

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number:

0 381 397
A2

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: **90300869.6**(51) Int. Cl.⁵: **C11D 3/386**(22) Date of filing: **29.01.90**(30) Priority: **30.01.89 GB 8902009**(43) Date of publication of application:
08.08.90 Bulletin 90/32(84) Designated Contracting States:
CH DE ES FR GB IT LI NL SE(71) Applicant: **UNILEVER PLC**
Unilever House Blackfriars P.O. Box 68
London EC4P 4BQ(GB)(84) **GB**Applicant: **UNILEVER NV**
Burgemeester s'Jacobplein 1 P.O. Box 760
NL-3000 DK Rotterdam(NL)(84) **CH DE ES FR IT LI NL SE**(72) Inventor: **Haverkamp, Johan**
Kroeskarper 40
NL-2661 KL Bergschenhoek(NL)
Inventor: **Van der Gugten, Johanna Antonia**
Prof Dr A E van Giffaenstraat 13
NL-2235 AE Valkenburg(NL)(74) Representative: **Stancliffe, Terence**
Christopher et al
UNILEVER PLC Patents Division P.O. Box 68
Unilever House
London EC4P 4BQ(GB)(54) **Particulate detergent compositions and their use.**

(57) An enzymatic detergent composition in the form of a granulate or powder, comprising surfactant, enzyme and optionally normal detergent adjuncts, characterised in that, in combination, said composition (a) has a bulk density higher than about 600 g/l, and (b) has an electrolyte content such that said composition yields a wash solution with ionic strength lower than about 0.04, (or 0.05 in the presence of phosphate builder), e.g. 0.03, e.g. 0.02, when dissolved or dispersed in aqueous liquid in an amount that gives about 0.8 g/l surfactant concentration, which supports well the activity of enzymes such as lipase, amylase, cellulase, or protease.

EP 0 381 397 A2

Particulate Detergent Compositions and their Use

This invention relates to particulate, e.g. granular, enzymatic detergent compositions. In certain embodiments the invention relates to detergent granulates of high density, and especially for example those that contain enzyme, e.g. lipase.

5

Disclosure of Prior Art

The following prior art exists:

Recently there has been considerable interest within the detergents industry in the production of
 10 detergent powders having relatively high bulk density, for example, 600 g/litre and above. Particular attention has been paid to the densification of spray-dried powders by post-treatment.

For example, EP 0 219 328 (Unilever) discloses a granular low-phosphate detergent composition prepared by spray-drying a slurry to give a base powder containing a low to moderate level of sodium tripolyphosphate builder and low levels of inorganic salts, and then postdosing solid material including
 15 sodium sulphate of high bulk density and of smaller particle size than the base powder, thus filling the voids between base powder particles and producing a product of high bulk density.

JP 61-069897 (Kao) discloses a batch process in which a spray-dried detergent powder containing surfactant and builder is subjected successively to pulverising and granulating treatments in a high-speed mixer, the granulation being carried out in the presence of an "agent for improving surface properties" and
 20 optionally a binder. It would appear that in the high-speed mixer, the spray-dried powder is initially broken down to a fine state of division; the surface-improving agent and optional binder are then added and the pulverised material granulated to form a final product of high bulk density. The surface-improving agent, which is a finely divided particulate solid such as fine sodium aluminosilicate, is apparently required in order to prevent the composition from forming into large balls or cakes: the examples of spray-dried starting
 25 powders described in the Kao specification contain very high levels of surfactant (45% by weight) and relatively low levels of builder salts, and are likely to have a high tendency towards caking and balling.

EP 0 229 671 (Kao) discloses postdosing a crystalline alkaline inorganic salt, for example, sodium carbonate, to a spray-dried base powder to produce a high bulk density product.

A different approach is described in GB 1 517 713 (Unilever), which discloses a process in which a
 30 detergent powder produced by spray-drying or pan granulation is spheronised and granulated in a "marumerizer" (Trade Mark) with some increase in bulk density.

