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SOLID TRANSPARENT DETERGENT COMPOSITIONS AND METHOD OF MAKING THE SAME

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ABSTRACT OF THE DISCLOSURE

Solid transparent detergent compositions comprising a sodium soap of a saturated fatty acid, a C_2–C_3 polyhydric alcohol, and a polyalkoxy ether of an alkyl phenol. Method of making such compositions by dispersing said soap and polyalkoxy ether in said alcohol at elevated temperatures.

The present invention relates to solid transparent detergent compositions and to methods of making the same.

The manufacture of transparent soaps is known in the art, and is typified by the teachings of U.S. Pat. 3,155,624 and the prior art discussed therein. However, transparent compositions containing detergent and of a solidity comparable with that of soap and sufficient to permit processing into cleansing bars or cakes by conventional soap-making techniques have not heretofore been disclosed.

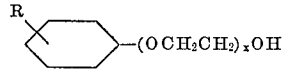
Detergent compositions of the type prepared according to the present invention have numerous desirable properties. Because of their detergent content, they are useful as cleansing agents with hard water. Further, the compositions according to the present invention are characterized by an extreme mildness not characteristic of conventional soaps or detergents. The compositions have a very high degree of transparency which permits their manufacture into clear products of considerable esthetic appeal. The compositions of the invention far exceed the definition of transparency discussed in U.S. Pat. 3,155,624, i.e. sufficient clarity to permit the reading of bold-face type of about 14 point size through a thickness of a quarter-inch of the soap composition. The detergent compositions of the invention can be formed into bars or cakes of higher density and of greater emolliency than conventional transparent soap bars. Because of the low content of volatiles in the compositions (generally less than 5–15 percent of water), bars formed therefrom show no shrinkage and negligible weight loss on storage. In contrast, conventional transparent soaps have a high content of water, alcohol, and other volatiles and shaped products formed therefrom may change considerably in size and weight with time.

The compositions of the present invention comprise from about 8 to about 22 parts by weight of a sodium soap consisting substantially of sodium soaps of saturated fatty acids having at least 18 carbon atoms. The soaps of practical interest are those of acids having 18–24 carbon atoms, e.g. stearic (C_{18}), arachidic (C_{20}), behenic (C_{22}), and lignoceric (C_{24}) since these are, presently, the acids commercially available. However, sodium soaps of other long chain fatty acids would be suitable if available in quantity. In those compositions containing relatively little soap within the limits given, the use of soaps having a high melting point is recommended.

The soap is combined with from about 25 to about 45 parts by weight of a dihydric or trihydric alcohol having 2 or 3 carbon atoms, e.g. ethylene glycol, propylene glycol, and glycerin. These polyhydric alcohols can be used alone, admixed with each other or in combination with a minor amount (i.e. up to about an equal amount by

weight) of other polyhydric alcohols having up to 12 carbon atoms, e.g. sucrose, lactose, dextrose, sorbitol, and diglycerol.

Finally, the compositions comprise from about 5 to about 30 parts by weight of a polyalkylene glycol ether of an alkyl phenol. Lower polyalkoxy ethers, e.g. polyethoxy, polypropoxy, and polybutoxy ethers, of alkyl phenols in which the alkyl group has from 6 to 12 carbon atoms are typical of these commercially available non-ionic detergents or wetting agents. Preferred materials are the polyethoxy glycol ethers of alkyl phenols, i.e. alkyl phenoxy polyethoxy ethanols of the formula:



wherein R is an alkyl group having from 6 to 12 carbon atoms and x is a number, not necessarily integral since mixtures of compounds may be involved, having an average value from about 7 to 13. Compounds of the latter type are commercially available under the tradenames "Igepal" (e.g. nonyl phenoxy polyethoxy ethanols, particularly those in which x is from 9 to 11) and "Triton" (e.g. isooctyl phenoxy polyethoxy ethanols, particularly those in which x is from 7 to 13).

In the compositions of the present invention, the polyhydric alcohol functions as a clarifying solvent for the remaining ingredients and as an emollient. The sodium soap acts primarily as a solidifying agent for the composition. The non-ionic wetting agent plays a detergent role and, further, functions as a coupling agent for the soap and polyhydric alcohol, giving a clearer product than can be obtained in the absence of the detergent. If the compositions are prepared with large amounts of soap, larger amounts of alcohol and detergent, within the limits disclosed, will be needed to solubilize and extend the soap component.

Additional ingredients such as perfumes, coloring agents, germicides, foaming and lathering agents, and the like can optionally be incorporated into the detergent compositions. Particularly useful commercially available foaming agents include soaps of lower fatty acids, such as sodium laurate; alkyl sulfates and alkyl ether sulfates, such as sodium lauryl sulfate and sodium lauryl ether sulfate; sulfobetaines, such as coconut acyl amido sodium sulfonic acid betaines; and alkyl amine oxides such as bis(2-hydroxyethyl) alkylamine oxides or dimethyl alkylamine oxides. These foaming agents can be incorporated in amounts up to about 60 parts by weight with the other ingredients mentioned earlier herein.

The compositions are conveniently prepared by heating the polyhydric alcohol to a temperature from about 170° F. to about 180° F. The sodium stearate soap is added with stirring until it dissolves to give a clear solution. The solution is then cooled to about 160° F. and the non-ionic detergent component is incorporated into the mixture. The composition is kept above its congealing temperature of about 140° F.–150° F. until solidification is desired. When detergent bars are to be prepared, the compositions need not be milled but are conveniently framed into bars of the desired size and then cooled. Since milling is not required, the manufacture of such bars is particularly simple and economical.

