

LIQUID SOFTERGENT HAVING IMPROVED
DETERGENCY CONTAINING ALKYL GLYCOSIDE

5 The present invention relates to novel liquid
detergent compositions to be used in the laundering of
fabrics, comprising an alkyl glycoside in an amount
effective to improve cleaning efficacy and to provide
improved softening properties in the presence of
quaternary ammonium softening compounds and anionic and
nonionic surfactants. Such compositions are also
10 referred to by the term "softergent".

The use of various and diverse chemical materials
and particularly cationic quaternary ammonium compounds
as softeners for textile products is very well known in
the art. It is also well known to employ such
15 materials for their softening effects during the
laundering operation and particularly in the rinse
cycle of the laundering process. This latter technique
has been necessitated by the fact that the aforesaid
quaternary compounds heretofore employed, being mainly
20 cationic in nature, were not compatible with the
anionic detergents, one of the major types of
detergents used in the washing cycle. Furthermore,
cationic quaternary compounds are relatively
ineffective in the presence of nonionic detergents.

25 It is also well known that there is a tendency for
laundered articles to yellow or discolour when treated
with the aforesaid quaternary compounds.

Another disadvantage associated with the use of
the said cationic agents in the laundering of fabrics
therewith is its interference with the deposition on
30 the fabrics of optical brighteners, thereby reducing
optical brightener performance of a detergent

composition containing the said optical brighteners.

Still another disadvantage of the cationic quaternary ammonium antistatic softener is its interference with the cleaning properties of the detergent by reducing the soil removal effected by the detergent, resulting in decreased washing effectiveness. The presence of the anionic detergent material substantially negates the fabric softening properties of the cationic quaternary ammonium compounds.

Accordingly, the aforesaid quaternary agents have been combined with a variety of compounds designed to counteract the adverse detergency properties thereof, or the said quaternary softening agents have been replaced by other softening agents to improve cleaning efficacy.

Higher alkyl mono- and poly-glycosides useful as detergents, textile softeners, surfactants, gelling agents, food emulsifiers and lubricants; and processes for their preparation have been disclosed in US Patent Nos. 3,598,865; 3,707,535; 3,839,318; 3,772,269; and 3,219,656.

Higher alkyl polyglycosides have been used as nonionic surfactants in a variety of detergent compositions in conjunction with anionic surfactants as shown in US Patent Nos. 3,721,633; European Patent Nos. 0,070,074; 0,070,075; 0,070,076; 0,092,877; and in conjunction with an anionic and another nonionic surfactant as shown in US Patent Nos. 4,483,779; 4,483,780; 4,483,787; European Patent Nos. 0,075,994; 0,075,995; 0,075,996 and 0,105,556 to provide good detergency.

The prior art also discloses detergent compositions containing an alkyl polyglycoside, a conventional nonionic surfactant and a cationic fabric-softening compound to provide both softening and detergency properties during laundering, as shown in US
5 Patent No. 4,493,773; European Patent Nos. 0,094,118 and 0,106,692. However, these patents expressly omit anionic surfactants as being detrimental to the composition.

10 US Patent No. 4,014,808 discloses an aqueous detergent composition for cleaning hard surfaces such as floors, comprising alkaline builders, a mixture of higher alkyl mono and polyglycosides, a nonionic ethoxylate or any anionic modified ethoxylate in acid
15 form, and a cationic flocculant such as polydiallyldimethyl ammonium chloride which causes soilage to agglomerate into flocs which float, and optionally a floatation agent which is sodium alkylaryl sulphonate.

20 However, none of the cited prior art references discloses a liquid detergent (or softergent) composition for simultaneously cleaning and softening fabrics comprising four essential ingredients, an effective amount of an alkyl glycoside to improve
25 detergency efficacy and softening properties in the presence of a quaternary ammonium softening compound and anionic and nonionic surfactants.

We have now discovered that the addition of an alkyl polyglycoside surfactant to a liquid detergent (or softergent) formula containing a cationic
30 quaternary softening compound in a nonionic-anionic surfactant system boosts detergency and provides

increased softening properties to fabrics treated therewith.