EP 0 220 024 (Procter & Gamble) is also concerned with the densification of a spray-dried powder containing a high level (30-85% by weight) of anionic surfactant. The powder is compacted and granulated, inorganic builder (sodium tripolyphosphate, or sodium aluminosilicate and sodium carbonate) being added
 35 before compaction.

EP 0 150 613 (Unilever) concerns detergent compositions involving base powder granules containing detergent-active materials and amorphous aluminosilicate together with a postdosed peroxygen bleach compound, for improved ion-exchange properties and bleach stability within a defined range of moisture contents, and discloses examples (including comparative example) of fully formulated detergent powders
 40 with 6-7% anionic active, 1.5-4% nonionic active, 0-5% soap, 5% Na silicate, 21-40% amorphous aluminosilicate, 0 or 10% NTA, 2.4-9.9% sodium sulphate, 15-20% perborate, 0-18% tripolyphosphate, 0-2% TAED, and 4.1-18% moisture. It has been proposed (Research Disclosure 29056, 1988) to use lipase in connexion with detergent compositions of EP 0 150 613.

EP 0 168 526 (Henkel) discloses further aluminosilicate-containing detergent powders and the use of
 45 enzyme (protease and/or amylase) granulates therein, comprising e.g. enzyme 15-18%, zeolite 20-31%, starch 26-36%, CMC 9-10%, and PEG and other minor additives. It has been proposed (Research Disclosure 29056, 1988) to use lipase in connexion with compositions of EP 0 168 526.

DE-OS 24 30 144 (Henkel) concerns washing/bleaching/cleaning processes using in the wash liquor finely-divided aluminosilicates or borosilicates with calcium exchange capacity, and discloses typical
 50 washing compositions with 5-30% (especially 5-8% anionic + 2-10% nonionic) anionic/nonionic actives, 5-70% ion-exchange materials, 2-45% complex-formers for calcium, 0-50% alkaline builders, 0-50% bleaching agents. Among the examples are washing compositions that contain 14-16.5% anionic + nonionic detergent, 10-11% cation-exchanger, 30-35% aluminosilicate, 20-26.5% Na perborate trihydrate, 6.6%-8.9% water,

US 4 287 101 (Lion Fat & Oil Co, assignees of Nishio et al) concerns enzyme-containing detergent

compositions, including e.g. protease and optionally amylase or lipase, e.g. as powder or particles, with compositions defined by reference to a triangular diagram and based on at least 25% in aggregate of C10-20 alpha-olefin sulphonate plus another sulphate or sulphonate detergent active, and a pyrophosphate. Comparative examples given in this specification show detergent compositions containing 8% AOS, animal
 5 fatty alkyl-11EO 0.5%, Na orthophosphate 10%, Na pyrophosphate 6%, sodium silicate 10%, Glauber's salt 4.46-4.76%, magnesium sulphate 4%, sodium perborate tetrahydrate 32%, cationic agglomerate 16.4% (based on 25.6% ditallow dimethyl ammonium chloride, 8.5% fatty alcohol, 48.8% Na montmorillonite clay, 2.6% Na pyrophosphate and 14.5% water), and minor additives.

JA 63-017996 (Kao) discloses phosphorus-free enzyme-containing powder detergents after-blended
 10 with alkaline inorganic builder, to improve enzyme stabilisation.

Further disclosures of enzyme-containing detergent powders are provided for example in JA 63-078000 (Lion), JA 63-069894 (Kao), JA 62-260900 (Sunstar), JA 62-068898 (Lion), JA 62 043499 (Kao), JA 61-291693 (Kao), JA 61-238898 (Lion), JA 59-221396 (Lion) and JA 58-045300 (Lion).

15

Summary and Details of the Invention

In spite of the above prior art several aims remain: e.g. to achieve high and possibly higher bulk density detergent granulates and powders.

20 A further aim is to incorporate into high bulk density powders and/or granulates compositions which have suitable properties to support enzyme activities, and particularly for example lipase activity.

