



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
30.06.2010 Bulletin 2010/26

(51) Int Cl.:
C11D 17/04 (2006.01) **B65D 1/02** (2006.01)
B65D 47/42 (2006.01) **B65D 51/24** (2006.01)

(21) Application number: **08172828.9**

(22) Date of filing: **23.12.2008**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

(71) Applicants:
• **Unilever PLC**
London EC4Y 0DY (GB)
Designated Contracting States:
CY GB IE MT
• **Unilever N.V.**
3013 AL Rotterdam (NL)
Designated Contracting States:
AT BE BG CH LI CZ DE DK EE ES FI FR GR HU IS IT LT LU LV MC NL NO PL PT RO SE SI SK TR

(72) Inventors:
• **Morley, Nicola-Jane**
Merseyside, CH63 3JW (GB)
• **Morris, John, Stephen**
Merseyside, CH63 3JW (GB)
• **Singleton, Stephen, John**
Merseyside, CH63 3JW (GB)

(74) Representative: **Hardy, Susan Margaret**
Unilever Patent Group
Colworth House
Sharnbrook
Bedford, MK44 1LQ (GB)

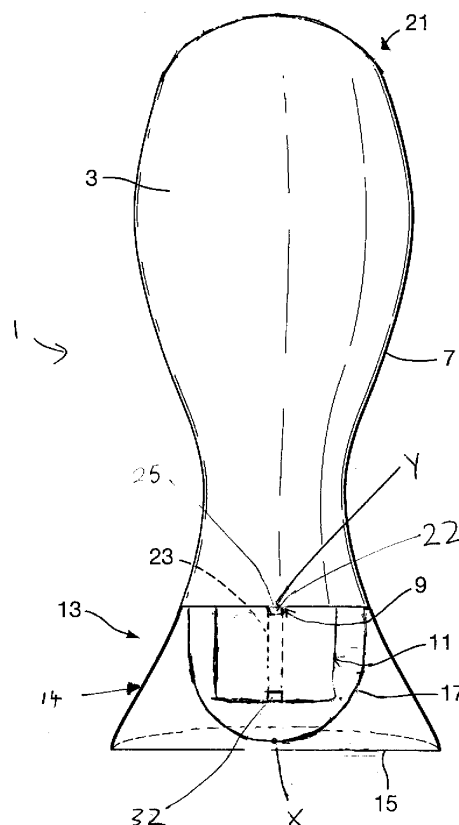
(54) **A flowable laundry composition and packaging therefor**

(57) A packaged laundry product comprising a flowable laundry composition contained in a package, wherein:

(i) the flowable laundry composition has a viscosity of at least 100 Pa.s. (and preferably at least 500 Pa.s) when in rest or up to a shear stress of 10 Pa and comprising at least one surfactant; and

(ii) the package comprises a squeeze-operated compressible container in which the flowable laundry composition is stored and a dispensing device and stain treatment device both located at the base of the compressible container;

(iii) a reservoir providing a supportive base portion and configured to receive the dispensed flowable laundry composition from the dispensing device and also receive at least a portion of the stain treatment device.



Description

[0001] The present invention concerns a viscous laundry product and packaging therefore.

[0002] An objective is to provide an improved pre-treatment device for the precise pre-treatment of laundry stains.

[0003] Accordingly, in a first aspect, the present invention provides a packaged laundry product comprising a flowable laundry composition contained in a package, wherein:

(i) the flowable laundry composition has a viscosity of at least 100 Pa.s. (and preferably at least 500 Pa.s) when in rest or up to a shear stress of 10 Pa and comprising at least one surfactant; and

(ii) the package comprises a squeeze-operated compressible container in which the flowable laundry composition is stored and a dispensing device and stain treatment device both located at the base of the compressible container;

(iii) a reservoir providing a supportive base portion and configured to receive the dispensed flowable laundry composition from the dispensing device and also receive at least a portion of the stain treatment device.

[0004] In a second aspect the invention provides a method of treating a stain on a fabric using the device of the first aspect, the method comprising the steps of:

(i) squeezing the compressible container to dispense the flowable laundry composition into the reservoir;

(ii) inserting the at least a portion of the stain treatment device into the dispensed flowable laundry composition within the reservoir; and

(iii) treating the stain by applying the flowable laundry composition on the at least one portion of the stain treatment device to the stain.

[0005] Steps (ii) and (iii) may be repeated at least once e.g. for larger stains, where repeated loading of the stain treatment device is needed.

[0006] The advantage of the above arrangement is that it offers great ease in a high viscosity composition vis-à-vis stained areas. Highly viscous liquids or gels are desirable for treating as they do not spread out so much after application and so can be restricted to the stain area. However, stain treating with such high viscosity fluids using squeeze-operated hand-held products can be difficult ergonomically. One particular problem is how to dispense a high viscosity composition onto the stain treatment device so it may be applied to the stain. Various devices are known, such as sponge applicators downstream of a dispensing orifice, whereby dispensing the fluid forces it through the sponge, however this is difficult with high viscosity fluids to get large amounts onto the stain treatment device.

[0007] The arrangement of invention allows the composition to be dispensed in the reservoir, such that it can be applied to the stain treatment device very easily and repeatedly for repeated loading with the composition which is useful for larger stains.

[0008] Importantly, as a consequence of the dispensing/stain treatment part being positioned at the base of the reservoir, means the user does not need to invert the package to dispense and treat stains as gravity maintains the composition at the bottom of the container, ready for dispensing. The dispensing device need not involve complicated and expensive seal/valves as the reservoir encloses the stain treatment device any drips are collected in the reservoir for later use. This also allows efficient emptying of the bottle when the composition is nearly all used up.

[0009] The stained area may present in any form such as discolouration, fading, darkening and may be due to soil or dirt or any other stain-creating substance. Generally stains affect localised areas (as opposed to the whole garment being affected) but can be quite large.

[0010] The treatment may precede a further operation such as a main washing operation. However it may also incorporate a rinsing process whereby the stain is simply treated and the stained area or whole fabric/article rinsed without a main wash.

[0011] The dispensing device may comprise a channel or duct or valve or aperture or any combination thereof.

[0012] The reservoir may be part of a closure and may also be used as a dosing device which can be placed in a washing machine along with the stained fabric (for a main wash or for a rinse etc) which has been pre-treated using the stain treatment device.

[0013] The reservoir preferably receives the stain treatment device to such a degree that the stain treatment device projects into the reservoir by more than 50% of the depth of the reservoir, and more preferably by more than 60%, even more preferably by more than 75% and most preferably by more than 90%.

[0014] The depth of the reservoir would preferably be the depth measured from the centre of the reservoir base to the top level of the reservoir sides at its highest point. For example in the case of a generally hemispherical reservoir the depth would be measured along the longitudinal axis from the centre of the base which is the deepest part to the level

of the sides - in Fig 1 this is shown from X to Y.

[0015] This feature means that the stain treatment device projects sufficiently deeply into the reservoir such that the stain treatment device is easily loaded with the composition. Where the reservoir forms part of a closure device, this is especially advantageous, since it minimises the risk that inserting the stain treater into the reservoir activates any closure mechanism (e.g. by snap-fit engagement or screw-on screw-off) as screw-threads or snap-fit members become engaged by accident.

[0016] The stain treatment device may comprise a device allowing mechanical cleaning, such as a body with multiple projections. The projections may be flexible so that they move during cleaning providing a light cleaning action. Alternatively some or all of the projections may be semi-rigid or rigid so as to provide a harsher mechanical cleaning action.

[0017] In one embodiment the stain treatment device comprises a generally hemispherical body with multiple projections extending radially therefrom.

[0018] The stain treatment device may itself be an extension of the dispensing device. So it may be continuous with e.g. a dispensing aperture, valve etc. It may comprise a surface surrounding said aperture or valve etc. so that it can be loaded with, so as to carry the composition which is then applied to the stained area without any scrubbing action as might be used with the above described devices containing projections. The surface may be a ring (full or partial e.g. annular section) around the dispensing aperture.