Accordingly, the present invention aims to provide a liquid detergent composition having improved cleaning efficacy in the presence of cationic quaternary ammonium softening compounds.

The invention also aims to provide a liquid detergent composition, that simultaneously cleanses and softens fabrics during the laundering process comprising an alkyl glycoside, a quaternary ammonium softening compound, a nonionic surfactant and an anionic surfactant as the four essential ingredients.

The invention further aims to provide a liquid detergent (or softergent) formulation having improved cleaning and softening properties, due to the presence of an alkyl glycoside in a detergent composition containing a mixture of anionic, nonionic and cationic surfactants.

According to the present invention, a liquid detergent (or softergent) composition for simultaneously cleaning and softening fabrics comprises four essential ingredients, namely a quaternary ammonium softening compound, an effective amount of an alkyl glycoside to improve detergency efficacy and softening properties in the presence of a quaternary ammonium softening compound, an anionic surfactant and a nonionic surfactant other than an alkyl glycoside in an aqueous carrier. The invention also extends to a method of simultaneously cleansing and softening fabrics without reducing brightener and detergency performance which comprises treating fabrics with a composition in accordance with the present invention during the wash cycle of the laundering operation.

More specifically, the present invention relates

to a stable liquid detergent (or softergent) composition, comprising a C_1 - C_{30} alkyl mono- or polyglycoside in an amount sufficient to overcome the decrease in detergency efficacy due to the quaternary ammonium compound and constitutes 2 to 25% by weight, 2 to 8% by weight of a quaternary ammonium softening compound, 8 to 25% by weight of a nonionic surfactant and 1 to 12% by weight of an anionic surfactant, in an aqueous carrier.

The alkyl glycosides function as a softening agent and boost fabric softening in the presence of cationic surfactants. It is believed that the alkyl glycosides coat the surface of the fabric and/or alter the fabric structure, thereby imparting softening benefits. It is believed that the alkyl glycosides may disrupt hydrogen-bonding, thereby increasing softening properties. The alkyl glycosides do not interfere with detergency and/or brightener deposition which is another problem of softergents.

The alkyl glycosides, utilized in the compositions of the present invention may be defined as having one or more hydrophobic groups containing 1 to 30 carbon atoms per hydrophobic group, and preferably 8 to 15 carbon atoms, and a hydrophilic glycoside group containing 1 to about 10, and preferably from about 1 to 3 saccharide radicals. The alkyl glycosides may be represented by the following formula:

$RO(R'O)_xZ_n$, wherein R represents a C_1 - C_{30} alkyl radical, $(R'O)$ represents an ethoxy, propoxy or glyceryl group, X has a numerical value of 0-10 and preferably 0, Z is a reducing saccharide containing 5 or 6 carbon atoms, and n has a numerical value of 1-10 and preferably 1.0 to 3. The hydrophobic alkyl group

may be saturated or unsaturated, branched or straight chain, preferably saturated and linear containing 1 to 30 carbon atoms, preferably 8 to 23, more preferably 12 to 13 carbon atoms. Suitable alkyl glycosides include methyl, ethyl, propyl, octyl, nonyl, decyl, undecyl, dodecyl, tridecyl, tetradecyl, hexadecyl, heptadecyl, and octadecyl glycosides and mixtures thereof, in the forms of monoglycosides, diglycosides, and triglycosides, e.g. a C_{12} - C_{13} alkyl triglycoside. The glycoside units may be glucose, galactose, mannose, lactose and/or fructose. Methods of preparing the aforesaid glycosides are disclosed in US Patent Nos. 3,598,865; 3,707,535; 3,839,318; 3,772,269; 3,219,656, all of which are incorporated herein by reference. The addition of the alkyl glycoside to the detergent or (softergent) improves the cleaning efficacy thereof. The amount of glycoside should be sufficient to counteract the loss in detergency due to the presence of the cationic quaternary ammonium softening agents in the softergent. Accordingly, the glycoside content improves detergency in the softergent composition, and preferably constitutes about 1 to 30% and more preferably 2 to 25% by weight of the composition.