According to the present invention there are provided detergent granulates and powders e.g. of high-bulk-density, e.g. higher than about 600 g/l, e.g. at least about 650 g/l, preferably at least about 700 g/l, e.g. about 750 g/l or about 800 g/l or more, with high levels of detergent actives, e.g. at least 15% (wt), often
 25 around 18-23% or higher.

Also provided are detergent granulates and powders e.g. of high-bulk-density which have a low salt (esp. neutral salt) content, e.g. those that yield a wash solution with ionic strength much lower than the ionic strength derived from standard washing powders, e.g. ionic strength of about 0.04 or less, e.g. about 0.03 or less, e.g. about 0.025 or less or about 0.02 or less, as compared with levels of about 0.06 - 0.09 or more
 30 derived from current washing powders, when used in standard quantity so as to yield a washing solution with (e.g.) about 0.8 g/l surfactant concentration. (When phosphate builder is present, it is contemplated that the upper ionic strength limit may be up to 0.05.)

Thus, in one aspect the invention provides an enzymatic detergent composition in the form of a granulate or powder, comprising surfactant, enzyme and optionally normal detergent adjuncts, characterised
 35 in that, in combination, said composition (a) has a bulk density higher than about 600 g/l, and (b) has an electrolyte content such that said composition yields a wash solution with ionic strength lower than about 0.04, (with the proviso that the ionic strength may be up to about 0.05 when phosphate builder is present), when said composition is dissolved or dispersed in aqueous liquid in an amount that gives about 0.8 g/l surfactant concentration.

40 It has surprisingly been found that embodiments of this invention incorporating lipase in low-ionic-strength detergent formulations, e.g. 0.05 or below, or 0.04 or below in the absence of phosphate builder, can give improved fabric wash results in respect of the odour quality/quantity of the fabrics after washing, as compared with results obtained using lipase enzyme in connection with detergents of higher ionic strength.

45 A convenient water type for comparing ionic strengths of various detergent compositions in use is for example a water having 15 degrees French hardness.

Also provided are detergent granulates and powders e.g. of high-bulk-density which have a low or even close-to-zero content of neutral salt (e.g. sodium sulphate), e.g. usually less than 10%, often less than 5% to 2%, or even less than 1% or absent.

50 The detergent compositions of the invention may for example comprise either phosphates or related builders or aluminosilicates or related builders or mixtures of the two types. Very often a level for such materials in the range of the order of about 25-40% by weight will be found useful, more broadly at least about 15% or for example up to about 45%.

In the absence of phosphate builder, examples of the compositions of the invention may sometimes
 55 have up to 15% neutral salt content, e.g. sodium sulphate.

Within these constraints, usual detergent additives and adjuncts may be used freely according to convenience, as illustrated in the examples below and as mentioned in the publications cited above, the disclosures of each of which are hereby specifically incorporated by reference.

It has surprisingly been found that the activities of enzymes and in particular lipase are well supported in the use of such detergent formulations, in spite of the fact which we have found that lipases in particular can be often less effective under conditions of low ionic strength than under standard conditions.

Enzymes other than lipase that may be present include protease, amylase, oxidase and/or cellulase.

5 The compositions can comprise lipase enzyme in for example an amount in the range 50 to 30,000 (LU) lipase units per gram of the surfactant system or of the detergent composition. In this specification lipase units are defined as they are in EP 0 258 068 (Novo).

It has been found that in these systems lipase enzyme shows surprisingly little inhibition.

10 The lipolytic enzyme can usefully be added in the form of a granular composition of lipolytic enzyme with carrier material (e.g. as in EP 0 258 068 and Savinase and Lipolase products of Novo).

The added amount of lipolytic enzyme can be chosen within wide limits, for example 50 to 30,000 LU/g of granular detergent composition, e.g. often at least 100 LU/g, very usefully at least 500 LU/g, sometimes preferably above 1000, above 2000 LU/g or above 4000 LU/g or more, thus very often within the range 50-4000 LU/g and possibly within the range 200-1000 LU/g.

