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(54) **CONSUMER PRODUCT**

- (57) The present invention relates to a consumer product comprising a water-soluble unit dose article and a container, wherein at least part of the interior surface of the container is constructed from paper-based material, and wherein that the paper-based material has an interior surface which is covered by a barrier layer so that the water-soluble film of a one unit dose article directly contacts the barrier layer on the internal surface of the paper-based material.

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Description

FIELD OF THE INVENTION

5 **[0001]** Consumer product comprising a container and at least one water-soluble unit dose article.

BACKGROUND OF THE INVENTION

10 **[0002]** Water-soluble unit dose articles are liked by consumers due to their convenience and ease of use. Water-soluble unit dose articles comprise a water-soluble film shaped to form at least one internal compartment which houses a single use dose of a detergent. Upon addition of the water-soluble unit dose article to water, the water-soluble film dissolves and/or disintegrates releasing the detergent into the surrounding water to produce a wash liquor.

15 **[0003]** Such water-soluble unit dose articles have historically been stored and transported in rigid or flexible plastic containers. Consumers purchase containers comprising a plurality of water-soluble unit dose articles. The containers are shipped from the place of manufacture to supermarkets and once purchased are stored in consumers' homes. Recently such water-soluble unit dose articles have been made commercially available in containers made from biodegradable material such as paper-based containers.

20 **[0004]** Water-soluble unit dose articles stored in containers made from biodegradable material may be exposed to an environment of higher moisture and higher humidity compared to plastic containers because such containers have higher moisture vapour transfer rates than plastic containers. Exposure to higher moisture and humidity may lead to problems including discolouration of the liquid detergent composition, or changes in the properties of the water-soluble film. Changes in the properties of the water-soluble film may make the water-soluble unit dose articles stickier, with greater tendency to stick to each other or to the inside wall of the container. Changes in the properties of the water-soluble film may make any ink used for printed information on the water-soluble unit dose articles more likely to smear and to become illegible. Changes in the properties of the water-soluble film may impact the integrity of a barrier layer applied on the container inside wall when the film comes into contact with the barrier layer.

SUMMARY OF THE INVENTION

30 **[0005]** The present invention relates to a consumer product comprising at least one water-soluble unit dose article and a container wherein the at least one water-soluble unit dose article comprises at least one water-soluble film orientated to create at least one unit dose internal compartment. The at least one unit dose internal compartment comprises a liquid detergent composition. The container comprises a container body which comprises a first compartment in which the at least one water-soluble unit dose article is contained. The first compartment is accessible through a first opening.

35 The container further comprises a container cover, wherein the container cover is positioned so that it prevents access through the first opening when the container is not in use, but is moveable to allow access to the container body when the container is in use. The container body comprises an interior surface and an exterior surface, wherein the interior surface faces the first compartment. At least part of the interior surface of the container body is constructed from paper-based material. The paper-based material has an interior surface which is covered by a barrier layer so that the water-soluble film of at least one unit dose article directly contacts the barrier layer on the internal surface of the paper-based material.

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DETAILED DESCRIPTION OF THE INVENTION

45 Consumer Product

[0006] The present invention is to a consumer product comprising at least one water-soluble unit dose article and a paper-based container. The water-soluble unit dose article and the paper-based container are described in more detail below.

50 **[0007]** The consumer product can be sold 'as is', in other words the consumer product is the item that the consumer picks up from the shelf. Alternatively, the consumer product could be housed as one unit of a multi-component product. For example, more than one consumer product could be housed within an outer package and the multiple packaged consumer products sold together in a single purchase.

55 **[0008]** The consumer product may comprise aesthetic elements, for example shrink sleeves or labels attached to the container. Alternatively, the container may be coloured or printed with aesthetic elements or informative print such as usage instructions.

Water-soluble unit dose article

[0009] The at least one water-soluble unit dose article comprises at least one water-soluble film orientated to create at least one unit dose internal compartment, wherein the at least one unit dose internal compartment comprises a detergent composition. The water-soluble film and the detergent composition are described in more detail below.

[0010] The consumer product comprises at least one water-soluble unit dose article, preferably at least two water-soluble unit dose articles.

