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54 **Enzyme-containing detergent compositions and their use.**

57 A detergent composition contains detergent surfactant, preferably anionic and/or nonionic surfactant, preferably builder, and enzymes including protease and amylase, characterised in that the composition contains a combination of three enzymes comprising protease, amylase and a third enzyme selected from lipase and cellulase.

**EP 0 425 214 A2**

## ENZYME-CONTAINING DETERGENT COMPOSITIONS AND THEIR USE

This invention relates to detergent compositions, and to their use, and in particular to compositions containing plural enzymes, and to their use.

### Prior Art:

Detergent compositions containing severally protease, lipase, amylase, cellulase, and other enzymes are known, and certain combinations of enzymes in detergents are also known.

In particular, the use of proteolytic enzymes in both solid and liquid detergent compositions is well known; although these proteolytic enzymes can be of various types and sources, the proteolytic enzymes commonly used are those produced by *Bacillus* strains. Although with such proteolytic enzymes satisfactory results as regards performance can be achieved, it is frequently necessary to include enzyme-stabilizing systems in the case of liquid detergent compositions to provide a satisfactory enzyme stability during storage of the enzymatic liquid detergent composition.

We believe that representative examples of relevant prior art concerning proteases are as follows.

Serine proteases from *Bacillus subtilis* are very widely known and used in detergent compositions. They are available for example under Trade Marks Savinase, Esperase, Maxatase, Alcalase, etc.

The prior art also includes WO 88/03946 (Novo), which discloses, as detergent additives, combinations of *Bacillus* proteases with alkaline fungal or actinomycete proteases, e.g. those proteases obtainable from the genera *Paecilomyces*, *Fusarium*, and *Nocardia*. The disclosure extends to the use of the detergent additive as a liquid, with a known enzyme stabiliser such as propylene glycol, for addition to a liquid detergent.

USP 3 707 504 (Procter & Gamble) discloses detergents for laundry and dishwashing, comprising protease from *Thermoactinomyces vulgaris* ATCC 15734, which are formulated as solid or liquid detergent compositions. This document mentions surprising stability of protease from *Thermoactinomyces vulgaris* in highly-alkaline detergent systems.

As to lipases, GB 1 372 034 (Unilever) for example discloses lipase from *Pseudomonas* in specific nonionic-containing detergent compositions for soaking fabrics.

USP 3 950 277 (Procter & Gamble) also describes fabric-soaking compositions: the described compositions comprise lipase and lipase activators and a number of lipases from microorganism and other sources are mentioned: those particularly

mentioned as preferred are Amano CE, Amano M-AP, Takeda 1969-4-9, and Meito MY-30 lipases, but no indications are given of the form in which the lipase is to be prepared or used.

USP 4 011 169/NL 74 08763 (Procter & Gamble) describes the use of a similar range of enzymes in the preparation of additives for washing agents (detergent compositions).

Examples of known lipase-containing detergent compositions are provided by EP 0 205 208 and 0 206 390 (Unilever), which relate to lipases related to those from *Ps. fluorescens*, *P. gladioli* and *Chromobacter* in detergent compositions.

EP 0 214 761 (Novo) and EP 0 258 068 (Novo), each give detailed description of lipases from certain microorganisms, and also give certain uses in detergent additives and detergent compositions for the enzymes described. EP 0 214 761 gives detailed description of lipases derived from organisms of the species *Pseudomonas cepacia*, and certain uses therefor. EP 0 258 068 gives detailed description of lipases derived from organisms of the genus *Thermomyces/Humicola*, and certain uses therefor.

Also believed to be in use in certain areas is a lipase-containing granular detergent composition containing about 37% detergent actives including 5% nonionic detergent and the remainder substantially anionic detergent, about 16% zeolite, about 60 LU/g lipase, plus protease and other normal detergent additives.

