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⑤④ **Detergent composition.**

⑤⑦ A detergent composition in solid, especially bar, form contains 15 to 35 wt% soap, 5 to 50 wt% of fatty acyl isethionate as a mild, non-soap, surfactant, 5 to 50 wt% of water and 5 to 50 wt% of an organic solvent, the majority of which is methanol, ethanol and/or propanol.
The composition is suitable for forming into bars by casting from a melt of the constituents.

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DETERGENT COMPOSITION

The present invention relates to a solid detergent composition, particularly to a toilet bar containing soap in combination with a non-soap detergent.

5 Soap traditionally forms the basis of personal washing bars and provides an efficient cleansing means in the form of a solid bar that is easy to use. Appropriate selection of soap components ensures a bar having acceptable lathering and physical properties. It has however been shown that soap can be somewhat harsh to the skin. Alternative surfactants to soap have therefore been investigated to provide skin cleansing compositions that are more mild to the skin. A number of proposals have been made to provide solid skin cleansing compositions containing a mixture of soap and mild surfactants. There is however a tendency for the mild surfactants to affect adversely the physical properties of the bar in terms for example of its rate of wear and mush characteristics.

Bars containing mild surfactant have been made and sold but there is a continuing need to provide a solid personal washing composition containing both soap and a mild non-soap detergent having good properties.

15 Many of the former proposals for toilet bars containing soap and mild non-soap surfactants comprise essentially mixing the selected soap, non-soap surfactants and any other components and processing the mixture on a conventional soap milling and extrusion line producing stamped bars of soap.

The alternative bar making process comprising forming a melt of the constituent ingredients and pouring the melt either into individual moulds or into large frames for subsequent cutting into smaller portions has usually been reserved for low volume specialist bars. It has for example been employed as a means of achieving transparent soap bars. Frequently however the desire to achieve bars of high transparency has been at the expense of other bar properties. Traditionally transparent soap bars have been achieved by use of a volatile solvent such as ethanol, a solution of soap and other ingredients in the ethanol being cast into the moulds or frames and then left for a number of months for the ethanol to evaporate.

20 The initial solution is semi-opaque and only becomes transparent as the alcohol evaporates. The process however is costly due to the long maturing time required and results in misshapen bars due to the loss of solvent. The resulting bars moreover tend to have user properties inferior to conventional opaque bars produced by the milling and stamping route.

The incorporation of solvent alcohol into bars can thus be seen to have associated problems. Incorporation of an alcohol has often been avoided except when there has been an intention to produce transparent bars.

30 An attempt to avoid the problems associated with alcohol evaporation is presented in US 2820768 (From-ont) which describes transparent toilet bars made from a mixture of transparent alkali metal soap and the product of free long chain fatty acid and excess triethanolamine. Such bars are available commercially under the name "Neutrogena". The bars are transparent, but in use suffer from a number of problems, in particular the surface of the bars can become sticky and develop an opaque surface layer following contact with water.

35 A proposal to provide a transparent soap bar containing both soap and an anionic or amphoteric surfactant e.g. triethanolamine lauryl sulphate, diethanolamine lauryl sulphate, yet which avoids the traditional alcohol problems is given in US 4165293 (Amway Corporation) which advocates the use of a dihydric alcohol e.g. glycols, especially propylene glycol. The bars are made by casting and specially formulated to avoid the need to add monohydric alcohol and hence the traditional mould shrinkage, weight loss and short life problems are overcome. A small amount of monohydric alcohol might be employed, up to a maximum of less than 5 wt% with respect to the total bar composition.

40 A further example of the combination of soap and non-soap surfactant in solid transparent form is disclosed in US 4206069 (Colgate). This proposal however is concerned with the provision of detergent pellets intended for fabric washing. It is a prime objective of the proposal to provide solid, transparent, form-stable, water soluble, non-sticky, free-flowing substantially non-hygroscopic detergent pellets. In order to achieve this objective the specification teaches the use of a solvent component consisting essentially of at least one normally liquid substantially non-volatile organic solvent having a boiling point of at least about 100°C. At least 50 wt% and preferably from 75 to 100 wt% of the solvent component should have a boiling point of at least 100°C i.e. should be substantially non-volatile, with a negligible vapour pressure at room temperature and negligible loss by evaporation on ageing or storage.