[0019] The package may have a convex, preferably a curved e.g. hemispherical top to deter users from storing the bottle top-down. In this way the package is more likely to be stored in a stain treatment device - loading position i.e. with the flowable laundry composition accumulated by gravity in the base of the package.

[0020] The composition is preferably a shear thinning gel-type composition. The viscosity under shear stress may be less than 300 Pa.s, preferably less than 100 Pa.s and more preferably less than 5 Pa.s, even more preferably it is at most 1 Pa.s and most preferably it is at most 0.5 Pa.s.

[0021] Shear thinning compositions may comprise a polymer gum, e.g. Xanthan gum or other gum capable of forming stable continuous gum networks which can suspend particles.

[0022] Other external structurant e.g. hydrogenated castor oil, micro crystalline cellulose may be used.

[0023] Another method useful is to change a non-gelled formulation so as to form an internal structure therein where the structure gives the desired properties to the thus-formed gel-type detergent. The composition may comprise a soap or fatty acid in combination with sodium sulphate and one or more surfactants may be used to form a gelled structure by the formation of lamellar phases.

[0024] The composition may comprise a lamellar phase dispersions from a micellar surfactant systems, and additionally a structurant for establishing the lamellar phase, whereby said structurant may be a fatty alcohol.

[0025] The composition of invention contains one or more surfactants and/or optionally other ingredients such that the composition is fully functional as a laundry cleaning and/or care composition. A composition of the invention may be provided in solid or liquid form. If in a solid form, the composition may be rehydrated and/or dissolved in a solvent, including water, before use. The composition may be provided in a concentrated form to be diluted or may be a ready-to-use (in-use) composition.

[0026] The present invention is suitable for use in industrial or domestic fabric wash compositions. The present invention can also be applied to industrial or domestic non-detergent based fabric care compositions.

[0027] Other contemplated ingredients including hydrotropes, preservatives, fillers, builders, complexing agents, polymers, stabilizers, perfumes per se, other conventional detergent ingredients, or combinations of one or more thereof are discussed below.

Surfactants:

[0028] Fabric wash compositions according to the present invention comprise a fabric wash detergent material selected from non-soap anionic surfactant, nonionic surfactants, soap, amphoteric surfactants, zwitterionic surfactants and mixtures thereof.

[0029] Detergent compositions suitable for use in domestic or industrial automatic fabric washing machines generally contain anionic non-soap surfactant or nonionic surfactant, or combinations of the two in suitable ratio, as will be known to the person skilled in the art, optionally together with soap.

[0030] The surfactants may be present in the composition at a level of from 0.1% to 60% by weight.

[0031] Suitable anionic surfactants include alkyl benzene sulphonate, primary and secondary alkyl sulphates, particularly C₈-C₁₅ primary alkyl sulphates; alkyl ether sulphates; olefin sulphonates; alkyl xylene sulphonates, dialkyl sulphonates; ether carboxylates; isethionates; sarcosinates; fatty acid ester sulphonates and mixtures thereof. The sodium salts are generally preferred. When included therein the composition usually contains from about 1% to about 50%, preferably 10 wt%-40 wt% based on the fabric treatment composition of an anionic surfactant such as linear alkylbenzenesulfonate, alpha-olefinsulfonate, alkyl sulfate (fatty alcohol sulfate), alcohol ethoxysulfate, secondary alkanesul-

fonate, alpha-sulfo fatty acid methyl ester, alkyl- or alkenylsuccinic acid or soap. Preferred surfactants are alkyl ether sulphates and blends of alkoxylated alkyl nonionic surfactants with either alkyl sulphonates or alkyl ether sulphates.

[0032] Preferred alkyl ether sulphates are C₈-C₁₅ alkyl and have 2-10 moles of ethoxlation. Preferred alkyl sulphates are alkylbenzene sulphonates, particularly linear alkylbenzene sulphonates having an alkyl chain length of C₈-C₁₅. The counter ion for anionic surfactants is typically sodium, although other counter-ions such as TEA or ammonium can be used. Suitable anionic surfactant materials are available in the marketplace as the 'Genapol'™ range from Clariant.

[0033] Nonionic surfactants include primary and secondary alcohol ethoxylates, especially C₈-C₇ aliphatic alcohol ethoxylated with an average of from 1 to 7 moles of ethylene oxide per mole of alcohol, and more especially the C₁₀-C₁₅ primary and secondary aliphatic alcohols ethoxylated with an average of from 1 to 10 moles of ethylene oxide per mole of alcohol. Non-ethoxylated nonionic surfactants include alkyl polyglycosides, glycerol monoethers and polyhydroxy amides (glucamide). Mixtures of nonionic surfactant may be used. When included therein the composition usually contains from about 0.2% to about 40%, preferably 1 to 7 wt%, more preferably 5 to 15 wt% of a non-ionic surfactant such as alcohol ethoxylate, nonylphenol ethoxylate, alkylpolyglycoside, alkyl dimethylamineoxide, ethoxylated fatty acid monoethanolamide, fatty acid monoethanolamide, polyhydroxy alkyl fatty acid amide, or N-acyl N-alkyl derivatives of glucosamine ("glucamides").

[0034] Nonionic surfactants that may be used include the primary and secondary alcohol ethoxylates, especially the C₈-C₇ aliphatic alcohols ethoxylated with an average of from 1 to 35 moles of ethylene oxide per mole of alcohol, and more especially the C₁₀-C₁₅ primary and secondary aliphatic alcohols ethoxylated with an average of from 1 to 10 moles of ethylene oxide per mole of alcohol.

Enzymes:

[0035] The composition may comprise one or more enzymes may be in any suitable. It is to be understood that enzyme variants (produced, for example, by recombinant techniques) are included within the meaning of the term "enzyme". Examples of such enzyme variants are disclosed, e.g., in EP 251,446 (Genencor), WO 91/00345 (Novo Nordisk), EP 525,610 (Solvay) and WO 94/02618 (Gist-Brocades NV).

[0036] The types of enzymes which may appropriately be incorporated in granules of the invention include oxidoreductases, transferases hydrolases, lyases, isomerases and ligases, that is, respectively (EC 1.-.-.-), (EC 2.-.-.-), (EC 3.-.-.-), (EC 4.-.-.-), (EC 5.-.-.-), (EC 6.-.-.-), wherein such enzyme classification is in accordance with Recommendations (1992) of the Nomenclature Committee of the International Union of Biochemistry and Molecular Biology, Academic Press, Inc., 1992.

[0037] Especially contemplated enzymes include proteases, alpha-amylases, cellulases, lipases, peroxidases/oxidases, pectate lyases, and mannanases, or mixtures thereof. Most preferred enzymes are proteases.

[0038] Suitable proteases include those of animal, vegetable or microbial origin.

Microbial origin is preferred. Chemically modified or protein engineered mutants are included. The protease may be a serine protease or a metallo protease, preferably an alkaline microbial protease or a trypsin-like protease. Examples of alkaline proteases are subtilisins, especially those derived from *Bacillus*, e.g., subtilisin Novo, subtilisin Carlsberg, subtilisin 309, subtilisin 147 and subtilisin 168 (described in WO 89/06279). Examples of trypsin-like proteases are trypsin (e.g. of porcine or bovine origin) and the *Fusarium* protease described in WO 89/06270 and WO 94/25583.

[0039] Examples of useful proteases are the variants described in WO 92/19729, WO 98/20115, WO 98/20116, and WO 98/34946, especially the variants with substitutions in one or more of the following positions: 27, 36, 57, 76, 87, 97, 101, 104, 120, 123, 167, 170, 194, 206, 218, 222, 224, 235 and 274. Preferred commercially available protease enzymes include Alcalase™, Savinase™, Primase™, Duralase™, Dyrazym™, Esperase™, Everlase™, Polarzyme™, and Kan-nase™, (Novozymes A/S), Maxatase™, Maxacal™, Maxapem™, Properase™, Purafect™, Purafect OxP™, FN2™, and FN3™ (Genencor International Inc.).