The cationic quaternary softening agents are commercially well known and include quaternary ammonium compounds wherein typically at least one of the four groups linked to the nitrogen atom is an alkyl group of about 10 -20 carbon atoms and at least two of the groups linked to the nitrogen atom are alkyl groups which contain 1-3 carbon atoms and the fourth group may be either another C_{10} - C_{20} alkyl group or a C_1 - C_3 alkyl

group, and there is present an anion such as halogen, acetate, or methosulphate. Typical quaternary ammonium compounds are ethyl-dimethyl-stearyl ammonium chloride, trimethyl-stearyl ammonium chloride, trimethylcetyl ammonium bromide, methyl-ethyl-dilauryl ammonium chloride, dimethyl-ethyl-lauryl ammonium chloride, dimethyl-propyl-myristyl ammonium chloride, tallow trimethyl ammonium chloride, dihydrogenated tallow dimethyl ammonium chloride, dicocodimethyl ammonium chloride, distearyl dimethyl ammonium chloride, octadecyl trimethyl ammonium chloride, dodecyl trimethyl or triethylammonium chloride, and the corresponding methosulphates and acetates. Other suitable quaternary ammonium compounds include duoquaternary ammonium compounds, imidazolinium quaternary ammonium compounds, polyethoxylated and amidoalkoxylated quaternary ammonium compounds.

In accordance with the present invention, the nonionic surfactants for use as the fabric detergent are commercially well known and include the primary or secondary aliphatic alcohol ethoxylates, alkylphenol ethoxylates and the alcohol ethylene oxide-propylene oxide condensates such as Plurafacs (Registered Trade Mark) (Wyandotte), and mixtures thereof. The nonionic synthetic organic detergents are generally the condensation product of an organic aliphatic or alkyl aromatic hydrophobic compound and hydrophilic ethylene oxide groups. Practically any hydrophobic compound having a carboxy, hydroxy, amido, or amino group with a free hydrogen attached to the nitrogen can be condensed with ethylene oxide or with the polyhydration product thereof, polyethylene glycol to form a nonionic detergent. Further, the length of the polyethenoxy chain can be adjusted to achieve the desired balance

between the hydrophobic and hydrophilic elements.

- The nonionic detergents include the polyethylene oxide condensate of one mole of alkyl phenol containing from about 6 to 12 carbon atoms in a straight- or
5. branched-chain configuration with about 5 to 30 moles of ethylene oxide, for example, nonyl phenol condensed with 9 moles of ethylene oxide, dodecyl phenol condensed with 15 moles of ethylene oxide. Condensation products of the corresponding alkyl
 10. thiophenols with 5 to 30 moles of ethylene oxide are also suitable.

- Also included in the nonionic detergent class are the condensation products of a higher alcohol (e.g. an alkanol containing about 8 to 18 carbon atoms in a
15. straight or branched-chain configuration) condensed with about 5 to 30 moles of ethylene oxide, for example, lauryl-myristyl alcohol condensed with about 16 moles of ethylene oxide.

- A preferred group of nonionic surfactants are the
20. Neodol (Registered Trade Mark) ethoxylates (Shell Co.), which are higher aliphatic alcohol ethoxylates having about 5 to 20 ethyleneoxy groups per mole of aliphatic alcohol containing about 10-18 carbon atoms, such as C_{12} - C_{13} alkanol condensed with 6.5 moles ethylene
 25. oxide, C_{12} - C_{15} alkanol condensed with 12 moles ethylene oxide, C_{14} - C_{15} alkanol condensed with 13 moles ethylene oxide, and the like. Ethoxamers having a HLB (hydrophobic lipophilic balance) value of about 8-15 give good O/W (oil in water) emulsification, whereas
 30. ethoxamers with low HLB values (below 8) contain less than 5 ethyleneoxy groups, and are poor emulsifiers and poor nonionic detergents. This nonionic surfactant is present in the detergent (or softergent) composition in

accordance with the present invention preferably in an amount equal to or greater than the alkyl polyglycoside content, and more preferably about 8 - 25% by weight. The total amount of nonionic surfactant, namely the glycoside, which is also a nonionic surfactant, and the nonionic alcohol ethoxylates defined above preferably constitutes the major detergent component in this detergent (or softergent), e.g. 25 - 40% and preferably 30 - 40% by weight of the composition.