Further examples of known lipase-containing detergent compositions are provided by JA 63-078000 (1988) (Lion Corp/K Mukoyama et al) which discloses properties and uses of a *Pseudomonas* lipase, including use in a lipase-containing system based on 10-40 % surfactant (e.g. sodium C14-C18 alpha-olefin sulphonate), as well as other conventional detergent ingredients.

Also in the prior art is Research Disclosure 29056 of June 1988 which discloses lipase in connexion with a large number of descriptions of detergent compositions, many of which descriptions also mention other enzymes than lipases.

Use of amylase in conjunction with protease is disclosed in for example GB 2 131 826 (Colgate-Palmolive) and specifications cited therein, especially in GB 1 576 946 (Procter & Gamble). Amylase enzyme in detergent compositions is also part of the subject of EP 0 118 933 (Procter & Gamble) and GB 1 247 292 (Novo).

It is known to stabilise enzymes when these are formulated into liquid detergent compositions: representative examples of prior art as to enzyme stabilisation in liquid detergents are as follows.

JP 47-35192 describes the use of glycerol or sorbitol with borax under certain conditions and proportions, to stabilise enzyme preparations including liquid washing materials.

DE 27 28 211 (Unilever) describes the use of polyols of 2 to 6 hydroxy groups together with boric acid or borate in ratios less than 1, particularly in unbuild detergents.

GB 2 079 305 (Unilever) describes the use of polyols together with boric acid and/or borate and polyacrylate polymers as stabilising agents, while EP 0 080 223 (Unilever) describes the combined use of boric acid or borate and polyol or polyamino compounds with reducing salts, and EP 0 126 505 (Unilever) describes the use of boric acid or borate and reducing salts, together with succinic or other dicarboxylic acids. Other prior art deals with the use of stabilisers such as calcium formate/acetate.

#### The Present Invention:

According to the present invention we have found that detergent compositions containing certain mixtures of enzymes can give surprisingly good stain-removal effects. Comparison with earlier compositions shows that some stains can be removed more effectively, others can be effectively removed with lower total amounts of enzyme than with earlier formulations.

According to the present invention there is provided a detergent composition containing detergent surfactant, preferably anionic and/or nonionic, preferably builder, and a combination of at least two and preferably three enzymes selected from protease, lipase, amylase, and cellulase, preferably in proportions more particularly exemplified below.

In particular, the invention provides for example a detergent composition containing detergent surfactant, preferably anionic and/or nonionic surfactant, preferably builder, and enzymes including protease and amylase, characterised in that the composition contains a combination of three enzymes comprising protease, amylase and a third enzyme selected from lipase and cellulase. The ratio between the amount of the amylase and lipase (and/or cellulase) taken together, and the protease is preferably that which is expressed by a ratio in the range 0.3 -540 ( (KNU + KLU\*) ) : KNPU).

KNPU denotes kilo Novo protease units; KNU are kilo Novo units used for measuring amylase activity; KLU are standard kilo units defined by Novo for measuring lipase activity; CEVU are standard units for measuring cellulase activity. KLU\* denotes a composite measure for the purposes herein, in which units of lipase (in KLU) are aggregated with units of cellulase, counted as if 1 KLU were constituted by 10 CEVU for this purpose

only.

Preferably the ratio between the amount of the amylase and lipase (and/or cellulase) taken together, and the protease, is in the range 1-100, e.g. 1-30 ( (KNU + KLU\*) ) : KNPU).

Preferably the relation of amylase to lipase (and/or cellulase) is expressed by a ratio in the range 0.02 - 240 (KNU:KLU\*), e.g. a ratio is in the range 0.1-100, e.g. 1-10 (KNU:KLU\*).

Several useful embodiments of the invention e.g. as described below contain protease, amylase and lipase. Cellulase can be added to such mixtures if desired.

The enzymes can usefully be added in the form of granular compositions of enzyme with carrier material.

It is within the scope of the invention to add plural enzyme preparations in the formulation of the detergent compositions, each of which can be in the form of a composition of a respective enzyme with e.g. granular or slurring material, or to add preparations in which the enzymes are present in admixture. At present, for convenience, we usually choose to add plural enzyme preparations each containing an enzyme with carrier material.