[0040] Suitable lipases include those of bacterial or fungal origin. Chemically modified or protein engineered mutants are included. Examples of useful lipases include lipases from *Humicola* (synonym *Thermomyces*), e.g. from *H. lanuginosa* (*T. lanuginosus*) as described in EP 258 068 and EP 305 216 or from *H. insolens* as described in WO 96/13580, a *Pseudomonas* lipase, e.g. from *P. alcaligenes* or *P. pseudoalcaligenes* (EP 218 272), *P. cepacia* (EP 331 376), *P. stutzeri* (GB 1,372,034), *P. fluorescens*, *Pseudomonas* sp. strain SD 705 (WO 95/06720 and WO 96/27002), *P. wisconsinensis* (WO 96/12012), a *Bacillus* lipase, e.g. from *B. subtilis* (Dartois et al. (1993), *Biochemica et Biophysica Acta*, 1131, 253-360), *B. stearothermophilus* (JP 64/744992) or *B. pumilus* (WO 91/16422).

[0041] Other examples are lipase variants such as those described in WO 92/05249, WO 94/01541, EP 407 225, EP 260 105, WO 95/35381, WO 96/00292, WO 95/30744, WO 94/25578, WO 95/14783, WO 95/22615, WO 97/04079 and WO 97/07202.

[0042] Preferred commercially available lipase enzymes include Lipolase™ and Lipolase Ultra™, Lipex™ (Novozymes A/S).

[0043] The method of the invention may be carried out in the presence of cutinase, classified in EC 3.1.1.74. The

cutinase used according to the invention may be of any origin. Preferably cutinases are of microbial origin, in particular of bacterial, of fungal or of yeast origin.

[0044] Cutinases are enzymes which are able to degrade cutin. In a preferred embodiment, the cutinase is derived from a strain of *Aspergillus*, in particular *Aspergillus oryzae*, a strain of *Alternaria*, in particular *Alternaria brassiciola*, a strain of *Fusarium*, in particular *Fusarium solani*, *Fusarium solani pisi*, *Fusarium roseum culmorum*, or *Fusarium roseum sambucium*, a strain of *Helminthosporium*, in particular *Helminthosporium sativum*, a strain of *Humicola*, in particular *Humicola insolens*, a strain of *Pseudomonas*, in particular *Pseudomonas mendocina*, or *Pseudomonas putida*, a strain of *Rhizoctonia*, in particular *Rhizoctonia solani*, a strain of *Streptomyces*, in particular *Streptomyces scabies*, or a strain of *Ulocladium*, in particular *Ulocladium consortiale*. In a most preferred embodiment the cutinase is derived from a strain of *Humicola insolens*, in particular the strain *Humicola insolens* DSM 1800. *Humicola insolens* cutinase is described in WO 96/13580 which is hereby incorporated by reference. The cutinase may be a variant, such as one of the variants disclosed in WO 00/34450 and WO 01/92502, which are hereby incorporated by reference. Preferred cutinase variants include variants listed in Example 2 of WO 01/92502, which is hereby specifically incorporated by reference.

[0045] Preferred commercial cutinases include NOVOZYM™ 51032 (available from Novozymes A/S, Denmark).

[0046] The method of the invention may be carried out in the presence of phospholipase classified as EC 3.1.1.4 and/or EC 3.1.1.32. As used herein, the term phospholipase is an enzyme which has activity towards phospholipids. Phospholipids, such as lecithin or phosphatidylcholine, consist of glycerol esterified with two fatty acids in an outer (sn-1) and the middle (sn-2) positions and esterified with phosphoric acid in the third position; the phosphoric acid, in turn, may be esterified to an amino-alcohol. Phospholipases are enzymes which participate in the hydrolysis of phospholipids. Several types of phospholipase activity can be distinguished, including phospholipases A₁ and A₂ which hydrolyze one fatty acyl group (in the sn-1 and sn-2 position, respectively) to form lysophospholipid; and lysophospholipase (or phospholipase B) which can hydrolyze the remaining fatty acyl group in lysophospholipid. Phospholipase C and phospholipase D (phosphodiesterases) release diacyl glycerol or phosphatidic acid respectively.

[0047] The term phospholipase includes enzymes with phospholipase activity, e.g., phospholipase A (A₁ or A₂), phospholipase B activity, phospholipase C activity or phospholipase D activity. The term "phospholipase A" used herein in connection with an enzyme of the invention is intended to cover an enzyme with Phospholipase A₁ and/or Phospholipase A₂ activity. The phospholipase activity may be provided by enzymes having other activities as well, such as, e.g., a lipase with phospholipase activity. The phospholipase activity may, e.g., be from a lipase with phospholipase side activity. In other embodiments of the invention the phospholipase enzyme activity is provided by an enzyme having essentially only phospholipase activity and wherein the phospholipase enzyme activity is not a side activity.

[0048] The phospholipase may be of any origin, e.g., of animal origin (such as, e.g., mammalian), e.g. from pancreas (e.g., bovine or porcine pancreas), or snake venom or bee venom. Preferably the phospholipase may be of microbial origin, e.g., from filamentous fungi, yeast or bacteria, such as the genus or species *Aspergillus*, e.g., *A. niger*; *Dictyosporium*, e.g., *D. discoideum*; *Mucor*, e.g. *M. javanicus*, *M. mucedo*, *M. subtilissimus*; *Neurospora*, e.g. *N. crassa*; *Rhizomucor*, e.g., *R. pusillus*; *Rhizopus*, e.g. *R. arrhizus*, *R. japonicus*, *R. stolonifer*; *Sclerotinia*, e.g., *S. libertiana*; *Trichophyton*, e.g. *T. rubrum*; *Whetzelinia*, e.g., *W. sclerotiorum*; *Bacillus*, e.g., *B. megaterium*, *B. subtilis*; *Citrobacter*, e.g., *C. freundii*; *Enterobacter*, e.g., *E. aerogenes*, *E. cloacae* *Edwardsiella*, *E. tarda*; *Erwinia*, e.g., *E. herbicola*; *Escherichia*, e.g., *E. coli*; *Klebsiella*, e.g., *K. pneumoniae*; *Proteus*, e.g., *P. vulgaris*; *Providencia*, e.g., *P. stuartii*; *Salmonella*, e.g. *S. typhimurium*; *Serratia*, e.g., *S. liquefaciens*, *S. marcescens*; *Shigella*, e.g., *S. flexneri*; *Streptomyces*, e.g., *S. violaceoruber*; *Yersinia*, e.g., *Y. enterocolitica*. Thus, the phospholipase may be fungal, e.g., from the class *Pyrenomycetes*, such as the genus *Fusarium*, such as a strain of *F. culmorum*, *F. heterosporum*, *F. solani*, or a strain of *F. oxysporum*. The phospholipase may also be from a filamentous fungus strain within the genus *Aspergillus*, such as a strain of *Aspergillus awamori*, *Aspergillus foetidus*, *Aspergillus japonicus*, *Aspergillus niger* or *Aspergillus oryzae*.

[0049] Preferred phospholipases are derived from a strain of *Humicola*, especially *Humicola lanuginosa*. The phospholipase may be a variant, such as one of the variants disclosed in WO 00/32758, which are hereby incorporated by reference. Preferred phospholipase variants include variants listed in Example 5 of WO 00/32758, which is hereby specifically incorporated by reference. In another preferred embodiment the phospholipase is one described in WO 04/111216, especially the variants listed in the table in Example 1.

[0050] In another preferred embodiment the phospholipase is derived from a strain of *Fusarium*, especially *Fusarium oxysporum*. The phospholipase may be the one concerned in WO 98/026057 derived from *Fusarium oxysporum* DSM 2672, or variants thereof.