[0011] A water-soluble unit dose article is generally in the form of a pouch. It comprises a unitary dose of a composition as a volume sufficient to provide a benefit in an end application.

[0012] The water-soluble unit dose article comprises at least one water-soluble film shaped such that the unit-dose article comprises at least one internal compartment surrounded by the water-soluble film. The at least one compartment comprises a cleaning composition. The water-soluble film is sealed such that the cleaning composition does not leak out of the compartment during storage. However, upon addition of the water-soluble unit dose article to water, the water-soluble film dissolves and releases the contents of the internal compartment into the wash liquor.

[0013] The unit dose article may comprise more than one compartment, even at least two compartments, or even at least three compartments, or even at least four compartments, or even at least five compartments. The compartments may be arranged in superposed orientation, i.e. one positioned on top of the other. Alternatively, the compartments may be positioned in a side-by-side orientation, i.e. one orientated next to the other. The compartments may even be orientated in a 'tyre and rim' arrangement, i.e. a first compartment is positioned next to a second compartment, but the first compartment at least partially surrounds the second compartment, but does not completely enclose the second compartment. Alternatively, one compartment may be completely enclosed within another compartment.

[0014] Wherein the unit dose article comprises at least two compartments, one of the compartments may be smaller than the other compartment. Wherein the unit dose article comprises at least three compartments, two of the compartments may be smaller than the third compartment, and preferably the smaller compartments are superposed on the larger compartment. The superposed compartments preferably are orientated side-by-side.

[0015] Each individual unit dose article may have a weight of between 10g and 40g, or even between 15g and 35g.

Water-soluble film

[0016] The film of the present invention is soluble or dispersible in water. Prior to being formed into a unit dose article, the water-soluble film preferably has a thickness of from 20 to 150 micrometers, preferably 35 to 125 micrometers, even more preferably 50 to 110 micrometers, most preferably about 76 micrometers.

[0017] Preferred film materials are preferably polymeric materials. The film material can, for example, be obtained by casting, blow-moulding, extrusion or blown extrusion of the polymeric material, as known in the art.

[0018] Preferably, the water-soluble film comprises a polyvinylalcohol polymer comprising a polyvinylalcohol homopolymer or a polyvinylalcohol copolymer, preferably a blend of polyvinylalcohol homopolymers and/or polyvinylalcohol copolymers, preferably wherein the polyvinylalcohol copolymers are selected from sulphonated and carboxylated anionic polyvinylalcohol copolymers especially carboxylated anionic polyvinylalcohol copolymers, most preferably the water-soluble film comprises a polyvinylalcohol comprising a blend of a polyvinylalcohol homopolymer and a carboxylated anionic polyvinylalcohol copolymer or a blend of polyvinyl alcohol homopolymers. In another preferred embodiment the water-soluble film comprises a polyvinylalcohol polymer consisting of a carboxylated anionic polyvinylalcohol copolymer.

[0019] Preferably, the water-soluble film comprises a polymer wherein the polymer comprises a homopolymer, copolymer, or mixture thereof selected from polyvinyl alcohols, polyvinyl pyrrolidone, polyalkylene oxides, acrylamide, acrylic acid, cellulose, cellulose ethers, cellulose esters, cellulose amides, polyvinyl acetates, polycarboxylic acids and salts, polyaminoacids or peptides, polyamides, polyacrylamide, copolymers of maleic/acrylic acids, polysaccharides including starch and gelatine, xanthum, carragum or a mixture thereof, preferably, polyvinylalcohol homopolymers and/or anionic polyvinylalcohol copolymers preferably selected from sulphonated and carboxylated anionic polyvinylalcohol copolymers especially carboxylated anionic polyvinylalcohol copolymers.

[0020] Preferred films are those supplied by Monosol under the trade references M8630, M8900, M8779, M8310.

[0021] The film may be opaque, transparent or translucent. The film may comprise a printed area. The printed area may be on the inside or on the outside or on both the inside and on the outside of the water-soluble film. In some embodiments the film may comprise a phthalocyanine based pigment. Such a pigment is used to print on to the film. A preferred pigment includes SpectraRAY® F UVDB354 commercially available from Sun Chemical and is a phthalocyanine based pigment. It is referred to as CAS 147-14-8.

[0022] The area of print may be achieved using standard techniques, such as flexographic printing or inkjet printing.

