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SOAP

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This invention relates to soap bars which are primarily useful in cleaning human skin and removing from it excessive amounts of oils.

It is known that the rate of epithelial secretion of oleaginous substances varies greatly between individuals. When the skin is excessively oily, due to over activity of the epithelial glands, it tends to become dirty and also fosters infection and the development of skin blemishes to a greater extent than when it is kept substantially free of excessive amounts of lipophilic substances.

In washing oily skin with conventional toilet soaps some of the lipophilic materials are emulsified by the soap so that they may be removed as aqueous emulsions with the wash water. In the production of such emulsions it is highly desirable to obtain maximum intimate contact between the emulisfying soap and the oil and dirt to be removed. In the presence of water, soluble soaps made from higher fatty acids, especially those rich in fatty acids of 16 to 18 carbon atoms and particularly those containing 1 or more double bonds in their structure, become slick and exhibit a lubricity which has been found undesirable in detergent products intended primarily for cleansing oily skin surfaces. Such soaps do not promote quickest cleaning because of the slower removal of the oily films from the skin and also do not give to the user the very important feeling of having satisfactorily cleansed the skin because the skin itself, before complete rinsing, feels "oily," too.

In accordance with the present invention it has been found that a toilet soap particularly suitable for cleansing oily skin is a milled and plodded, pressed bar comprising 75 to 87% sodium soap which is the sodium salt of higher fatty acid of 8 to 20 carbon atoms, 15 to 45% of the fatty acid being saturated fatty acid of 8 to 14 carbon atoms and about 1 to 1.75% of finely divided grit free water insoluble inorganic abrasive material. The inorganic material is distributed homogeneously throughout the soap and is of small enough particle size to perceptibly decrease the slip of such soap bar when wet, without scratching human skin or exerting an abrasive effect on it. In a highly preferred embodiment of the invention the milled and plodded toilet soap bar comprises 75 to 87% sodium salt of higher fatty acid of 8 to 20 carbon atoms derived from a mixture of equal parts of tallow and coconut oil and, distributed homogeneously throughout the detergent, 1 to about 1.75% of finely divided grit free water insoluble sodium metaphosphate, $(NaPO_3)_4$, of number average particle diameter of about 5 microns and of particle size distribution, by weight, of about 25% between 1 and 5 microns, 25% between 5 and 10 microns, 20% between 10 and 20 microns and the balance between 20 and 40 microns, to perceptibly decrease the slip of such soap bar, when wet, without scratching human skin or exerting an abrasive effect thereon, 0.1 to 0.4% 3,5-dichlorsalicyl-3',4'-dichloranilide, 0.5–1% menthol, of which a substantial proportion is laevo-menthol, the amount of laevo-menthol present being sufficient to counteract any tendency of hypersensitive skin to irritation by components of this composition.

The sodium soap employed is one in which there is an appreciable content of saturated fatty acids of 8 to 14 carbon atoms. These fatty acids do not form soaps as

unctuous in feel to the skin as those soaps of longer carbon chain length and are significantly different in this respect from the unsaturated soaps, such as those of oleic, palmitoleic and linoleic acids. They also have a greater emulsifying activity on the sebum and sebaceous or oleaginous substances normally deposited on the skin. The fatty acids of 8 to 14 carbon atoms, such as caprylic, capric, lauric and myristic acids, are found in coconut oil. In the present compositions the 15 to 45% of such acids in the soap making charge, which is the percentage that contributes best detergency and physical properties with an acceptable decrease of slip, is preferably obtained from a mixture of coconut oil and tallow. These materials are triglycerides but in the soap kettle may be considered to split to form fatty acids and glycerine. The glycerine and various impurities are washed and settled out from the toilet soap by the usual well known changes, washes and settling methods to yield a kettle soap which is substantially free of glycerine, inorganic salt and unreacted material. The preferable oil charge to obtain the desired soap is one of about equal parts coconut oil and tallow but an acceptable product can be obtained if the soap charge has no less than about 15% coconut oil content.

The water insoluble inorganic abrasive must be chosen with care to avoid using materials containing detectable percentages of grit. When rubbed on a glass plate with finger pressure no scratches should be left by the "abrasive." Various abrasive substances have been combined with soaps in bar form but none has been of the effectiveness in this composition as insoluble sodium metaphosphate of the right particle size and distribution. Even alumina, known as a gentle polishing agent, produces an objectionable drag which is perceptible and annoying to the user. Some diatomaceous earths approach the utility of insoluble metaphosphate but are not as good in decreasing slip without creating an objectionable "drag" effect and also do tend to discolor the bar. Insoluble sodium metaphosphate, on the other hand, is a pure, white, impalpable powder which is readily dispersed in the soap, contributes to whitening it and gives the user the feeling of better contact of skin and bar and lesser slip between them.

