United States Patent

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[54] **SOAP COMPOSITIONS CONTAINING VICINAL HYDROXYALKYL MALEATES**
4 Claims, No Drawings

[52] **U.S. Cl.** **252/132,**
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[50] **Field of Search** 260/485;
252/89, 117, 121, 132, 135

[56] **References Cited**

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ABSTRACT: The tendency of natural soap compositions to deposit precipitates in hard water is inhibited by addition of 12–25 percent by weight sodium or potassium vicinal hydroxy alkyl maleate wherein the alkyl group contains from 12 to 20 carbon atoms.

SOAP COMPOSITIONS CONTAINING VICINAL HYDROXYALKYL MALEATES

BACKGROUND OF THE INVENTION

This invention relates to improved soap compositions. More particularly, the invention relates to improved compositions suitable for use in hard water.

The excellent performance characteristics of soaps derived from animal fats and vegetable oils, e.g., lauric, myristic, palmitic, stearic, tallow and coconut oil acid soaps are well-known. However, when such soaps are employed in hard water (i.e., water containing substantial quantities of alkaline earth metal ions—particularly, calcium or magnesium) they interact with the ionic constituents of such water to form insoluble precipitates which tend to deposit on washing vessels and items being washed. Such undesirable effects are exemplified by "the ring around the tub" which frequently demarcates the water line of washing vessels utilized in geographical localities having hard water supplies.

Although deposition of precipitates by such compositions can be inhibited by use of sequestrants to "soften" the water, such sequestrants are inert components which do not contribute to the cleansing power of the compositions in soft water. Further, such additives sometimes impair physical characteristics of bar soap compositions in terms of hardness, gloss, solubility, etc. and therefore are not desired for use therein.

SUMMARY OF THE INVENTION

It is an object of this invention to provide improved soap compositions particularly suited for use in hard water.

Basically, the improved soap compositions of the invention comprise natural soaps in combination with minor amounts of vicinal hydroxyalkyl maleates hereinafter described.

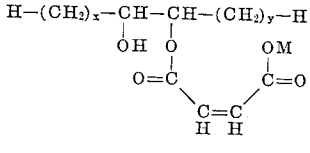
The invention will be understood from the following description of the preferred embodiments.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The soap compositions of this invention comprise a soap derived from natural products (hereinafter referred to in the specification and claims as natural soaps) in combination with vicinal hydroxyalkyl maleates.

Any of the well-known natural soaps conventionally employed in soap bars and/or powders, can be utilized in the compositions of this invention. Such natural soaps include sodium and potassium salts of acids obtained by saponification of animal fats and vegetable oils, for example, lauric, myristic, palmitic, stearic, tallow and coconut oil acids and mixtures thereof. As is well-known to those skilled in the art, the selection of natural soap constituents is based on the physical and performance characteristics desired as well as cost and availability of the natural products from which the soaps are derived.

The vicinal hydroxyalkyl maleates employed in this invention are represented by the formula:



wherein M is sodium or potassium, and x and y are each numbers from 0 to 18, the sum of x plus y being from 10 to 18. Compositions wherein the sum of x plus y is from 13 to 16 are particularly preferred. The limitations set forth above are essential to provide the advantages of this invention.

Maleates of the above type can be prepared by reaction of appropriate vicinal diols with not more than 1 molecular proportion of maleic anhydride at temperatures of about 125°–150° C. and neutralization of the resulting acid with dilute sodium or potassium base. Use of excess base should be avoided to prevent hydrolysis of the ester linkage.

The compositions of this invention may contain a single hydroxyalkyl maleate; a mixture of position isomers (i.e. the hydroxyl and maleate substituents being attached to the alkyl chains at various isomeric positions e.g. 1,2; 2,3; 3,4 etc.); a mixture of hydroxyalkyl maleates of various alkyl chain lengths, i.e. a homolog mix, or; homolog mixes wherein individual homologs comprise a mixture of position isomers. The use of mixtures is preferred to the use of single compounds in order to provide a composition having optimum cleaning properties.

The maleates used in this invention are themselves excellent surfactants and do not in any way diminish the cleansing performance of the soap compositions in which they are used.