[0023] The film may comprise an aversive agent, for example a bittering agent. Suitable bittering agents include, but are not limited to, naringin, sucrose octaacetate, quinine hydrochloride, denatonium benzoate, or mixtures thereof. Any suitable level of aversive agent may be used in the film. Suitable levels include, but are not limited to, 1 to 5000ppm, or

even 100 to 2500ppm, or even 250 to 2000ppm.

[0024] The water-soluble film or water-soluble unit dose article or both may be coated with a lubricating agent. Preferably, the lubricating agent is selected from talc, zinc oxide, silicas, siloxanes, zeolites, silicic acid, alumina, sodium sulphate, potassium sulphate, calcium carbonate, magnesium carbonate, sodium citrate, sodium tripolyphosphate, potassium citrate, potassium tripolyphosphate, calcium stearate, zinc stearate, magnesium stearate, starch, modified starches, clay, kaolin, gypsum, cyclodextrins or mixtures thereof.

Container

[0025] The consumer product comprises a paper-based container. The container comprises a container body, wherein the container body comprises a first compartment in which the at least one water-soluble unit dose article is contained. Preferably the first compartment comprises at least two water-soluble unit dose articles. The first compartment may comprise between 1 and 80 water-soluble unit dose articles, or even between 1 and 60 water-soluble unit dose articles, or even between 1 and 40 water-soluble unit dose articles, or even between 1 and 20 water-soluble unit dose articles.

The volume of the first compartment may be between 500ml and 5000ml, preferably between 800ml and 4000ml.

[0026] The first compartment is accessible through a first opening. Those skilled in the art will be aware of a suitable size for the first opening. Without wishing to be bound by theory, the first opening should be of sufficient size to retrieve at least a single water-soluble unit dose article at a time. Alternatively, the first opening may be shaped to allow the unit dose articles to be poured out from the container. Therefore, it should be dimensioned to be big enough for at least a single unit dose article to fit through the first opening. Preferably, the first opening should be big enough for a user to fit their hand through to retrieve at least one water-soluble unit dose article.

[0027] The container comprises a container cover to cover the first compartment of the container body. Preferably the container cover is a lid or hood. The container cover is positioned so that it prevents access through the first opening when the container is not in use, but is moveable to allow access to the first opening when the container is in use. The container body and the container cover are able to move relative to one another to allow the container cover to block entry to the first opening when not in use, but then allow access to the first opening when in use. Without wishing to be bound by theory, the user controls the movement of the container body and container cover relative to one another to achieve this.

[0028] The movement of the container body and the container cover relative to one another can be achieved via any suitable means. Those skilled in the art will be aware of suitable means. The container cover may act as a lid or hood to the container body. The lid may be hinged to the container body. Preferably the container cover acts as a hood to the container body and can be completely separated from the container body. Preferably, the container cover comprises a top wall and at least one side wall, and the container body comprises a base wall and the first opening, wherein the first opening is opposite to the base wall and the base wall and the first opening are connected by at least one side wall. In the closed position the at least one side wall of the container cover overlaps at least partially over the one side wall of the container body. In other words, the container cover acts as a hood positioning over the container body and so blocking access to the first opening.

[0029] The container preferably further comprises a locking means. The locking means comprises a first locking component on the container body and a second locking component on the container cover. The first locking component engages the second locking component to prevent sufficient movement of the container cover relative to the container body to allow access to the first opening, until the first locking component and second locking component are disengaged from one another by a user. Those skilled in the art will be aware of suitable locking means to achieve this. A preferred locking means is where the first locking component comprises a tab and the second locking component comprises an abutment against which the tab abuts when in the closed position. The abutment may simply comprise a surface against which the tab abuts. Alternatively, the abutment comprises a slot or pocket capable of receiving the tab when in the locked position. Preferably, the first locking component is a tab that protrudes from the exterior surface of the container body and the container cover comprises an abutment against which the first locking tab is able to releasably engage.

