



⑫

EUROPEAN PATENT APPLICATION

⑳ Application number : **91401545.8**

⑤① Int. Cl.⁵ : **C11D 9/26**

㉒ Date of filing : **11.06.91**

③① Priority : **22.06.90 US 541995**

④③ Date of publication of application :
02.01.92 Bulletin 92/01

⑧④ Designated Contracting States :
AT BE CH DE DK ES FR GB IT LI LU NL SE

⑦① Applicant : **Colgate-Palmolive Company**
300 Park Avenue
New York, N.Y. 10022-7499 (US)

⑦② Inventor : **Joshi, David P.**
104 Elizabethtown Court
South Plainfield New Jersey (US)
Inventor : **Maaser, Heidrun**
46 Arrowwood Lane
Monmouth Junction, New Jersey (US)

⑦④ Representative : **Varady, Peter et al**
Cabinet Lavoix 2, Place d'Estienne d'Orves
F-75441 Paris Cedex 09 (FR)

⑤④ **Toilet soap bar composition with alkyl polyglycoside surfactant.**

⑤⑦ A toilet soap bar contains an alkyl polyglycoside nonionic surfactant to achieve improved foaming, lather, skin feel, skin moisturization, lime dispersion and cleaning. In addition, elimination or reduction of wet cracking and increased hardness is achieved. Translucent bars at moisture contents as high as 17 to 22% can also be obtained.

Field of Invention

This invention relates to a toilet soap bar composition and, especially a complexion soap product. In particular, the invention relates to a soap or soap/synthetic detergent composition in bar form which is hard and machinable with reduced wet-cracking and which provides improved lather, skin feel, and skin moisturization properties.

Background of the Invention

Soaps made from mixtures of animal fats and vegetable oils have been made and available for many years. Today, on the American market, most of the personal or toilet soap bars or cakes are made from a mixture of tallow and coconut oil or from the fatty acids obtained from such oils. Such products have been accepted by consumers but it is recognized that the consumer will respond positively to improvements in certain properties of such soaps. Furthermore, from the point of view of the manufacturer, improvements in physical properties leading to reduced defects, such as cracking or splitting during the manufacturing process, such as machining, molding, shaping, and the like, would be highly desirable. For the consumer, in particular, improvements in wet-cracking resistance, foaming power, rinsing ease, lathering properties, skin feel, skin moisturization, and mildness are especially important characteristics. Furthermore, for many types of consumers and for specific applications, the transparency or translucency characteristics of a soap bar are also highly desirable.

Representative of some of the more recent patent art relating to soap bar products, mention can be made of U.S. Patent 4,923,627 to David Joshi, 4,767,560 to Gregorio Gervasio, 4,265,778 to Gerard Sonenstein, all assigned to Colgate-Palmolive, the assignee of the subject application; and U.S. Patent 4,678,593 to Ridley, and EPA 0,311,343 to Dawson, both assigned to Proctor & Gamble.

It has also been known to include alkyl polyglycoside surfactants in detergent compositions. For instance, U.S. Patents 4,536,318 and 4,599,188, both to Ramon Llenado, disclose foaming compositions containing alkyl polysaccharide surfactant and co-surfactant mixture. These patents state that the foaming compositions may be used in soap bars in addition to other types of products. U.S. Patent 4,536,319 to Payne relates to a homogeneous granular detergent composition containing an alkyl polysaccharide with detergent co-surfactant, water-soluble neutral or alkaline salt and water with optional detergent builders.

In applicants' commonly assigned copending application Serial No. 07/369,538, filed June 21, 1989, a detergent laundry bar containing a non-soap anionic surfactant mixture and from about 2 to about 25% of an alkyl polysaccharide nonionic surfactant is described.

As far as the present inventors are aware, the advantages of alkyl polyglycoside surfactants in soap bar formulations were not recognized nor appreciated in the prior art.

Summary of the Invention

Accordingly, the present invention provides a toilet bar composition comprising a soap or soap/synthetic detergent mixture incorporating a small amount of alkyl polyglycoside nonionic surfactant to produce toilet bars that are hard but machinable and which exhibits reduced wet-cracking.

