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SHAMPOO COMPOSITIONS CONTAINING MONOMETHYLOL DIMETHYL HYDANTOIN

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The present invention relates to shampoo compositions and has particular reference to shampoo compositions comprising in combination a water-soluble organic anionic synthetic detergent and monomethylol dimethyl hydantoin in an aqueous medium.

Shampoo compositions containing many different types of detergents are suggested in the prior art. Thus, some shampoo compositions contain soap, i. e., water-soluble salts of fatty acids as the active detersive or cleansing ingredient. In others, the so-called non-soap synthetic detergents are used instead of soap, while in still others various synthetic detergents are used in combination with soap.

Those shampoo compositions which contain anionic sulfate and sulfonate salts as the principal cleaning ingredient have enjoyed a considerable amount of commercial success in recent years. Such compositions exhibit high water solubility and have excellent detergent and foaming properties.

It has been observed, however, that such shampoo compositions sometimes develop an unpleasant odor on standing and often darken in color thereby losing their desirable appearance. Bacteriological examination of those shampoo compositions which have darkened and which have developed an unpleasant odor reveal that those compositions also are contaminated with certain bacteria and mold. Since the freshly manufactured shampoo has a desirable color and odor, it is believed that the darkening in color and the development of an unpleasant odor is associated with the growth and multiplication of bacteria and mold. It is further believed that the synthetic detergent material furnishes the nutrient medium in which the bacteria and mold grow and multiply.

It now has been discovered that the incorporation of relatively small amounts of monomethylol dimethyl hydantoin in shampoo compositions which contain water-soluble anionic sulfate and sulfonate salts as the active cleansing ingredient provides a shampoo composition which has a desirable initial color and odor and further provides a shampoo composition which does not darken in color or develop an unpleasant odor, and which is not contaminated with bacteria or mold, even on long standing. The composition has further advantages in that it has excellent stability against phase separation, is non-irritating to the skin, and has high foaming power and excellent cleansing properties when applied to human hair in either soft or hard water. The composition is simple to manufacture and can be produced in conventional shampoo formulating equipment.

The shampoo compositions of this invention consist essentially of at least one water-soluble organic anionic synthetic detergent selected from the group consisting of sulfated and sulfonated detersive salts, and monomethylol dimethyl hydantoin in an aqueous medium.

The invention is applicable to shampoo compositions containing water-soluble anionic synthetic detergents which are well known in the art. Representative examples of these detergents are the sulfated materials having an alkyl substituent containing about 8 to about 26 carbon atoms per molecule, those containing at least about 10 and preferably about 12 to about 22 carbon atoms per molecule having particularly useful detergent properties.

Representative compounds which may be suitably employed include the sulfuric acid esters of polyhydric alcohols incompletely esterified with higher fatty acids, e. g., coconut oil monoglyceride monosulfate, tallow diglyceride monosulfate; the long chain pure or mixed alkyl sulfates, e. g., lauryl sulfate, cetyl sulfate, higher fatty alcohol sulfates derived from coconut oil; the hydroxy sulfonated higher fatty acid esters, e. g., higher fatty acid esters of 2,3-dihydroxy propane sulfonic acid; the higher fatty acid esters of low molecular weight alkylol sulfonic acids, e. g., oleic acid esters of isethionic acid; the sulfated higher fatty acid alkylolamides, e. g., ethanolamide sulfates; the higher fatty acid amides of amino alkyl sulfonic acids, e. g., lauric amide of taurine, and the like.

Additional well known anionic synthetic detergent materials which may be employed include those materials known generally as the alkylated aromatic hydrocarbon compounds having an alkyl substituent containing about 8 to 26 carbon atoms. The aromatic portion of the molecule may be mono- or polynuclear in structure, e. g., benzene, toluene, xylene, naphthalene, phenanthrene, anthracene, etc., and may contain other substituents such as hydroxyl groups, e. g., phenols, cresols, phenol ethers, short chain alkyl groups, e. g., alkylated toluene, alkylated xylene, etc. The long chain alkyl substituent of the alkylated aromatic molecule preferably is saturated and may be straight or branched. Representative long chain alkyl groups include such radicals as dodecyl; hexyl; octyl; nonyl; decyl; mixed alkyls derived from fatty materials, cracked paraffin wax olefins, and polymers of lower mono olefins; etc.

In general, the alkylated aromatic detergent materials employed will be a mixture of compounds having alkyl substituents of varying chain lengths, the range of lengths depending upon the sharpness of the fractionation of the aliphatic hydrocarbon used in the alkylation reaction. For most purposes the average chain length of the alkyl substituents should be from about 9 to about 15 carbon atoms and preferably between about 12 and about 14 carbon atoms.

These various anionic detergents are employed in the compositions of this invention in the form of their water-soluble salts. Thus, the detergents may be used in the form of their alkali metal salts, e. g., sodium, potassium or lithium salts, as well as in the form of salts of nitrogen containing bases, e. g., ammonium and lower alkylolamine salts, such as the ethanolamine salts including mono-, di-, and tri-ethanolamine salts, and mixtures thereof.

Although the essential ingredients are the three mentioned above, the shampoo compositions may contain various additional materials. Thus, the compositions ordinarily will contain a perfume which should be selected so as to be compatible with the character of the finished shampoo.

Other ingredients which are sometimes used in shampoos for imparting desirable qualities to the hair after washing may be incorporated in the present compositions. Thus, superfatting materials such as fatty alcohols, fatty amides, lanolin, etc., may be used in amounts up to about 5%. The higher fatty alcohols such as myristyl, cetyl, and stearyl alcohols are useful not only for their effect on the hair but also to increase the foaming properties of the composition. Among suitable amides are the higher fatty acid amides such as myristamide,

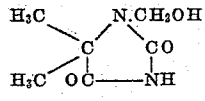
palmitylamide, stearylamide, or the amides produced by condensing a higher fatty acid or mixtures of such acids with an alkylolamine such as palmityl ethanolamide, myristyl propanolamide, and they may be used either alone or in combination with the fatty alcohols and/or lanolin.