Protease can for example be used in an amount in the range about 0.0002 to about 0.05 Anson units per gram of the detergent composition. Often in practice the quantity of protease added is in the range 0.05-5%, (e.g. 0.2-4%, corresponding in the case of Savinase (TM) to 1-24 KNPU/100g).

The protease can be chosen from among a wide range of enzymes, e.g. those available under the Trade Marks Savinase, Esperase, Maxatase, Alcalase, or other subtilisin proteases obtained from Gram-positive bacteria or fungi, e.g. subtilisins from Bacillus strains, namely, subtilisin 168, subtilisin BPN', subtilisin Carlsberg, subtilisin DY, subtilisin amylosacchariticus, and mesentericopeptidase (Kurihara et al., 1972, J.Biol.Chem. 247:5629-5631; Stahl and Ferrari, 1984, J.Bacteriol. 159:811-819, Jacobs et al., 1985, Nucl.Acids Res. 13:8913-8926; Nedkov et al., 1985, Biol.Chem. Hoppe-Seyler 366:421-430, Svendsen et al., 1986, FEBS Lett 196:228-232), and two fungal subtilisins, subtilisin thermitase from Thermoactinomyces vulgaris (Meloun et al., 1985, FEBS Lett. 1983:195-200) and proteinase K from Tritirachium album (Jany and Mayer, 1985, Biol.Chem. Hoppe-Seyler 366:584-492).

Included within the scope of the invention is the use of modified proteases such as those described in EP 0 130 756 (Genentech), USP 4 760 025 (Genencor), EP 0 214 435 (Henkel), WO 87/04461 (Amgen), WO 87/05050 (Genex), EP 0 303 761 (Genentech), and EP 0 260 105 (Genencor).

Amylase can for example be used 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)), or for example 0.05-5%, (e.g. 0.1-4%, corresponding in the case of Thermamyl (TM) to 6-240 KNU/100g).

A preferred amylase for use in the invention is Thermamyl (from Novo).

The amount of lipase 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.

Often the amount of lipase used is in the range 0.005-5%, (e.g. 0.01-3%, corresponding in the case of Lipolase (TM) to 1-300 KLU/100g).

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).

Cellulase can for example be used in an amount in the range about 0.3 to about 35 CEVU units per gram (30-3500 CEVU/100g) of the detergent composition.

Whenever desired, the enzymes used may be those obtained by genetic engineering on the basis of mutant producer organisms.

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.

It is preferable to choose the enzymes using any one or more of the following ranges and ratios:

For the range of the protease, e.g. about 1 - 24 KNPU/100gram detergent composition (e.g. on basis of solid or liquid composition or of dry components of liquid composition).

For the relation between the amount of the amylase and lipase taken together, and the protease, e.g. a ratio of 0.3 - 540 (KNU + KLU : KNPU).

For the relation of amylase to lipase, e.g. 0.02 - 240 (KNU:KLU).

More-preferred ranges are:

Protease: e.g. 3-6 (KNPU/100g);

Ratio of amylase + lipase to protease of 1-100, e.g. 1-30 (KNU + KLU : KNPU);

Ratio of amylase to lipase of 0.1- 100, e.g. 1 - 10 (KNU:KLU).

Where cellulase is present instead of lipase, these formulae can be applied and adapted reckoning 10 CEVU unit as equivalent to 1 KLU.

For several practical embodiments, it has been found convenient to use up to about 1.9% Savinase, (11.4 KNPU/100g); up to about 1.8% Thermamyl (108 KNU/100g); and up to about 1.1% Lipolase (110 KLU/100g).

Detergent compositions according to the invention 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 from 1-45%, e.g. 5-30% by weight of one or more organic and/or inorganic builders. Typical examples of such builders include alkali metal ortho, pyro, and tripolyphosphates, alkali metal carbonates, either alone or in admixture with calcite, alkali metal citrates, alkali metal nitrilo-triacetates, carboxymethyloxysuccinates, zeolites, polyacetal-carboxylates and so on.

