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(54) Title: DETERGENT COMPOSITIONS COMPRISIING ALDOBIONAMIDES (57) Abstract The present invention relates to a detergent composition having a surfactant system consisting essentially of an anionic surfactant, and a nonionic surfactant system comprising an alkoxyated nonionic surfactant having an average degree of alkoxylation of at least 6 and an aldobionamide.		

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DETERGENT COMPOSITIONS COMPRISING ALDOBIONAMIDESTechnical Field

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The present invention relates to detergent compositions suitable for fabric washing, comprising aldobionamides as nonionic surfactants, in combination with anionic surfactants and other nonionic surfactants.

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Background and Prior Art

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Fabric washing detergent compositions containing aldobionamides are disclosed in EP 550 278A (Unilever), which describes binary active detergent compositions in which nonionic aldobionamides are used in combination with anionic surfactants (eg linear alkylbenzene sulphonates, LAS) instead of combinations of LAS and the high-alkoxylated nonionic surfactants, for example, a C₁₂-C₁₅ aliphatic alcohol alkoxylated with an average of 7 ethylene oxide groups.

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The examples in EP 550 278A were used to show that aldobionamides could perform at par with, or better than, the highly alkoxylated nonionic surfactants normally used in a binary surfactant system, and thus could be used as a replacement for such highly alkoxylated surfactants.

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There is, however, no teaching or suggestion that the aldobionamides could be used as replacements for low alkoxylated nonionic surfactants (ie having average degree of alkoxylation from 1 to 5).

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Unexpectedly, it has now been discovered that if the aldobionamides are used in a ternary surfactant system as a replacement for low alkoxyated nonionic surfactants, ie nonionic surfactants having an average degree of alkoxylation of from 1 to 5, they give excellent performance compared with similar systems containing the low alkoxyated nonionic surfactants.

More specifically, the applicants have discovered that aldobionamides can be used in ternary surfactant systems also comprising an anionic surfactant and a relatively highly alkoxyated nonionic surfactant (ie having an average degrees of alkoxylation of 6 or above) and provide superior detergency compared with corresponding systems in which low-alkoxyated nonionic surfactants are used.

DEFINITION OF THE INVENTION

The present invention accordingly provides a detergent composition suitable for fabric washing, comprising a surfactant system consisting essentially of:

(i) from 1 to 99 wt% anionic surfactant, and

(ii) from 1 to 99 wt% of a nonionic surfactant system comprising

(a) an alkoxyated nonionic surfactant having an average degree of alkoxylation of at least 6; and

(b) an aldobionamide.

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to detergent compositions comprising at least the following three required surfactant components: (i) an anionic surfactant; (ii)(a) an alkoxyated nonionic surfactant having an average degree of alkoxylation of 6 or higher, preferably from 6 to 10; and (ii)(b) an aldobionamide.

Detergent compositions of the invention may suitably contain from 5 to 60 wt% (in total) of the surfactant system, from 10 to 80 wt% of one or more detergency builders, and optionally other ingredients suitable for a fabric washing detergent composition to 100 wt%.

The anionic surfactant (i)

Suitable anionic surfactants include water-soluble, preferably alkali metal, salts of organic sulphates and sulphonates, suitably having alkyl radicals containing from 8 to 22 carbon atoms, the term alkyl being used to include the alkyl portion of higher acyl radicals.

Examples of suitable synthetic anionic detergent compounds are primary and secondary alkyl sulphates, preferably in alkali metal, more preferably sodium salt form. Suitable alkyl sulphates are especially those obtained by sulphating higher (C₈-C₁₈) alcohols produced, for example, from tallow or a coconut oil.

Also suitable are alkylbenzene sulphonates, preferably in alkali metal, more preferably sodium, salt form; examples include especially alkyl (C₉-C₂₀) benzene sulphonates, and more especially sodium linear secondary alkyl (C₁₀-C₁₅) benzene sulphonates.

Alkyl sulphates and alkylbenzene sulphonates, and mixtures thereof, are especially preferred anionic surfactants for use in the compositions of the present invention. The preferred anionic detergent compounds are sodium (C₁₁-C₁₅) alkyl benzene sulphonates and sodium (C₁₆-C₁₈) alkyl sulphates.

Other suitable anionic surfactants include sodium alkyl glycerol ether sulphates, especially those ethers of the higher alcohols derived from tallow or coconut oil and synthetic alcohols derived from petroleum; sodium coconut oil fatty monoglyceride sulphates and sulphonates; sodium and potassium salts of sulphuric acid esters of higher (C₈-C₁₈) fatty alcohol-alkylene oxide, particularly ethylene oxide, reaction products: the reaction products of fatty acids such as coconut fatty acids esterified with isethionic acid and neutralised with sodium hydroxide; sodium and potassium salts of fatty acid amides of methyl taurine; alkane monosulphonates such as those derived by reacting alpha-olefins (C₈-C₂₀) with sodium bisulphite and those derived from reacting paraffins with SO₂ and Cl₂ and then hydrolysing with a base to produce a random sulphonate; and olefin sulphonates, which term is used to describe the material made by reacting olefins, particularly C₁₀-C₂₀ alpha-olefins, with SO₃ and then neutralising and hydrolysing the reaction product.

Other examples of anionic surfactants are described in "Surface Active Agents and Detergents" (Vol. I & II) by Schwartz, Perry and Berch.

The anionic surfactant may suitably constitute from 5 to 95 wt% of the ternary surfactant system, preferably from 25 to 80 wt%.

The nonionic surfactant system (ii)

The nonionic surfactants in the surfactant system of the compositions of the invention are an alkoxyated nonionic surfactant, and an aldobionamide.

The ratio of aldobionamide to alkoxyated nonionic surfactant can range from 1:99 to 99:1, preferably from 5:95-95:5.

