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3,689,437

## MALLEABLE DETERGENT PRODUCT

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10 Claims

### ABSTRACT OF THE DISCLOSURE

Malleable, non-hardenable detergent products suitable for molding into various shapes while retaining detergency function are prepared from a mixture comprising by weight of the total composition (A) from about 20 to 55 percent of a water soluble salt of an ester of a fatty acid and isethionic acid wherein said fatty acid contains from 8 to 18 carbon atoms, (B) from about 10 to 35 percent water, (C) from about 4 to 10 percent gelatin, (D) a member chosen from the group consisting of mineral oil and paraffin and mixtures thereof, the combined weight of (C) and (D) being from about 12 to 33 percent, and (E) from 0 to about 50 percent of a filler material.

This invention relates to synthetic non-soap detergent compositions. More particularly it relates to malleable non-soap detergent products capable of being shaped or molded into various shapes and forms, while retaining their basic detergent function.

### BACKGROUND OF THE INVENTION

At present there are a myriad number of soap and non-soap detergent compositions shaped in the form of coherent bars or cakes. Recently, recognizing the importance of the play element in bathing children, a new type detergent product has appeared on the market, preshaped in the form of animals, cartoon characters and the like. In this new art, pertaining to specialty novelty items for sale to children, and in particular to the play-bath type detergent articles, there is a need for a malleable type product which can be shaped by the child into many different forms in the course of bathing (or separate therefrom in a purely play or artistic sense) which will retain its primary detergent, cleansing function, but still serve as an inducement for bathing and/or artistic endeavor. It is essential that such an item have the capacity to be shaped, pounded or pressed into a host of forms, in the manner of clay, without returning to its original shape—i.e., to be malleable.

The prior art is not apprised of such a composition. At best there are disclosed milled detergent (mostly soap) products having various degrees of plasticity or flexibility. For example, in U.S. Pat. 1,085,437 there is disclosed a milled soap comprising a mixture of soap, vegetable albumin and glycerin. U.S. Pat. 2,360,920 discloses an aerated soap product containing about 20% by weight of soap, 11% by weight of an Irish moss-gelatin mixture, 12% by weight of glycerine and 57% water. U.S. Pat. 2,226,075 discloses 50–80% by weight of soap, 10–50% by weight of polyvinyl alcohol and 2–10% glycerine.

### SUMMARY OF THE INVENTION

It is the primary object of the subject invention to provide a tailor-made, malleable, non-sticky, non-hardenable detergent product which can be molded into various shapes.

According to this invention, a malleable, substantially non-sticky, non-hardenable detergent product particularly suitable for molding into various shapes comprises, by weight of the total composition, (A) from about 20 to

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55 percent of a water soluble salt of an ester of a fatty acid and isethionic acid wherein said fatty acid contains from 8 to 18 carbon atoms, (B) from about 10 to 35 percent water, (C) from about 4 to 10 percent gelatin, (D) a member chosen from the group consisting of mineral oil and paraffin and mixtures thereof, the combined weight of (C) and (D) being from about 12 to 33 percent wherein when paraffin is employed without mineral oil, said paraffin is present in amounts of from about 14 to 16 percent, and when employed with mineral oil, said paraffin is present in amounts of from about 4 to 6 percent, and (E) from 0 to about 50 percent of a filler material.

### DETAILED DESCRIPTION OF THE INVENTION

The detergent product described broadly above and in all of its embodiments is a delicately balanced mixture of ingredients, each ingredient present contributing to the overall result. The mixture is tailored to produce the desired characteristics of malleability, non-stickiness and moldability.

The surface active agents employed in the product of the subject invention are white, finely divided solid powders. In the practice of this invention, isethionate synthetic detergents, the acyl groups thereof having from 8 to 18 carbon atoms, are useful. Illustrative of such surface active agents are the fatty acid esters of sodium isethionate such as sodium oleyl isethionate, the coconut oil fatty acid esters of sodium isethionate and the like. These synthetic detergents may be employed in the bars of the subject invention in amounts of from about 20 to 55 percent by weight of the total composition. Within this range, a desirable range is from about 43 to 47 percent by weight when no filler material is used. When filler material is present, a desirable range is from about 21 to 42 percent.