15 The lipolytic enzyme can be chosen from among a wide range of lipases: in particular the lipases described in for example the following patent specifications, EP 0 214 761 (Novo), EP 0 258 068 (Novo) and especially lipases showing immunological cross-reactivity with antisera raised against lipase from *Thermomyces lanuginosus* ATCC 22070, EP 0 205 208 (Unilever) and EP 0 206 390 (Unilever), and especially lipases showing immunological cross-reactivity with antisera raised against lipase from *Chromobacter viscosum* var *lipolyticum* NRRL B-3673, or against lipase from *Alcaligenes* PL-679, ATCC 31371 and FERM-P 3783, also the lipases described in specifications WO 87/00859 (Gist-Brocades) and EP 0 204 284 (Sapporo Breweries). Suitable in particular are for example the following commercially available lipase preparations: Novo Lipolase, Amano lipases CE, P, B, AP, M-AP, AML, and CES, and Meito lipases MY-30, OF, and PL, also esterase MM, Lipozym, SP225, SP285, Saiken lipase, Enzeco lipase, Toyo Jozo lipase and Diosynth lipase (Trade Marks).

25 Genetic engineering of the enzymes can be achieved by extraction of an appropriate lipase gene, e.g. the gene for lipase from *Thermomyces lanuginosus* or from a mutant thereof, and introduction and expression of the gene or derivative thereof in a suitable producer organism such as an *Aspergillus*. The techniques described in WO 88/02775 (Novo), EP 0 243 338 (Labofina) and EP 0 268 452 (Genencor) may be applied and adapted.

30 Similar considerations apply mutatis mutandis in the case of the other enzymes. Without limitation: Amylase can for example be used when present in an amount in the range about 1 to about 100 MU (maltose units) per gram of detergent composition, (or 0.014-1.4, e.g. 0.07-0.7, KNU/g (Novo units)). Cellulase can for example be used when present in an amount in the range about 0.3 to about 35 CEVU units per gram of the detergent composition. Protease can for example be used when present in an amount in the range about 0.0002 to about 0.05 Anson units per gram of the detergent composition.

40 The detergent compositions may be based on non-soap surfactant, e.g. usually at least partially anionic surfactant. Suitable anionic surfactants are well known to those skilled in the art, and include linear alkylbenzene sulphonates, primary alcohol sulphates, alkyl ether sulphates, alpha-olefin sulphonates, internal olefin sulphonates, fatty acid ester sulphonates and combinations thereof. It is preferred that (e.g. alpha-) olefin sulphonates are absent or not used in substantial or appreciable quantity, e.g. less than 10-15%, e.g. less than 5%, of the total surfactant of the composition.

45 If desired, conventional nonionic surfactant such as alkoxylated fatty alcohols may also be present, preferably in a minor amount. Suitably the surfactant component of the compositions of the invention may be constituted by 10 to 35% by weight of anionic surfactant preferably alkylbenzene sulphonate and/or primary alcohol sulphate and 0 to 10% by weight of nonionic surfactant.

50 The detergent compositions may furthermore include the following usual detergent ingredients in the usual amounts. They may be built or unbuilt, and may be of the zero-P type (i.e. not containing any phosphorus-containing builders). Thus the composition may contain in aggregate for example from 1-50%, e.g. at least about 5% and often up to about 35-40% by weight, of one or more organic and/or inorganic builders. Typical examples of such builders include those already mentioned above, and more broadly include alkali metal ortho, pyro, and tripolyphosphates, alkali metal carbonates, either alone or in admixture with calcite, alkali metal citrates, alkali metal nitrilotriacetates, carboxymethyloxy succinates, zeolites, polyacetal carboxylates and so on.