The present invention also provides such toilet bars providing improved lather, skin feel, and skin moisturization properties making it highly desirable for a complexion soap product.

Still further, the present invention in a preferred embodiment thereof is in the form of a highly translucent soap bar product.

The soap bar products of the present invention also provide improved lime soap dispersion and improved foaming characteristics.

Detailed Description of the Invention and Preferred Embodiments

As used herein, the term "toilet bar" includes both conventional soap bar compositions, superfatted soap bar compositions and also mixed soap/synthetic anionic detergent bar compositions. Furthermore, the term "bar" includes both conventional bar or cake forms which may have generally rectangular or oval or circular cross-sections, as well as tablets, sticks, and the like.

The compositions generally contain from about 45% to about 95%, more preferably from about 55% to about 88% of soap, i.e. soluble alkali metal salt of a C₈ to C₂₄, preferably C₁₀ to C₂₀ fatty acid and from 0 to about 45%, preferably from about 0 to about 35% by weight of a non-soap synthetic anionic surfactant. In highly preferred embodiments of the invention, free fatty acids of fats or oils of the same general carbon content as the fatty acid component of the soap may be incorporated in the soap composition. Such superfatted soaps or

superfatted soap/synthetic anionic detergent compositions can provide soap bars of improved mildness wherein the "added" fats and/or oils and/or fatty acids can be added to the compositions as such or can result from a portion of the fatty components and oils used to make the soap being intentionally not saponified. Generally, only small amounts of from about 0.5 to 20%, preferably from about 1 to 10%, especially from 2 to 8% of the free fatty acid, fat or oil, will provide the desired effect.

Fatty acid soaps suitable for use herein can be obtained from natural sources, such as, for instance, plant or animal esters (e.g. palm oil, coconut oil, babassu oil, soy bean oil, castor oil, tallow, whale or fish oils, grease, lard and mixtures thereof). The fatty acid soaps can also be synthetically prepared (e.g. by the oxidation of petroleum, or by the hydrogenation of carbon monoxide by the Fischer-Tropsch process). Resin acids, such as those present in tall oil, may be used. Naphthenic acids are also suitable.

Sodium and potassium soaps can be made by direct saponification of the fats and oils or by the neutralization of the free fatty acids which are prepared in a separate manufacturing process. Particularly useful in the present invention are the sodium and potassium salts of mixtures of fatty acids derived from coconut oil and tallow, i.e. sodium and potassium tallow and coconut soaps, and especially the sodium tallow and coconut soaps. For example, 60/40, 75/25, or 85/15 blends of tallow/coco soaps are especially useful. More generally, blends of tallow/coco soaps at ratios of from 10/90 to 90/10 can be used with advantage.

Generally, tallow fatty acids can be derived from various animal sources and generally comprise from about 1 to about 8% myristic acid, about 21 to 32% palmitic acid, about 14 to 31% stearic acid, and 0 to 4% palmitoleic acid, about 36 to 50% oleic acid, and about 0 to 5% linoleic acid. Coconut oil refers to fatty acid mixtures having an approximate carbon chain length distribution of: 8% C₈, 7% C₁₀, 48% C₁₂, 17% C₁₄, 8% C₁₆, 2% C₁₈, 7% oleic, and 2 % linoleic acids. Other sources having similar carbon chain lengths, such as palm kernel oil and babassu kernel oil are considered to fall within the term coconut oil.

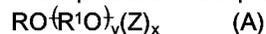
The fatty acid soap may also be formed from the topped, distilled coco fatty acid from which the lower carbon chain length acids have been totally or substantially removed, such as disclosed in U.S. Patent 4,767,560, the disclosure of which is incorporated herein in its entirety, by reference thereto.

The compositions herein generally take the form of a toilet bar wherein the soap is at least partially in beta-phase form. For instance, in preferred embodiments, the soap is at least about 20%, more preferably at least about 50%, and especially at least about 70% in the beta-phase form.

