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2,773,835

LIQUID SHAMPOO COMPOSITION

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The present invention relates to liquid shampoo compositions and has particular reference to novel liquid shampoo compositions which have improved stability and resistance to phase separation even on long standing.

Numerous types of liquid shampoo compositions have been developed within recent years. Such compositions generally contain either soap, i. e., water-soluble salts of fatty acids, or various non-soap synthetic detergents, as the active ingredient or principal cleansing agent. One shampoo which has enjoyed a considerable amount of commercial success has utilized the water-soluble salts of sulfated monoglycerides of higher fatty acids as the principal cleansing ingredient. When dissolved in an aqueous solvent medium these detergent salts provide clear liquid shampoo preparations.

Such shampoo preparations exhibit high water solubility and have excellent foaming properties. It is preferred to package and distribute the liquid preparations in glass bottles for reasons of convenience and economy. Experience has shown, however, that liquid shampoo preparations containing water-soluble salts of sulfated monoglycerides of higher fatty acids as the detergent often undergo phase separation on standing and lose their desirable clear appearance.

The instability of the detergent in aqueous media is believed to be the cause of the phase separation. Immediately upon dissolution in the aqueous solvent medium the detergent slowly begins to hydrolyze. In time the quantity of hydrolytic products formed becomes so great that said products go out of solution and rise to the top of the shampoo composition as a viscous creamy emulsion. If the shampoo is shaken the emulsion becomes dispersed through the composition and the shampoo becomes cloudy in appearance.

Prior to this invention, so far as can be determined, attempts to provide a stable liquid shampoo composition which contained the water-soluble salts of sulfated monoglycerides of higher fatty acids have been generally unsuccessful.

It has now been discovered that liquid shampoo compositions comprising water-soluble salts of sulfated monoglycerides of higher fatty acids as a detergent, an aqueous solvent medium, and a minor amount of urea have improved stability and resistance to phase separation even on long standing. The pH of the finished shampoo composition should be within the range of 5.5 to 7.0 and preferably is within the range of about 6.0 to about 6.5. It has been found that compositions having an hydrogen ion concentration outside the preferred range tend to hydrolyze more readily than compositions having a pH within the said range. The novel compositions of the present invention provide shampoos having high foaming power and excellent cleansing properties when applied to human hair in either soft or hard water.

The detergent employed in accordance with the present invention is well known in the art and may be prepared in any suitable manner, e. g., by reacting about two molecular weights of substantially anhydrous glycerine with

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one molecular weight of fatty oil (which may or may not contain free fatty acid) and an amount of fuming sulfuric acid in excess of three molecular weights.

The resulting product then is converted to a water-soluble salt, more particularly alkali metal salts, alkaline earth metal salts, or amine salts; the term alkali metal salts including ammonium salts. Although the magnesium salts, calcium salts and the like may be employed in this invention, it is preferred to use the ammonium, sodium, and amine (including alkylolamine) salts in view of their greater solubility in aqueous solution.

The detergent prepared in the manner described will usually contain a considerable amount of inorganic salt such as ammonium sulfate, sodium sulfate, etc., the greater proportion of which may be removed by alcohol extraction as disclosed by Russell et al. U. S. Patent No. 2,187,144. The amount of inorganic salt left in the detergent used in the present invention preferably is as low as possible and generally should not exceed about 5% by weight of the final shampoo composition.

The concentration of the detergent in the novel liquid shampoo preparations is generally at least about 5%, usually between about 5 to about 45%, and preferably from about 15 to 35%. It has been determined that the beneficial effects of the instant invention are achieved to an optimum degree when the shampoo compositions contain an appreciable amount of detergent, such as specified within the preferred range.

The urea serves a multiplicity of functions in the novel liquid shampoo compositions of this invention. It acts as a stabilizer in the composition, it retards or substantially minimizes phase separation of the shampoo even when the composition is left undisturbed for many months, it has a soothing and ameliorative effect upon the skin, etc.

The amount of urea used in formulation is variable and should be integrated with the concentration of the detergent in the liquid mixture in an amount sufficient to maintain the desired degree of fluidity. In general, the urea should be present in an amount within the range of about 0.5% to 20% by weight of the final composition although larger amounts, e. g., on the order of about 25% or higher may be used. The maximum amount employed is determined by the amount that will conveniently go into solution in the shampoo composition.