Gelatin is employed in the bars of the subject invention in amounts of from about 4 to 10 percent by weight of the total composition. The preferred ranges of the gelatin content may be from about 9 to 10 percent when no filler is present and from about 4 to 9.0 percent in the presence of a filler material.

Also employed in the practice of the subject invention is a member chosen from the group consisting of paraffin and mineral oil and mixtures thereof, mineral oil being the preferred ingredient. Gelatin, paraffin, mineral oil or mixtures thereof are broadly present in the subject bar formulation, on a combined basis, in amounts of from about 12 to 33 percent by weight of the total composition. When paraffin is employed without mineral oil, it is present in such combination in amounts such that it will comprise from about 14 to 16 percent of the total formulation. When employed with mineral oil, it is present in amounts of from about 4 to 6 percent of the total formulation. Broadly, mineral oil can be used alone or in combination with paraffin in amounts ranging from 0 to about 25 percent by weight of the total composition. When no filler material is present, the combined weight of the gelatin and paraffin and/or mineral oil may usefully be from about 19 to 27 percent by weight of the total composition. When filler material is used, it is preferred to use from about 9 to 18 percent mineral oil.

Propylene glycol is another material which may be used in the formulation of the subject invention. It is normally employed in amounts ranging from about 10 to 15 percent by weight of the total composition.

It is believed that the gelatin forms the matrix of the subject malleable detergent system and the paraffin, mineral oil and propylene glycol act to solubilize and plasticize the gelatin.

It should be again emphasized that the inventive formulation is a critically balanced, tailor-made composition. In this connection, the amount of water is important, al-

though as will be discussed hereinafter, its presence may be dispensed with under certain circumstances. In the desired practice of this invention, water is present in amounts of from about 10 to 35 percent of the total weight of the composition. Useful ranges of water which may be contained in the subject bar formulation are about 20.0 to 31 percent when no filler is used and from about 10 to 25.0 percent when filler is employed.

It is not clearly understood how the aforesaid ingredients interact with each other to obtain the desired complex of properties. The initial mixture of gelatin with mineral oil and/or paraffin and/or propylene glycol results in a rubbery product. Apparently the subsequent addition of the isethionate detergent imparts clay-like characteristics to the aforesaid mixture. The water content is again important to aid in the malleability of the finished product. For example, too much water results in a bar which is too hard to be malleable. As stated above, however, all of the active ingredients are employed in balanced proportions to effect the desired properties of malleability, non-stickiness and moldability.

As indicated previously, filler materials may also be employed in the subject bar formulation. The filler materials useful in the practice of this invention are well known in the art. Typical of such filler materials are talc and cornstarch, talc being preferred. The presence of filler does not serve merely to provide bulk or to lower the active contents. It has been found that the filler material further acts as a malleability regulator. The filler material further has an effect on the stickiness of the formulation, which is normally decreased along with elasticity while malleability, i.e., the ability to be molded without returning to original shape, is increased. In general, fillers can be used in amounts of from 7 to about 50 percent by weight of the total composition, though this range is not seriously critical. When fillers are employed, the proportions of the active ingredients hereinbefore discussed can be decreased, within the broad ranges indicated.

Other ingredients which can be used in the practice of the subject invention include soil suspending or thickening agents as well as suds boosters or stabilizers. Cellulosic materials are primarily used as soil suspending or thickening agents. When used in the subject formulation, it further serves as an additional plasticizer. When employed, these materials are normally present in amounts from about 0.5 to 3 percent by weight of the total composition. Among the cellulosic materials useful in the subject invention are sodium carboxymethylcellulose, methylcellulose, ethylcellulose, cellulose acetate butyrate, and nitrocellulose. Useful suds boosters or stabilizers are fatty acyl alkylolamides containing 10 to 18 carbon atoms in the acyl groups. Illustrative of such alkylolamides are coconut monoethanolamide (CMEA) and lauryl diethanolamide. When present, these materials are used in amounts ranging from about 1 to 7 percent.

Other optional ingredients which may be included in the subject bar formulation are common emollient materials such as stearic acid, fillers and builders such as urea, sodium sulfate and sodium chloride which serve as solid diluents, and perfumes, coloring materials, bacteriostatic agents and preservatives in minor amounts.