When the soap bar composition is comprised of a mixture of fatty acid soap and non-soap synthetic anionic surfactant, the anionic surfactant may be any of those conventionally included in toilet bar products. Examples of such non-soap anionic surfactants include the salts of higher fatty alcohol sulfates wherein the higher fatty alcohol is generally of from about 10 to 18 carbon atoms and which may be ethoxylated with from about 0 to 10 moles ethylene oxide, preferably 0 to 5 moles ethylene oxide, such as 2 or 3 moles ethylene oxide per mole of fatty alcohol. Other useful anionic surfactants include the sulfated and sulfonated detergents, such as the higher fatty acid monoglyceride sulfates of from 10 to 18 carbon atoms in the fatty acid moieties, the paraffin sulfonates, olefin sulfonates, and branched and linear alkyl benzene sulfonates of from about 10 to 18 carbon atoms in the lipophilic groups thereof. Of these, it is generally preferred to incorporate those anionic surfactants which are most biodegradable. These anionic surfactants are normally employed as their water-soluble salts and preferably as the sodium salts, although the cation portion may also be one or more of potassium, ammonium, magnesium, and calcium or an organic cation, such as mono-, di- or triethanolamine. The sodium salts will normally constitute more than 50%, preferably more than 75%, and most preferably all or substantially all of the cation of both the fatty acid soap and the synthetic anionic detergent surfactants.

A further essential component of the toilet bar composition is an alkyl polysaccharide nonionic surfactant. Incorporation of the alkyl polysaccharide, especially alkyl polyglucoside, nonionic surfactant in the soap bar composition provides a product with improved hardness, lather, skin feel, and moisturization, as well as improved translucency of the product bars and better lime dispersion and overall cleaning properties.

Glycoside surfactants suitable for use in the practice of the present invention include those of formula:



wherein R is a monovalent organic radical (e.g. a monovalent saturated aliphatic, unsaturated aliphatic or aromatic radical such as alkyl, hydroxyalkyl, alkenyl, hydroxyalkenyl, aryl, alkylaryl, hydroxyalkylaryl, arylalkyl, alkenylaryl, arylalkenyl, etc.) containing from about 6 to about 30 (preferably from about 8 to about 18 more preferably from about 10 or 12 to about 16) carbon atoms; O is an oxygen atom; R¹ is a divalent hydrocarbon radical containing from 2 to 4 carbon atoms, such as ethylene, propylene or butylene (most preferably the unit (R¹O)_y represents repeating units of ethylene oxide, propylene oxide and/or random or block combinations thereof); y is a number having an average value of from 0 to about 12; Z represents a moiety derived from a reducing saccharide containing 5 or 6 carbon atoms (most preferably a glucose unit); and x is a number having an average value of from 1 to about 10 (preferably from 1 to about 5, more preferably from 1 to about 3, and most preferably from about 1.2 to about 2). Generally, the lower values of x (corresponding to degree of polym-

erization, DP) of from about 1.2 to 1.4 provide somewhat better skin feel while higher P values, of say 1.35 to 1.7 often provide better cleaning and foaming and are also somewhat harder but less translucent.

Glycoside surfactants of the sort mentioned above, and various preferred subgenera thereof, are fully discussed, for example, in U.S. Patents 4,483,779 to Llenado, et al. (issued November 20, 1984) and 4,668,422 to Malik, et al. (issued March 26, 1987) the discussions and descriptions of which are hereby incorporated herein by reference.

Glycoside surfactants suitable for use herein also include those of the formula A above in which one or more of the normally free (i.e. unreacted) hydroxyl groups of the saccharide moiety, Z, have been alkoxyated (preferably, ethoxylated or propoxylated) so as to attach one or more pendant alkoxy or poly(alkoxy) groups in place thereof. In such event, the amount of alkylene oxide (e.g. ethylene oxide, propylene oxide, etc.) employed will typically range from about 1 to about 20 (preferably from about 3 to about 10) moles thereof per mole of saccharide moiety within the Formula A glycoside material.