Preferably, the amount of aldobionamide used is equal to or lower than the amount of alkoxyated nonionic surfactant, ie the ratio of aldobionamide to alkoxyated nonionic surfactant is preferably from 50:50 to 1:99. This is not, however, a requirement of the invention and the invention will work even if the amount of aldobionamide exceeds the amount of the other nonionic surfactant.

The alkoxyated nonionic surfactant (ii)(a)

Suitable alkoxyated nonionic surfactants include, in particular, the reaction products of compounds having a hydrophobic group and a reactive hydrogen atom, for example aliphatic alcohols, acids, amides or alkyl phenols, with alkylene oxides, especially ethylene oxide, either alone or with propylene oxide.

Specific nonionic detergent compounds are the condensation products of alkyl (C₆-C₁₈) primary or secondary linear or branched alcohols with ethylene oxide, and products made by condensation of ethylene oxide with the reaction products of propylene oxide and ethylenediamine.

The average degree of alkoxylation should be at least 6, and is preferably from 6 to 10.

Especially preferred-alkoxylated nonionic surfactant for use in the compositions of the present invention are the ethoxylation products of linear or branched primary or secondary aliphatic alcohols having from 6 to 18, preferably from 10 to 16, carbon atoms, having an average degree of ethoxylation of from 6 to 10, and preferably from 6 to 8.

The alkoxylated nonionic surfactant may suitably constitute from 5 to 95 wt% of the ternary surfactant system, preferably from 20 to 75 wt%.

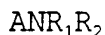
The aldobionamide (ii)(b)

The third component of the ternary surfactant system of the compositions of the invention is an aldobionamide.

The aldobionamide may suitably constitute from 5 to 90 wt%, preferably from 10 to 65 wt%, of the surfactant system.

An aldobionamide is defined as the amide of an aldobionic acid (or aldobionolactone); an aldobionic acid is a sugar substance (eg any cyclic sugar comprising at least two saccharide units) wherein the aldehyde group (generally found at the C₁ position of the sugar) has been replaced by a carboxylic acid, which upon drying cyclises to an aldolactone.

An aldobionamide may be represented by the structure:



wherein

A is a sugar moiety which is an aldobionic acid except that it does not contain the OH group normally extending from the carbonyl group on the aldonic acid;

NR_1R_2 is attached where the hydroxyl group on the aldobionic acid would normally be found; and

each of R_1 and R_2 , which may be the same or different, is a hydrogen atom, an aliphatic hydrocarbon radical, an aromatic radical, a cycloaliphatic radical, an amino acid ester, or an ether amine, with the proviso that R_1 and R_2 cannot both be hydrogen atoms.

The term "aliphatic hydrocarbon radical" encompasses alkyl groups and alkenyl groups which groups may contain heteroatoms such as N, O or S or alkoxyated alkyl chains such as ethoxylated or propoxylated alkyl groups, but preferably indicates an alkyl group having from 8 to 24, more preferably from 10 to 18, carbon atoms.

Suitable aliphatic hydrocarbon radicals include saturated and unsaturated radicals including but not limited to methyl, ethyl, amyl, hexyl, heptyl, nonyl, decyl, undecyl, dodecyl, tridecyl, tetradecyl, pentadecyl, hexadecyl, heptadecyl, octadecyl, allyl, undecenyl, olelyl, linoleyl, linolenyl, propenyl, and heptenyl.

The term "aromatic radical" encompasses substituted or unsubstituted aryl groups and arenes. Aromatic radicals are exemplified, for example, by phenyl.

Suitable mixed aliphatic aromatic radicals are exemplified by benzyl, phenyl ethyl, and vinyl benzyl.

Cycloaliphatic radicals are exemplified by cyclopentyl and cyclohexyl.

5 Most preferably, one of R_1 and R_2 is hydrogen and the other of R_1 and R_2 is an alkyl group having from 8 to 24 carbon atoms.

10 Aldobionamides may be based on compounds comprising two saccharide units (eg lactobionamides or maltobionamides from the aldobionamide bonds), or they may be based on compounds comprising more than two saccharide units, as long as the terminal sugar in the polysaccharide has an aldehyde group. By definition an aldobionamide must have at least two saccharide units and cannot be linear.

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Disaccharide compounds such as lactobionamides or maltobionamides are preferred compounds. Thus, in the formula above, A is preferably a disaccharide sugar group forming the compound which is an aldonic acid except for the OH group.

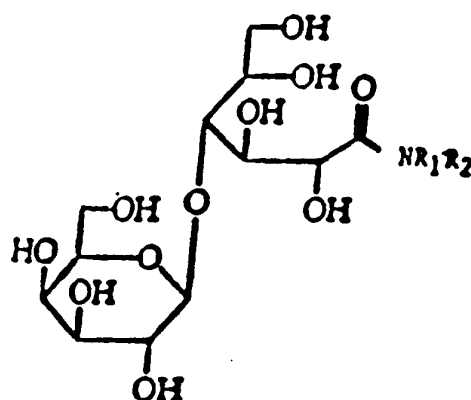
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Other examples of aldobionamides (disaccharides) which may be used include cellobionamides, mellibionamides and gentiobionamides.

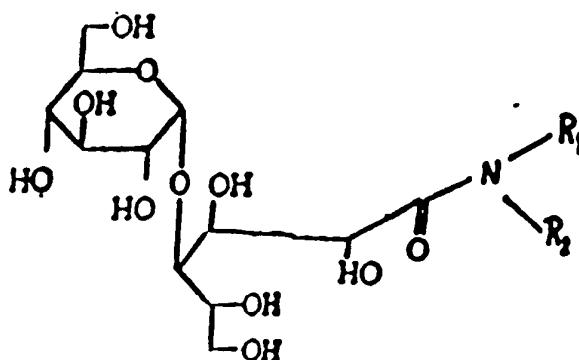
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A specific example of an aldobionamide which may be used in the compositions of the present invention is the disaccharide lactobionamide of the following structure, wherein R_1 and R_2 are as defined above.