55 Furthermore, the detergent compositions may contain from 1-35% of a bleaching agent or a bleach precursor or a system comprising bleaching agent and/or precursor with activator therefor. Further optional ingredients are lather boosters, foam depressors, anticorrosion agents, soil-suspending agents, sequestering agents, anti-soil redeposition agents, perfumes, dyes, stabilising agents for the enzymes and so on.

Our European and US patent applications filed 7 November 1989, claiming priority of 08 Nov 1988, EPA 89311465.2 (unpublished) and USSN 432,702 (incorporated herein by reference) disclose a granular detergent composition or component therefor, which comprises:

- (a) from 6% to 35%, often over 17%, by weight of non-soap detergent-active material consisting at least partially of anionic and/or nonionic detergent-active material;
- (b) at least 45% by weight of builder,
- (b1) the builder including at least 28%, e.g. up to 45%, by weight (anhydrous basis) of crystalline or amorphous sodium aluminosilicate and/or citrate, carbonate, or layered silicate builder,
- (c) a lipolytic enzyme, the weight ratio of (b1) to (a) being from 0.9:1 to 2.6:1, preferably from 1.2:1 to 1.8:1; and other detergent ingredients to 100% by weight.

Even if the description of our mentioned unpublished patent applications referred to above were to be taken into account it would still remain surprising that compositions as described in the present specification can show advantage in supporting the activity of enzymes such as lipase, and in providing improved odour performance. In general the use of combinations with the features set out above in connection with our earlier patent applications is not excluded from the present invention.

Certain examples of these compositions may in practice be formulated to achieve low ionic strengths. In particular certain formulation examples mentioned in the earlier specification may be so formulated.

The present invention extends for example to compositions which are subject to any one or more of the following provisos:

- (a) that where the surfactant consists essentially of Linear alkylbenzene sulphonate 24 parts, Nonionic surfactant 2 parts, Soap 1 part, and the builder consists essentially of Zeolite (anh) 38 parts, then the soluble electrolyte component consists of a mixture of salts other than (e.g. substantially less or more than) sodium silicate 4 parts, sodium carbonate 10 parts;
- (b) that where the surfactant consists essentially of Linear alkylbenzene sulphonate 20 parts, Nonionic surfactant 2 parts, Soap 1 part, and the builder consists essentially of Zeolite (anh) 35 parts, then the soluble electrolyte component consists of a mixture of salts other than (e.g. substantially less or more than) sodium silicate 4 parts, sodium carbonate 10 parts, sodium sulphate 11 parts;
- (c) that where the surfactant consists essentially of Linear alkylbenzene sulphonate 26 parts, primary coco-alkyl sulphate (coc-PAS) 8 parts, Nonionic surfactant 4 parts, Soap 3 parts, and the builder consists essentially of Zeolite (anh) 18 parts, then the soluble electrolyte component consists of a mixture of salts other than (e.g. substantially less or more than) sodium silicate 6 parts, sodium carbonate 20 parts, sodium sulphate 4 parts;

(d) a proviso that excludes the compositions set out in the above-mentioned earlier patent application. The compositions can be used for the washing of textile materials, especially but without limitation cotton and polyester-based textiles and mixtures thereof. Especially suitable are for example washing processes carried out at temperatures of about 60-65 deg C or lower, e.g. about 30-35 deg C or lower. It can be very suitable to use the compositions at a rate sufficient to provide about 0.8 g/l surfactant in the wash liquor, although it is of course possible to use greater concentrations if desired. Without limitation it can for example be stated that a range from about 3 g/l and up to about 6 g/l of the total powder concentration is suitable for use in the case when the powders are formulated as in the Examples below.

The compositions can for example be prepared by any suitable processing technique, for example by adaptation of the techniques disclosed in the documents cited above for making concentrated powders and granulates, which are hereby specifically incorporated by reference.

The following examples of detergent formulations according to the invention are given by way of illustration and not limitation.