The percentage of insoluble metaphosphate employed to obtain a suitable effect should be kept within a relatively narrow range, it has been found that less than 1% by weight is imperceptible to most people, whereas 2% or more is usually considered to be too readily apparent to the user and creates more drag than is desirable.

In bars made from mixtures of tallow and coconut oil 1.75% insoluble metaphosphate has been found to be satisfactory. Therefore, 1 to 1.75% insoluble metaphosphate, and preferably about 1.5% of this material is used to counteract the slick feeling caused by the presence of oil and soap, while still creating no objectionable drag.

The particle size of the insoluble metaphosphate used should be such that substantially all of it, usually over 99%, will pass through a 325 mesh screen, such screen having an opening which is a square 44 microns on the side. Thus, substantially all the particles passing this screen will have diameter less than about 40 microns. The particle size distribution is preferably over the 1 to 40 micron range and it has been found that a product containing 25% by weight within the 1 to 5 micron range, 25% of 5 to 10 microns, 20% of 10 to 20 microns and the balance of 20 to 40 microns, is desirable. The average particle size of such a powder is about 5 microns (on a number basis). The apparent density of this material is usually from about .9 to 1.2 g./cu. cm. With these particle sizes and in the percentages described above, the insoluble metaphosphate powder distributed homogene-

ously throughout the soap bar will not scratch the skin or have an abrasive effect on it but will perceptibly decrease the slip of the soap. It is believed that it will assist in improving contact between the emulsifiable oils on the skin and the soap itself and it is definitely known that to most users it will give the desirable effect of a cleaning feeling, indicative that undesirable excesses of oil is being efficiently removed.

The phenolic germicide may be any suitable halogenated phenolic compound compatible with soap and useful in destroying skin bacteria. Among such germicides may be mentioned the halogenated diphenyl methanes such as 3,5,6,3′,5′,6′-hexachloro diphenyl methane, salicylanilides such as 3,5-dichlorsalicyl-3′,4′-dichloranilide, thiuram sulfides such as tetramethylthiuram disulfide and carbanilides such as trichlorocarbanilide. Several of these materials have been found to be substantive to the human skin, even in the presence of detergent solutions, and thereby render it antibacterial for significant periods after washing. This is important in soaps for use on skins which tend toward oiliness because the excessive sebaceous material is often a very favorable culture medium for bacteria.

The germicides described may be employed in soaps at very low percentages which, however, are still very effective. From 0.1 to 2% is sufficient to destroy substantial proportions of skin bacteria. Of the germicides the salicylanilides are most preferred. It has been found that 0.1–0.4% tetrachlorsalicylanilide, most preferably the most effective 3,5-dichlorsalicyl-3′,4′-dichloranilide, has the desired antibacterial effect.

The soap, insoluble metaphosphate and halogenated phenolic bactericide are suitable for use on normal human skin without any objectionable degreee of irritation or discomfort being experienced by the user. In cases of hypersensitivity, the combination of excellent cleaning of the soap, contact of the insoluble metaphosphate particles and adsorption of and reaction to the germicide might cause an unwanted stimulation or tactile impression on the skin surfaces. To prevent such a condition from being of annoyance to the consumer, it has been found useful to add a small amount of menthol to the composition. From ½ to 1.5% menthol has been included in these compositions but the use of more than 1% appears to have no additional desirable activity. Less than ½% is of little perceptible effect. Within the proportions disclosed, preferably at .75% concentration, the menthol has a depressing effect on the nerves sensitive to irritation and pain, allowing the use of these bars without annoyance even by those who are more sensitive than is normal to the other active bar constituents. It has been found that menthol is also actively germicidal and therefore it is supplementary in action to the other bactericide present. In addition, menthol stimulates the nerves sensitive to the perception of cold and therefore leaves the washed skin with a pleasant clean, cooling sensation. The menthol employed is preferably laevo-menthol, rather than a racemic mixture. The laevo compound is a more effective antipruritic material and has a greater cooling action. It is usually obtainable most readily from natural menthol, rather than from the synthetic types, which are mixtures of isomers. The menthol employed should contain a substantial proportion, preferably about 60% or more, of the laevo isomer.

The balance of the soap bar is primarily water plus whatever adjuvants may be considered desirable. The proportion of adjuvants is preferably kept low to maintain the essential soap-like characteristics of the bar. Among the adjuvants employed may be mentioned perfume, fluorescent dyes, stabilizers, antioxidants, solvents, pigments and coloring agents. Usually the contents of such additives will be less than 5 and preferably less than 2%.

With these compositions it has been found possible to include substantially high percentages of moisture, from

10 to 17 and preferably 12 to 17% being suitable. Apparently, the presence of insoluble metaphosphate and high proportion of saturated soap of 8 to 14 carbon atoms together with the menthol allows the product to hold more moisture than would otherwise be possible.

