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DETERGENT COMPOSITION

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3 Claims. (Cl. 252—138)

This invention relates to a detergent suitable for use in cake form, and more specifically to a detergent that can be used in the form of a cake containing as its essential detergent material a mixture of a water-soluble salt of di-(normal octyl) sulfosuccinate and boric acid, with or without monoglycerol or monoglycol sulfosuccinates, water-soluble phosphates or other modifying constituents.

The esters of sulfosuccinic acid are known to possess detergent properties. U. S. Patent No. 2,028,091, which covers these compounds as new compositions of matter, describes a large number of such esters including the esters of 2-ethyl hexyl alcohol and of capryl alcohol. These dioctyl esters, and particularly the sodium salt of the di-(2-ethyl hexyl) sulfosuccinic acid are among the most powerful wetting agents known, and I have prepared successful spray-dried detergent compositions containing them. However, they are not suitable for the preparation of an ordinary cake type of detergent having the characteristics of bar soap as they are soft, gelatinous materials at ordinary temperatures.

I have now discovered that a composition having excellent detergent and antiseptic properties can be prepared in the solid or cake form from the di-(normal octyl) sulfosuccinate by admixing this material with boric acid, with or without the addition of alkali metal polyphosphates and other fillers, abrasives and the like. The di-(normal octyl) sulfosuccinate is not specifically described in the patent above referred to and, in fact, normal octyl alcohol was known only as a chemical curiosity when that patent was applied for. Recently, however, this alcohol has become available in commercial quantities, and I have found that the water-soluble salt of its di-ester with sulfosuccinic acid possesses unexpected properties for the preparation of detergent compositions in cake form, as will now be explained.

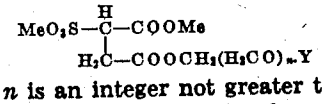
As is noted above, the water-soluble salts of the other dioctyl sulfosuccinates are soft, gelatinous compounds at atmospheric temperatures and they disperse completely and form a homogeneous gel when admixed with warm water. The corresponding esters of alcohols of lower molecular weight than octyl alcohol are even softer and more water-dispersible, while the esters of alcohols higher than octyl alcohol do not possess such good wetting properties. It is therefore a very surprising and unexpected discovery to find that the alkali metal salts, ammonium salt, and other water-soluble salts of di-(normal octyl) sulfosuccinic acid, when admixed with equal or greater quantities of powdered boric acid, will form a moldable detergent cake that has most of the physical properties of ordinary hard soaps such as "Ivory" soap. This composition does not soften and disperse in water as do the other dioctyl sulfosuccinates, but the water dissolves only the outer layer and even this dissolution takes place very much more slowly than with ordinary soap. Cakes of my new detergent composition therefore possess a much longer effective life than does an ordinary bar of soap of the same size, and possess a number of advantages.

My new detergent compositions may be used either as toilet or laundry soaps. They form a class of detergents having a mildly acid reaction, as contrasted with the alkaline reaction of ordinary soap, and yet they foam freely and leave the skin in a soft condition. Many persons experience skin irritations from the alkali of even the most expensive toilet soaps, and for such as these the present invention is especially recommended. Surgeons, doctors, dentists, and others who must wash their hands many times daily will also find the present invention of value, as a continuing source of skin irritation is avoided.

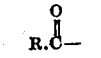
The water-soluble salts of di-(normal octyl) sulfosuccinic acid are even better detergents than are the corresponding compounds prepared from other octyl alcohols, and for this reason they may be used in relatively small amounts. Thus, for example, I have prepared detergent cakes containing from 5% to 15% of sodium di-(normal octyl) sulfosuccinate and 95–85% of boric acid that have excellent detergent properties and a long effective life. Other cakes having equal detergency and even better lathering properties have been prepared using the same amount of the sulfosuccinate but replacing about 20–30% of the boric acid by sodium or potassium tetraphosphate, tetrasodium or potassium pyrophosphate, sodium hexa metaphosphate and other alkali metal polyphosphates. A part of the boric acid may also be replaced by water-soluble or water-dispersible fillers such as "Cerelose" (a corn sugar), cane sugar, urea, glycerine, sodium sulfate, or water-soluble, neutral inorganic salts, waxes, fats, etc., or by a small amount of neutral soap such as sodium stearate or sodium oleate. Other fillers, antiseptics, germicides or addition agents such as phenol or cresol, sodium nucleinate and the like will also readily suggest

themselves to those adapting the principles of my invention for specific purposes.