In glycosides of the Formula A above, the RO(R¹O)_y group is generally bonded or attached to a number 1 carbon atom of the saccharide moiety, Z. Accordingly, the free hydroxyls available for alkoxylation are typically those in the number 2, 3, 4 and 6 positions in 6-carbon atom saccharides and those in the number 2, 3 and 4 positions in 5-carbon atom saccharide species. Typically, the number 2 position hydroxyls in 5-carbon saccharides, and the number 2 and 6 position hydroxyls in 6-carbon saccharides, are substantially more reactive or susceptible to alkoxylation than those in the number 3 and 4 positions. Accordingly, alkoxylation will usually occur in the former locations in preference to the latter.

Glycoside surfactants especially preferred for use herein include those of the Formula A above wherein R is an alkyl group containing from about 12 to about 14 or 16 carbon atoms; y is zero; Z is derived from glucose; and x has an average value of from 1 to about 3, especially from 1 or 1.2 to about 1.7 or 2.

The amount of unreacted alcohol (free fatty alcohol content) will generally be less than about 2%, e.g. 2.0%, 1.5%, 1.0%, 0.5%, by weight, based on the total glycoside and unreacted alcohol.

The benefits of the glycoside surfactants employed in the compositions hereof become noticeable when used in an amount ranging from about 1.5 to about 2.3 wt%, preferably from about 1.8 to 2.0 wt% based on the total composition. However, even greater benefits are often observed when the glycoside surfactant is used in amounts as high as about 20% by weight of the composition, especially up to about 12 or 15%, such as 6%, 8%, 10%, etc. Above about 20% the cost of the product tends to be too high.

The amount of moisture present in the soap bar compositions is not particularly critical and may be selected depending upon the final desired properties of the product as is well known to those skilled in the art. Generally, amounts of water ranging from about 10 to about 26%, more preferably from about 15 to 24%, by weight of the composition, will be present. In the range of moisture of from about 17 to 22%, the products tend to be more highly translucent to nearly transparent. However, this range may vary depending on the content of free fats, fatty acids or oils in the composition which tend to make the soap bar product less translucent, i.e. let less light pass through the bar.

In addition to the essential and preferred components described above, the toilet bar soap compositions of the present invention may contain a wide variety of optional materials. These optional materials include, for example, skin conditioning components, processing aids, anti-bacterial agents and sanitizers, dyes, perfumes, pearlescent agents, coloring agents and the like.

Materials to facilitate the preparation of the instant toilet bars can also be present. Thus, glycerine, for example, can be added to the crutcher or amalgamator in order to facilitate processing. Glycerine, if present, generally comprises from about 0.2% to about 10% by weight of the finished bar. Additionally, emulsifiers such as polyglycerol esters (e.g. polyglycerol monostearate), propylene glycol esters and other chemically stable nonionic materials may be added to the bars to help solubilize various components, particularly skin conditioning agents, such as sorbitan esters. Alkali metal citrates are also valuable herein as plasticizers.

Conventional anti-bacterial agents and sanitizers may be present. Typical anti-bacterial sanitizers include, for example, 3,4-di- and 3',4',5-tribromosalicyl-anilides, 4,4'-dichloro-3-(trifluoromethyl)carbanalide; 3,4,4'-trichloro-carbanalide and mixtures of these materials. If present, anti-bacterial agents and sanitizers generally comprise from about 0.5% to about 4% by weight of the finished bar.

Various emollients and skin conditioning agents may also be present, for example, sorbitan esters, such as those described in U.S. 3,988,255, lanolin, cold cream, mineral oil, isopropyl myristate, and similar materials. When present, such emollients and skin conditioning agents generally comprise from about 0.5% to about 5% by weight of the bar.

The toilet bars may also contain an electrolyte. Suitable electrolytes include, for example, sodium chloride, potassium chloride, potassium carbonate, dipotassium monohydrogen orthophosphate, tetrasodium pyrophosphate, tetrapotassium pyrophosphate, sodium tripolyphosphate, potassium tripolyphosphate, trisodium orthophosphate, tripotassium orthophosphate, and sodium and/or potassium formates, citrates, acetates, and

tartrates, and mixtures of the above. Sodium chloride is especially preferred. The electrolyte level, when present, is generally from about 0.2% to about 4.5% by weight of the composition.