Furthermore, they may contain e.g. 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. The enzymes other than lipase that may be present include protease, amylase, oxidase and cellulase.

The compositions may be formulated in any desired way, e.g. as powders, bars, pastes, liquids, including aqueous and nonaqueous liquids (in many cases incorporating enzyme-stabilising materials), according to per-se known formulations thereof with the addition of enzymes in the types and amounts described herein.

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.

The invention is further illustrated non-limitatively by the following examples.

#### Example 1 & 2:

In each case a detergent powder composition is formulated as follows:

Zeolite 33%,  
 Sokalan CP5 3.6%,  
 Nonionic 3EO 3.3%,  
 Nonionic 7EO 8.0%,  
 Sodium linear alkylbenzenesulphonate 7.4%,  
 Fatty acid 1.0%,  
 Sodium sulphate 0.3%,  
 Sodium perborate monohydrate 14.4%,  
 Tetaethylethylenediamine 5.3%,  
 Antifoam 1.5%,  
 Sodium carbonate 7.8%,  
 Sodium carboxymethylcellulose 1%,  
 Perfume, fluorescer, minors and water to 100%.

The enzymes mentioned above and added (Example 1) in the quantities ('mixture (a)'):

Savinase 6T: 0.64% (3.8 KNPU/100g);  
 Thermamyl 60T: 0.77% (46.2 KNU/100g);  
 Lipolase 100T: 0.15% (15 KLU/100g).

The ratio A + L/P is 16.1. The ratio A/L is 2.9.

The quantities of enzymes added for Example 2 are ('mixture (b)'):

Savinase 6T: 0.64% (3.8 KNPU/100g);  
 Thermamyl 60T: 0.23% (13.8 KNU/100g);  
 Lipolase 100T: 0.25% (25 KLU/100g).

The ratio A + L/P is 6.6. The ratio A/L is 0.55.

These detergent formulations were found to perform well with a combination of good washing results with economy in total use of enzyme.

Further examples of the invention can be formulated as follows:

#### Example 3:

A detergent powder according to an embodiment of the invention containing phosphate builder is formulated to contain: total active detergent about 16%, anionic detergent about 9%, nonionic detergent about 6%, phosphate-containing builder about 20%, acrylic or equivalent polymer about 3.5%, perborate or peracid bleach precursor about 6-18%, amino-containing bleach activator about 2%, silicate or other structurant about 3.5%, protease

enzyme about 8 glycine units/mg, with alkali to adjust to desired pH in use, and neutral inorganic salt, and enzymes.

The anionic detergent is a mixture of sodium dodecylbenzene sulphonate 6% and primary alkyl sulphate 3%. The nonionic detergent is an ethoxylate of an approx. C13-C15 primary alcohol with 7 ethoxylate residues per mole. The phosphate builder is sodium tripolyphosphate. The polymer is polyacrylic acid. The perborate or peracid bleach precursor is sodium tetraborate tetrahydrate or monohydrate. The activator is tetraacetylenehydrazine. The structurant is sodium silicate. The neutral inorganic salt is sodium sulphate. Plural enzymes are included as described above (e.g. mixture (a) or (b)).

#### Example 4:

A detergent powder according to an embodiment of the invention containing zeolite builder is formulated to contain: total active detergent about 16%, anionic detergent about 9%, nonionic detergent about 6%, zeolite-containing builder about 20%, acrylic or equivalent polymer about 3.5%, perborate or peracid bleach precursor about 6-18%, amino-containing bleach activator about 2%, silicate or other structurant about 3.5%, protease enzyme about 8 glycine units/mg, with alkali to adjust to desired pH in use, and neutral inorganic salt, and enzymes.