[0051] In a preferred embodiment of the invention the phospholipase is a phospholipase A₁ (EC. 3.1.1.32). In another preferred embodiment of the invention the phospholipase is a phospholipase A₂ (EC.3.1.1.4.).

[0052] Examples of commercial phospholipases include LECITASE™ and LECITASE™ ULTRA, YIELSMAX, or LI-POPAN F (available from Novozymes A/S, Denmark).

[0053] Suitable amylases (alpha and/or beta) include those of bacterial or fungal origin. Chemically modified or protein engineered mutants are included. Amylases include, for example, alpha-amylases obtained from *Bacillus*, e.g. a special strain of *B. licheniformis*, described in more detail in GB 1,296,839, or the *Bacillus* sp. strains disclosed in WO 95/026397

or WO 00/060060.

[0054] Examples of useful amylases are the variants described in WO 94/02597, WO 94/18314, WO 96/23873, WO 97/43424, WO 01/066712, WO 02/010355, WO 02/031124 and PCT/DK2005/000469 (which references all incorporated by reference).

[0055] Commercially available amylases are Duramyl™, Termamyl™, Termamyl Ultra™, Natalase™, Stainzyme™, Fungamyl™ and BAN™ (Novozymes A/S), Rapidase™ and Purastar™ (from Genencor International Inc.).

[0056] Suitable cellulases include those of bacterial or fungal origin. Chemically modified or protein engineered mutants are included. Suitable cellulases include cellulases from the genera *Bacillus*, *Pseudomonas*, *Humicola*, *Fusarium*, *Thielavia*, *Acremonium*, e.g. the fungal cellulases produced from *Humicola insolens*, *Thielavia terrestris*, *Myceliophthora thermophila*, and *Fusarium oxysporum* disclosed in US 4,435,307, US 5,648,263, US 5,691,178, US 5,776,757, WO 89/09259, WO 96/029397, and WO 98/012307.

[0057] Especially suitable cellulases are the alkaline or neutral cellulases having color care benefits. Examples of such cellulases are cellulases described in EP 0 495 257, EP 0 531 372, WO 96/11262, WO 96/29397, WO 98/08940. Other examples are cellulase variants such as those described in WO 94/07998, EP 0 531 315, US 5,457,046, US 5,686,593, US 5,763,254, WO 95/24471, WO 98/12307 and PCT/DK98/00299.

[0058] Commercially available cellulases include Celluzyme™, Carezyme™, Endolase™, Renozyme™ (Novozymes A/S), Clazinase™ and Puradax HA™ (Genencor International Inc.), and KAC-500(B)™ (Kao Corporation).

[0059] Suitable peroxidases/oxidases include those of plant, bacterial or fungal origin. Chemically modified or protein engineered mutants are included. Examples of useful peroxidases include peroxidases from *Coprinus*, e.g. from *C. cinereus*, and variants thereof as those described in WO 93/24618, WO 95/10602, and WO 98/15257. Commercially available peroxidases include Guardzyme™ and Novozym™ 51004 (Novozymes A/S).

[0060] Examples of pectate lyases include pectate lyases that have been cloned from different bacterial genera such as *Erwinia*, *Pseudomonas*, *Klebsiella* and *Xanthomonas*, as well as from *Bacillus subtilis* (Nasser et al. (1993) FEBS Letts. 335:319-326) and *Bacillus* sp. YA-14 (Kim et al. (1994) Biosci. Biotech. Biochem. 58:947-949). Purification of pectate lyases with maximum activity in the pH range of 8-10 produced by *Bacillus pumilus* (Dave and Vaughn (1971) J. Bacteriol. 108:166-174), *B. polymyxa* (Nagel and Vaughn (1961) Arch. Biochem. Biophys. 93:344-352), *B. stearothermophilus* (Karbassi and Vaughn (1980) Can. J. Microbiol. 26:377-384), *Bacillus* sp. (Hasegawa and Nagel (1966) J. Food Sci. 31:838-845) and *Bacillus* sp. RK9 (Kelly and Fogarty (1978) Can. J. Microbiol. 24:1164-1172) have also been described. Any of the above, as well as divalent cation-independent and/or thermostable pectate lyases, may be used in practicing the invention. In preferred embodiments, the pectate lyase comprises the amino acid sequence of a pectate lyase disclosed in Heffron et al., (1995) Mol. Plant-Microbe Interact. 8: 331-334 and Henrissat et al., (1995) Plant Physiol. 107: 963-976. Specifically contemplated pectate lyases are disclosed in WO 99/27083 and WO 99/27084. Other specifically contemplated pectate lyases derived from *Bacillus licheniformis* is disclosed in US patent no. 6,284,524 (which document is hereby incorporated by reference). Specifically contemplated pectate lyase variants are disclosed in WO 02/006442, especially the variants disclosed in the Examples in WO 02/006442 (which document is hereby incorporated by reference).

[0061] Examples of commercially available alkaline pectate lyases include BIOPREP™ and SCOURZYME™ L from Novozymes A/S, Denmark.

[0062] Examples of mannanases (EC 3.2.1.78) include mannanases of bacterial and fungal origin. In a specific embodiment the mannanase is derived from a strain of the filamentous fungus genus *Aspergillus*, preferably *Aspergillus niger* or *Aspergillus aculeatus* (WO 94/25576). WO 93/24622 discloses a mannanase isolated from *Trichoderma reesei*. Mannanases have also been isolated from several bacteria, including *Bacillus* organisms. For example, Talbot et al., Appl. Environ. Microbiol., Vol.56, No. 11, pp. 3505-3510 (1990) describes a beta-mannanase derived from *Bacillus stearothermophilus*. Mendoza et al., World J. Microbiol. Biotech., Vol. 10, No. 5, pp. 551-555 (1994) describes a beta-mannanase derived from *Bacillus subtilis*. JP-A-03047076 discloses a beta-mannanase derived from *Bacillus* sp. JP-A-63056289 describes the production of an alkaline, thermostable beta-mannanase. JP-A-63036775 relates to the *Bacillus* microorganism FERM P-8856 which produces beta-mannanase and beta-mannosidase. JP-A-08051975 discloses alkaline beta-mannanases from alkalophilic *Bacillus* sp. AM-001. A purified mannanase from *Bacillus amyloliquefaciens* is disclosed in WO 97/11164. WO 91/18974 describes a hemicellulase such as a glucanase, xylanase or mannanase active. Contemplated are the alkaline family 5 and 26 mannanases derived from *Bacillus agaradhaerens*, *Bacillus licheniformis*, *Bacillus halodurans*, *Bacillus clausii*, *Bacillus* sp., and *Humicola insolens* disclosed in WO 99/64619. Especially contemplated are the *Bacillus* sp. mannanases concerned in the Examples in WO 99/64619 which document is hereby incorporated by reference.

[0063] Examples of commercially available mannanases include Mannaway™ available from Novozymes A/S Denmark.

[0064] Any enzyme present in the composition may be stabilized using conventional stabilizing agents, e.g., a polyol such as propylene glycol or glycerol, a sugar or sugar alcohol, lactic acid, boric acid, or a boric acid derivative, e.g., an aromatic borate ester, or a phenyl boronic acid derivative such as 4-formylphenyl boronic acid, and the composition may

be formulated as described in e.g. WO 92/19709 and WO 92/19708.

Hydrotropes:

[0065] The term "hydrotrope" generally means a compound with the ability to increase the solubilities, preferably aqueous solubilities, of certain slightly soluble organic compounds.

[0066] Examples of hydrotropes include sodium xylene sulfonate, SCM.

Solvents:

[0067] The composition may comprise a solvent such as water or an organic solvent such as isopropyl alcohol or glycol ethers. Solvents may be present in liquid or gel compositions.