As has been stated, a molded detergent cake composed of sodium or potassium di-(normal octyl) sulfosuccinate and boric acid is quite hard, and is only slowly attacked by water. I have found, as another important feature of my invention, that an improvement in both the detergency and the emollient characteristics of these compositions can be effected by admixing therewith another new class of esters of sulfosuccinic acid. This class of compounds, which may be used in any desired proportions, consists in the water-soluble salts of the mono-esters of sulfosuccinic acid with glycerol or glycol esters or ethers. These compounds are sulfosuccinic acid mono-esters of the formula



in which n is an integer not greater than 2, Me is a salt-forming radical selected from the group consisting of alkali metals, ammonium, and monovalent organic salt-forming radicals, and Y is a member of the group consisting of alkyl radicals of the type $R.CH_2$— and monovalent aliphatic acyl radicals of the type



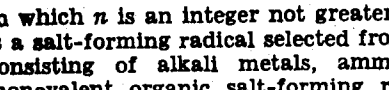
R being an aliphatic radical containing 7 or more carbon atoms. Preferably the groups represented by Y are higher aliphatic hydrocarbon or fatty acid groups containing at least 8 carbon atoms, in order to give enhanced detergency to the composition, and the best results are obtained when Y contains from 12—18 carbon atoms. Representative compounds of this class are obtained by esterifying one mole of sulfosuccinic acid with one mole of monostearin, monoölein, or the mono-esters of ethylene glycol or the mono-esters of glycerol with other fatty acids such as ricinoleic acid, caprylic acid, pelargonic acid, lauric acid, myristic acid, palmitic acid, or the mixture of higher fatty acids obtained by the hydrolysis of coconut oil. Similar compositions of the ether type are obtained by esterifying with sulfosuccinic acid the mono-ether of ethylene glycol with 2-ethyl hexyl alcohol, capryl alcohol, decyl alcohol, lauryl alcohol, octadecyl alcohol and the like or the corresponding mono-ethers of glycerol.

From the foregoing it will be seen that my invention in its broadest aspects comprises a detergent composition capable of being prepared and sold in cake form, which composition contains both a water-soluble di-(normal octyl) sulfosuccinic acid salt and boric acid, with or without the addition of other ingredients. Water-soluble salts of polyphosphoric acids may be added in quantities up to about 20% in order to increase the lathering and detergent properties and mono-esters of sulfosuccinic acid salts with higher alkyl esters or ethers of polyhydric alcohols may be added in any suitable quantities. The composition may also contain fillers, antiseptics and other minor ingreidents such as those noted above.

What I claim is:

1. A detergent composition in solid cake form comprising a water-soluble salt of di-(normal octyl) sulfosuccinate and boric acid in the ratio of 5 to 15% by weight of the former to 95 to 85% by weight of the latter.

2. A detergent composition in solid cake form comprising from 5 to 15% by weight of a water-soluble salt of di-(normal octyl) sulfosuccinate, boric acid in amounts at least equal to the amount of said salt of di-(normal octyl) sulfosuccinate, and a sulfosuccinate of the formula



in which n is an integer not greater than 2, Me is a salt-forming radical selected from the group consisting of alkali metals, ammonium, and monovalent organic salt-forming radicals, and Y is a member of the group consisting of alkyl and aliphatic monovalent acyl radicals containing 8 to 18 carbon atoms in amounts effective as an emollient.

3. A detergent composition in solid cake form comprising from 5 to 15% by weight of a water-soluble salt of di-(normal octyl) sulfosuccinate, the remaining 95 to 85% by weight of the detergent composition comprising boric acid and an alkali metal polyphosphate, the said alkali metal polyphosphate being present in amounts of from about 20 to 30% by weight of the boric acid.

COLEMAN R. CARYL.