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A second specific example of an aldobionamide which may be used in the compositions of the present invention is the disaccharide maltobionamide of the following structure, wherein R_1 and R_2 are as defined above.



The detergent compositions

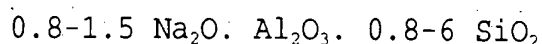
The novel ternary surfactant system of the present invention may be incorporated in detergent compositions of all physical types, for example, powders, liquids, gels and solid bars. Especially preferred are powders and liquids for fabric washing.

As previously indicated, the compositions may suitably contain from 5 to 60 wt%, preferably from 5 to 40 wt%, of the surfactant system, and from 10 to 80 wt%, preferably from 10 to 60 wt%, of detergency builder or builders, plus, if desired, other suitable functional ingredients.

Inorganic builders that may be present include sodium carbonate, if desired in combination with a crystallisation seed for calcium carbonate, as disclosed in GB 1 437 950 (Unilever); crystalline and amorphous aluminosilicates, for example, zeolites as disclosed in GB 1 473 201 (Henkel), amorphous aluminosilicates as disclosed in GB 1 473 202 (Henkel) and mixed crystalline/amorphous aluminosilicates as disclosed in GB 1 470 250 (Procter & Gamble); and layered silicates as disclosed in EP 164 514B (Hoechst). Inorganic phosphate builders, for example, sodium orthophosphate, pyrophosphate and tripolyphosphate, may also be present, but on environmental grounds those are no longer preferred.

The detergent compositions of the invention preferably contain an alkali metal, preferably sodium, aluminosilicate builder. Sodium aluminosilicates may generally be incorporated in amounts of from 10 to 70% by weight (anhydrous basis), preferably from 25 to 50 wt%.

The alkali metal aluminosilicate may be either crystalline or amorphous or mixtures thereof, having the general formula:



These materials contain some bound water and are required to have a calcium ion exchange capacity of at least 50 mg CaO/g. The preferred sodium aluminosilicates contain 1.5-3.5 SiO₂ units (in the formula above).

Both the amorphous and the crystalline materials can be prepared readily by reaction between sodium silicate and sodium aluminate, as amply described in the literature.

5 Suitable crystalline sodium aluminosilicate ion-exchange detergency builders are described, for example, in GB 1 429 143 (Procter & Gamble). The preferred sodium aluminosilicates of this type are the well-known commercially available zeolites A and X, and mixtures
10 thereof.

 The zeolite may be the commercially available zeolite 4A now widely used in laundry detergent powders. However, according to a preferred embodiment of the invention, the
15 zeolite builder incorporated in the compositions of the invention is maximum aluminium zeolite P (zeolite MAP) as described and claimed in EP 384 070A (Unilever). Zeolite MAP is defined as an alkali metal aluminosilicate of the zeolite P type having a silicon to aluminium ratio not
20 exceeding 1.33, preferably within the range of from 0.90 to 1.33, and more preferably within the range of from 0.90 to 1.20.

 Especially preferred is zeolite MAP having a silicon
25 to aluminium ratio not exceeding 1.07, more preferably about 1.00. The calcium binding capacity of zeolite MAP is generally at least 150 mg CaO per g of anhydrous material.

30 Organic builders that may be present include polycarboxylate polymers such as polyacrylates, acrylic/maleic copolymers, and acrylic phosphinates; monomeric polycarboxylates such as citrates, gluconates, oxydisuccinates, glycerol mono-, di- and trisuccinates,
35 carboxymethyloxysuccinates, carboxymethyloxymalonates,

dipicolinates, hydroxyethyliminodiacetates, alkyl- and alkenylmalonates and succinates; and sulphonated fatty acid salts. This list is not intended to be exhaustive.

5 Especially preferred organic builders are citrates, suitably used in amounts of from 5 to 30 wt%, preferably from 10 to 25 wt%; and acrylic polymers, more especially acrylic/maleic copolymers, suitably used in amounts of from 0.5 to 15 wt%, preferably from 1 to 10 wt%.

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Builders, both inorganic and organic, are preferably present in alkali metal salt, especially sodium salt, form.

15 Detergent compositions according to the invention may also suitably contain a bleach system. Preferred bleach systems for fabric washing may contain peroxy bleach compounds, for example, inorganic persalts or organic peroxyacids, capable of yielding hydrogen peroxide in aqueous solution.

20

Suitable peroxy bleach compounds include organic peroxides such as urea peroxide, and inorganic persalts such as the alkali metal perborates, percarbonates, perphosphates, persilicates and persulphates. Preferred
25 inorganic persalts are sodium perborate monohydrate and tetrahydrate, and sodium percarbonate. Especially preferred is sodium percarbonate having a protective coating against destabilisation by moisture. Sodium percarbonate having a protective coating comprising sodium
30 metaborate and sodium silicate is disclosed in GB 2 123 044B (Kao).

The peroxy bleach compound is suitably present in an amount of from 5 to 35 wt%, preferably from 10 to 25 wt%.

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The peroxy bleach compound may be used in conjunction with a bleach activator (bleach precursor) to improve bleaching action at low wash temperatures. The bleach precursor is suitably present in an amount of from 1 to 8 wt%, preferably from 2 to 5 wt%.

