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LIQUID SOAP

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The present invention has for an object to provide an improved liquid soap. It is one of the aims to provide a soap which may have a high percentage of fatty acids without certain undesired characteristics.

Liquid soaps as now commercially produced are principally potassium soaps of the soap forming acids and ordinarily contain not more than 30% of the fatty acids, since those in which a higher proportion of fatty acids are found tend to have certain soft soap properties which are undesirable for the purposes for which the liquid soaps are used.

The potassium soaps are generally used for the reason that potassium tends more readily to form liquid compositions.

According to the present invention it has been found that whatever the composition of the liquid soap, the addition of dicarboxylic acid with potassium hydroxide or ammonium hydroxide and with low molecular alcohols or the reaction products of these tend to maintain the fluidity of the soap and to permit the production of soap with a higher content of fatty acid. The addition of these substances or compounds prevents the gelatinizing of the liquid soap.

There are certain advantages in first combining the soap forming acid, the dicarboxylic acid and the alcohol and then adding potassium hydroxide dissolved in the necessary or desired quantity of water in an amount sufficient for reaction with both the soap forming acid and the dicarboxylic acid.

It is believed that any of the dicarboxylic acids may be used but that those having approximately 2 to 8 carbon atoms in the molecule will prove more satisfactory, such, for example, as the oxalic, succinic, tartaric, adipic, methyl adipic, malic, maleic, fumaric, saccharic, mucic, phthalic, and hydro-phthalic.

The low molecular alcohols either mono-hydric such as methyl, ethyl, propyl, isopropyl, butyl, iso-butyl, or the poly-hydric such as glycol and glycerol, and probably some of even higher molecular structure, are suitable for the purposes of the invention.

Among the potassium salts of the acids mentioned the potassium adipate and the potassium methyl adipate have proved to be particularly effective. The liquid soaps in which these are used may have a very high proportion of fatty acid, around 45%, and especially good lathering and cleansing effects. Their liquid state is also preserved even at low temperatures.

If desired, the potassium or ammonium salts of

the dicarboxylic acid may be used as such, and they can be introduced in solid form or in concentrated aqueous solutions.

The order of addition of the various ingredients may be varied considerably to suit the convenience of operation. For example, liquid potassium soap with an excess of caustic alkali, potassium carbonate or other suitable potassium salts may be used as a starting material and the dicarboxylic acid and the alcohol may be added thereto.

It is believed that the dicarboxylic acid reacts with the low molecular alcohol and with the potassium or ammonium hydroxide to form dibasic salt having both the alcohol and the alkali combined in the same molecule but applicant does not commit himself to this theory.

The invention may be applied in producing liquid soaps of high quality from the soap forming acids of a wide range. For example, mixtures of fatty acids produced from coconut, palm kernel, olive, castor or linseed oil produce liquid soaps of high content of fatty acid and having high lathering and good cleansing properties. It is advantageous, however, to remove the stearic acid or higher saturated acids. Ordinarily it is preferable that the saturated fatty acids used should be those having 16 or less carbon atoms in the molecule for the reason that the higher molecular acids tend to produce solid soaps. Unsaturated fatty acids, however, of even higher molecular structure may be used effectively. Perhaps the most satisfactory fatty acids are the unsaturated acids containing 12 to 18 carbon atoms in the molecule, such as the oleic and its homologues. Mixtures of saturated and unsaturated soap forming acids are good starting materials.

Example I

350 parts by weight of oleic acid, 50 parts of distilled coconut oil fatty acid (free of stearic acid) and 150 parts of ethyl alcohol are stirred together with a solution of 50 parts of potassium-methyl-adipate in 900 parts of water and 190 parts of potassium hydroxide of 48° Bé. The product thereof is a liquid soap which is always perfectly liquid and clear even at the freezing-point, without any gelatinizing even after standing for several months.

Example II

1000 parts by weight of oleic acid (low-boiling fraction of the fatty acids made out of sperm oil) are mixed with 220 parts of coconut oil fatty acid (distilled and free of stearic acid) and combined with a solution of 75 parts of adipic

acid in 450 parts of ethyl alcohol. Then a mixture of 630 parts of potassium-hydroxide (48° Bé.) and 700 parts of water is stirred in. The soap thus resulting is perfectly clear and liquid and contains 40% of fatty acid.

It is to be noted from the examples that the adipinate or other ammonium or potassium salt of a dibasic acid is added in the quantity of the order of 10% of the weight of the soap forming acid or of the weight of the soap formed therefrom. The expression "of the order of 10%" is used here and in the claims to indicate the proportions reasonably suggested by the examples described in one of which the proportion is actually above 10% and in the other of which the proportion is actually below 10%.