The anionic detergent is a mixture of sodium dodecylbenzene sulphonate 6% and primary alkyl sulphate 3%. The nonionic detergent is an ethoxylate of an approx. C13-C15 primary alcohol with 7 ethoxylate residues per mole. The zeolite builder is type A zeolite. The polymer is polyacrylic acid. The perborate bleach precursor is sodium tetraborate tetrahydrate or monohydrate. The activator is tetraacetyl-ethylenediamine. The structurant is sodium silicate. The neutral inorganic salt is sodium sulphate. Plural enzymes are included as described above (e.g. mixture (a) or (b)).

#### Example 5:

An aqueous detergent liquid according to an embodiment of the invention is formulated to contain: Dodecylbenzene-sulphonic acid 16%, C12-C15 linear alcohol condensed with 7 mol/mol ethylene oxide 7%, monoethanolamine 2%, citric acid 6.5%, sodium xylenesulphonate 6%, sodium hydroxide about 4.1%, protease 0.5%, minors and water to 100%. The pH is adjusted to a value between 9 and 10. Plural enzymes are included as described above (e.g. mixture (a) or (b)).

## Example 6:

A nonaqueous detergent liquid according to an embodiment of the invention is formulated using 38.5% C13-C15 linear primary alcohol alkoxyated with 4.9 mol/mol ethylene oxide and 2.7 mol/mol propylene oxide, 5% triacetin, 30% sodium triphosphate, 4% soda ash, 15.5% sodium perborate monohydrate containing a minor proportion of oxoborate, 4% TAED, 0.25% EDTA of which 0.1% as phosphonic acid, Aerosil 0.6%, SMC 1%, and 0.6% protease. The pH is adjusted to a value between 9 and 10, e.g. about 9.8. Plural enzymes are included as described above (e.g. mixture (a) or (b)).

## Example 7:

A detergent powder according to an embodiment of the invention is formulated in the form of a granulate having a bulk density of at least 600 g/l, containing about 20% by weight surfactant of which about 10% is sodium dodecylbenzene sulphonate, and the remainder is a mixture of Synperonic A7 and Synperonic A3 (about 5.5% to 4.5%), and zero neutral inorganic salt (e.g. sodium sulphate), plus phosphate builder about 33%, sodium perborate tetrahydrate about 16%, TAED activator about 4.5%, sodium silicate about 6%, and minors including sodium carbonate about 2%, and moisture content about 10%. Plural enzymes are included as described above (e.g. mixture (a) or (b)).

## Example 8:

A detergent powder according to an embodiment of the invention is formulated in the form of a granulate having a bulk density of at least 600 g/l, containing about 20% by weight surfactant of which about 9% is sodium dodecylbenzene sulphonate, and the remainder is a mixture of Synperonic A7 and Synperonic A3 (respectively about 5% & 6%), and zero neutral inorganic salt (e.g. sodium sulphate), plus zeolite builder about 30%, sodium perborate tetrahydrate about 14%, TAED activator about 3.6%, and minors including sodium carbonate about 9%, Dequest 2047 (TM) about 0.7%, and moisture content about 10%. Plural enzymes are included as described above (e.g. mixture (a) or (b)).

## Example 9:

A detergent powder according to an embodiment of the invention is formulated to contain:

Dodecylbenzenesulphonic acid 6%, C12-C15 linear alcohol condensed with 7 mol/mol ethylene oxide 5%, fatty acid soap 3%, Sokolan CP5 polymer (TM) 3%, zeolite A 22%, sodium carbonate 10%, sodium sulphate 17%, clay particles 8%, sodium perborate tetrahydrate 13%, tetraacetylenediamine 2%, protease 0.5%, minors and water to 100%. The pH is adjusted to a value between 9 and 10. Plural enzymes are included as described above (e.g. mixture (a) or (b)).