Metal Chelation Agents:

[0068] The composition may contain a metal chelating agent such as carbonates, bicarbonates, and sesquicarbonates. The metal chelating agent can be a bleach stabiliser (i.e. heavy metal sequestrant). Suitable bleach stabilisers include ethylenediamine tetraacetate (EDTA), diethylenetriamine pentaacetate (DTPA), ethylenediamine disuccinate (EDDS), and the polyphosphonates such as the Dequests (Trade Mark), ethylenediamine tetramethylene phosphonate (EDTMP) and diethylenetriamine pentamethylene phosphate (DETPMP). In general metal chelating agents will not be present in the part (a) of the composition as microbial function may be impaired if metal ions are made unavailable.

Builders or Complexing Agents:

[0069] Builder materials may be selected from 1) calcium sequestrant materials, 2) precipitating materials, 3) calcium ion-exchange materials and 4) mixtures thereof.

[0070] Examples of calcium sequestrant builder materials include alkali metal polyphosphates, such as sodium tripolyphosphate and organic sequestrants, such as ethylene diamine tetra-acetic acid.

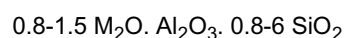
[0071] Examples of precipitating builder materials include sodium orthophosphate and sodium carbonate.

[0072] Examples of calcium ion-exchange builder materials include the various types of water-insoluble crystalline or amorphous aluminosilicates, of which zeolites are the best known representatives, e.g. zeolite A, zeolite B (also known as zeolite P), zeolite C, zeolite X, zeolite Y and also the zeolite P-type as described in EP-A-0,384,070.

[0073] The composition may also contain 0-65 % of a builder or complexing agent such as ethylenediaminetetraacetic acid, diethylenetriamine-pentaacetic acid, alkyl- or alkenylsuccinic acid, nitrilotriacetic acid or the other builders mentioned below. Many builders are bleach-stabilising agents by virtue of their ability to complex metal ions.

[0074] Where builder is present, the compositions may suitably contain less than 7%wt, preferably less than 10% by weight, and most preferably less than 10%wt of detergency builder.

[0075] The composition may contain as builder a crystalline aluminosilicate, preferably an alkali metal aluminosilicate, more preferably a sodium aluminosilicate. This is typically present at a level of less than 15%w. Aluminosilicates are materials having the general formula:



where M is a monovalent cation, preferably sodium. 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. They can be prepared readily by reaction between sodium silicate and sodium aluminate, as amply described in the literature. The ratio of surfactants to aluminosilicate (where present) is preferably greater than 5:2, more preferably greater than 3:1.

[0076] Alternatively, or additionally to the aluminosilicate builders, phosphate builders may be used. In this art the term 'phosphate' embraces diphosphate, triphosphate, and phosphonate species. Other forms of builder include silicates, such as soluble silicates, metasilicates, layered silicates (e.g. SKS-6 from Hoechst).

[0077] For low cost formulations carbonate (including bicarbonate and sesquicarbonate) and/or citrate may be employed as builders.

Polymers:

[0078] The composition may comprise one or more polymers. Examples are carboxymethylcellulose, poly(vinylpyrrolidone), poly(ethylene glycol), poly(vinyl alcohol), poly(vinylpyridine-N-oxide), poly(vinylimidazole), polycarboxylates

such as polyacrylates, maleic/acrylic acid copolymers and lauryl methacrylate/acrylic acid copolymers.

[0079] Modern detergent compositions typically employ polymers as so-called 'dye-transfer inhibitors'. These prevent migration of dyes, especially during long soak times. Any suitable dye-transfer inhibition agents may be used in accordance with the present invention. Generally, such dye-transfer inhibiting agents include polyvinyl pyrrolidone polymers, polyamine N-oxide polymers, copolymers of N-vinylpyrrolidone and N-vinylimidazole, manganese phthalocyanine, peroxidases, and mixtures thereof.

[0080] Nitrogen-containing, dye binding, DTI polymers are preferred. Of these polymers and co-polymers of cyclic amines such as vinyl pyrrolidone, and/or vinyl imidazole are preferred.

[0081] Polyamine N-oxide polymers suitable for use herein contain units having the following structural formula: $R-A_x-P$; wherein P is a polymerizable unit to which an N-O group can be attached or the N-O group can form part of the polymerizable unit; A is one of the following structures: $-NC(O)-$, $-C(O)O-$, $-S-$, $-O-$, $-N=$; x is 0 or 1; and R is an aliphatic, ethoxylated aliphatic, aromatic, heterocyclic or alicyclic group or combination thereof to which the nitrogen of the N-O group can be attached or the N-O group is part of these groups, or the N-O group can be attached to both units. Preferred polyamine N-oxides are those wherein R is a heterocyclic group such as pyridine, pyrrole, imidazole, pyrrolidine, piperidine and derivatives thereof. The N-O group can be represented by the following general structures: $N(O)(R')_{0-3}$, or $=N(O)(R')_{0-1}$, wherein each R' independently represents an aliphatic, aromatic, heterocyclic or alicyclic group or combination thereof; and the nitrogen of the N-O group can be attached or form part of any of the aforementioned groups. The amine oxide unit of the polyamine N-oxides has a $pK_a < 10$, preferably $pK_a < 7$, more preferably $pK_a < 6$.

[0082] Any polymer backbone can be used provided the amine oxide polymer formed is water-soluble and has dye transfer inhibiting properties. Examples of suitable polymeric backbones are polyvinyls, polyalkylenes, polyesters, polyethers, polyamides, polyimides, polyacrylates and mixtures thereof. These polymers include random or block copolymers where one monomer type is an amine N-oxide and the other monomer type is an N-oxide. The amine N-oxide polymers typically have a ratio of amine to the amine N-oxide of 10:1 to 1:1,000,000. However, the number of amine oxide groups present in the polyamine oxide polymer can be varied by appropriate copolymerization or by an appropriate degree of N-oxidation. The polyamine oxides can be obtained in almost any degree of polymerization.

[0083] Typically, the average molecular weight is within the range of 500 to 1,000,000; more preferably 1,000 to 500,000; most preferably 5,000 to 100,000. This preferred class of materials is referred to herein as "PVNO". A preferred polyamine N-oxide is poly(4-vinylpyridine-N-oxide) which has an average molecular weight of about 50,000 and an amine to amine N-oxide ratio of about 1:4.

[0084] Copolymers of N-vinylpyrrolidone and N-vinylimidazole polymers (as a class, referred to as "PVPVI") are also preferred. Preferably the PVPVI has an average molecular weight range from 5,000 to 1,000,000, more preferably from 5,000 to 70,000, and most preferably from 10,000 to 7,000, as determined by light scattering as described in Barth, et al., Chemical Analysis, Vol. 113, "Modern Methods of Polymer Characterization". The preferred PVPVI copolymers typically have a molar ratio of N-vinylimidazole to N-vinylpyrrolidone from 1:1 to 0.2:1, more preferably from 0.8:1 to 0.3:1, most preferably from 0.6:1 to 0.4:1. These copolymers can be either linear or branched. Suitable PVPVI polymers include SokalanTM HP56, available commercially from BASF, Ludwigshafen, Germany.

[0085] Also preferred as dye transfer inhibition agents are polyvinylpyrrolidone polymers ("PVP") having an average molecular weight of from about 5,000 to about 400,000, preferably from about 5,000 to about 700,000, and more preferably from about 5,000 to about 50,000. PVP's are disclosed for example in EP-A-262,897 and EP-A-256,696. Suitable PVP polymers include SokalanTM HP50, available commercially from BASF. Compositions containing PVP can also contain polyethylene glycol ("PEG") having an average molecular weight from about 500 to about 100,000, preferably from about 1,000 to about 10,000. Preferably, the ratio of PEG to PVP on a ppm basis delivered in wash solutions is from about 2:1 to about 50:1, and more preferably from about 3:1 to about 10:1.