50 According to the present invention there is provided a detergent composition in solid form comprising 15 to 35 wt% soap, 5 to 50 wt% non-soap surfactant which is fatty acyl isethionate or a mixture of fatty acyl isethionate and a lesser amount of other mild surfactant, 5 to 50 wt% water and 5 to 50 wt% organic solvent, wherein the organic solvent comprises more than 50 wt% methanol, ethanol, propanol or mixtures thereof.

55 By 'mild surfactant' we mean a surfactant that solubilises less than 500 mg N/100 cm³ in a zein test. The zein test employed is as described by E Gotte, Proc. Int. Cong. Surface Active Subs., 4th, Brussels, 3, 89-90

(1964).

The present invention thus provides a detergent composition in solid form containing both soap and a mild surfactant and a volatile alcohol solvent. The composition is suitably in bar form and can, but need not be, transparent. The present composition can thus provide a toilet bar that is milder to the skin than a conventional all soap bar. Due to the present formulation the bars in use have improved physical characteristics, in particular the bars have a reduced tendency to develop a soft surface layer on contact with water and hence are less messy and mushy.

The soap component is an essential element of the present composition. It is preferably at a level between 20 and 30 wt% with respect to the whole composition. Preferably the soap component comprises more than 8 wt%, preferably more than 15 wt%, with respect to the total composition, soaps having a saturated fatty acid chain length of C16 or more. Suitably substantially the entire soap component can comprise soaps having a saturated chain length of C16 or more. Such soaps are relatively water insoluble and provide a structure to the present solid composition. Preferably the ratio of soluble soaps (i.e. soaps having a chain length of C14 or less or unsaturated C18 soaps) to insoluble soaps is less than 1 : 1. Suitable sources of soap include traditional soap making materials. In particular hardened tallow soap comprising an approximate 1 : 1 mixture of saturated C16 and C18 soaps provides a useful source of appropriate water insoluble soaps. The soaps employed are preferably sodium soaps, but potassium, ammonium or substituted ammonium soaps could be employed instead either in whole or in part.

Fatty acyl isethionates used in this invention have acyl groups containing 8 to 22 carbon atoms. Acyl chain length is usually 8 to 18 carbon atoms. This isethionate may well be a mixture of compounds of varying acyl chain length. The solubilising cation of the fatty acyl isethionate is preferably sodium but other possibilities include potassium, ammonium and substituted ammonium.

The amount of fatty acyl isethionate is preferably between 20 and 40 wt%, more preferably between 20 or 25 and 35 wt% with respect to the whole composition. Other mild surfactants may possibly be included in amounts which are less than the amount of fatty acyl isethionate, and which are such that the total of non-soap surfactant does not exceed 50 wt% based on the whole composition.

Other mild surfactant, if any, should satisfy the zein test, as mentioned. Examples of other mild surfactants include sarcosinates, amine oxides, ether sulphates, coconut diethanolamide, alcohol ethoxylates, sulphosuccinates and mixtures thereof.

The zein test is a measure of irritancy and provides a classification in terms of the amount of nitrogen found in the supernatant after equilibration of 40 cm³ of a 1 wt% surfactant solution with 2 g of zein powder at 35°C for 1 hour. As indicated above we define a mild surfactant to be one which yields a value of less than 500 mg nitrogen per 100 cm³. Preferably any surfactant is employed in compositions of the present invention yields a value of less than 400 mg nitrogen per 100 cm³. These values are based on zein having a total N content of 700 mg N per 5 gm of zein powder. The test is easy to perform and is increasingly being employed by commercial suppliers of surfactants as an indication of the irritancy of their products.

The organic solvent component is preferably present at a level between 10 and 40 wt%, more preferably at a level between 10 and 25 wt%, with respect to the whole composition and can if desired comprise wholly the C₁ to C₃ monohydric alcohols recited above. Preferably the recited C₁ to C₃ monohydric alcohol(s) comprise at least 75 wt% of the organic solvent component. When the organic solvent is present a level in total of less than 10 wt%, suitably methanol, ethanol, propanol or mixture thereof is present at a level to comprise more than 5 wt% with respect to the total bar composition. The presence of these solvents in a major amount in the solvent component is essential to achieve a solid composition having the desired physical properties. In particular the presence of the defined solvent increases the solubility of the surfactant and the soap in a melt during its preparation, and hence the quantity that can be included, but not at the expense of finished bar properties. Examples of other ingredients that could be included in the organic solvent include sugars, linear and branched polyols and cyclic polyols. Particular examples include sucrose, fructose, glucose, glycerol, diethyleneglycol, propyleneglycol, triethyleneglycol, sorbitol, mannitol and polyethyleneglycols having a molecular weight between 400 and 6000. Whether or not any such other ingredients are included will depend on the desired end product. Their presence may for example be helpful in modifying the feel and in-use properties of the bar and if desired in enhancing the transparency of the bar.

