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SOAP COMPOSITION

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This invention relates to a soap composition and process of producing the same and more particularly to a soap which can be employed for washing in sea water and to a method for its preparation.

The problem of washing fabrics, metallic surfaces, stone and wooden surfaces and the like with sea water has long been recognized. In the past, sand and wood ashes and cold process soaps containing considerable quantities of glycerin, and alkali have been used. Later, soaps comprising coconut oil and palm oil mixed with small amounts of various alkaline salts were employed. However, none of these combinations were very soluble in sea water, requiring large amounts of soap for the work and, in general, leading to ineffective results.

Now in accordance with the present invention, a soap has been prepared which will have adequate detersive and foaming properties in sea water at a low concentration and have the added features of being relatively inexpensive and comprising readily obtainable materials. This improved soap composition comprises a fatty acid soap of an alkali metal, an alkali resinate, and a polyphosphate of an alkali metal.

In general, in carrying out the preparation of the described soap composition, water, a fatty acid soap, a resinate of an alkali metal or ammonia, hereafter referred to as an alkali resinate, and an alkali metal polyphosphate which may be mixed with other alkaline salts are introduced into a soap crutcher which is then operated until a homogeneous mass is formed. The whole mass is then poured into soap frames and allowed to solidify. After solidification, the frame is removed, the large block of soap cut into slabs, the slabs into bars and the bars into cakes, granules, or flakes of the desired size. The soap thus prepared when used with salt water has high detersive and foaming properties.

Having described in a general way the nature of this invention, the following examples are given by way of illustration:

Example 1

To a large mixer were added 34 parts by weight of water, which was then heated to 180° F. With continuous agitation, 33 parts by weight of 41° C. titer tallow soap were added. Then, 16.5 parts by weight of dry sodium resinate were stirred into the mixture, followed by addition of 16.5 parts by weight of anhydrous tetrasodium pyrophosphate. Agitation was continued until the mass was smooth in texture. The soap was then

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poured into a frame, allowed to solidify and finally cut into bars.

The soap thus produced was subjected to a performance test as follows:

Wool fabric was soiled by passing through a soiling solution comprising a vegetable oil, a mineral oil and carbon black all dissolved or dispersed in carbon tetrachloride. The unsoiled fabric having a reflectance of 58%±2.0%, as measured by a Hunter reflectometer, was passed through the soiling solution a sufficient number of times to reduce the reflectance to 30%±2.5%. After soiling, the wool fabric was washed in a 3% solution of the described soap in sea water, by squeezing it vigorously 50 times in the detergent solution within 2 minutes. The fabric was then rinsed in warm soft water and dried. The reflectance was compared with that of an unsoiled piece of the identical fabric which had likewise been squeezed 50 times in sea water, rinsed, and dried. The reflectance difference was found to be 1.9%. A soap prepared in a similar manner in which the sodium resinate of the above sample was replaced by an equal weight of tallow soap showed a reflectance difference of 20.4% in a comparable washing test.

In a manner similar to that of Example 1, other soap compositions were made and tested in which a portion of the tetrasodium pyrophosphate was replaced by other alkaline salts and in which the sodium resinates of various modified rosins were employed. The results are summarized below:

Example 2

Composition	Parts by weight
Fatty acid sodium soap (41° C. titer)	33.0
Sodium resinate of wood rosin	16.5
Tetrasodium pyrophosphate	8.25
Sodium silicate (N grade)	8.25
Water	34.0

Reflectance difference=1.9%.

Example 3

Composition	Parts by weight
Fatty acid sodium soap (41° C. titer)	33.0
Sodium resinate of wood rosin	16.5
Tetrasodium pyrophosphate	8.25
Sodium metasilicate	8.25
Water	34.0

Reflectance difference=5.5%.

Example 4

Composition	Parts by weight
Fatty acid sodium soap (41° C. titer)	33.0
Sodium resinate of wood rosin	16.5
Tetrasodium pyrophosphate	8.25
Trisodium phosphate	8.25
Water	34.0

Reflectance difference=4.0%.

Example 5

Composition	Parts by weight
Fatty acid sodium soap (41° C. titer)	33.0
Sodium resinate of gum rosin	16.5
Tetrasodium pyrophosphate	16.5
Water	34.0

Reflectance difference=2.0%.

Example 6

Composition	Parts by weight
Fatty acid sodium soap (41° C. titer)	33.0
Sodium resinate of polymerized rosin	16.5
Tetrasodium pyrophosphate	16.5
Water	34.0

Reflectance difference=1.8%.

Example 7

Composition	Parts by weight
Fatty acid sodium soap (41° C. titer)	33.0
Sodium resinate of hydrogenated rosin	16.5
Tetrasodium pyrophosphate	16.5
Water	34.0

Reflectance difference=1.7%.