[0086] Also suitable as dye transfer inhibiting agents are those from the class of modified polyethyleneimine polymers, as disclosed for example in WO-A-0005334. These modified polyethyleneimine polymers are water-soluble or dispersible, modified polyamines. Modified polyamines are further disclosed in US-A-4,548,744; US-A-4,597,898; US-A-4,877,896; US-A-4,891,160; US-A-4,976,879; US-A-5,415,807; GB-A-1,537,288; GB-A-1,498,57; DE-A-28 29022; and JP-A-06313271.

[0087] Preferably the composition according to the present invention comprises a dye transfer inhibition agent selected from polyvinylpyrrolidone N-oxide (PVNO), polyvinyl pyrrolidone (PVP), polyvinyl imidazole, N-vinylpyrrolidone and N-vinylimidazole copolymers (PVPVI), copolymers thereof, and mixtures thereof.

[0088] The amount of dye transfer inhibition agent in the composition according to the present invention will be from 0.01 to 10 %, preferably from 0.02 to 5 %, more preferably from 0.03 to 2 %, by weight of the composition.

Other Detergent Ingredients:

[0089] The composition may also contain other conventional detergent ingredients such as e.g. fabric conditioners including clays, foam boosters, suds suppressors (antifoams), anti-corrosion agents, soil-suspending agents, anti-soil

red deposition agents, further dyes, anti-microbials, optical brighteners, tarnish inhibitors, or perfumes.

[0090] Various non-limiting embodiments of the invention will now be more particularly described with reference to the following figure in which:

Figure 1 shows a packaged laundry product according to one embodiment of the invention.

[0091] Referring to the drawing, a packaged laundry product 1 is shown. The product 1 comprises a flowable laundry composition 3 contained in a package 5, the high viscosity laundry composition 3 according to Example A or B detailed below.

[0092] The package comprises a squeeze-operated compressible container, in this example a plastic bottle 7 storing the flowable, high viscosity laundry composition 3 and a dispensing device 9 and a fabric stain treatment device 11. The dispensing device 9 is located at the base 13 of the container 7 and is enclosed by a dosing closure device 14. The closure 14 comprises the supportive base 13 of the package 5.

[0093] The bottle 7 and a stain treatment device 11 are attached to each other by threaded connection. The stain treatment device comprises projections (not shown). In an alternative embodiment it is a sponge, and in a further embodiment it is thin annular section around the orifice 25 (described below).

[0094] The closure 14 is attached to the bottle also by a threaded connection. (Threaded connections not shown). In a separate embodiment the closure 14 is connected to the bottle 7 using a snap-on connection, which negates the requirement to rotate the bottle/closure to open shut.

[0095] The bottle 7 is fabricated from a flexible plastic material comprising polyethylene terephthalate.

[0096] The top 21 of the bottle is curved to discourage storage top-down.

[0097] The closure 14 includes an enlarged (with respect to at least the neck region of the bottle) flat, generally planar bottom surface 15. By providing an enlarged flat top surface 15, the surface allows the closure 14 to function as a supportive base with the bottle 7 in an inverted position thereby allowing the high viscosity gel 3 to accumulate (under gravity) during storage at the dispensing device 9.

[0098] The closure 14 incorporates a reservoir portion 17 in which the stain treatment device 11 is shown enclosed. The closure 14 has a tapered outer shape, wherein the tapering is outward in the direction of the base, to provide a stable base area 15 as described about.

[0099] The stain treatment device projects into the reservoir by approximately 60% of the depth of the reservoir (the depth being measured along a longitudinal line X-Y. This affords the advantage that the stain treatment device can be inserted into the reservoir and contact the dispensed composition so as to be easily loaded with this, without the screw threads engaging, even when the reservoir is not filled to the top with composition.

[0100] The dispensing device 9 comprises an orifice 25 through which dispensing may occur. The orifice includes a valve 22 in fluid communication with duct 23. The valve 22 comprises a membrane extending across orifice 25.

[0101] In an alternative embodiments the orifice/membrane are located further downstream in the duct. In the extreme examples, it is at the end, as shown in figure ref. 32

[0102] In one embodiment, the membrane has an arcuate portion (not shown) directed toward the container 7. The arcuate portion of the membrane is provided with a intersecting slits to define a plurality of generally triangular leaves. When contents of the container are pressurized for dispensing, the triangular leaves bend toward the open end of the orifice 25 allowing product to pass through the orifice 25. When the dispensing pressure is released, the triangular leaves spring back to their original position and operate to block passage of product through the orifice 25. The leaves of the valve are sufficiently resilient that they do not bend open unless the applied pressure exceeds the hydraulic static head pressure generated by a full of condiment. In use, the fluid is pressurised to flow past and partially collect at the base of the bottle 7 ready for squeeze-operated dispensing into the reservoir. Any of the fluid which remains on the stain treatment device 11, drips into the reservoir, for later use. This reduces waste of product.

Exemplary Laundry Formulation A.

[0103] The following gel laundry detergent compositions were prepared, of which composition A is according to the invention

Component:	Wt %
Propylene glycol	8.0
sodium citrate	3.9
Borax	3.0
NaOH (50%)	1.1
Monoethanolamine	1.0

EP 2 202 290 A1

(continued)

Component:	Wt %
LAS-acid	4.4
Coconut fatty acid	1.5
Nonionic surfactant	11.1
Oleic acid	2.3
1-Dodecanol	5.0
Protease enzyme	0.3
Lipase enzyme	0.5
Perfume	0.2
Water	balance to 100

wherein:

Borax : Sodium tetraborate (10aq)

nonionic surfactant: ethoxylated alcohol with on average 9 ethylene oxide groups.

[0104] The gel detergent composition exemplified by composition A was found to be shear thinning and stable. Furthermore, typical detergent particles of density between 0.8 and 0.9 g/cm³ and having a diameter up to 5000 microns could be stable suspended in this composition for more than 2 weeks without any observable net movement of the particles.

Sample	Viscosity / Pa.s	Eta 0	Critical Stress	Tan Delta
	20s ⁻¹ 100s ⁻¹	Pa.s	Pa	at 1 Hz
A	2.11 0.61	3.00E+05	15	0.04

For obtaining the values shown in the above table, all rheological measurements were carried out at 25 °C using a Carrimed CSL100 rheometer with a cone and plate geometry specially roughed to prevent slip.

[0105] Viscosity was measured at varying shear rates from very low shear up to a shear regime in excess of 100 s⁻¹. Two situations are shown: the viscosity measured at relatively low shear (20 s⁻¹) and that measured at much higher shear (100 s⁻¹). It can be seen that the viscosity of composition A at high shear is much lower than that obtained at low shear, whereas composition B shows almost equal viscosity's for high and low shear. In other words composition A is clearly shear thinning, whereas composition B is not.

[0106] In addition, the critical stress is shown. This parameter represents the stress at which the material leaves the upper Newtonian plateau and thins under increasing shear. Also, "Eta 0"-values are shown, referring to the viscosity calculated for zero shear from creep flow measurements.

[0107] Finally, "Tan delta" values are shown, referring to the ratio of loss over storage moduli (G''/G') and reflecting the dominance of viscous over elastic properties such that materials giving very low "Tan delta"-values (tending to zero, such as composition A in the above table), will be much more elastic than those giving higher "Tan delta" values (tending to 90).

Exemplary Laundry Formulation B

[0108] The following gel laundry detergent compositions were prepared of which composition C is according to the invention and composition D is a comparative composition according to the prior art:

Component:	Wt %
Propylene glycol	4.75
sodium citrate	2.8
Borax	2.3
NaOH (50%)	0.43
Monoethanolamine	0.23
LAS-acid	6.0

(continued)

Component:	Wt %
Coconut fatty acid	0.77
Sodium alcohol EO sulphate	10.5
Nonionic surfactant	6.6
1-Decanol	6.0
Protease enzyme	0.45
Lipase enzyme	0.25
Perfume	0.2
Water	balance to 100

wherein:

Borax : Sodium tetraborate (10aq)

nonionic surfactant: ethoxylated alcohol with on average 9 ethylene oxide groups

[0109] Sodium alcohol EO sulphate: ethoxylated alcohol sulphate with on average 3 ethylene oxide groups.