Example 1:

A zero-phosphate high-bulk density composition is made up with the following constitution (% wt):

Alkylbenzenesulphonate	10
C12-C15 alkyl-3EO Nonionic	6
C12-C15 alkyl-7EO Nonionic	5
Na carbonate	12
zeolite (Degussa A or equivalent)	32
Sokolan CP5 maleic/acrylic polymer co-builder	5
Na perborate tetrahydrate	15.5
TAED	4
Protease (e.g. Savinase T grade)	1
Lipase (e.g. Lipolase T grade)	1
Minor additives, perfumes, etc.	

The composition can be prepared as follows: first, a detergent base is obtained by spray-drying an aqueous slurry comprising the bulk constituents other than the bleach precursors, enzymes and minors. The base powder is passed through an airlift and fed into a Lödige recycler (type Lödige CB30 - Trade Mark), operated at a rotational speed of about 1600 rpm, and processed therein with a mean residence time of about 10 seconds, after which it is passed to a plough-share mixer (type Lödige KM300 -Trade Mark), a continuous moderate-speed granulator/densifier, operated at a rotational speed of about 120 rpm, with a mean residence time of about 3 minutes. Thereafter the resulting high-density granulate is dried in a fluid-bed dryer and sieved if desired. In the result, there is formed a particulate base of high bulk density and small particle size; the high-density base is post-dosed with the remaining constituents. The processing conditions can be adjusted to control the final bulk density, e.g. to about 800 g/l.

The composition is found to give an ionic strength in use of less than about 0.02 under the conditions mentioned above.

Example 2:

A phosphate-built high-bulk density composition is made up with the following constitution (% wt) and processing as in Example 1 to a final bulk density of about 800 g/l:

Linear alkylbenzenesulphonate	10
C12-C15 alkyl-3EO Nonionic	4.5
C12-C15 alkyl-7EO Nonionic	5.5
Na perborate tetrahydrate	16
TAED 83%	4.3
Dequest 2047	0.3
Na tripolyphosphate (STPP)	33
Blue speckles (STPP)	2
Na silicate	6
Na carbonate	2
Protease (Savinase 6T)	0.5
Lipase (Lipolase 100T)	0.5

with minor additives including perfumes, and water content 9.6%.

This composition provides an ionic strength of about 0.045 when used at a rate which provides 0.8 g/l surfactant in a wash liquor.

Example 3:

A zero-phosphate high-bulk density composition is made up with the following constitution (% wt) and processing as in Example 1 to a final bulk density of about 800 g/l:

5	Linear alkylbenzenesulphonate	9
	C12-C15 alkyl-3EO Nonionic	5
	C12-C15 alkyl-7EO Nonionic	6
	Na perborate tetrahydrate	14
	TAED 83%	3.6
	Dequest 2047	0.7
	Zeolite (Degussa A or equivalent)	30
	Speckles	0.5
10	Na carbonate	9
	Protease (Savinase 6T)	0.6
	Lipase (Lipolase 100T)	0.7
	Silicone oil antifoam carried on particulate Na carbonate carrier	3

15

with minor additives including perfumes, and water content 11%.

This composition provides an ionic strength of less than about 0.02 when used at a rate which provides 0.8 g/l surfactant in a wash liquor.

20 The present invention is susceptible of modifications and variations, and the present disclosure extends to the use of all combinations and subcombinations of the features described herein including the examples and claims hereof, optionally in combination with each of the features of the above-cited published patent specifications, each of which is specifically incorporated by reference herein.

25 Claims

1. An enzymatic detergent composition in the form of a granulate or powder, comprising surfactant, enzyme and optionally normal detergent adjuncts, characterised in that, in combination, said composition (a) has a bulk density higher than about 600 g/l, and (b) has an electrolyte content such that said composition yields a wash solution with ionic strength lower than about 0.04, (with the proviso that the ionic strength may be up to about 0.05 when phosphate builder is present), when said composition is dissolved or dispersed in aqueous liquid in an amount that gives about 0.8 g/l surfactant concentration.