The anionic surfactants utilized in the detergent (or softergent) compositions of the present invention are commercially well known and include alkylbenzene sulphonic acid and its salts, e.g. compounds of the formula alkyl-phenyl-SO₃-M, wherein alkyl is an alkyl radical of C₈ to C₂₂ and preferably C₁₀ to C₁₈ and M is hydrogen or an alkali metal, which compounds comprise a well-known class of anionic detergents and include sodium dodecylbenzene-sulphonate, sodium laurylbenzene sulphonate, and sodium cetylbenzene sulphonate. Others include paraffin sulphonates, alkyl sulphates, alcohol ether sulphates, olefin sulphonates and the alkylphenolethoxylate sulphates (e.g. sodium dinonylphenoxynonaethoxyethanol sulphate) and other equivalent water-soluble salts, particularly of the alkali metal series.

Among the above-noted alkylbenzene-sulphonic acids and salts thereof, the preferred compounds include those which are biodegradable and which are particularly characterised by a linear alkyl substituent of from C₁₀ to C₂₂ and preferably from C₁₂ to C₁₅. It is, of course, understood that the carbon chain length represents, in general, an average chain length since methods for producing such products

usually employs alkylating reagents of mixed chain length. It is clear, however, that substantially pure olefins as well as alkylating compounds used in other

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techniques can and do give alkylated benzene sulphonates wherein the alkyl moiety is substantially (i.e. at least 99%) of one chain length, i.e. C₁₂, C₁₃, C₁₄, or C₁₅. The linear alkyl benzene sulphonates are further characterized by the position of the benzene ring in the linear alkyl chain with any of the position isomers (i.e. alpha to omega) being operable and contemplated.

In addition to the benzene sulphonates one may also employ the lower alkyl (C₁ to C₄) analogs of benzene such as toluene, xylene, the trimethyl benzenes, ethyl benzene, isopropyl benzene and the like. The sulphonates are generally employed in the water soluble salt form which include as the cation, the alkali metals, ammonium and lower amine, and alkanolamine cations.

Examples of suitable linear alkyl benzene sulphonates include:

sodium n-decyl benzene sulphonate
sodium n-dodecyl benzene sulphonate
sodium n-tetradecyl benzene sulphonate
sodium n-pentadecyl benzene sulphonate
sodium n-hexadecyl benzene sulphonate

and the corresponding lower alkyl substituted homologues of benzene as well as the salts of the cations previously referred to. Mixtures of these sulphonates may, of course, also be used with mixtures which may include compounds wherein the linear alkyl chain is smaller or larger than indicated herein provided that the average chain length in the mixture conforms to the specific requirements of C_{10} to C_{22} .

The linear paraffin sulphonates are also a well-known group of compounds and include water-soluble salts (alkali metal, amine, alkanolamine, and ammonium) of:

- 1-decane sulphonic acid
- 1-dodecane sulphonic acid
- 1-tridecane sulphonic acid
- 1-tetradecane sulphonic acid
- 1-pentadecane sulphonic acid
- 1-hexadecane sulphonic acid

as well as the other position isomers of the sulphonic acid group.

In addition to the paraffin sulphonates illustrated above, others with the general range of C_{10} to C_{22} alkyls may be used, with the most preferable range being from C_{12} to C_{20} .

The linear alkyl sulphates which are contemplated for use in compositions in accordance with the present invention comprise the range of C_{10} to C_{20} . Specific examples include sodium n-decyl sulphate; sodium n-dodecyl sulphate; sodium n-hexadecyl sulphate, sodium n-heptadecyl sulphate; sodium n-octadecyl sulphate; and the ethoxylated (1 to 100 moles ethylene oxide) derivatives such as the ethoxylated alcohol sulphates, and, of course, the other water-soluble salt-forming

cations mentioned above.