As mentioned above, while it is preferred to operate within the ranges indicated above which includes water, it has further been found that substantially anhydrous compositions can be formulated which have good properties of malleability, nonstickiness and moldability. In this regard, substantially anhydrous means containing not more than 3 percent by weight of water. The anhydrous compositions of the subject invention typically comprise by weight of total composition from about 20 to 55 percent of the synthetic isethionate detergents discussed above. These anhydrous materials further comprise, as a second ingredient, mineral oil and/or a mixture of gelatin and propylene glycol. When mineral oil is employed, it is present in amounts ranging from about 10 to 40 percent.

When the mixture of gelatin and propylene glycol is employed, the gelatin is usually present in amounts of from about .1 to 15 percent and the propylene glycol is present in amounts of from about 25 to 35 percent.

According to this aspect of the subject invention, filler materials can also be added to these anhydrous compositions so that they comprise from 0 to about 50 percent by weight of the total composition.

Also, as indicated above, additional ingredients such as the aforementioned soil suspending or thickening agents, such boosters or stabilizers, emollient materials, fillers and builders, perfumes, coloring materials, bacteriostatic agents and preservatives can also be used in these anhydrous bar formulations.

The product of the subject invention may be formulated in a mixer with the following features:

- (1) Double shafted.
- (2) Overlapping or tangential blades.
- (3) Heated jacket.

Typical of such a mixer is a Sigma-type amalgamator. In the above indicated amalgamator, a typical subject bar formulation may be prepared in the following manner:

The quantity of water desired is added to the preheated mixer. In this regard the temperature of the mixer should be between 100° F. to 120° F., or on the average approximately 110° F. To the water a charge of gelatin is then added. At this juncture the temperature should be kept above 130° F. but below 160° F. When the gelatin appears to be dissolved, mineral oil is added. A charge of carboxymethylcellulose can then be added as well as the desired amounts of cocomonethanolamide, stearic acid emollient and the like. If such mass were cooled, a spongy rubbery substance, super elastic in nature, would result. However, while still hot the mixture is contacted and admixed with the solid, finely dispersed, powdered isethionate detergent material. The resulting mixture now possesses the moldability, formability and malleability which is desired in the subject mixture. At this point the batch temperature can be reduced to 100° F. and colorant, perfume, etc. can be added. The formulation may then be permitted to cool and then plodded in a conventional plodder and extruded. The extruded bars are subsequently cut to conventional lengths and then may be shaped or stamped with appropriate indicia. If filler is used, it is added before the isethionate. Alternatively, if desired, the formulation may be extruded or poured into a container while hot. It will then take the shape of the container in which it is poured or extruded.

Generally speaking, the desirable process conditions are that gelatin and other ingredients are added to a heated mixer, and thereafter the isethionate synthetic detergent is added while the aforesaid mixture is hot.

The following examples represent typical formulations illustrative of the malleable bar products of the present invention. However, it is to be understood that the invention is not limited thereto. Unless otherwise indicated, all percentages are by weight of total composition.

#### EXAMPLE 1

The following ingredients were added to a Sigma-type amalgamator:

| Ingredient                         | Batch wt.<br>(lbs.) | Percent<br>by weight |
|------------------------------------|---------------------|----------------------|
| Sodium oleyl isethionate.....      | 4.50                | 30.0                 |
| Gelatin.....                       | .75                 | 5.0                  |
| Mineral oil.....                   | 1.80                | 12.0                 |
| Water.....                         | 1.50                | 10.0                 |
| Talc.....                          | 6.00                | 40.0                 |
| Sodium carboxymethylcellulose..... | 0.15                | 1.0                  |
| CMEA.....                          | 0.30                | 2.0                  |
| Total.....                         | 15.00               | 100.0                |

The formulation was first amalgamated, then was plodded, extruded and stamped into a bar according to this invention. The resulting bar exhibited a high degree

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of malleability, moldability and non-stickiness. It could be molded with facility into any desirable shape.

## EXAMPLES 2-8

The ingredients listed in Table I below were mixed according to the procedures indicated above and formed into malleable bars according to the invention.