Glycerine may be present in amount up to about 10%. Titanium dioxide may be added to impart opacity and/or increased whiteness to the compositions and preferably it should not exceed about 0.5% of the final composition. If a color other than white is desired, a color or dye may be added.

Furthermore, the compositions may be prepared and marketed in any form. Thus, the various ingredients may be so proportioned as to form a clear or an opaque liquid, cream, paste, gel, or aerosol type shampoo composition.

The concentration of the detergent in the shampoo composition generally should amount to at least about 5% usually about 5 to about 45% and preferably from about 15 to about 35% by weight. It has been determined that the beneficial effects of the instant invention are achieved to an optimum degree when the shampoo composition contains an appreciable amount of detergent such as specified within the preferred range.

The monomethylol dimethyl hydantoin incorporated in the shampoo compositions of this invention has the following structural formula:



and further may be defined as 1-methylol 5,5-dimethyl hydantoin. This material serves as a preservative in the shampoo composition in that it inhibits bacterial and mold growth and prevents the compositions from developing an unpleasant odor or darkening in color even on long standing. The amount of monomethylol dimethyl hydantoin used in formulating the present shampoo compositions is variable and will be in minor proportion such as up to about 1% by weight of the composition. In general, it has been found that at least about 0.05% is required, but it is preferred to use at least about 0.1% by weight, with excellent results being obtained with amounts of at least about 0.2% by weight.

In order to indicate even more fully the nature of the present invention the following specific examples of shampoo compositions are set forth. Each of these compositions has a desirable odor and color when initially produced and they do not develop an unpleasant odor or darken or discolor and are not contaminated with bacteria or mold 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.

Example I

The following is a satisfactory white, opaque cream shampoo composition of pasty consistency:

Detergent [1]	percent	20.55
Sodium chloride	do	0.89
Lanolin	do	0.47
Sodium benzoate	do	0.235
Methyl p-hydroxy benzoate	do	0.14
Stearic acid	do	6.580
Potassium hydroxide (34.2%)	do	4.035
Lauric-myristic diethanolamide	do	1.500
Monomethylol dimethyl hydantoin	do	0.10
Perfume	do	0.295
Water		balance

[1] Sodium lauryl sulfate.

Example II

The following is a satisfactory paste shampoo composition:

Detergent [1]	percent	30.00
Sodium chloride	do	12.00
Disodium phosphate	do	1.50
Titanium dioxide	do	0.40
Sodium benzoate	do	0.25
Methyl p-hydroxy benzoate	do	0.15
Lanolin	do	0.50
Monomethylol dimethyl hydantoin	do	0.50
Perfume	do	0.40
Water		balance

[1] Sodium salt of sulfated monoglyceride of hydrogenated coconut oil fatty acids. It contains about 10% by weight of sodium sulfate.

Example III

The following is a satisfactory liquid shampoo containing only the essential ingredients:

Detergent [1]	percent	30.00
Monomethylol dimethyl hydantoin	do	0.25
Water		balance

[1] Ammonium salt of sulfated monoglyceride of hydrogenated coconut oil fatty acids. It contained a few percent of ammonium sulfate.

Example IV

The following is a satisfactory liquid shampoo containing only the essential ingredients:

Detergent [1]	percent	25.00
Monomethylol dimethyl hydantoin	do	0.05
Water		balance

[1] Sodium dodecyl benzene sulfonate. It contains about 10% by weight sodium sulfate.

In formulating the shampoo compositions of this invention the solid ingredients preferably are melted and stirred into the aqueous medium at elevated temperatures to form a homogeneous mixture. The composition then is cooled methylol dimethyl hydantoin and perfume added, and the shampoo bottled, filled into jars, or otherwise prepared for use. Other methods of manufacture may be employed, if desired, including continuous proportioning of the ingredients into a mixing apparatus wherein the ingredients are blended thoroughly at elevated temperatures, cooled, and thereafter filled into suitable containers.

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 shampoo composition comprising at least about 5% by weight of an organic detergent selected from the group consisting of sulfated and sulfonated detersive salts in an aqueous medium which is normally subject to bacterial and mold growth and a minor proportion up to about 1% of 1-methylol 5,5-dimethyl hydantoin sufficient to inhibit said growth.

2. A shampoo composition comprising at least about 5% by weight of a water-soluble higher fatty acid monoglyceride sulfate detergent salt in an aqueous medium which is normally subject to bacterial and mold growth and a minor proportion up to about 1% of 1-methylol 5,5-dimethyl hydantoin sufficient to inhibit said growth.

3. A shampoo composition comprising at least about 5% by weight of a water-soluble higher alkyl sulfate detergent salt in an aqueous medium which is normally subject to bacterial and mold growth and a minor proportion of up to about 1% by weight of 1-methylol 5,5-dimethyl hydantoin sufficient to inhibit said growth.

4. A shampoo composition comprising at least about 5% by weight of an organic detergent selected from the group consisting of sulfated and sulfonated detersive salts in an aqueous medium which is normally subject to bacterial and mold growth and about 0.1–1% by weight of 1-methylol 5,5-dimethyl hydantoin sufficient to inhibit said growth.

5. A shampoo composition comprising about 15–35% by weight of an organic detergent selected from the group consisting of sulfated and sulfonated detersive salts in an aqueous medium which is normally subject to bacterial and mold growth and about 0.1–1% by weight of 1-methylol 5,5-dimethyl hydantoin sufficient to inhibit said growth.

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