Acidic materials can be added to the bar to control free alkalinity. A suitable example is citric acid added at a level of about 0.1% to about 3%.

5 Another desirable ingredient of the composition, for aesthetic purposes, is a pearlescent material, such as mica, titanium-dioxide coated mica, natural fish silver or heavy metal salts, such as bismuth oxychloride.

The toilet bar soap compositions may also contain any of the conventional perfumes, dyes, and coloring agents generally used in commercially-marketed bars to improve the characteristics of such products. When present, such perfumes, dyes, and coloring agents comprise from about 0.2% to about 5% by weight of the
10 bar.

The compositions of the present invention may be prepared in conventional manner, either from neat kettle soap or from saponified touch-hardened fatty acid blends. In a typical process, neat kettle soap (i.e. after saponification) and commercially available alkyl polyglucoside surfactant (present as, for example, a 50% aqueous solution) are blended together to provide a composition containing about 70% soap/glycoside mixture and about
15 30% moisture at a temperature of about 160°F (71°C) to 190°F (88°C). This mixture is passed to a heat exchanger at a temperature of, for example, 320°F (160°C) and then is dried, e.g. by vacuum or spray-drying, to the desired moisture level, such as 10 to 20 or 25%. The dried soap mixture is then mechanically worked at elevated temperature, for example, in an amalgamator or over milling rolls until the temperature is raised to the range of from about 86°F (30°C) to about 122°F (50°C), preferably from about 95°F (35°C) to 113°F (45°C),
20 e.g. about 104°F (40°C). Thereafter, the soap mass is plodded into bar form. The alkyl polysaccharide anionic surfactant may be, as described above, added to the formulation in its liquid form, or it may be added in its more concentrated powder form, both forms being commercially available.

The invention will now be described by the following non-limitative examples. All parts, percents, and ratios are on a weight basis, unless otherwise specified.

25

Example 1

Soap bar compositions according to the invention are prepared as described above in which sodium tallow/coconut (75/25) kettle soap is mixed with the alkyl polyglucoside (50% aqueous solution) shown below and
30 the mixture is dried in a Mazzoni spray dryer, the dried soap mixture is admixed with perfume and dye components in an amalgamator, then milled at about 40°C to optimize beta-phase soap formation, and finally plodded into bar form to yield a soap bar containing 1.8% alkyl polyglucoside and 20% moisture. For comparison, a similar composition, but without any added alkyl polyglucoside (APG) surfactant is also prepared.

Each of the resulting soap bar products are tested for translucency, hardness, lather ranking and skin feel
35 ranking.

The results are shown in the following table:

	Run No. 1 APG 350 ¹)	Run No. 2 APG 500 ²)	Control (no APG)
40 Translucency (EV)	7.1	7.7	5.4
45 Hardness (mm) (Penetrometer Test)	5.5	6.2	5.6
Lather Ranking	2	1	3
50 Skin Fee Ranking	2	1	3

1) C₉/C₁₀/C₁₁ = 20/40/40, avg. = 10.2, D.P. = 1.8

55 2) C₁₂/C₁₃ = 45/55, avg.=12.55, D.P. = 1.4

From the above, it can be seen that the compositions of the present invention with as little as 1.8% of the

alkyl polyglycoside nonionic surfactant provide increased translucency, hardness, and better lather ranking and skin feel ranking as compared to the control without any APG.

Example 2

5

This example illustrates production of a superfatted high APG soap bar composition according to the invention prepared by blending preformed soap chips with powdery APG at a 91/8 mixing ratio.