[0110] Composition B was is a stable, transparent, pourable shear thinning liquid, capable of stable suspending typical detergent particles having a density of between 0.8 and 0.9 g/cm³ and a diameter of up to 5000 microns, for more than 2 weeks without any observable net movement of the particles.

[0111] Critical rheological parameters for the two compositions are shown below.

Sample	Viscosity / Pa.s	Eta 0	Critical Stress	Tan Delta
	20s-1 100s-1	Pa.s	Pa	at 1 Hz
B	1.33 0.48	9.85E+05	10	0.07

[0112] For clarification of the rheological values shown in this table, reference is made to the description concerning the similar table shown in above example A.

[0113] It is of course to be understood that the invention is not intended to be restricted to the details of the above embodiment which are described by way of example only.

Claims

1. A packaged laundry product comprising a flowable laundry composition contained in a package, wherein:

(i) the flowable laundry composition has a viscosity of at least 100 Pa.s. (and preferably at least 500 Pa.s) when in rest or up to a shear stress of 10 Pa and comprising at least one surfactant; and

(ii) the package comprises a squeeze-operated compressible container in which the flowable laundry composition is stored and a dispensing device and stain treatment device both located at the base of the compressible container ; and

(iii) a reservoir providing a supportive base portion and configured to receive the dispensed flowable laundry composition from the dispensing device and also receive at least a portion of the stain treatment device.

2. A packaged laundry product according to claim 1, wherein the reservoir forms part of a closure.

3. A packaged laundry product according to any preceding claim wherein the reservoir receives the stain treatment device to such a degree that the stain treatment device projects into the reservoir by more than 50% of the depth of the reservoir.

4. A packaged laundry product according to any preceding claim wherein the stain treatment device comprises a device allowing mechanical cleaning, such as a body with multiple projections.

5. A packaged laundry product according to claim 4 wherein the projections are flexible so that they move during

cleaning.

6. A packaged laundry product according to claim 4 or 5 wherein some or all of the projections are semi-rigid or rigid.

5 7. A packaged laundry product according to any preceding claim wherein the package has a curved top.

8. A packaged laundry product according to any preceding claim wherein the stain treatment device comprises an area surrounding the dispensing device.

10 9. A packaged laundry product according to any preceding claim wherein the composition is a shear thinning gel-type composition having viscosity under shear stress less than 300 Pa.s.

10. A method of treating a stain on a fabric using the device of any of claims 1-8, the method comprising the steps of:

15 (i) squeezing the compressible container to dispense the flowable laundry composition into the reservoir;
(ii) inserting the at least a portion of the stain treatment device into the dispensed flowable laundry composition within the reservoir; and
(iii) treating the stain by applying the flowable laundry composition on the at least one portion of the stain
20 treatment device to the stain.

11. The method of claim 9 wherein steps (ii) and (iii) are repeated at least once.

25

30

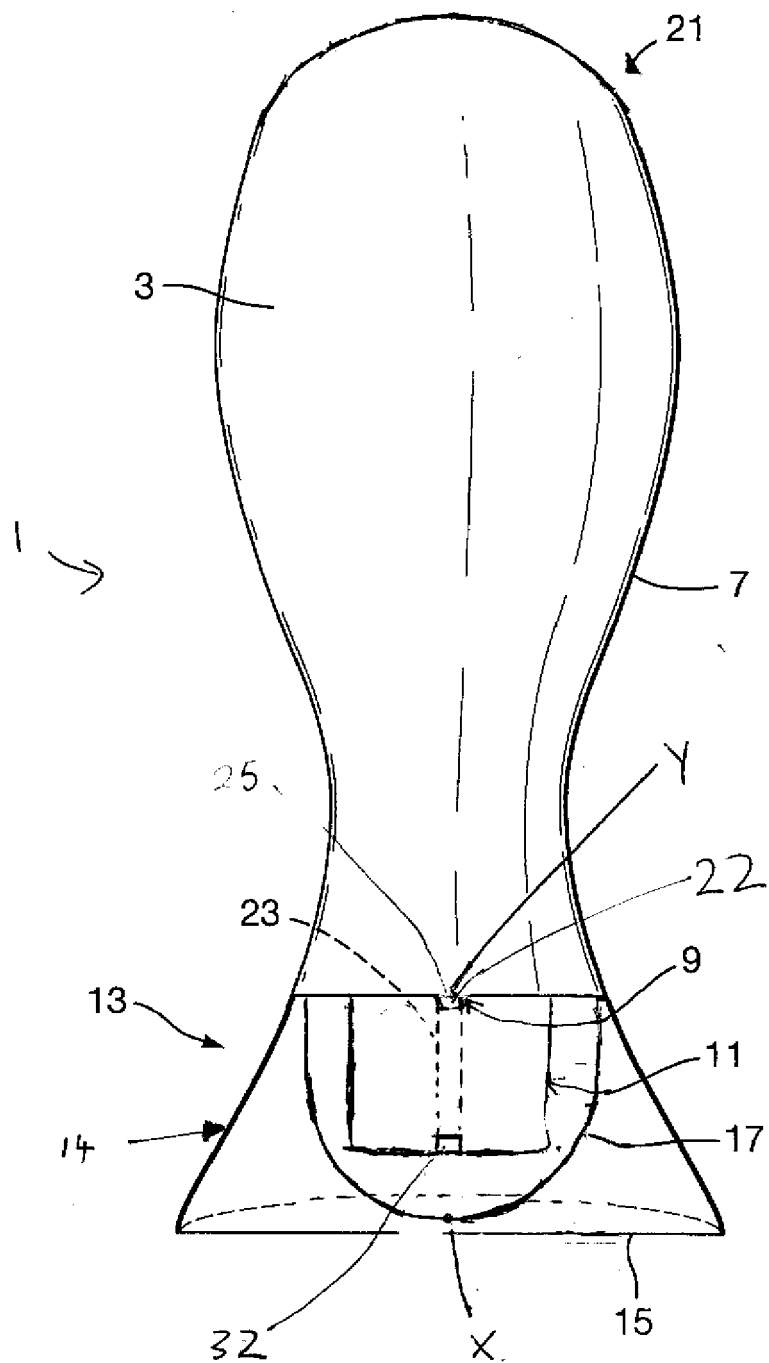
35

40

45

50

55





EUROPEAN SEARCH REPORT

Application Number
EP 08 17 2828

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 97/20099 A (PROCTER & GAMBLE [US]; TCHEOU ERIC [BE]; VEGA JOSE LUIS [BE]) 5 June 1997 (1997-06-05) * page 15, paragraph 2; claims 1-9; figures 1-4 *	1-11	INV. C11D17/04 B65D1/02 B65D47/42 B65D51/24
A	WO 2007/130569 A (PROCTER & GAMBLE [US]; DE BUZZACCARINI FRANCESCO [BE]; DE WREE ANN [BE]) 15 November 2007 (2007-11-15) * page 5, line 21; claims 1-10; figures 1-9 *	1-11	
A	WO 95/15710 A (COLVILLE LOMAX & CO LTD [GB]; HIBBERT JOHN COLVILLE [GB]; SKERRATT STE) 15 June 1995 (1995-06-15) * page 3, paragraph 3; claims 1-14; figure 1 * * page 4, paragraph 1 *	1-11	
A	US 2 947 015 A (BURT HUGH M) 2 August 1960 (1960-08-02) * column 2, line 22 - line 24 * * column 3, line 50 - line 57; claim 1; figures 1-3 *	1-11	TECHNICAL FIELDS SEARCHED (IPC) B65D C11D
A	WO 98/16148 A (PROCTER & GAMBLE [US]) 23 April 1998 (1998-04-23) * claim 1; figures 2b,5 *	1-11	
A	WO 2007/130568 A (PROCTER & GAMBLE [US]; DE WREE ANN [BE]; ERGELEN MEHMET TUGRUL [US]; V) 15 November 2007 (2007-11-15) * claims 1-10; figures 1-9 *	1-11	
A	WO 2007/149286 A (JOHNSON & SON INC S C [US]; SMITH LELAND J [US]; BANCO MICHAEL J [US];) 27 December 2007 (2007-12-27) * claims 1-20; figures 1,3 *	1-11	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 3 June 2009	Examiner Richards, Michael
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