2. A detergent composition according to claim 1, characterised by an electrolyte content such that said composition yields a wash solution with ionic strength lower than about 0.03, when dissolved or dispersed in aqueous liquid in an amount that gives about 0.8 g/l surfactant concentration.

3. A detergent composition according to claim 1, characterised by an electrolyte content such that said composition yields a wash solution with ionic strength lower than about 0.02, when dissolved or dispersed in aqueous liquid in an amount that gives about 0.8 g/l surfactant concentration.

4. A detergent composition according to claim 1, characterised in that it contains lipase enzyme, in an amount in the range 50 to 30,000 (LU) lipase units per gram of the surfactant system.

5. A detergent composition according to claim 4, characterised in that the lipase enzyme comprises Lipolase (TM, Novo).

6. A detergent composition according to claim 1, characterised in that it contains an enzyme selected from amylase, in an amount in the range about 1 to about 100 MU (maltose units) per gram of detergent composition, (or 0.014-1.4, e.g. 0.07-0.7, KNU/g (Novo units)), cellulase, in an amount in the range about 0.3 to about 35 CEVU units per gram of the detergent composition, or protease, in an amount in the range about 0.0002 to about 0.05 Anson units per gram of the detergent composition.

7. A detergent composition according to claim 1, characterised by a bulk density of at least about 700 g/l.

8. A detergent composition according to claim 1, characterised by a content of at least 15% (by weight) of detergent active material.

9. A detergent composition according to claim 1, characterised by a content of detergent active material in the range 18-23% by weight.

10. A detergent composition according to claim 1, characterised in that it contains less than 5% by weight neutral salt.

11. A detergent composition according to claim 1, characterised in that it contains less than 2% by weight neutral salt.

12. A detergent composition according to claim 1, characterised in that it contains exclusively non-

phosphate builder, in the range 25-40%.

13. A detergent composition according to claim 1, characterised in that it comprises a synthetic surfactant composition comprising from 10 to 35% by weight of anionic surfactant preferably alkylbenzene sulphonate and/or primary alcohol sulphate and 0 to 10% by weight of nonionic surfactant, provided that if
5 alpha-olefin sulphonate is present then it forms not more than 15% of the surfactant of the composition.

14. A detergent composition according to claim 1, subject to the provisos

(a) that where the surfactant consists essentially of Linear alkylbenzene sulphonate 24 parts, Nonionic surfactant 2 parts, Soap 1 part, and the builder consists essentially of Zeolite (anh) 38 parts, then the soluble electrolyte component consists of a mixture of salts other than sodium silicate 4 parts, sodium
10 carbonate 10 parts;

(b) that where the surfactant consists essentially of Linear alkylbenzene sulphonate 20 parts, Nonionic surfactant 2 parts, Soap 1 part, and the builder consists essentially of Zeolite (anh) 35 parts, then the soluble electrolyte component consists of a mixture of salts other than sodium silicate 4 parts, sodium carbonate 10 parts, sodium sulphate 11 parts;

15 (c) that where the surfactant consists essentially of Linear alkylbenzene sulphonate 26 parts, primary coco-alkyl sulphate (coc-PAS) 8 parts, Nonionic surfactant 4 parts, Soap 3 parts, and the builder consists essentially of Zeolite (anh) 18 parts, then the soluble electrolyte component consists of a mixture of salts other than sodium silicate 6 parts, sodium carbonate 20 parts, sodium sulphate 4 parts.

15. A detergent composition according to claim 1, subject to the proviso that where the surfactant
20 (component (a)) consists essentially of from 6% to 35% by weight of non-soap detergent-active material consisting at least partially of anionic and/or nonionic detergent-active material; at least 45% by weight of builder (component (b)) is present, and where the builder includes (component (b1)) at least 28% by weight (anhydrous basis) of crystalline or amorphous sodium aluminosilicate and/or citrate, carbonate, or layered silicate builder, then the weight ratio of components (b1) to (a) is outside the ratio 0.9:1 to 2.6:1.