The compositions of this invention must contain at least 12 percent by weight vicinal hydroxyalkyl maleate (based on the combined weight of the maleate and natural soap) to effectively inhibit precipitate deposition. The use of greater than 25 percent by weight maleate does not provide bar soaps of acceptable physical (solubility) characteristics. A maleate content of from 15 to 20 percent by weight is particularly preferred.

In addition to the foregoing essential components, the compositions of this invention may contain minor amounts of perfumes, dyes, abrasives, antiperspirants, germicides, or other additives conventionally employed in soap compositions.

The invention is further illustrated by the following examples wherein all percentages are by weight unless otherwise indicated.

EXAMPLE I

A cleansing composition is prepared by admixing 16 percent sodium vicinal hydroxy hexadecyl maleate and 84 percent of a natural soap formulation comprising 20 percent coconut oil soap and 80 percent tallow soap.

To compare precipitate deposition properties of this composition with those of conventional natural soaps, a 1 percent solution of the foregoing composition and a 1 percent solution of a natural soap composition consisting of 20 percent coconut oil soap and 80 percent tallow soap are prepared. The water used in the preparation of these solutions contains 200 parts per million calcium.

Black tile plates are immersed in each solution for about 10 seconds, removed and allowed to drain and dry at ambient temperatures. Visual observation indicates substantially less, in fact, almost no precipitate deposition on the plate immersed in solution of soap containing maleate as compared to heavy deposition on the plate immersed in the solution of soap composition containing no maleate.

EXAMPLE II

The procedure of example I is repeated with the exception that 12 percent of a 50—50 mixture of sodium vicinal hydroxy hexadecyl maleate and sodium vicinal hydroxy octadecyl maleate is used in place of the sodium vicinal hydroxy hexadecyl maleate. Comparable results are obtained.

EXAMPLE III

The procedure of example I is repeated with the exception that 25 percent sodium vicinal hydroxy octadecyl maleate is utilized in the composition. Comparable results are obtained.

EXAMPLE IV

Soap bars are formed from the compositions of examples I–III by thoroughly blending the ingredients with about 18 parts by weight water and pressing the blended mass in a 2¼ inch diameter die at about 10,000 p.s.i. All bars were found to have acceptable physical properties.

EXAMPLE V

A soap bar consisting of 27 percent sodium vicinal hydroxy

tetradecyl maleate and 73 percent of natural soap (20 percent coconut oil soap, 80 percent tallow soap) is prepared according to example IV. In use, the bar is found to dissolve with undesirable rapidity.

EXAMPLE VI

The procedure of example I is repeated with the exception that only 10 percent sodium vicinal hydroxy hexadecyl maleate is utilized in the composition. An undesirably high level of precipitate deposition is observed.

EXAMPLE VII

The procedure of example I is repeated with the exception that sodium vicinal hydroxy decyl maleate is utilized in place of sodium vicinal hydroxy hexadecyl maleate. An undesirably high level of precipitate deposition is observed.

EXAMPLE VIII

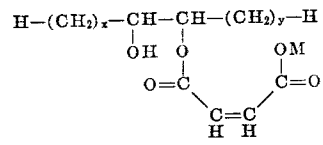
The procedure of example I is repeated with the exception that sodium vicinal hydroxy docosyl maleate is substituted for sodium vicinal hydroxy hexadecyl maleate. An undesirably high level of precipitate deposition is observed.

Examples I–IV above illustrate the practice of this invention and the advantages obtained thereby. Examples V–VIII illustrate that, generally, similar compositions not falling within the defined limitations of this invention do not provide such advantages.

What is claimed is:

1. A detergent composition consisting essentially of:

A. a vicinal hydroxyalkyl maleate component represented by the formula:



wherein x and y are each numbers from 0 to 18 the sum of x and y being from 10 to 18 and M is selected from the group consisting of sodium and potassium; and

B. a soap selected from the group consisting of sodium and potassium salts of fatty acids obtained from animal fats and vegetable oils;

where said (A) component constitutes from 12 percent to 25 percent by weight of the total dry weight of said (A) and (B) components.

2. The composition of claim 1 wherein said composition contains from 15 percent to 20 percent by weight of said maleate based on the total dry weight of said maleate and said soap.

3. The composition of claim 2 wherein the sum of x plus y is from 13 to 16.

4, The composition of claim 1 wherein said n-alkyl maleate component comprises a mixture of position isomers.