Preferred bleach precursors are peroxycarboxylic acid precursors, more especially peracetic acid precursors and peroxybenzoic acid precursors; and peroxycarbonic acid precursors. An especially preferred bleach precursor suitable for use in the present invention is N,N,N',N'-tetracetyl ethylenediamine (TAED). The novel quaternary ammonium and phosphonium bleach precursors disclosed in US 4 751 015 and US 4 818 426 (Lever Brothers Company) and EP 402 971A (Unilever) are also of great interest. Especially preferred are peroxycarbonic acid precursors, in particular choly-4-sulphophenyl carbonate. Also of interest are peroxybenzoic acid precursors, in particular, N,N,N-trimethylammonium toluoyloxy benzene sulphonate; and the cationic bleach precursors disclosed in EP 284 292A and EP 303 520A (Kao).

A bleach stabiliser (heavy metal sequestrant) may also be present. Suitable bleach stabilisers include ethylenediamine tetraacetate (EDTA) and the polyphosphonates such as Dequest (Trade Mark), EDTMP.

The compositions may also suitably contain one or more enzymes. Suitable enzymes include proteases, amylases, cellulases and lipases. Detergent enzymes are commonly employed in granular form in amounts of from 0.1 to 3.0 wt%.

Powder or granular compositions of the invention may if desired contain alkali metal, preferably sodium, carbonate, in order to increase detergency and ease

processing. Sodium carbonate may suitably be present in amounts ranging from 1 to 60 wt%, preferably from 2 to 40 wt%. However, compositions containing little or no sodium carbonate are also within the scope of the invention.

Powder flow may be improved by the incorporation of a small amount of a powder structurant, for example, a fatty acid (or fatty acid soap), a sugar, an acrylate or acrylate/maleate polymer, or sodium silicate. A preferred powder structurant is fatty acid soap, suitably present in an amount of from 1 to 5 wt%.

Other materials that may be present in detergent compositions of the invention include sodium silicate; antiredeposition agents such as cellulosic polymers; fluorescers; inorganic salts such as sodium sulphate; lather control agents or lather boosters as appropriate; dyes; coloured speckles; perfumes; and fabric softening compounds. This list is not intended to be exhaustive.

Detergent compositions of the invention may be prepared by any suitable method. Particulate detergent compositions may, for example, be prepared by spray-drying a slurry of compatible heat-insensitive ingredients, and then spraying on or postdosing those ingredients unsuitable for processing via the slurry. So-called "compact" granular compositions having bulk densities of at least 650 g/litre, more preferably at least 700 g/litre, may be prepared, for example, by post-tower densification of spray-dried powder, or by wholly non-tower methods such as dry mixing and granulation; in both cases a high-speed mixer/granulator may advantageously be used. Processes using high-speed mixer/granulators are disclosed, for example, in EP 340 013A, EP 367 339A, EP 390 251A and EP 420 317A (Unilever).

EXAMPLES

The invention is illustrated further by the following non-limiting Examples, in which parts and percentages are by weight unless otherwise stated. Examples designated by a number are within the invention, while Examples designated by a letter are comparative.

Reference is made in the Examples to the accompanying drawings (Figures 1 to 6) which show detergency results for various combinations of linear alkylbenzene sulphonate (LAS), 7EO ethoxylated nonionic surfactant, and aldobionamide in various proportions; and comparative results for corresponding combinations of LAS, 7EO ethoxylate, and 3EO ethoxylate.

Preparation of lactobionamides

The lactobionamides used in the examples were made by the following method, described with specific reference to cocolactobionamide ($R_1 = H$, $R_2 = \text{coconut alkyl}$).

15 g of lactone were charged into a 150 ml flask. 100 ml of methanol were added at 25°C. The batch was heated up to 50°C. 0.15 g of alkylbenzene sulphonic acid were charged into the reaction vessel. After this addition the mixture was held at 50°C for 1 hour. 8.2 g of cocoamine were added at 50°C in 30 minutes. The batch was then cooled down to 25°C in 30 minutes and left overnight for crystallisation. 19 g of white crystalline product were recovered after filtration.

EXAMPLES 1 TO 6, COMPARATIVE EXAMPLES A TO F

Detergencies were evaluated on a WFK 30D test cloth (polyester cloth coated with pigment/sebum) using a Tergotometer. The performances of a series of mixed surfactant systems as detailed below were evaluated at about 0.22 g/l total surfactant. A non-phosphate, zeolite-built burkeite (sodium carbonate/sodium sulphate) base powder comprising about 0.45 g/l of commercially available zeolite powder (Zeolite 4A) and 0.30 g/l sodium carbonate was dosed over the side at about 1.0g/l, to give a ratio of total surfactant to zeolite base powder of about 22:88. The system was kept at 37°C, pH 10, 120 ppm hardness (added as 2:1 ratio of Ca:Mg) for 15 minutes.

Detergency improvement was measured as a change in reflectance (ΔR) of the stained cloth before and after washing with the detergent prototype as measured with a standard reflectometer. In general, larger reflectance values suggest better detergency and oily soil removal.

The surfactants used were as follows:

(i) linear alkylbenzene sulphonate (LAS);

(ii)(a) Neodol (Trade Mark) 25-7 ex Shell, an ethoxylated C_{12} - C_{15} aliphatic alcohol having an average degree of ethoxylation of 7, referred to hereinafter as $C_{12-15}EO_7$;

(ii)(b) Lactobionamides or maltobionamides as detailed below (invention), or an ethoxylated linear primary C_{12} alcohol having an average degree of ethoxylation of 3, hereinafter referred to as $C_{12}EO_3$ (comparative).

Examples 1 to 4, Comparative Example A

Linear alkylbenzene sulphonate (anionic) was mixed in ratios of 25:75, 50:50 and 75:25 with 75:25 mixtures of $C_{12-15}EO_7$ with lactobionamides (LBA) of various chain lengths (Examples 1 to 4), and $C_{12}EO_3$ (Comparative Example A). The detergency results are shown in the following table, and also graphically in Figure 1.