The water employed in compositions of this invention is preferably distilled or deionised. Within the above stated range it is present in an amount to balance the other ingredients present to 100 wt%.

It is strongly preferred that the composition includes some free fatty acid having a carbon chain length in the range 8 to 22 carbon atoms. For instance saturated C₁₆ and C₁₈ acids may be used. The amount may be at least 10% or 15% by weight based on the fatty acyl isethionate. The amount will not generally exceed 40% by weight based on the fatty acyl isethionate.

This is effectively the same as utilising a superfatted soap and indeed free acids may be incorporated as

superfatted soap. The ratio of fatty acid (neutral) soap in the composition may lie in a range from 0.05 : 1 to 0.4 : 1. Preferably it does not exceed 0.25 : 1.

Other ingredients that can be present in the present solid composition include those conventionally employed in soap manufacture. They include antioxidants, preservatives, dyes, pearlescers, opacifiers and perfumes.

The present compositions are suitable for manufacture by forming a melt of the constituent ingredients and casting the melt. One possibility is to cast the melt into large moulds or frames for subsequent cutting into smaller portions or directly into moulds which define a bar shape. preferably the melt is poured directly into separate moulds which comprise the packaging means for the subsequently set bars. Such moulds can for example comprise rigid or semi-rigid plastic packaging or can even be flexible sachets which adapt to the internal pressure exerted by the melt. Such packaging means can be air-tightly sealed and, if for example transparent, provide an attractive means to display the finished product.

Suitably the melt is heated to 70 to 85°C in order to ensure full dissolution of all the ingredients. Preferably the soap component is admixed with the other ingredients already in the form of a melt at 70 to 85°C.

Thus the present invention provides a process for making a detergent composition in solid form comprising forming a melt at 70 to 85°C comprising 15 to 35 wt% soap, 5 to 50 wt% non-soap surfactant which is fatty acyl isethionate or a mixture of fatty acyl isethionate and a lesser amount of other mild surfactant, 5 to 50 wt% water and 5 to 50 wt% organic solvent, the organic solvent comprising more than 50 wt% methanol, ethanol, propanol or mixtures thereof, and casting the melt into moulds.

Embodiments of the present invention will now be described by way of Example only.

Examples 1 to 4 and Comparative Examples 5 to 7

Bars were made from seven formulations as given in the Table below. In each case a melt was formed at 80°C of all the ingredients excluding the soap, to which the soap was added to ensure full dissolution. The resulting melts were cast into moulds and allowed to set.

The bars obtained in each case were firm in appearance and felt firm when handled. They were assessed for mildness by the zein test referred to above. They were also assessed for formation of a mushy surface in use. This was assessed by a test in which each bar is twisted 18 times in gloved hands after immersion in a bowl of water at 30°C. The procedure is repeated 8 times a day for 4 days by a panel of testers. At the end of the fourth day, the bars are left overnight in a drained tray. On the fifth day, the face of the bar which has been in contact with the tray is prodded by an experienced worker. The number score given in the table reflects the depth and area of indentation achieved, the higher the number, the greater the indentation and hence the worse the mush properties.

A conventional soap, based on an 80 : 20 ratio of tallow and coconut oil gave a value of 3.8 in this test.

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TABLE

Example	1	2	3	4	5	6	7
<u>Constituents (wt%)</u>							
Fatty acid Na soap	25	25	25	25	25	25	20
Industrial methylated spirit	25	12	10	10	10	10	17
Sodium fatty acyl isethionate	22	28	22	18	--	--	--
Free fatty acids	6	8	6	5	--	--	--
Na lauryl ether sulphate (3EO)	--	--	--	--	38	--	--
Na lauryl betaine	--	--	--	--	--	32	--
Na lauryl amido betaine	--	--	--	--	--	--	12
Na lauryl ether sulphate (2EO)	--	--	--	--	--	--	17
Dobanol 91-8	--	--	--	--	--	--	12
Na isethionate	2	3	2	2	--	--	--
Propan-1,2-diol	--	10	--	--	7	7	12
Sorbitol	10	--	--	8	--	--	--
Water	10	14	35	32	20	26	10