Included in the group of anionic detergents, which have been described above as suitable for use in the present invention, are the olefin sulphates, including long chain alkene sulphonates, long chain hydroxyalkene sulphonates, as well as disulphonates. Examples of suitable olefin sulphonates, which are merely illustrative of the general class, are sodium dodecenyl-1 sulphonate, sodium tetradecenyl-1 sulphonate, sodium hexadecenyl-1 sulphonate, and sodium octadecenyl-1 sulphonate. The amount of anionic surfactant utilized in the compositions of the present invention is preferably less than the nonionic (ethoxylated aliphatic alcohol) surfactant content by weight, and preferably less than 50% by weight of the total nonionic surfactant (alkylglycoside plus ethoxylated aliphatic alcohol) content, and preferably constitutes 1 - 12% by weight of the composition.

The detergent (or softergent) compositions of the present invention may also include conventional laundering additives such as optical brighteners, germicides, soil suspending agents, antiredisposition agents, antioxidants, colouring materials (dyes and pigments), perfumes, water-soluble alcohols, foam boosters, hydrotopes such as sodium and potassium xylene sulphonates, sodium and potassium toluene sulphonates, cumene sulphonates, ethyl benzene sulphonate and the like, enzymes and enzyme stabilizers, provided they do not interfere with the detergency and softening activity of the composition.

The invention may be put into practice in various ways and a number of specific embodiments will be described to illustrate the invention with reference to the accompanying examples.

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Example 1

A composition is made up having the ingredients and proportions given in Table 1 below.

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Table 1

15%	C ₁₂ - C ₁₅ alcohol: 7 mols ethylene oxide
15%	alkyl polyglycoside, C ₁₂ - C ₁₃ : 3 mols glycoside (Staley Industrial Products)
0.25%	triethanolamine
8.0%	monoalkyltrimethyl ammonium chloride ¹
12%	C ₁₂ - C ₁₅ alcohol: 3 mols ethylene oxide sulphate, sodium
4.0%	sodium xylene sulphonate
0.5%	brightener
Q.S.	water

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Note on Table 1

1. tallow trimethyl ammonium chloride

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The liquid detergent is prepared by mixing the above ingredients until homogeneous to form a stable liquid composition.

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The detergency of this product was tested in a tergotometer containing 1 litre of 150 ppm (calcium) water at 120°F (49 °C) and 70°F (21 °C), with a concentration of 0.18% softergent, and compared to commercial detergent products which do not contain the

- alkyl glycoside ingredient. A fabric load of standard soiled swatches of Test Fabric nylon (TFN) and cotton (TFC), a 65 - 35% blend of polyester-cotton (PC) and 50:50% Dacron (Registered Trade Mark):cotton (DC) and
5. EMPA 101 Cloth, was washed with the test detergents and dried in electric tumble dryers. Reflectance of the soiled swatches are read as a measure of detergency (Rd). The soil removal (SR) is the sum total of the Rd readings on all the swatches, and the soil removal
10. index (SRI) is the average of the total Rd readings divided by the number of swatches. These results are given in Table 2 below.

Table 2

		<u>Dynamo</u>	<u>SOLO</u>	<u>Ex.1</u>	<u>Liq. TIDE</u>	<u>BOLD 3</u>
15.	120°C	212.5	202.2	220.9	219.5	181.3
	SR Total					
	70°F	194.5	183.8	198.7	202.5	193.8
	SR Total					

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Example 1 exhibits superior detergency to Dynamo, Solo and Bold (Registered Trade Mark) 3. No statistically significant difference in detergency was observed between Ex. 1 and Liquid Tide at 120°F (49°C) and 70°F

25. (21°C).

- Sebum soil removal test results are given in Table 3 below. Sebum soil removal at 120°F (49°C) was better than Liquid TIDE (Registered Trade Mark) on cotton but slightly worse on D/C 50/50. Example 1 was better than
30. all other materials tested on both cotton and D/C 50/50. At 70°F (21°C) Liquid TIDE (Registered Trade Mark) was slightly better than the material of Example 1 which was equal to or better than the other materials

tested.