While there is no criticality in the order in which the ingredients are combined, solution of the stearate soap at a feasible rate requires heating. The preferred process described just above minimizes exposure of the detergent, which is usually the most heat-sensitive component, to temperatures which might tend to yellow or discolor the compositions. However, if a heat-resistant detergent is employed, the soap and detergent can be combined prior to addition to the polyhydric alcohol. Of the alcohols,

glycerin is a preferred material because it has little tendency to discolor on heating. In any event, slight discoloration of any of the components which may be caused by heating is of no consequence if compositions having other than a water-white color are to be prepared.

A better understanding of the present invention and of its many advantages will be had by referring to the following specific examples given by way of illustration. In the following examples, the sodium fatty acid soaps employed are of a purity of at least about 95 percent to minimize the presence of water in the compositions.

EXAMPLE 1

A clear detergent composition was prepared by dissolving 18 parts by weight of sodium stearate in 42 parts of glycerin warmed to about 170° F. After slight cooling, 30 parts of nonyl phenoxy polyethoxy ethanol ("Igepal") were dispersed in the mixture with stirring. On further cooling, the mixture formed a clear solid mass.

The composition has cleansing properties, and is also useful as a solid vehicle for perfumes and the like.

EXAMPLE 2

A closely similar composition was prepared as in Example 1, but employing a mixture of 38 parts of glycerin with 10 parts of propylene glycol as the polyhydroxy component.

EXAMPLE 3

42 parts by weight of glycerin and 10 parts of sorbitol were heated to about 170° F. before addition of 18 parts of sodium stearate. After cooling to 160° F., 30 parts of isooctyl phenoxy polyethoxy ethanol ("Triton X–100" or "X–102") were added. The composition was then cooled to solidification.

EXAMPLE 4

15 parts by weight of the sodium salt of a fatty acid fraction containing 90 percent of C_{20}–C_{22} fatty acids was dispersed in 40 parts of glycerine together with 30 parts of alkyl phenol polyalkylene glycol ether ("Igepal"), as in the earlier examples.

EXAMPLE 5

9 parts by weight of a 30 percent aqueous solution of sodium lauryl sulfate and 10 parts of sodium laurate (70 percent pure) were added as foaming agents, together with 2 parts of perfume and 0.65 part of a soluble dye, to a detergent composition prepared from 17 parts of sodium stearate, 40 parts of glycerin, 10 parts of sorbitol, and 12 parts of alkyl phenoxy polyethoxy ethanol ("Igepal"). The composition was framed to form detergent bars.

In place of sorbitol, dextrose, lactose, sucrose, or diglycerol can be combined with the glycerin as an extender and coupling agent.

EXAMPLE 6

10 parts by weight of sodium laurate, 2.4 parts by weight of ethoxylated lauryl alcohol, and 40 parts of sodium lauryl ethoxy ether sulfate (60 percent solids) were combined as foaming agents with a detergent composition prepared by dispersing 12 parts of sodium stearate and 7 parts of alkyl phenoxy ethoxy ethanol ("Igepal") in 28.6 parts of glycerin.

Other commercially available foaming agents such as sulfobetaines and alkyl amine oxides can be used to impart foaming properties to the compositions.

EXAMPLE 7

A detergent composition of particular usefulness as a solid base or carrier for perfume was prepared by combining 10 parts by weight of sodium sterate, 45 parts of ethylene glycol, and 5 parts by weight of alkyl phenoxy polyethoxy ethanol.

What is claimed is:

1. A solid transparent detergent composition adaptable to forming into bars or cakes and consisting essentially of about 8 to about 22 parts by weight of a sodium soap of a saturated fatty acid having at least 18 carbon atoms, about 25 to about 45 parts by weight of a polyhydric alcohol having 2 or 3 carbon atoms, and about 5 to about 30 parts by weight of a poly(ethoxy) ether of an alkyl phenol in which the alkyl group has from 6 to 12 carbon atoms and the number of ethoxy groups has an average value of from about 7 to 13.

2. A detergent composition as in claim **1** wherein said fatty acid has from 18 to 24 carbon atoms.

3. A detergent composition as in claim **1** wherein said sodium soap is sodium stearate.

4. A detergent composition as in claim **1** wherein said polyhydric alcohol is propylene glycol.

5. A detergent composition as in claim **1** wherein said polyhydric alcohol is glycerin.

6. A detergent composition as in claim **1** wherein said polyhydric alcohol having 2 or 3 carbon atoms is admixed with up to about an equal amount by weight of a polyhydric alcohol selected from the group consisting of sucrose, lactose, dextrose, sorbitol, and diglycerol.

7. A detergent composition as in claim **1** which additionally contains up to about 60 parts by weight of a foaming agent selected from the group consisting of alkyl sulfates and alkyl ether sulfates.

8. The method of making a solid transparent detergent composition as in claim **1** which comprises dispersing said sodium soap and said poly(ethoxy) ether of an alkylphenol in said polyhydric alcohol at a temperature above the congealing temperature of about 140° F.–150° F., and up to about 180° F., and then cooling the composition below its solidfication point.

9. The method as in claim **8** wherein sodium stearate and nonyl phenol polyethoxy ethanol are dispersed in glycerin.

10. The method as in claim **8** wherein said sodium soap is first dissolved in said polyhydric alcohol at about 170° F.–180° F., the solution is then cooled to about 160° F. and said polyethoxy ether of an alkyl phenol is added and dispersed therein, and the composition is then cooled below its solidification point.

References Cited

UNITED STATES PATENTS

2,005,160	6/1935	Pape	87—16
2,595,300	5/1952	Safrin	252—109
3,155,624	11/1964	Kelly	252—122

OTHER REFERENCES

"Cracking of Toilet Soaps" in Soap & Chemical Specialties, July 1965, pages 147–149.

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