Example 8

Composition	Parts by weight
Fatty acid sodium soap (41° C. titer)	33.0
Sodium resinate of dehydrogenated rosin	16.5
Tetrasodium pyrophosphate	16.5
Water	34.0

Reflectance difference=4.1%.

In general, salt water soaps which give to fabrics a reflectance difference of not greater than 15% are considered to be suitable for use. It is to be noted that in all of the above examples the reflectance difference is less than 6% and in some cases less than 2%. These values may be compared with a soap containing no resinate but only tallow soap, pyrophosphate and water and which showed a reflectance difference of 20.4% and thus was unsuitable for use in washing with sea water.

In addition to the above examples, the following soap compositions have been found to have excellent detergent qualities when used for washing in salt water.

Example 9

Composition	Parts by weight
Fatty acid sodium soap (41° C. titer)	33.0
Sodium resinate of wood rosin	16.5
Sodium hexametaphosphate	16.5
Water	34.0

Example 10

Composition	Parts by weight
Fatty acid sodium soap (41° C. titer)	33.0
Sodium resinate of wood rosin	16.5
Sodium tetraphosphate	16.5
Water	34.0

Example 11

Composition	Parts by weight
Fatty acid sodium soap (41° C. titer)	33.0
Sodium resinate of wood rosin	16.5
Sodium tripolyphosphate	16.5
Water	34.0

Example 12

Composition	Parts by weight
Fatty acid sodium soap (41° C. titer)	26.5
Sodium resinate of wood rosin	19.75
Tetrasodium pyrophosphate	19.75
Water	34.0

Example 13

Composition	Parts by weight
Fatty acid sodium soap (41° C. titer)	33.0
Sodium resinate of wood rosin	13.0
Tetrasodium pyrophosphate	20.0
Water	34.0

Example 14

Composition	Parts by weight
Fatty acid sodium soap (41° C. titer)	33.0
Sodium resinate of wood rosin	20.0
Tetrasodium pyrophosphate	13.0
Water	34.0

Example 15

Composition	Parts by weight
Fatty acid sodium soap (33° C. titer)	33.0
Sodium resinate of wood rosin	16.5
Tetrasodium pyrophosphate	16.5
Water	34.0

In most of the above examples, a fatty acid sodium soap having a titer test of 41° C. was used. However, other soaps produced by the saponification of fats and oils with alkali metal hydroxides or carbonates by any of the usual soap making processes such as boiled, semiboiled, or cold made may be employed. The titer should lie between about 25° C. and about 48° C. and preferably in the range of from about 39° C. to about 43° C.

The alkali resinate used may be produced by the saponification or neutralization of refined or unrefined wood rosin or gum rosin or from modified rosins, such as polymerized rosin, hydrogenated rosin, dehydrogenated rosin, partially decarboxylated rosin, isomerized rosin resulting from heat treatment and various other modified rosins. While in general, the resinate of any of the alkali metals or ammonia may be employed, the sodium resinate made by the saponifi-

cation of rosin has been found to be particularly useful.

Of the alkaline salts used, the pyrophosphate of an alkali metal and particularly sodium has been found to yield the most effective results. Other polyphosphates, however, such as the hexametaphosphates, tetraphosphates and tripolyphosphates of the alkali metals have been employed. A portion of the polyphosphate up to about 50% of its weight may be replaced with other alkaline water-soluble inorganic salts such as sodium silicate, trisodium phosphate, sodium carbonate, and the various other alkaline materials commonly used in the soap industry.

The composition of the soap may vary depending upon its physical form and the material which is to be worked. In general the soap may comprise on a dry basis from about 5% to about 30% of an alkali metal resinate and preferably from about 20% to about 30%, from about 20% to about 45% of an alkaline salt and preferably from about 20% to about 30%, and from about 45% to about 75% of a fatty acid soap and preferably from about 40% to about 60%. The moisture content of the finished soap may be between about 0% and about 50% depending upon whether the soap is to be employed in paste, powder, flake or bar form. The most preferable form has been found to be that of a bar soap having a moisture content between about 32% and about 36%.

In addition to the described process, various other methods of making the soap have been employed. Thus a mixture of rosin and fatty acid was saponified with a hydroxide or carbonate of an alkali metal so as to obtain a soap comprising about two parts of fatty acid soap to about one part of alkali resinate. This mixture was subsequently crutched together with the alkaline salt to yield a salt-water soap. In this connection, talloil comprising a mixture of resin acids and fatty acids may be employed by saponifying and then adding the alkaline salt.

The components of the soap may be mixed either in the dry state or a water slurry of the ingredients may be made prior to mixing. Mechanical mixtures of tallow soap flakes, dry alkali metal resinates, and alkali metal polyphosphates have been found to yield a soap which is equally effective as those compositions in which the components were mixed together in a semi-fluid state.