Table 3

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120°F (49°C) SEBUM SOIL REMOVAL

	<u>Dynamo</u>	<u>SOLO</u>	<u>Ex.1</u>	<u>Liq.TIDE</u>	<u>BOLD 3</u>
Cotton	75.3	71.5	76.5	74.0	72.3
10. D/C 50/50	67.8	66.5	70.6	71.2	62.4

70°F (21°C) SEBUM SOIL REMOVAL

Cotton	76.4	71.9	76.2	80.5	73.3
15. D/C 50/50	68.0	65.2	68.2	70.4	65.5

A Multistain test at 120°F (49°C) and 70°F (21°C) gave the following results given in Table 4, using Liquid TIDE as the control.

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Table 4

	<u>Ex.1</u>	<u>SOLO</u>	<u>BOLD 3</u>
120°F (49°C)			
Significant wins	2	1	0
25. Not significant	7	7	2
Significant losses	13	14	20

70°F (21°C)

30. Significant wins	5	3	0
Not Significant	9	3	5
Significant losses	8	16	17

120°F (49°C)	<u>Ex.1</u>	<u>Liq.TIDE</u>	<u>SOLO</u>	<u>BOLD 3</u>
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Total Rd for all				
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22 Swatches	1407	1502	1368	1202
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70°F (21°C)				
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Total Rd for all				
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22 Swatches	1351	1390	1240	1215
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The most significant losses in detergency as compared to Liquid TIDE were incurred in the case of the enzyme at 120°F (49°C). This was to be expected since the Ex. 1 formulation contains no enzymes. However, losses were also observed with the oxidizable stains (grape juice and cranberry juice). Ex. 1 showed strong gains on DDK (Dacron double knit) in case of oily soils (Barbecue Sauce and French Dressing).

At 70°F (21°C) losses due to enzyme stains were considerably reduced. This is due to the fact that enzymes in general are more effective at higher temperatures. At 70°F (21°C) Ex. 1 is a much more effective detergent than Liquid TIDE in the case of oily soils (Spangler Sebum/Particulate, Barbecue Sauce, Red Crisco Shortening and French Dressing).

BOLD 3 and SOLO did not perform better at any temperature.

The five cycle softening/static/brightener test gave the results set out in Table 5 below.

Flourescence of the cotton swatches is read as a measure of brightener effectiveness (Rb).

Table 5

	<u>Rb reading</u>
Ex. 1	269.94

Liquid TIDE	255.44
SOLO	120.80
DYNAMO	245.53
BOLD 3	224.56

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5 The formulation of Ex. 1 was equal to BOLD 3 in controlling static cling and better than SOLO. Ex. 1 was rated somewhat less effective in softening as compared to SOLO, but showed improved softening as compared to the formulation of Ex. 1 minus the alkyl glycoside.

Example 2

10 A detergent (or softergent) composition having the ingredients and proportions given in Table 6 is made up.

Table 6

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21% Neodol 25-7¹

6% Sodium dodecyl benzene sulphonate

4% tallow trimethyl quaternary ammonium sulphate

2% Methyl glycoside

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0.4% Brightener

8% Ethanol

5% Sodium xylene sulphonate

0.5% Colour

Q.S. Water

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Note on Table 6

¹ C₁₂ - C₁₅ alcohol: 7 moles ethylene oxide.

Examples 3A to 3E

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A detergent (or softergent) composition having the ingredients and proportions given in Table 7 is made up.

Table 7

5	21% Neodol 25-7 ¹
	4% Sodium dodecyl benzene sulphonate
	4% tallow trimethyl quaternary ammonium sulphate
	2% Methyl glycoside
	0.4% Brightener
	8% Ethanol
	5% Sodium xylene sulphonate
	0.5% Colour
10	Q.S. Water

Adding 3% of a tallow amine : 15 ethylene oxide to this formulation reduces the softness rating to 6.0. Omitting the quaternary compound and increasing the methyl glycoside to 6% increases the softness rating to 7.2.

