82	81–75	78–71	61–43
0.25 2-mercaptobenzothiazole.	do	75–67	66–52	85–82	81–75	78–71	61–41
0.10 2-mercaptobenzothiazole.	do	77–66	69–54	86–82	82–74	80–70	64–45
0.05 2-mercaptobenzothiazole.	do	77–63	69–52	86–79	82–70	81–66	64–45
0.025 2-mercaptobenzothiazole.	do	77–62	69–52	86–79	82–70	81–67	64–45
0.01 2-mercaptobenzothiazole.	do	76–59	68–51	85–76	81–67	80–63	63–44
0.005 2-mercaptobenzothiazole.	do	77–59	69–51	85–75	82–66	80–63	64–44
0.0025 2-mercaptobenzothiazole.	do	76–58	69–50	85–75	82–65	80–62	63–43

TABLE IV

Color Degradation of Bar Soap Containing 2,2'-Thiobis (4,6Dichlorophenol) (A), Percent Reflectance (MgO=100%)

Color stabilizer	Test item	Monochromatic filters			Tri-stimulus filters		
		Green	Blue	Red	Amber	Green	Blue
None	Soap	74–71	68–64	86–83	80–77	78–76	61–58
Do	Soap+0.5 B	74–63	67–56	85–80	81–70	78–67	61–48
0.1 thiocarbanilide	do	75–68	67–59	85–81	81–75	78–70	61–52
0.25 zinc dibutyl-dithiocarbamate.	do	73–67	66–60	83–82	79–75	76–74	62–53
0.1 zinc dibutyl-dithiocarbamate.	do	76–67	68–59	86–82	82–77	78–72	62–53
0.25 zinc diethyl-dithiocarbamate.	do	73–67	65–57	82–81	80–74	76–72	60–50
0.25 zinc dimethyl-dithiocarbamate.	do	76–70	68–61	86–84	82–78	79–75	64–44
0.10 zinc dimethyl-dithiocarbamate.	do	75–66	67–57	85–82	82–74	78–71	62–49

TABLE V

Color Degradation of Bar Soap Containing 2,2'-Thiobis (4,6-Dichlorophenol) (A), Percent Reflectance (MgO=100%)

Color stabilizer	Test item	Monochromatic filters			Tri-stimulus filters		
		Green	Blue	Red	Amber	Green	Blue
None	Soap	74–71	68–64	86–83	80–77	78–76	61–58
Do	Soap+0.5 C	72–56	61–41	78–70	75–59	68–51	54–36
0.1 thiocarbanilide	do	75–63	67–49	85–77	81–69	77–63	61–42
0.25 zinc dibutyl-dithiocarbamate.	do	71–62	63–52	81–78	77–69	74–67	59–45
0.1 zinc dibutyl-dithiocarbamate.	do	75–63	67–53	85–79	81–72	78–66	60–45
0.25 zinc diethyl dithiocarbamate.	do	71–62	64–51	82–79	78–70	74–67	59–45
0.10 zinc diethyl-dithiocarbamate.	do	71–58	63–47	82–77	79–67	75–63	59–39
0.25 zinc dimethyl dithiocarbamate.	do	73–63	62–52	82–77	80–72	76–69	61–44
0.10 zinc dimethyl dithiocarbamate.	do	73–61	65–49	83–80	80–71	76–67	61–41

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 represents an improvement of whiteness over the soap and bacteriostat on the order of 30 percent (see 0.1 2,2'-thiobis(4,6-dichlorophenol) in Table V using blue monochromatic filter).

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 considerations.

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 mixture 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, 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 zinc dibutyl dithiocarbamate.

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 2-mercaptobenzothiazole.

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 zinc dibutyl dithiocarbamate.

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