An alternate method of proceeding is to add the dry alkali metal resinate to a mixture of water, fatty acid soap, and alkaline salt. This method has resulted in a porous, floating soap having a high rate of solution. By variation in the crutching technique to control the amount of air included in the soap, the density may be varied from a dense soap, having the advantages of being compact and requiring less space for storage and shipping to a light porous soap in which much air is included.

The described soap in addition to being an excellent salt-water soap may be used with effective results in ordinary soft or hard water, and has been found to be an excellent cleansing and washing agent for fabrics, the surfaces of metals, glass, wood, porcelain and the like when used either with soft, hard, or sea water.

Thus, the present invention has described a new and useful soap composition comprising a fatty acid soap, a polyphosphate of an alkali metal, and an alkali resinate. The described soap, consisting of inexpensive and readily obtainable materials, has been found to have high detersive and foaming properties in sea water at a low concentration yielding a more effective cleansing and washing agent than used heretofore.

What I claim and desire to protect by Letters Patent is:

1. A salt-water soap composition, comprising on a dry weight basis from about 45% to about 75% of an alkali metal water-soluble soap of fatty acids having a titer between about 25° C. and about 48° C., from about 5% to about 30% of a water-soluble rosinate selected from the group consisting of alkali metal rosinates and ammonium rosinates, and from about 20% to about 45% of an alkaline water-soluble inorganic salt, at least one-half of said salt being a polyphosphate of an alkali metal, said soap composition being characterized by high detersive and foaming properties in sea water.

2. A salt-water soap composition comprising on a dry weight basis from about 40% to about 60% of an alkali metal water-soluble soap of fatty acids having a titer between about 25° C. and about 48° C., from about 20% to about 30% of a water-soluble rosinate selected from the group consisting of alkali metal rosinates and ammonium rosinates, and from about 20% to about 30% of an alkaline water-soluble inorganic salt, at least one-half of said salt being a polyphosphate of an alkali metal, said soap composition being characterized by high detersive and foaming properties in sea water.

3. A salt-water soap composition comprising on a dry weight basis from about 40% to about 60% of an alkali metal water-soluble soap of fatty acids having a titer between about 25° C. and about 48° C., from about 20% to about 30% of a water-soluble alkali metal rosinate of wood rosin, and from about 20% to about 30% of an alkaline water-soluble inorganic salt, at least one-half of said salt being a polyphosphate of an alkali metal, said soap composition being characterized by high detersive and foaming properties in sea water.

4. A salt-water soap composition comprising on a dry weight basis from about 40% to about 60% of an alkali metal water-soluble soap of fatty acids having a titer between about 25° C. and about 48° C., from about 20% to about 30% of a water-soluble alkali metal rosinate of gum rosin, and from about 20% to about 30% of an alkaline water-soluble inorganic salt, at least one-half of said salt being a polyphosphate of an alkali metal, said soap composition being characterized by high detersive and foaming properties in sea water.

5. A salt-water soap composition comprising on a dry weight basis from about 40% to about 60% of an alkali metal water-soluble soap of fatty acids having a titer between about 25° C. and about 48° C., from about 20% to about 30% of a water-soluble alkali metal rosinate of polymerized rosin, and from about 20% to about 30% of an alkaline water-soluble inorganic salt, at least one-half of said salt being a polyphosphate of an alkali metal, said soap composition being characterized by high detersive and foaming properties in sea water.

6. A salt-water soap composition comprising on a dry weight basis from about 40% to about 60% of a sodium soap of fatty acids having a titer between about 25° C. and about 48° C., from about 20% to about 30% of a sodium rosinate, and from about 20% to about 30% of tetrasodium pyro-

phosphate, said soap composition being characterized by high detersive and foaming properties in sea water.

7. A salt-water soap composition comprising on a dry weight basis from about 40% to about 60% of an alkali metal water-soluble soap of fatty acids having a titer between about 25° C. and about 48° C., from about 20% to about 30% of a water-soluble alkali metal rosinate, and from about 20% to about 30% of an alkaline water-soluble inorganic salt, at least one-half of said salt being tetrasodium pyrophosphate and the remainder being sodium silicate, said soap composition being characterized by high detersive and foaming properties in sea water.

8. A salt-water soap composition comprising on a dry weight basis from about 40% to about 60% of an alkali metal water-soluble soap of fatty acids having a titer between about 25° C. and about 48° C., from about 20% to about 30% of a water-soluble alkali metal rosinate, and from about 20% to about 30% of an alkaline water-soluble inorganic salt, at least one-half of said salt being tetrasodium pyrophosphate and the remainder being trisodium phosphate, said soap composition being characterized by high detersive and foaming properties in sea water.

9. A salt-water dry soap composition comprising on a dry weight basis from about 40% to about 60% of a sodium soap of fatty acids having a titer between about 25° C. and about 48° C., from about 20% to about 30% of a sodium rosinate, and from about 20% to about 30% of tetrasodium pyrophosphate, said soap composition being characterized by high detersive and foaming properties in sea water.

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