[0030] The container may comprise more than one locking means. The container may comprise two locking means. The locking means may be orientated to be opposite one another on the container, such that the consumer can hold the container and using a thumb and a finger to open both locking means simultaneously. Preferably, wherein the locking means are opposite to one another the container is of an appropriate dimension to allow the user, especially an adult user, to grip the container with one hand and simultaneously open both locking means using the thumb and a finger of the other hand. When the container comprises at least two locking means, preferably the two locking means are spaced apart by a distance of between 70mm and 150mm, more preferably between 80mm and 120mm. Without wishing to be bound by theory such distance allows for the adult human handspan to ergonomically fit around the container to allow simultaneous disengagement of the two locking means.

[0031] Preferably both locking means comprise a first locking component on the container body and a second locking component on the container cover. Preferably the first locking means and second locking means both comprise tabs on

the container body and abutments on the container cover.

[0032] The container body comprises an interior surface and an exterior surface, wherein the interior surface faces the internal compartment. At least part of the interior surface of the container body is constructed from paper-based material and the paper-based material comprises a barrier layer on the interior surface so that the water-soluble film of the at least one unit dose article either directly contacts the barrier layer of the interior surface.

[0033] By paper-based material, we herein mean a material comprising paper. Without wishing to be bound by theory, by 'paper' we herein mean a material made from a cellulose-based pulp. Preferably, the paper-based material comprises paper, cardboard, or a mixture thereof, wherein preferably, cardboard comprises paper-board, corrugated fibre-board, or a mixture thereof. The interior surface of the container body is constructed from a paper-based material having a barrier layer on the interior surface. More preferably, the whole of the container body is constructed from a paper-based material having a barrier layer on the interior surface.

[0034] The container cover comprises an interior surface and an exterior surface. At least part of the interior surface and at least part of the exterior surface of the container cover is constructed from a paper-based material having a barrier layer on the interior surface, preferably the entire interior surface of the container cover is constructed from a paper-based material having a barrier layer on the interior surface, even more preferably, the entire container cover is constructed from a paper-based material having a barrier layer on the interior surface.

[0035] The paper-based material may be a laminate comprising paper, cardboard, or a mixture thereof, wherein preferably, cardboard comprises paper-board, corrugated fibre-board, or a mixture thereof, and at least a second material. Wherein the paper-based material is a laminate, then the internal surface of the container body and preferably the internal surface of the container cover comprises paper, cardboard, or a mixture thereof, wherein preferably, cardboard comprises paper-board, corrugated fibre-board, or a mixture thereof, and preferably the external surface of the container body, external surface of the container cover or a mixture thereof comprises the second material. Alternatively, the second material might also be laminated in-between two paper-based material layers.

[0036] Without wishing to be bound by theory, paper-board comprises fibres running in the fibre direction, wherein the fibre direction should be understood to be the direction along the longest dimension of the fibres. Preferably, the tab comprises a fold which runs perpendicular to the fibre direction. Such folding of the tab results in the tab being capable of returning to its original position, in other words having a memory property to allow it to spring back. This is preferably so that it can re-engage efficiently with the second locking component on subsequent use.

[0037] Those skilled in the art will be aware of suitable materials for coating or barrier. The paper-based packaging may comprise a barrier material for improved performance such as providing humidity control and are usually applied on the paper-based surface on one or both sides, depending on the end use.

[0038] The coating or barrier material may comprise a plastic material. Preferably, the plastic material, if present, comprises polyethylene, polyethylene terephthalate, polypropylene, polyvinylalcohol or a mixture thereof. The coating or barrier material may be a biaxially orientated polypropylene, a metallised polyethylene terephthalate, or a mixture thereof. Alternatively, the coating or barrier material may be a wax, a cellulose material, polyvinylalcohol, or a mixture thereof. Preferably, the paper-based laminate comprises greater than 50%, preferably greater than 85%, and more preferably greater than 95% by weight of the laminate of fibre-based materials. Preferably, the plastic material if present has a thickness of between 10 micrometers and 40 micrometers, more preferably between 10 micrometers and 35 micrometers. Preferably the paper-based laminate comprises less than 5% by weight of the laminate of plastic material. Most preferably the paper based material is free of such a plastic material.