The following Tables 8A to 8C summarise the brightening and static results of the 5-cycle softening/static/brightener tests on 5 test products and 2 controls.

20 Table 8A
Products: C O N T R O L

			Product 1.
	<u>DYNAMO</u>	<u>SOLO</u>	<u>LIQ.DET.6/6</u>
25	Static	Moderate	Light
	Control	to Heavy	v. Light
	Brightening		Very
	1st wash	188.5	102.9
	3rd wash	223.1	95.9
30	5th wash	209.7	90.5
	Softness	1	10
	SRI	-	171.5
			186.1

Table 8B

Products:

	Product 2.	Product 3.
	<u>Liq. Det. 5/5/6E</u>	<u>Soft. 4/4/3E/2MG</u>
5	Static Control	Light v Light
		Very Light
	Brightening	
	1st wash	211.1
		216.3
	3rd wash	228.2
		241.9
10	5th wash	228.9
		237.4
	Softness	5.8
		6.0
	SRI	190.2
		186.6

Table 8C

Products:

	Product 4.	Product 5.
	<u>Soft. 4/4 2MG</u>	<u>Soft. 4/0/6MG</u>
15	Static Control	Light v Light
		Moderate Heavy
	Brightening	
	1st wash	227.1
		228.5
	3rd wash	253.2
		254.2
	5th wash	251.4
		257.0
	Softness	6.8
		7.2
	SRI	193.4
		184.1

Notes on Tables 8A to 8CProductNo.

- 30
1. 6% dodecylbenzene sulphonate (DBS)/6% tallow trimethyl quat (quat)
 2. 5% DBS/5% quat/6% tallow amine :15 ethylene oxide (TAE0)

3. 4% DBS/4% quat/3% TAE0/2% methyl glycoside (MG)
4. 4% DBS/4% quat/2% MG
5. 4% DBS/0% quat/6% MG

The above results indicate that methyl glycoside imparts softening benefits to fabrics. The lab tests also indicate that the glycoside imparts brightening benefits in liquid formulations. However, in the absence of quat. no static control is achieved.

The precise composition of Examples 3A to 3E is set out in Table 9 below.

Table 9

PRODUCT	1	2	3	4	5
<u>Example</u>	3B	3C	3D	3A	3E
	<u>Parts %</u>				
<u>Ingredients</u>					
Neodol	21	21	21	21	21
'DBS'	6	5	4	4	4
quat ²	6	5	4	4	-
TAE0 ³	-	6	3	-	-
MG ⁴	-	-	2	2	6
Brightener	0.4	0.4	0.4	0.4	0.4
Ethanol	8	8	8	8	8
SXS ⁵	5	5	5	5	5
Colour	0.5	0.5	0.5	0.5	0.5
Water	QS	QS	QS	QS	QS

Notes on Table 9

- 1 Sodium dodecyl benzene sulphonate
- 2 Tallow trimethyl quaternary ammonium chloride

- 5. 3 Tallow amine 15 ethylene oxide
- 4 Methyl glycoside
- 5 Sodium xylene sulphonate

The detergents (or softergent) containing an alkyl glycoside have been unexpectedly found to not only overcome the reduction in detergency due to the presence of the quaternary softening agent, but have improved the detergency and the softening properties of the detergent (or softergent) compositions. This is clearly shown in Table 8 by Product 4 (Example 3A) containing only 2% methyl glycoside, exhibiting a greater degree of softness (6.8) than Products 1 (Example 3B) (5.9), 2 (Example 3C) (5.8) and 3 (Example 3D) (6.0). Likewise, Product 4 (Example 3A) exhibits a greater brightness after the 1st, 3rd and 5th wash cycle, then Products 1, 2 and 3, as well as an increased SRI value compared to the products containing no alkyl glycoside. Amounts as low as 2% alkyl glycoside are effective in improving both the detergency and softening properties of a softergent composition used in the laundering of fabrics. In addition, the formulations of the present invention exhibit better cleaning and softening efficacy than other surfactant and/or softener combinations presently on the market, as shown by the comparative results in Tables 2, 3, 5 and 8A to 8C.