TABLE I

| Example                       | 2    | 3     | 4    | 5    | 6    | 7    | 8    |
|-------------------------------|------|-------|------|------|------|------|------|
| Sodium oleyl isethionate      | 28.6 | 26.0  | 21.0 | 23.0 | 42.0 | 37.5 | 32.0 |
| Gelatin                       | 5.8  | 5.2   | 4.0  | 5.0  | 8.5  | 7.5  | 6.5  |
| Mineral oil                   | 14.5 | 10.0  | 9.0  | 10.0 | 17.0 | 15.0 | 13.0 |
| Water                         | 15.4 | 13.7  | 13.0 | 14.0 | 22.0 | 20.0 | 19.0 |
| Talc                          | 34.6 | 41.90 | 50.0 | 45.0 | 8.5  | 15.0 | 25.0 |
| Sodium carboxymethylcellulose | 1.1  | 1.0   | 1.0  | 1.0  | 0.6  | 1.5  | 1.3  |
| CMEA                          | 2.1  | 2.0   | 2.0  | 2.0  | 1.2  | 3.0  | 2.6  |

Optional ingredients such as stearic acid, urea, coloring, perfume, etc. were added to bring all formulations up to 100 percent.

## EXAMPLE 9

The following materials were mixed in the amounts indicated below according to the procedures outlined above but excluding filler, and were formed into malleable bars according to the subject invention:

| Ingredient                    | Batch wt. (lbs.) | Percent by weight |
|-------------------------------|------------------|-------------------|
| Sodium oleyl isethionate      | 7.5              | 46.0              |
| Gelatin                       | 1.5              | 9.0               |
| Mineral oil                   | 3.0              | 18.90             |
| Water                         | 4.0              | 24.2              |
| Sodium carboxymethylcellulose | 0.15             | 0.6               |
| CMEA                          | 0.3              | 1.2               |
| Total                         | 16.45            | 99.0              |

Perfume and coloring were added to bring the formulation up to 100.0 percent.

## EXAMPLES 10-16

The ingredients listed in Table II below were prepared without filler and formed into malleable bars of the subject invention.

TABLE II

| Example                       | 10   | 11   | 12   | 13   | 14   | 15   | 16   |
|-------------------------------|------|------|------|------|------|------|------|
| Sodium oleyl isethionate      | 43.5 | 43.5 | 46.0 | 46.0 | 46.0 | 46.0 | 46.5 |
| Gelatin                       | 9.0  | 9.0  | 9.0  | 9.0  | 9.0  | 9.0  | 10.0 |
| Mineral oil                   | 14.5 | 20.5 | 15.5 | 5.0  | 5.0  | 5.0  | 15.0 |
| Paraffin                      | 14.5 | 14.5 | 5.0  | 5.0  | 14.5 | 14.5 | 14.5 |
| Propylene glycol              | 29.0 | 14.5 | 20.5 | 20.5 | 31.0 | 29.0 | 25.5 |
| Sodium carboxymethylcellulose | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  |
| CMEA                          | 2.0  | 2.0  | 2.0  | 2.0  | 2.0  | 2.0  | 2.0  |

Optional ingredients such as stearic acid, urea, coloring, perfume, etc. were added to bring all formulations up to 100 percent.

## EXAMPLE 17

A typical anhydrous composition of the instant invention may also be formulated in a Sigma-type amalgamator. Such formulations are usually prepared in the following manner.

The quantity of propylene glycol desired is added to the preheated mixer. The temperature of the mixer should be between 185° F. to 215° F., or on the average approximately 200° F. A charge of gelatin is then added to the propylene glycol. At this juncture, the temperature should be kept above 200° F. but below 212° F. When the gelatin appears to be dissolved, a charge of carboxymethylcellulose can then be added as well as desired amounts of CMEA, stearic acid emollient and the like. If such mass were cooled, a spongy rubbery substance, super elastic in nature, would result. However, while still hot, the mixture is contacted and admixed with the solid, finely dispersed, powdered isethionate detergent material. The resulting mixture now possesses the moldability, formability and malleability which is desired in the subject mixture.

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The batch temperature can then be reduced to 150° F. and filler, colorant, perfume, etc. can be added. The formulation is then permitted to cool, plodded in a conventional plodder and extruded. Bars of convenient length are then cut, and may then be shaped or stamped.