10

LAS (wt%)			0	25	50	75	100
15	1	C_9 LBA	23.5	19.6	25.0	17.4	13.6
	2	C_{11} LBA	16.3	17.5	20.5	20.6	13.6
	3	C_{12} LBA	15.2	12.8	16.8	16.6	13.6
20	4	CocoLBA	15.5	15.0	18.2	18.7	13.6
	A	$C_{12}EO_3$	13.3	12.4	13.2	15.0	13.6

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As seen from Figure 1, all systems demonstrated some synergistic interaction, but a mixture of aldobionamide and high alkoxyated nonionic is almost always superior to a mixture of low alkoxyated nonionic and highly alkoxyated nonionic when used in a ternary surfactant system with an anionic surfactant.

Examples 5 to 10, Comparative Example B

5 The procedure of Examples 1 to 4 was repeated, but using a ratio of C₁₂₋₁₅EO₇ to LBA of 50:50. The results are shown in the table below, and also graphically in Figure 2.

10	LAS (wt%)	0	25	50	75	100
	5 C ₉ LBA	13.0	13.5	18.9	22.0	13.6
15	6 C ₁₀ LBA	11.7	12.5	20.2	21.0	13.6
	7 C ₁₁ LBA	16.3	18.0	20.0	19.5	13.6
	8 C ₁₂ LBA	15.9	16.0	17.1	19.1	13.6
20	9 C ₁₃ LBA	18.3	17.5	19.1	18.5	13.6
	10 CocoLBA	14.4	14.5	17.2	18.0	13.6
25	B C ₁₂ EO ₃	7.8	8.0	9.0	11.8	13.6

30 In this case all the systems according to the invention exhibited a significant synergistic interaction that was absent in the comparative system.

Examples 11 to 14, Comparative Example C

The procedure of Examples 1 to 4 was repeated, using a C₁₂₋₁₅EO₇ to lactoobionamide ratio of 25:75. The results are shown in the table below and also graphically in Figure 3.

5							
10	LAS (wt%)	0	25	50	75	100	
	11 C ₁₀ LBA	12.8	17.3	18.0	14.0	13.6	
	12 C ₁₁ LBA	18.4	21.5	21.0	17.6	13.6	
15	13 C ₁₂ LBA	19.5	20.2	19.6	16.1	13.6	
	14 C ₁₃ LBA	16.2	16.3	21.0	18.0	13.6	
20	C C ₁₂ EO ₃	0	4.7	7.8	10.5	13.6	

The results show a similar pattern to those of Examples 5 to 10, but with slightly lower absolute detergency.

Examples 15 and 16, Comparative Example D

The procedure of Examples 1 to 4 was repeated using maltobionamides rather than lactobionamides. The ratio of $C_{12-15}EO_7$ to maltobionamide (MBA) in each case was 75:25. The results are shown in the following table, and graphically in Figure 4.

10	LAS (wt%)	0	25	50	75	100
15	C_{11} MBA	12.5	14.4	17.0	18.7	13.6
15	16 C_{12} MBA	12.4	11.9	14.9	17.9	13.6
	D $C_{12}EO_3$	11.8	10.2	11.5	15.0	13.6

20 Examples 17 and 18, Comparative Example E

The procedure of Examples 15 and 16 was repeated using a $C_{12-15}EO_7$ to maltobionamide ratio of 50:50. The results are shown in the following table, and graphically in Figure 5.

25	LAS (wt%)	0	25	50	75	100
30	17 C_{11} MBA	14.6	16.0	16.6	14.4	13.6
	18 C_{12} MBA	12.3	13.4	16.5	17.3	13.6
35	E $C_{12}EO_3$	11.3	12.4	12.8	14.6	13.6

Examples 19 and 20, Comparative Example F

The procedure of Examples 15 and 16 was repeated using a C₁₂₋₁₅EO₇ to maltobionamide ratio of 25:75. The results are shown in the following table, and graphically in Figure 6.

LAS (wt%)	0	25	50	75	100
19 C ₁₁ MBA	14.6	16.0	16.6	14.0	13.6
20 C ₁₂ MBA	13.3	13.7	14.7	12.6	13.6
F C ₁₂ EO ₃	6.6	7.5	9.0	10.2	13.6

*

*

*

CLAIMS

1 A detergent composition having a surfactant system
5 consisting essentially of:

(i) from 1 to 99 wt% anionic surfactant, and

10 (ii) from 1 to 99 wt% of a nonionic surfactant system
comprising

(a) an alkoxyated nonionic surfactant having an
average degree of alkoxylation of at least 6; and

15 (b) an aldobionamide.

2 A detergent composition according to claim 1, wherein
20 the ratio of aldobionamide (ii)(b) to alkoxyated nonionic
surfactant (ii)(a) is within the range of from 5:95 to
95:5.

25 3 A detergent composition as claimed in claim 1, wherein
the ratio of aldobionamide (ii)(b) to alkoxyated nonionic
surfactant (ii)(a) is within the range of from 1:99 to
50:50.

30 4 A detergent composition as claimed in any preceding
claim, wherein the anionic surfactant (i) is a linear
alkylbenzene sulphonate or an alkyl sulphate.

35

5 A detergent composition as claimed in any preceding claim, wherein the anionic surfactant (i) constitutes from 25 to 80 wt% of the surfactant system.

5

6 A detergent composition as claimed in any preceding claim, wherein the alkoxyated nonionic surfactant (ii)(a) has an average degree of alkoxylation of from 6 to 10.

10

7 A detergent composition as claimed in claim 6, wherein the alkoxyated nonionic surfactant (ii)(a) is an ethoxylation product of a linear or branched primary or secondary aliphatic alcohol having from 6 to 18 carbon atoms and an average degree of ethoxylation of from 6 to 10.