The aqueous solvent medium of the compositions of the present invention is requisite for the preparation of shampoos in liquid state having desirable foaming and cleaning properties. It has been found that water (tap water, distilled water, deionized water, etc.) possesses adequate solubility for the detergents.

The amount of the aqueous solvent medium employed generally should amount to at least 25%, usually about 40 to about 85%, and preferably about 55 to 75% of the total weight of the final composition.

In general, relatively small amounts of lower molecular weight aliphatic alcohols, preferably lower monohydric alcohols, e. g., methanol, ethanol, normal propanol, isopropanol, etc., may be admixed with the water. Any concentration of alcohol may be used, however, it should not be present in an amount which will adversely affect the foaming properties of the finished shampoo.

As indicated hereinbefore, the liquid shampoo compositions of the present invention should have a pH within the range of about 5.5 to about 7.0 and preferably within the range of 6.0 to 6.5. Shampoo compositions having such an hydrogen ion concentration tend to neutralize alkaline residues on the hair and scalp and serve to tone up the stratum of the hair.

The data set forth in the following table demonstrate the stability of the novel liquid shampoo compositions of the present invention. Eight shampoo samples were

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made up as follows: samples 1-4 contained 44.7% detergent, 0.4% perfume, and 54.9% deionized water; samples 5-8 contained 44.7% detergent, 2.0% urea; 0.4% perfume, and 52.9% deionized water. The detergent used in each sample had about the following composition: about 46% detergent solids (ammonium monoglyceride sulfate derived from coconut oil, ammonium sulfate and unsulfated material), and about 20% ethyl alcohol, the remainder being water. When prepared each sample had a pH within the range of 6.0 to 6.5. All of the samples were aged at a temperature of 110° F.

TABLE

Sample No.	Separated after aging for—	pH at time of separation
1.....	20 weeks.....	3.38
2.....	32 weeks.....	4.32
3.....	do.....	4.00
4.....	28 weeks.....	3.72
5.....	38 weeks.....	5.89
6.....	do.....	5.75
7.....	Had not separated after 40 weeks' aging.....	5.95
8.....	do.....	5.85

In order to indicate even more fully the nature of the present invention the following specific examples of novel liquid shampoo compositions are set forth. The compositions have improved stability and improved resistance to phase separation even on long standing. The examples are presented for illustrative purposes only and are not intended to limit the scope of the invention in any manner. The parts given are by weight unless otherwise indicated.

Example I

About 45 parts of a mixture of the ammonium salt of a coconut oil fatty acid monoglyceride sulfate detergent having approximately the following composition: 43% ammonium monoglyceride sulfate derived from coconut oil, 20% ethyl alcohol, 3% ammonium sulfate and the remainder water are introduced into a suitable mixing vessel. About 2 parts of urea and about 53 parts of deionized water then are added to the mixture. The ingredients are thoroughly stirred to form a homogeneous mixture comprising about 19.35% ammonium monoglyceride sulfate derived from coconut oil, 9% ethyl alcohol, 1.35% ammonium sulfate, 2% urea and 68.3% water. The resulting liquid shampoo composition is adjusted to a pH of about 6.1.

Example II

About 35 parts of a mixture of the sodium salt of a coconut oil fatty acid monoglyceride sulfate detergent having approximately the following composition: 40% sodium monoglyceride sulfate derived from coconut oil, 20% ethyl alcohol, 4% sodium sulfate and the remainder water are thoroughly admixed with 64.5 parts of distilled water. The resulting mixture is thoroughly agitated and about 0.5 part of urea are introduced slowly. The liquid shampoo is adjusted to a pH of about 6.5.

Example III

About 5 parts of glycerine and about 31 parts of a mixture of the potassium salt of a coconut oil fatty acid monoglyceride sulfate detergent having approximately the following composition: 35% potassium monoglyceride sulfate derived from coconut oil, 25% ethyl alcohol and 3% potassium sulfate, the remainder being water, are placed in a mixing vessel together with about 1 part of urea, about 62 parts of water and about 1 part of perfume. The mixture is stirred thoroughly to produce a liquid shampoo the pH of which is adjusted to about 6.2.