The manufacture of these new soaps may be conducted by methods similar to those employed in making conventional toilet soaps. Dried kettle soap is blended in an amalgamator with insoluble sodium metaphosphate, bactericide and menthol and the mixture is milled, plodded and pressed into bar form. Care is taken to blend the various additives homogeneously in the amalgamator and the mill rolls are sufficiently fine to avoid the presence of any undispersed materials.

The following example describes the production of bars made according to this invention. The example is illustrative of the invention and is not to be considered as a limitation thereon. All parts given are by weight unless otherwise specified.

Example

	Parts
Sodium soap (derived from a fat charge of equal parts coconut oil and inedible tallow)	82.5
Insoluble sodium metaphosphate (average particle diameter 4.8±0.5 microns, 99% through 325 mesh sieve	1.5
Laevo-menthol (60% laevo-menthol content)	0.75
3,5-dichlorsalicyl-3′,4′-dichloranilide (added as a 33% solution)	0.2
Pigment	0.4
Perfume	1.0
Coloring and preservative	0.05
Water	13.6

Bars of the above formula were made by milling together soap chip dried to the proper moisture content, solution of bactericide, insoluble metaphosphate, pigment, laevo-menthol, perfume, coloring and preservative. Water was added to compensate for that lost during working and after milling to about .005–.010 thickness, the chip was fed to a plodder from which it emerged in bar form, after which it was cut and pressed to shape. The bars made were tested by a panel of subjects who found that the bars cleansed well, were not objectionably slick on oily skin, did not irritate the skin and left it with a cool, fresh, clean feeling.

Similar products were made in which the soap stock was composed of one part coconut oil with 4 parts tallow and also with one part coconut oil with about 2 parts tallow. Such bars were useful but were possessed of greater slip than those previously described. Variations in the sodium metaphosphate content indicated that less than 1% was useless while more than 1.75% gave a scratchy effect. Among the useful concentrations found were 1.0, 1.5 and 1.75%. Changes in the amounts of menthol used show that less than ½% gave no appreciable effect and more than 1% resulted in no additional desirable improvement.

What is claimed is:

1. A milled and plodded toilet soap bar particularly suitable for cleansing oily skin, consisting essentially of 75–87% sodium salt of higher fatty acids of 8 to 20 carbon atoms, of which acids 15 to 45% thereof is of saturated fatty acids of 8 to 14 carbon atoms and, distributed homogeneously throughout the soap, 1 to 1.75% of finely divided grit free water insoluble sodium metaphosphate, substantially all of which is of particle diameter size of from about one to 40 microns which perceptibly decreases the slip of such soap bar, when it is wet, without scratching human skin or exerting an abrasive effect thereon the balance being essentially moisture.

2. A milled and plodded toilet soap bar particularly suitable for cleansing oily skin consisting essentially of 75–87% sodium salt of higher fatty acid of 8–20 carbon atoms derived from a mixture of equal parts of

tallow and coconut oil and, distributed homogeneously throughout the detergent, 1 to 1.75% of finely divided grit free water insoluble sodium metaphosphate, $(NaPO_3)_4$, of number average particle diameter of about 5 microns and of particle size distribution, by weight, of about 25% between 1 and 5 microns, 25% between 5 and 10 microns, 20% between 10 and 20 microns and the balance between 20 and 40 microns, to perceptibly decrease the slip of such soap bar, when it is wet, without scratching human skin or exerting an abrasive effect thereon, 0.1–0.4%, 3,5-dichlorsalicyl-3',4'-dichloranilide, 0.5–1% menthol, of which a substantial proportion is laevo-menthol, the amount of laevo-menthol present being sufficient to counteract any tendency of hypersensitive skin to be irritated by components of this composition the balance being essentially moisture.

3. A milled and plodded toilet soap bar particularly suitable for cleansing oily skin, according to claim 1, in which the sodium salt of higher fatty acids is a salt derived from tallow and coconut oil, of which mixture of fat and oil about 15 to 50% is coconut oil.

4. A milled and plodded toilet soap bar particularly suitable for cleansing oily skin, according to claim 1, in which there is present 0.1 to 2.0% halogenated phenolic bactericide and 0.5 to 1% menthol.

References Cited in the file of this patent

UNITED STATES PATENTS

2,027,535	Jacobson	Jan. 14, 1936
2,195,713	Kritchevsky	Apr. 2, 1940
2,356,799	Taylor et al.	Aug. 29, 1944
2,814,597	Wenneis et al.	Nov. 26, 1957

FOREIGN PATENTS

2,343	Great Britain	1904
1,066,216	France	June 3, 1954
1,094,578	France	May 23, 1955

OTHER REFERENCES

Ser. No. 323,475, Croulard (A.P.C.), published June 1, 1943.