15

8 A detergent composition as claimed in claim 7, wherein the alkoxyated nonionic surfactant (ii)(a) is an ethoxylated aliphatic alcohol having from 10 to 16 carbon atoms and an average degree of ethoxylation of from 6 to 8.

20

9 A detergent composition as claimed in any preceding claim, wherein the alkoxyated nonionic surfactant (ii)(a) constitutes from 20 to 75 wt% of the surfactant system.

25

10 A detergent composition as claimed in any preceding claim, wherein the aldobionamide (ii)(b) constitutes from 10 to 65 wt% of the surfactant system.

30

35

11 A detergent composition as claimed in any preceding claim, wherein the aldobionamide (ii)(b) has the structure



5

wherein

A is a sugar moiety which is an aldobionic acid except that it does not contain the OH group normally extending from the carbonyl group on the aldonic acid;

10

NR_1R_2 is attached where the hydroxyl group on the aldobionic acid would normally be found; and

15

each of R_1 and R_2 , which may be the same or different, is a hydrogen atom, an aliphatic hydrocarbon radical, an aromatic radical, a cycloaliphatic radical, an amino acid ester, or an ether amine, with the proviso that R_1 and R_2 cannot both be hydrogen atoms.

20

12 A detergent composition as claimed in claim 11, wherein in the aldobionamide (ii)(b), one of R_1 and R_2 is hydrogen and the other of R_1 and R_2 is an alkyl group having from 8 to 24 carbon atoms.

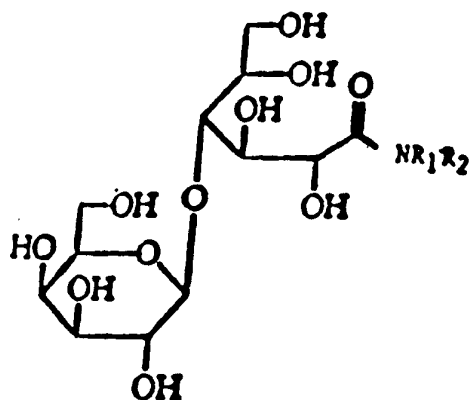
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13 A detergent composition as claimed in claim 11 or claim 12, wherein in the aldobionamide (ii)(b), A is a disaccharide sugar group forming the compound which is an aldonic acid except for the OH group.

30

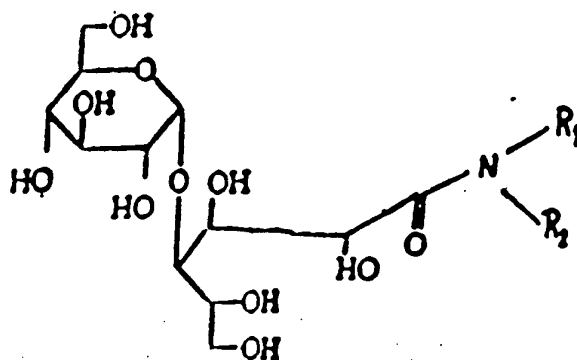
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14 A detergent composition as claimed in any one of claims 11 to 13, wherein the aldobionamide is a lactobionamide having the structure:



wherein R_1 and R_2 have the meanings given in claim 11.

15 A detergent composition as claimed in any one of claims 11 to 13, wherein the aldobionamide is a maltobionamide having the structure:



wherein R_1 and R_2 have the meanings given in claim 11.

16 A detergent composition as claimed in any preceding claim, which comprises from 5 to 60 wt% of the surfactant system, from 10 to 80 wt% of a detergency builder system, and optionally other detergent ingredients, to 100 wt%.