 3
EPO FORM 1503 03.82 (P04C01)



EUROPEAN SEARCH REPORT

Application Number
EP 08 17 2828

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 02/079369 A (UNILEVER NV [NL]; UNILEVER PLC [GB]; LEVER HINDUSTAN LTD [IN]) 10 October 2002 (2002-10-10) * figure 1 * -----	1-11	
			TECHNICAL FIELDS SEARCHED (IPC)
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 3 June 2009	Examiner Richards, Michael
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

3

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 17 2828

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

03-06-2009

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9720099	A	05-06-1997	CA 2238497 A1	05-06-1997
			DE 69628464 D1	03-07-2003
			EP 0910619 A1	28-04-1999
			JP 11506174 T	02-06-1999
			JP 3093279 B2	03-10-2000
			NO 982358 A	22-06-1998
WO 2007130569	A	15-11-2007	CA 2649855 A1	15-11-2007
			EP 2016165 A2	21-01-2009
			US 2007267444 A1	22-11-2007
WO 9515710	A	15-06-1995	AU 1195795 A	27-06-1995
			GB 2285392 A	12-07-1995
US 2947015	A	02-08-1960	NONE	
WO 9816148	A	23-04-1998	AU 4051897 A	11-05-1998
			BR 9712338 A	31-08-1999
			CN 1239873 A	29-12-1999
			EP 1014847 A1	05-07-2000
			JP 2000504969 T	25-04-2000
			US 5971645 A	26-10-1999
WO 2007130568	A	15-11-2007	CA 2649347 A1	15-11-2007
			EP 2024249 A2	18-02-2009
			US 2008029548 A1	07-02-2008
WO 2007149286	A	27-12-2007	AR 061521 A1	03-09-2008
			EP 2032014 A2	11-03-2009
			US 2007289071 A1	20-12-2007
			US 2008041424 A1	21-02-2008
			US 2008041425 A1	21-02-2008
WO 02079369	A	10-10-2002	AR 033087 A1	03-12-2003
			US 2003004087 A1	02-01-2003

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 251446 A [0035]
- WO 9100345 A [0035]
- EP 525610 A [0035]
- WO 9402618 A [0035]
- WO 8906279 A [0038]
- WO 8906270 A [0038]
- WO 9425583 A [0038]
- WO 9219729 A [0039]
- WO 9820115 A [0039]
- WO 9820116 A [0039]
- WO 9834946 A [0039]
- EP 258068 A [0040]
- EP 305216 A [0040]
- WO 9613580 A [0040] [0044]
- EP 218272 A [0040]
- EP 331376 A [0040]
- GB 1372034 A [0040]
- WO 9506720 A [0040]
- WO 9627002 A [0040]
- WO 9612012 A [0040]
- JP 64744992 B [0040]
- WO 9116422 A [0040]
- WO 9205249 A [0041]
- WO 9401541 A [0041]
- EP 407225 A [0041]
- EP 260105 A [0041]
- WO 9535381 A [0041]
- WO 9600292 A [0041]
- WO 9530744 A [0041]
- WO 9425578 A [0041]
- WO 9514783 A [0041]
- WO 9522615 A [0041]
- WO 9704079 A [0041]
- WO 9707202 A [0041]
- WO 0034450 A [0044]
- WO 0192502 A [0044]
- WO 0032758 A [0049]
- WO 04111216 A [0049]
- WO 98026057 A [0050]
- GB 1296839 A [0053]
- WO 95026397 A [0053]
- WO 00060060 A [0053]
- WO 9402597 A [0054]
- WO 9418314 A [0054]
- WO 9623873 A [0054]
- WO 9743424 A [0054]
- WO 01066712 A [0054]
- WO 02010355 A [0054]
- WO 02031124 A [0054]
- DK 2005000469 W [0054]
- US 4435307 A [0056]
- US 5648263 A [0056]
- US 5691178 A [0056]
- US 5776757 A [0056]
- WO 8909259 A [0056]
- WO 96029397 A [0056]
- WO 98012307 A [0056]
- EP 0495257 A [0057]
- EP 0531372 A [0057]
- WO 9611262 A [0057]
- WO 9629397 A [0057]
- WO 9808940 A [0057]
- WO 9407998 A [0057]
- EP 0531315 A [0057]
- US 5457046 A [0057]
- US 5686593 A [0057]
- US 5763254 A [0057]
- WO 9524471 A [0057]
- WO 9812307 A [0057]
- DK 9800299 W [0057]
- WO 9324618 A [0059]
- WO 9510602 A [0059]
- WO 9815257 A [0059]
- WO 9927083 A [0060]
- WO 9927084 A [0060]
- US 6284524 B [0060]
- WO 02006442 A [0060]
- WO 9425576 A [0062]
- WO 9324622 A [0062]
- JP 03047076 A [0062]
- JP 63056289 A [0062]
- JP 63036775 A [0062]
- JP 08051975 A [0062]
- WO 9711164 A [0062]
- WO 9118974 A [0062]
- WO 9964619 A [0062]
- WO 9219709 A [0064]
- WO 9219708 A [0064]
- EP 0384070 A [0072]
- EP 262897 A [0085]
- EP 256696 A [0085]
- WO 0005334 A [0086]
- US 4548744 A [0086]
- US 4597898 A [0086]
- US 4877896 A [0086]
- US 4891160 A [0086]
- US 4976879 A [0086]
- US 5415807 A [0086]

EP 2 202 290 A1

- GB 1537288 A [0086]
- GB 149857 A [0086]
- DE 2829022 A [0086]
- JP 06313271 A [0086]

Non-patent literature cited in the description

- Nomenclature Committee of the International Union of Biochemistry and Molecular Biology. Academic Press, Inc, 1992 [0036]
- **Dartois et al.** *Biochemica et Biophysica Acta*, 1993, vol. 1131, 253-360 [0040]
- **Nasser et al.** *FEBS Letts.*, 1993, vol. 335, 319-326 [0060]
- **Kim et al.** *Biosci. Biotech. Biochem.*, 1994, vol. 58, 947-949 [0060]
- **Dave ; Vaughn.** *J. Bacteriol.*, 1971, vol. 108, 166-174 [0060]
- **Nagel ; Vaughn.** *Arch. Biochem. Biophys.*, 1961, vol. 93, 344-352 [0060]
- **Karbassi ; Vaughn.** *Can. J. Microbiol.*, 1980, vol. 26, 377-384 [0060]
- **Hasegawa ; Nagel.** *J. Food Sci.*, 1966, vol. 31, 838-845 [0060]
- **Kelly ; Fogarty.** *Can. J. Microbiol.*, 1978, vol. 24, 1164-1172 [0060]
- **Heffron et al.** *Mol. Plant-Microbe Interact.*, 1995, vol. 8, 331-334 [0060]
- **Henrissat et al.** *Plant Physiol.*, 1995, vol. 107, 963-976 [0060]
- **Talbot et al.** *Appl. Environ. Microbiol.*, 1990, vol. 56 (11), 3505-3510 [0062]
- **Mendoza et al.** *World J. Microbiol. Biotech.*, 1994, vol. 10 (5), 551-555 [0062]
- **Barth et al.** Modern Methods of Polymer Characterization. *Chemical Analysis*, vol. 113 [0084]