CLAIMS

1. A liquid detergent composition for simultaneously cleaning and softening fabrics comprising four essential ingredients, namely a quaternary ammonium softening compound, an effective amount of an alkyl glycoside to improve detergency efficacy and softening properties in the presence of a quaternary ammonium softening compound, an anionic surfactant and a nonionic surfactant other than an alkyl glycoside in an aqueous carrier.

2. A composition as claimed in Claim 1 in which the amount of alkyl glycoside is sufficient to overcome the decrease in detergency efficacy due to the presence of the quaternary ammonium content, and constitutes 2 to 25% by weight of the composition.

3. A composition as claimed in Claim 1 or Claim 2 in which the alkyl glycoside has one or more hydrophobic groups containing 1 to 30 carbon atoms per hydrophobic group, and a hydrophilic glycoside group containing 1 to 10 reducing saccharide radicals.

4. A composition as claimed in Claim 1, 2 or 3 in which the alkyl glycoside is a C_1 - C_{30} alkyl monoglycoside or polyglycoside.

5. A composition as claimed in Claim 4 in which the alkyl glycoside is C_{12} - C_{13} alkyl glycoside.

6. A composition as claimed in Claim 4, in which the glycoside is methyl monoglycoside.



7. A composition as claimed in Claim 4 in which the glycoside is C₁₂-C₁₃ alkyl triglycoside.

5. 8. A composition as claimed in any one of Claims 1 to 7 in which in the quaternary ammonium compound at least one of the four groups linked to the nitrogen atom is a C₁₀-C₂₀ alkyl group and at least two of the groups are C₁-C₃ alkyl groups and the fourth group may be either another C₁₀-C₂₀ alkyl group or a C₁-C₃ alkyl group.

15. 9. A composition as claimed in any one of Claims 1 to 8 in which the quaternary compound constitutes 2 to 8% by weight of the composition.

10. 10. A composition as claimed in any one of the preceding claims in which the nonionic surfactant constitutes 8 - 25% by weight of the composition.

20. 11. A composition as claimed in any one of Claims 1 to 10 in which the nonionic surfactant is selected from the group consisting of primary aliphatic alcohol ethoxylates, secondary aliphatic alcohol ethoxylates, alkylphenol ethoxylates, alcohol ethylene oxidepropylene oxide condensates, and mixtures thereof.

25. 12. A composition as claimed in Claim 11 in which the total nonionic surfactant content consisting of the combination of the alcohol ethoxylate and the alkyl glycoside constitutes the major detergent component in



* C L M S *

an amount of 25 - 40% by weight of the composition.

13. A composition as claimed in Claim 10, 11 or 12 in which the nonionic surfactant is a C_{12} - C_{15} aliphatic alcohol having 7 ethylene-oxy groups per mole of alcohol.

14. A composition as claimed in any one of the preceding claims in which the anionic surfactant is selected from the group consisting of alkylbenzene sulphonates, alcohol ether sulphates, olefin sulphonates, paraffin sulphonates, alkyl sulphates, and ethoxylated alcohol sulphates.

15. A composition as claimed in any one of the preceding claims in which the anionic surfactant content is less than the nonionic surfactant content and constitutes 1 - 12% by weight of the composition.

16. A composition as claimed in Claim 14 or Claim 15 in which the anionic surfactant is the sodium salt of the ethoxylated C_{12} - C_{15} alcohol sulphate containing 3 moles ethylene oxide per mole alcohol.

17. A composition as claimed in any one of Claims 1 to 15 in which the anionic surfactant is sodium dodecyl benzene sulphonate.



18. A composition as claimed in Claim 1 substantially as specifically described herein with reference to the accompanying Examples.

5 19. A method of simultaneously cleansing and softening fabrics without reducing brightener and detergency performance which comprises treating fabrics with a composition as claimed in any one of the preceding claims in the wash cycle of the laundering
10 operation.

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