The temperatures may be usual room temperature or those usual in making soap.

I claim:—

1. A liquid soap comprising, in combination, the potassium soap of an unsaturated soap forming acid having approximately 12 to 18 carbon atoms in the molecule and potassium methyl adipinate in a proportion of the order of 10% of the potassium soap.

2. A liquid soap comprising, in combination, a potassium salt of a soap forming acid having not more than 16 carbon atoms in the molecule and the reaction products of adipic acid, a low molecular aliphatic alcohol having 1 to 3 carbon atoms in the molecule and an alkali of the group consisting of potassium and ammonium hydroxides, said reaction products being present in a proportion of the order of 10% of the salt of the soap forming acid.

3. A liquid soap consisting of the reaction products of the combination of approximately—

	Parts by weight
Oleic acid.....	35
Coconut oil fatty acid (free of stearic acid) ..	5
Ethyl alcohol.....	15
Potassium methyl adipinate.....	5
Potassium hydroxide of 48° Bé.....	19
Water.....	90

4. A liquid soap consisting of the reaction products of the combination of approximately—

	Parts by weight
Oleic acid.....	100
Coconut oil fatty acids (free of stearic acid) ..	22
Adipic acid.....	7½
Ethyl alcohol.....	45
Potassium hydroxide of 48° Bé.....	63
Water.....	70

5. A liquid soap having more than 30% fatty acid content comprising potassium soap of an unsaturated acid having 12 to 18 carbon atoms in the molecule and the reaction products of adipic acid, normal primary aliphatic alcohol having 1 to 3 carbon atoms in the molecule and potassium hydroxide the reaction product being present in a proportion of the order of 10% of the weight of the potassium soap.

6. A liquid soap having approximately 40% fatty acid content and comprising as principal ingredients the potassium salts of a mixture of unsaturated fatty acids of the group having 12 to 18 carbon atoms in the molecule and the reaction products of adipic acid, normal primary aliphatic alcohol having 1 to 4 carbon atoms

in the molecule and potassium hydroxide, the reaction product being of the order of 10% of the weight of the potassium salts.

7. A non-gelatinizing liquid soap having 30% to about 45% fatty acid content comprising, in combination, salts of the group consisting of the potassium and ammonium salts of the unsaturated soap forming acids and of the saturated soap forming acids having not more than 16 carbon atoms in the molecule, and the reaction products of an aliphatic dibasic acid, a primary aliphatic mono-hydric alcohol having approximately 1 to 4 carbon atoms in the molecule and an alkali of the group consisting of potassium and ammonium hydroxides, said reaction products being present in a proportion of the order of 10% of the salts of the soap forming acids.

8. A non-gelatinizing liquid soap having approximately 40% fatty acid content comprising, in combination, salts of the group consisting of the potassium and ammonium salts of the unsaturated aliphatic soap forming acids and of the saturated aliphatic soap forming acids having not more than 16 carbon atoms in the molecule, and the reaction products of an aliphatic dibasic acid, a primary aliphatic mono-hydric alcohol having approximately 1 to 4 carbon atoms in the molecule and an alkali of the group consisting of potassium and ammonium hydroxides, said reaction products being present in a proportion of the order of 10% of the salts of the soap forming acids.

9. A non-gelatinizing liquid soap having approximately 30% to about 45% fatty acid content and comprising salts of the group consisting of the potassium and ammonium salts of the unsaturated soap forming acids and of the saturated soap forming acids having not more than 16 carbon atoms in the molecule and the reaction products of an aliphatic dibasic acid having approximately 2 to 8 carbon atoms in the molecule, normal primary aliphatic alcohol having 1 to 4 carbon atoms in the molecule and an alkali of the group consisting of potassium and ammonium hydroxides, said reaction products being present in a proportion of the order of 10% of the salts of the soap forming acid.

10. A liquid soap having approximately 40% to 45% fatty acid content comprising, in combination, the potassium soap of an unsaturated soap forming acid having approximately 12 to 18 carbon atoms in the molecule and the reaction products of a dibasic aliphatic acid, normal primary aliphatic alcohol having 1 to 4 carbon atoms in the molecule, and potassium hydroxide, said reaction products being present in a proportion of the order of 10% of the salts of the soap forming acid.

11. A liquid soap having approximately 40% to 45% fatty acid content comprising, in combination, the potassium soap of an unsaturated soap forming acid having approximately 12 to 18 carbon atoms in the molecule and the reaction products of a dibasic aliphatic acid having 2 to 8 carbon atoms in the molecule, a primary aliphatic monohydric alcohol having 1 to 4 carbon atoms in the molecule, and potassium hydroxide, said reaction products being present in a proportion of the order of 10% of the salts of the soap forming acid.

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