## Example 10:

A detergent (soap) bar according to an embodiment of the invention is formulated as follows: soap based on pansaponified 82% tallow, 18% coconut oil, neutralised with 0.15% orthophosphoric acid, mixed with protease (about 8 GU/mg of the bar composition) and mixed with sodium formate 2%, borax 2%, propylene glycol 2% and sodium sulphate 1%, is then plodded on a soap production line. Plural enzymes are included as described above (e.g. mixture (a) or (b)).

In further non-limitative Examples of the invention, the indicated quantities of lipase as given in Examples 1-10 (mixtures (a) and (b)) can be replaced by cellulase at the rate of 10 CEVU per KLU activity.

In further embodiments of the invention, structured liquid detergents can for example contain, in addition to plural enzymes as described herein, 2-15% nonionic surfactant, 5-40% total surfactant, comprising nonionic and optionally anionic surfactant, 5-35% phosphate-containing or non-phosphate-containing builder, 0.2-0.8% polymeric thickener, e.g. cross-linked acrylic polymer with m.w. over  $10^6$ , at least 10% sodium silicate, e.g. as neutral waterglass, alkali (e.g. potassium-containing alkali) to adjust to desired pH, preferably in the range 9-10 or upwards, e.g. above pH 11, with a ratio sodium cation: silicate anion (as free silica) (by weight) less than 0.7:1, and viscosity of 0.3-30 Pa.s (at 20 deg. C and 20 reciprocal secs).

For example such detergents can contain about 5% nonionic surfactant C13-15 alcohol alkoxyated with about 5 EO groups per mole and with about 2.7 PO groups per mole, 15-23% neutral waterglass with 3.5 weight ratio between silica and sodium oxide, 13-19% KOH, 8-23% STPP, 0-11% sodium carbonate, 0.5% Carbopol 941 (TM).

The present invention is susceptible of modifications and variations, and the present disclosure extends to the use of all combinations and sub-combinations of the features mentioned and described herein, optionally in combination with each of the features of the above-cited published patent specifications, each of which is specifically incor-

porated by reference herein.

### Claims

1. A detergent composition containing detergent surfactant, preferably anionic and/or nonionic surfactant, preferably builder, and enzymes including protease and amylase, characterised in that the composition contains a combination of three enzymes comprising protease, amylase and a third enzyme selected from lipase and cellulase. 5  
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2. A detergent composition according to claim 1, characterised in that the ratio between the amount of the amylase and lipase (and/or cellulase) taken together, and the protease is expressed by a ratio in the range 0.3 -540 ( (KNU + KLU\*) : KNPU). 15
3. A detergent composition according to claim 2, characterised in that said ratio is in the range 1-100, e.g. 1-30 ( (KNU + KLU\*) : KNPU). 20
4. A detergent composition according to claim 1, characterised in that the relation of amylase to lipase (and/or cellulase) is expressed by a ratio in the range 0.02 - 240 (KNU:KLU\*). 25
5. A detergent composition according to claim 4, characterised in that said ratio is in the range 0.1-100, e.g. 1-10 (KNU:KLU\*). 30
6. A detergent composition according to claim 1, characterised in that the protease is present at about 1 - 24 KNPU/100gram detergent composition, e.g. 3-6 (KNPU/100g). 35
7. A detergent composition according to claim 1, characterised in that the amylase is present in an amount in the range about 1 to about 100 MU (maltose units) per gram of detergent composition, or 0.01-2.5, e.g. 0.1-1, KNU/g (Novo units)), or 0.05-5% by weight, e.g. 0.1-4% by weight. 40
8. A detergent composition according to claim 1, characterised in that lipase used in the range 0.005-5%, e.g. 0.01-3%. 45
9. A detergent composition according to claim 1, characterised in that cellulase is present in an amount in the range about 0.3 to about 35 CEVU units per gram of the detergent composition. 50
10. A detergent composition according to claim 1, wherein the third enzyme is lipase. 55
11. A detergent composition according to claim 1, in the form of a laundry detergent powder containing a bleaching system and a phosphate-containing or non-phosphate-containing builder. 7
12. A detergent composition according to claim 1, in the form of a liquid detergent concentrate composition.