The following ingredients were combined and formulated into bars of the subject invention:

| Ingredient                         | Percent by weight |
|------------------------------------|-------------------|
| Sodium oleyl isethionate           | 50.0              |
| Gelatin                            | 10.0              |
| Propylene glycol                   | 30.0              |
| Sodium carboxymethylcellulose      | 2.0               |
| CMEA                               | 7.0               |
| Emollients and other miscellaneous | 1.0               |
| Total                              | 100.0             |

## EXAMPLES 18-20

The ingredients listed in Table III below were mixed in accordance with Example 17 and formulated into malleable bars of the subject invention.

TABLE III

| Example                                            | 18    | 19    | 20    |
|----------------------------------------------------|-------|-------|-------|
| Sodium oleyl isethionate                           | 27.0  | 54.0  | 54.0  |
| Coconut oil fatty acid ester of sodium isethionate |       | 38.0  |       |
| Mineral oil                                        | 20.0  |       | 40.0  |
| Gelatin                                            |       | 10.0  |       |
| Propylene glycol                                   |       | 30.0  |       |
| CMEA                                               | 2.0   | 2.0   | 4.0   |
| Sodium carboxymethylcellulose                      |       | 1.0   |       |
| Stearic acid                                       |       | 5.0   |       |
| Starch                                             |       | 5.0   |       |
| Talc                                               | 50.0  |       |       |
| Miscellaneous                                      |       | 9.0   |       |
| Water                                              | 1.0   |       | 2.0   |
| Total                                              | 100.0 | 100.0 | 100.0 |

Although the present invention has been described with reference to particular embodiments and examples, it will be apparent to those skilled in the art that variations and modifications of this invention can be made.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A malleable, substantially non-sticky, non-hardenable detergent product suitable for molding into various shapes consisting essentially of by weight of the total composition:

(A) from about 20 to 55 percent of a water soluble salt of an ester of fatty acid and isethionic acid wherein said fatty acid contains from 8 to 18 carbon atoms;

(B) from about 10 to 35 percent water;

(C) from about 4 to 10 percent gelatin;

(D) a member chosen from the group consisting of mineral oil and paraffin and mixtures thereof;

the combined weight of (C) and (D) being from about 12 to 33 percent, wherein when paraffin is employed without mineral oil, said paraffin is present in amounts of from about 14 to 16 percent, and when employed with mineral oil, said paraffin is present in amounts of from about 4 to 6 percent; and

(E) from 0 to about 50 percent of a filler material, said filler material being selected from the group consisting of talc and corn-starch.

2. A detergent product as claimed in claim 1 in which the isethionate is sodium oleyl isethionate.

3. A detergent product as claimed in claim 1 in which the isethionate is the coconut oil fatty acid esters of sodium isethionate.

4. A detergent product as claimed in claim 1 in which there is present from about 10 to 15 percent by weight of propylene glycol.

5. A detergent product as claimed in claim 1 wherein the filler material is talc.

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6. A detergent product as claimed in claim 1 wherein there is present,

- (A) from about 43 to 47.0 percent isethionate;  
 (B) from about 20 to 31.0 percent water;  
 (C) from about 9 to 10 percent gelatin; and  
 wherein the combined weight of (C) and (D) is from about 19 to 27 percent.

7. A detergent product as claimed in claim 1 wherein there is present,

- (A) from 21 to 42 percent isethionate;  
 (B) from about 10 to 25.0 percent water;  
 (C) from about 4 to 9.0 percent gelatin;  
 (D) from about 9 to 18 percent mineral oil; and  
 (E) from about 7.0 to 50.0 percent filler.

8. A substantially anhydrous, malleable, substantially non-sticky, non-hardenable detergent product suitable for molding into various shapes consisting essentially of by weight of the total composition.

- (a) from about 20 to 55 percent of water soluble salt of an ester of a fatty acid an isethionic acid wherein said fatty acid contains from 8 to 18 carbon atoms;  
 (b) a member chosen from the group consisting of mineral oil and a mixture of gelatin and propylene glycol and mixtures thereof, said mineral oil being present in an amount from about 10 to 40 percent, said gelatin being present in an amount from about 1 to 15 percent and said propylene glycol being present in an amount of from about 25 to 35 percent, and  
 (c) from 0 to about 50 percent of a filler material, said

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filler material being selected from the group consisting of talc and corn-starch.

9. A detergent product as claimed in claim 8 in which the isethionate is sodium oleyl isethionate.

10. A detergent product as claimed in claim 8 in which the isethionate is the coconut oil fatty acid esters of sodium isethionate.

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