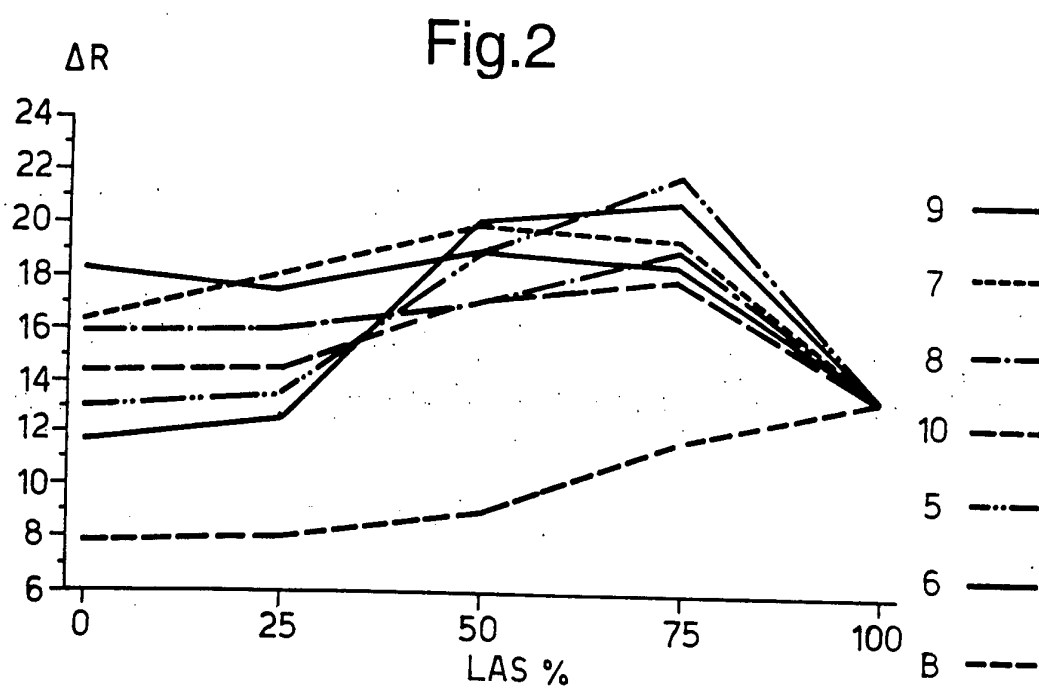
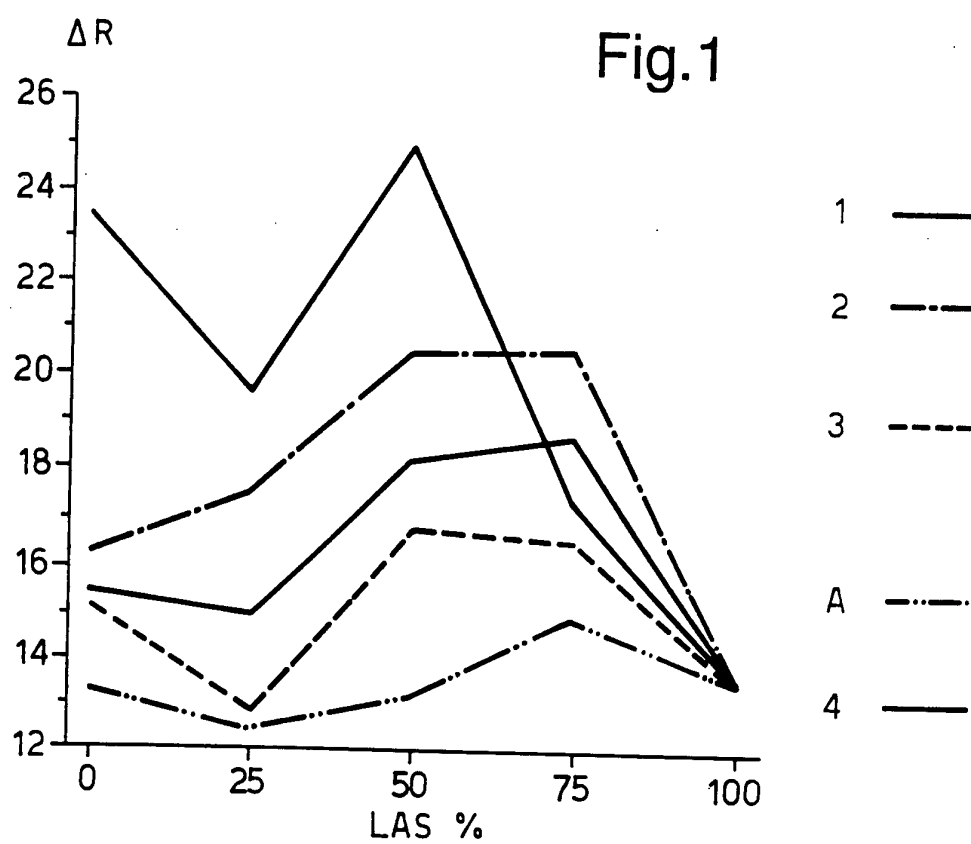
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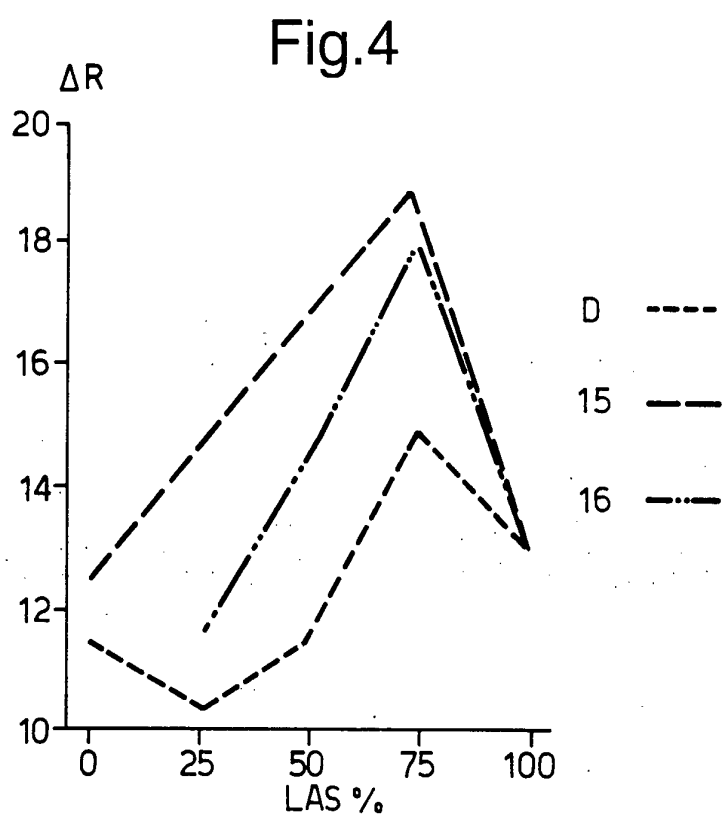
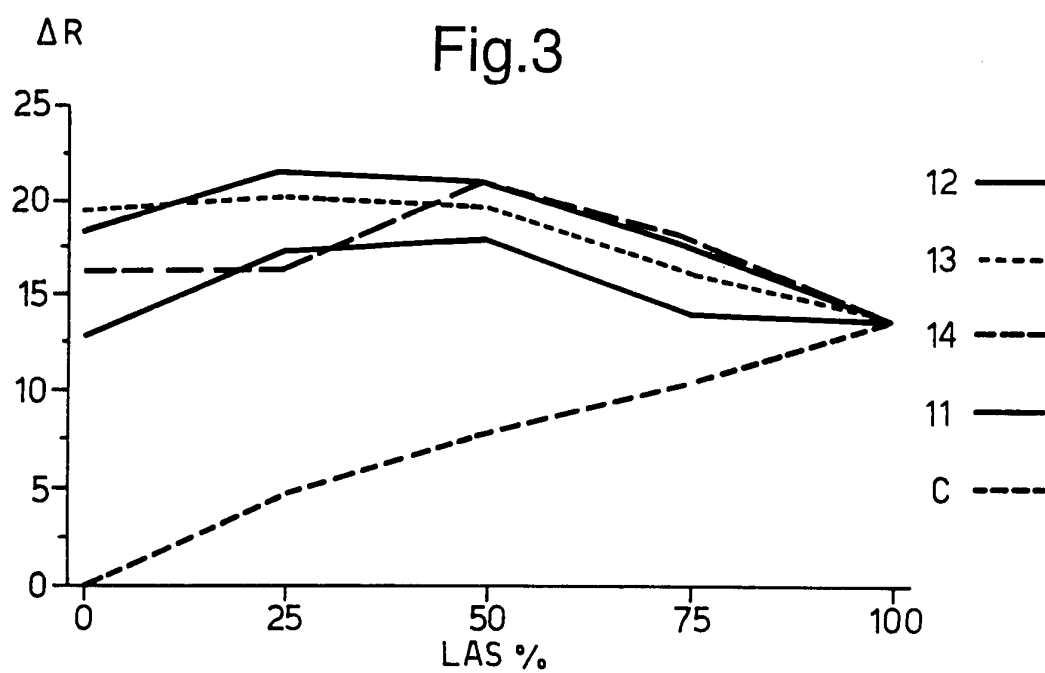
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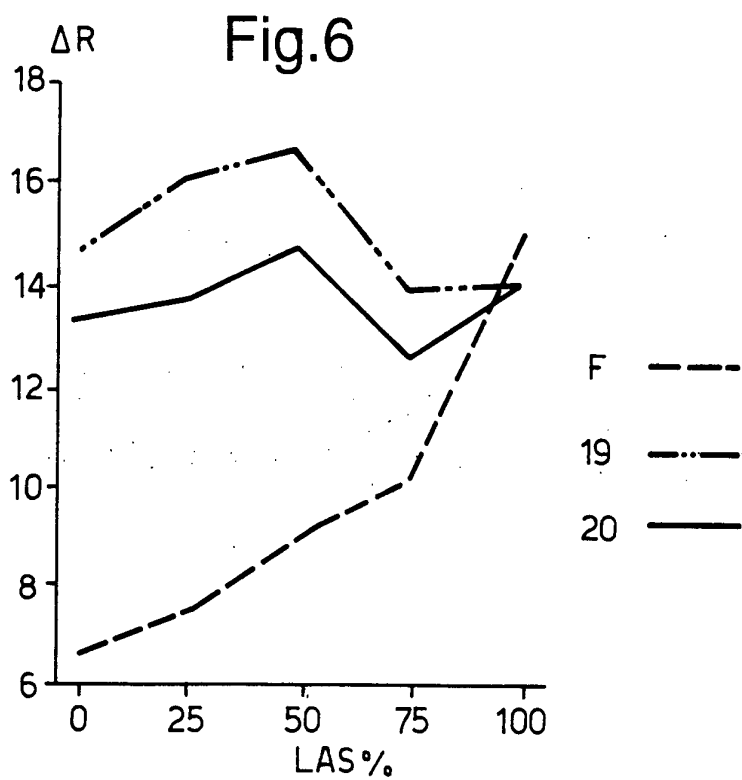
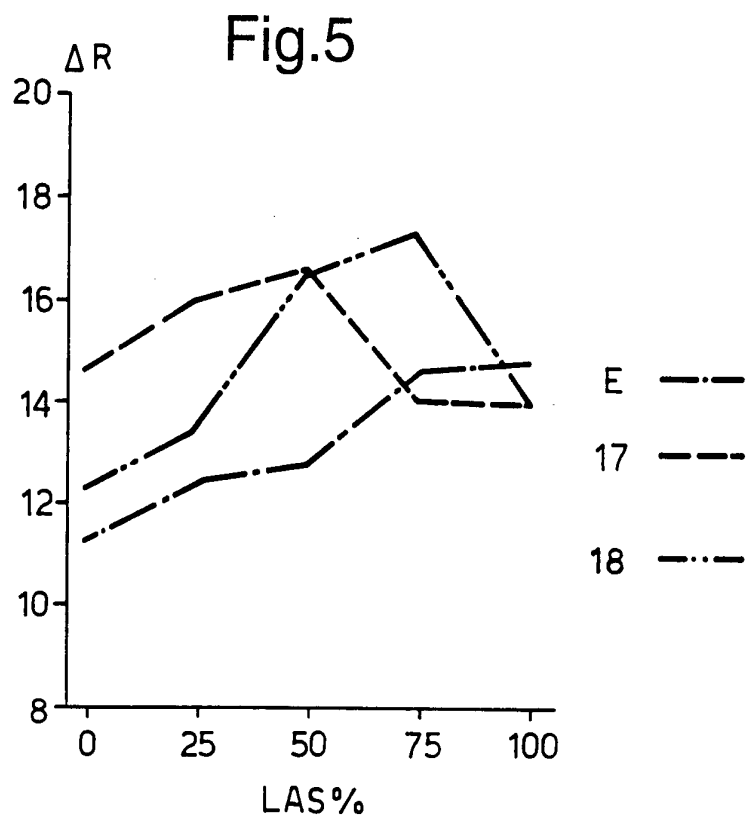
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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP 95/01036

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 C11D1/86

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP,A,0 550 278 (UNILEVER PLC) 7 July 1993 cited in the application see page 3, line 5 - page 5, line 41; claims ---	1,4, 11-16
A	EP,A,0 569 869 (SOLVAY DEUTSCHLAND GMBH) 18 November 1993 see claims 1,9 -----	1,11,14

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP 95/01036

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		EP-A-	0550281	07-07-93
		AU-B-	5562394	22-06-94
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