The soap chips are formed from a 60/40 tallow/coco kettle soap as follows:

10

<u>Part 1 (Pre-blend)</u>	<u>Parts (by weight)</u>
50/50 coco/stearic fatty acid blend	92.6
di-tert. butyl-para-cresol	0.4
anhydrous lanolin-odorless	7.0
Total	<u>100.0</u>

15

20

<u>Part 2 (Salt Water)</u>	<u>Parts (by weight)</u>
Table salt	6.4
Tap water	93.6
Total	<u>100.0</u>

25

30

<u>Part 3</u>	
60/40 tallow/coco kettle soap	87.04
Part 1 (pre-blend)	6.15
Part 2 (salt water)	6.81
Total	<u>100.00</u>

35

The part 3 mixture is dried to a moisture level of about 10.0% (approximately 23.2% moisture loss or 76.8% yield). To 91 parts of the resulting dried soap chips 8 parts of APG 625 ($C_{12}/C_{14}/C_{16} = 68/26/6$, glucoside unit content - 1.5 DP, on average), 0.1 part color and 0.9 part perfume, are added and formulated into bar form in the same manner as described in Example 1.

40

When the soap bar from this composition is subjected to a wet cracking test by submersing the soap bar in water for several hours and hanging the bar in the air to dry overnight no cracks form. In contrast, when the same composition but without the APG 625 is formed into soap bars by the same procedure, numerous wet cracks of varying degrees of severity (on a scale of 1 to 5) are observed.

If in the above composition the coco/stearic acid blend is replaced by an equivalent amount of a 50/50 palm kernel oil/stearic acid blend, similar results are obtained.

45

Similarly, the 60/40 tallow/coco kettle soap may be replaced by a 60/40 tallow/palm kernel oil kettle soap to achieve substantially the same results.

Similar results are also achieved if the amount of moisture remaining in the soap bar is increased to 15 to 20% or more.

50

Claims

55

1. A toilet soap bar comprising
 - (a) from about 45 to 95% C_8-C_{24} fatty acid soap,
 - (b) from 0 to about 45% non-soap anionic surfactant,
 - (c) from 0 to about 20% of C_8-C_{24} fatty acid, fat or oil,
 - (d) from about 1 to 20% of a nonionic alkyl polysaccharide surfactant, and
 - (e) moisture.

2. The toilet soap bar of claim 1 comprising
- (a) from about 55 to 66% of said soap,
 - (b) from 0 to about 35% of said non-soap anionic surfactant,
 - (c) from about 1 to 10% of said fatty acid, fat or oil,
 - (d) from about 1.5 to 15% of said alkyl polysaccharide, and
 - (e) from about 10 to 25% moisture.
3. The toilet soap bar of claim 1 wherein said soap comprises at least one alkali metal salt of a C₁₀ to C₂₀ fatty acid.
4. The toilet soap bar of claim 3 wherein said soap comprises tallow soap and coco soap at a mixing weight ratio of from 10/90 to 90/10.
5. The toilet soap bar of claim 1 wherein said nonionic polysaccharide surfactant has the formula
- $$RO(R^1O)_yZ_x$$
- wherein R is a monovalent organic radical containing from about 8 to 18 carbon atoms, R¹ is a divalent hydrocarbon radical of from 2 to 4 carbon atoms, y is a number having an average value of from 0 to about 12; Z represents a moiety derived from a reducing saccharide of 5 or 6 carbon atoms, and x is a number having an average value of from 1 to about 10.
6. The toilet soap bar of claim 5 wherein R is a monovalent aliphatic radical of from about 10 to 16 carbon atoms, y is 0, Z is a glucose unit and x is a number having an average value of from about 1.2 to 2.
7. The toilet soap bar of claim 6 containing from about 1.5 to 2.3% of said nonionic alkyl polyglucoside surfactant.
8. The toilet soap bar of claim 6 containing from about 6 to 15% of said nonionic alkyl polyglucoside surfactant.



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 91401545.8

DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
A	<u>WO - A1 - 80/00 452</u> (QUIMICA MILEN) * Abstract; claim 13 * --	1, 3
A	<u>EP - A2/A3 - 0 075 994</u> (THE PROCTER & GAMBLE) * Claim 1; page 3, lines 20-29 * --	1, 3, 7
D, A	<u>EP - A2/A3 - 0 311 343</u> (THE PROCTER & GAMBLE) * Claims 1, 7 * ----	1, 3
The present search report has been drawn up for all claims		
Place of search VIENNA	Date of completion of the search 12-09-1991	Examiner WILFLINGER
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document</p>		

EPO FORM 1503 03.82 (P0401)