Other formulations illustrating the compositions of the present invention include:

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Example IV

	Percent
Triethanolamine salt of higher fatty acid monoglyceride sulfate derived from coconut oil.....	25.0
Urea	10.0
5 Perfume	0.5
Isopropanol	10.0
Water	54.5

The composition is adjusted to a pH of about 6.3

Example V

Magnesium salt of higher fatty monoglyceride sulfate derived from coconut oil.....	15.0
Myristoylpropanolamide	5.0
15 Urea	5.0
Perfume	0.7
Sodium benzoate.....	0.3
Lecithin	1.0
Water	73.0

The composition is adjusted to a pH of about 6.0.

Example VI

Ammonium salt of sulfated monoglyceride of hydrogenated coconut oil fatty acids.....	35.0
25 Urea	20.0
Methyl alcohol.....	15.0
Perfume	1.0
Water	29.0

The composition is adjusted to a pH of about 6.4.

As indicated in the preceding examples, the addition of various adjuvant materials to the shampoo compositions is contemplated by the present invention. Thus, the shampoo compositions ordinarily will contain a perfume which should be selected so as to be compatible with the character of the finished shampoo.

Furthermore, ingredients which impart further desired qualities to the hair after washing and rinsing may be incorporated in the present compositions. Hair conditioners, for example, or superfatting materials such as fatty alcohols, fatty amides, fatty acid esters of polyhydroxy alcohols, egg yolk, etc. generally may be used in minor proportions, e. g., up to about 5%. The higher fatty alcohols such as myristyl, cetyl and stearyl alcohols have the advantage of maintaining the foaming properties of the compositions at a desirably high level. Among suitable amides are the higher fatty acid amides such as myristamide, palmitamide, stearamide, palmitoylethanolamide, myristoylpropanolamide, etc.

Glycerine may be added in amounts up to about 10%. Coloring materials or dyes may be added to tint the liquid if desired. Preservatives such as sodium benzoate and the like may be added to prevent mold growth. Furthermore, gum mucilages such as carboxymethyl cellulose, tragacanth and the like may be used if desired.

While there has been disclosed and described what is at present considered to be the preferred embodiment of the invention, it will be understood, of course, that many modifications and changes and substitutions may be made therein without departing from the true scope of the invention as defined in the appended claims.

Having thus described the invention, what is claimed is:

1. A liquid shampoo composition characterized by having improved resistance to phase separation on long standing which comprises about 5 to 45% by weight of a water-soluble salt of a sulfated monoglyceride of higher fatty acids as a detergent, from about 0.5 to about 25% of urea, and the balance being water, said shampoo having a pH within the range of 5.5 to 7.0.

2. A liquid shampoo composition which comprises about 15% to 35% by weight of a water-soluble higher fatty acid monoglyceride sulfate detergent salt, about 0.5 to about 20% urea, and the balance water, said shampoo having a pH within the range of 6.0 to about 6.5.

3. A liquid shampoo composition which comprises by

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weight about 15% to 35% of ammonium monoglyceride sulfate derived from coconut oil, about 2% urea, and the balance water in which about 9% ethyl alcohol is present, said shampoo having a pH within the range of 6 to about 6.5.

4. A liquid shampoo composition as set forth in claim 2 in which said water-soluble salt is the potassium salt.

5. A liquid shampoo composition as set forth in claim 2 in which said water-soluble salt is the triethanolamine salt.

6. A liquid shampoo composition as set forth in claim 2 in which said water-soluble salt is a sodium salt.

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7. A liquid shampoo composition as set forth in claim 2 in which said water-soluble salt is an ammonium salt.

References Cited in the file of this patent

UNITED STATES PATENTS

2,289,004 Franz ----- July 7, 1942

FOREIGN PATENTS

407,039 Great Britain ----- Mar. 2, 1934

471,247 Great Britain ----- Aug. 25, 1937

477,521 Great Britain ----- Dec. 28, 1937

906,056 France ----- May 7, 1945