<u>Test Results</u>			
Zejn Test (mg N/100ml)	110	140	110
Mush Test	0	0	0
		180	180
		6.0	6.0
		50	50
		8.0	8.0
			120
			5.0

The fatty acid sodium soap is a 1 : 1 mixture of saturated C16 and C18 soaps derived from hardened tallow.
 The free fatty acids were a similar mixture of saturated C16 and C18 fatty acids.
 The sodium fatty acyl isethionate is sodium cocoyl isethionate.
 Industrial methylated spirit is a mixture of ethanol and methanol in 9 : 1 ratio.
 5 Dobanol 91-8 is a C9-C11 alcohol ethoxylate with average 8EO.
 The non-soap surfactants employed score as follows on the above defined zein test.

	mg N/100cm ³
10 Sodium fatty acyl isethionate	260
Na lauryl ether sulphate (3EO)	270
15 Na lauryl amido betaine	120
Na lauryl ether sulphate (2EO)	260
20 Dobanol 91-8	40

The lathering properties of bars cast from the composition of Example 1 were compared with those of conventional soap based on tallow and coconut oil in the standard 80 : 20 ratio.

Lather volume was determined by an objective test and by means of a panel assessment. The panel also assessed creaminess of the lather. No significant difference could be detected between the lathering properties
 25 of the two compositions.

Claims

- 30 1. Detergent composition in solid form comprising 15 to 35 wt% soap, 5 to 50 wt% non-soap surfactant which is fatty acyl isethionate or a mixture of fatty acyl isethionate with a lesser amount of other mild surfactant, 5 to 50 wt% water and 5 to 50 wt% organic solvent, wherein the organic solvent comprises more than 50 wt% methanol, ethanol, propanol or mixtures thereof.
- 35 2. Detergent composition according to claim 1 comprising 20 to 30 wt% soap.
3. Detergent composition according to claim 1 or claim 2 wherein the soap component comprises with respect to the total composition more than 8 wt% soaps having a saturated fatty acid chain length of C16 or more.
- 40 4. Detergent composition according to any one of the preceding claims comprising 20 to 40 wt% fatty acyl isethionate.
5. Detergent composition according to any one of the preceding claims wherein the non-soap surfactant consists substantially exclusively of fatty acyl isethionate.
- 45 6. Detergent composition according to any one of the preceding claims comprising 10 to 40 wt% organic solvent.
7. Detergent composition according to any one of the preceding claims wherein the organic solvent comprises at least 75 wt% methanol, ethanol, propanol or mixtures thereof.
- 50 8. Detergent composition according to any one of the preceding claims wherein the organic solvent includes a member selected from the group comprising sugars, linear polyols, branched polyols, cyclic polyols and mixtures thereof.
- 55 9. Detergent composition according to any one of the preceding claims which contains free fatty acid in an amount from 10 to 40 wt% based on the fatty acyl isethionate.

10. Detergent composition according to any one of the preceding claims in bar form.

11. Process for making a detergent composition in solid form according to any one of the preceding claims comprising forming a melt at 70 to 85°C comprising 15 to 35 wt% soap, 5 to 50 wt% non-soap surfactant which is fatty acyl isethionate or a mixture of fatty acyl isethionate and a lesser amount of other mild surfactant, 5 to 50 wt% water and 5 to 50 wt% organic solvent, the organic solvent comprising more than 50 wt% methanol, ethanol, propanol or mixtures thereof and casting the melt into moulds.

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European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 90314160.4
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	<u>EP - A2 - 0 287 300</u> (UNILEVER PLC) * Claims 1-3,5-11; abstract; tables I,II * ---	1,2,9, 10	C 11 D 10/04 C 11 D 9/32
X	<u>US - A - 4 663 070</u> (DOBROVOLNY et al.) * Claims 1-4,7,12,13,17 * ---	1,2, 9-11	
D,X	<u>US - A - 4 206 069</u> (BORRELLO) * Claims 1-3,12,15 * ---	1-4,6, 8,10	
A	<u>US - A - 4 695 395</u> (CASWELL et al.) * Claims * ---	1,10	
A	<u>US - A - 4 832 861</u> (RESCH) * Claims 1-4 * -----	1,10	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			C 11 D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
VIENNA		13-03-1991	WILFLINGER
CATEGORY OF CITED DOCUMENTS			
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		I : 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	

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