[0039] A widespread of alternative barrier application types exist, including dispersion barrier in which the surface is finished with a water-based dispersion technology turning the board liquid and grease resistant during its use while it breaks down in a paper recycling process hence still enabling a high yield of recovered paper fibers when products are recycled, green PE (polyethylene) made of renewable, plant-based raw material, PE Coating hence polyolefin barriers including LDPE and HDPE polymers, biodegradable coating including tailor-made polymers including biopolymers which can be produced from natural crops or from fossil raw materials, PET coating, PP coating, or a mixture thereof. However, it is preferred that the barrier material comprises less than 5% wt. more preferably less than 1% and preferably substantially zero PE, PP or PET.

[0040] In a preferred embodiment the barrier comprises a water-based dispersion. Water-based dispersion barrier coatings protect the packaging from external and internal influences, including humidity impacts. Preferably, the interior surface of the first part of the container comprising the water-soluble unit dose articles comprises such a water-based dispersion barrier. Preferably also the exterior surface of the lid or hood part comprises such a water-based dispersion barrier. Preferably, the lid or hood component comprises less than 1% wt. of the barrier material, more preferably wherein the barrier material is a water-based dispersion barrier. More preferably, the dispersion barrier component comprises a thermoplastic elastomer (TPE). Said TPE is preferably dispersed in the barrier component. Contrary to some alternative barrier components, TPE dispersion barriers have the advantage they can be applied as one layer, rather than requiring a multi-layer application process. Examples of such multi-layer alternative barrier components include those commercially available from Weilburger under the Senolith® brand. Examples are also described in WO 2018/069413. Such water-

based dispersion barrier materials may be applied as a wet layer primarily. The dispersion is preferably an aqueous dispersion, in particular a PTFE dispersion, perfluoroalkoxy (PFA) polymer dispersion, and/or fluorinated ethylene-propylene (FEP), copolymer of hexafluoropropylene, these polymers typically being present in a range of from 40% to 60% of the water-based dispersion. The water-based dispersion can further comprise a resin, typically in a range of from 3% to 8% of the water-based dispersion, in order to improve adhesion to a substrate. Exemplary suitable resins include polyamideimide, polyphenylene sulfide (PPS), polyether sulfone (PES), polyether ether ketone (PEEK), silicone resin and/or polysulfone.

[0041] The paper-based material preferably comprises at least one bleached outerlayer of the paper-based material. The outerlayer may be on the interior or the exterior side of the paper-based material or on both sides of the paper-based material. Preferably the paper-based material comprises a bleached and un-bleached layer on opposing sides. Preferably, the lid or hood comprises a bleached layer on the exterior side and an unbleached layer on the interior side. Preferably, this outermost layer further comprises printed parts. Preferably, the bleached layer also comprises a barrier material as described above. Bleaching has been found to facilitate printing, coating or barrier layer application. More preferably, the interior surface comprises an unbleached layer and most preferably is not treated with a barrier material. Preferably, the first part of the container comprising the water-soluble unit-dose articles comprises a bleached layer on the interior side, hence physically in contact with the water-soluble unit dose articles, and an unbleached layer on the exterior side. Preferably, this bleached layer also comprises a barrier material as described above. The lid or hood having a non-bleached interior surface and the first part of the container comprising the water-soluble unit dose articles having a non-bleached outer surface means that the two unbleached surfaces are in contact with one another when the consumer product is in closed position. This configuration has been found to facilitate sliding upon opening between the two, particularly under humid conditions.

[0042] Preferably, the packaging is folded into shape and maintained in shape with the help of adhesives, such as hot melt adhesives, reactive hot melt adhesives, thermosetting adhesives, pressure sensitive adhesives, contact glue adhesives, preferably, a hot melt pressure sensitive adhesive.

[0043] Preferably, the barrier material and adhesive comprises from 0.1 to 5% wt. of the total package including adhesive and barrier material. More preferably, the barrier material and adhesive comprise from 1 to 3% wt. and most preferably from 1.5 to 2.5% wt. of the total package including adhesive and barrier material.

[0044] Preferably, the container cover is a removable hood or lid, wherein the container cover in a closed position blocks access to the first opening and when in a closed position the first locking component is engaged with the second locking component, and when in an open position the first locking component and second locking component are disengaged and the container cover is removable to allow access to the first opening. The container cover may be attached to the container body via a hinge or the container cover may be completely removed from the container body. Preferably, the container cover is completely removable from the container body.

[0045] Optionally, the container further comprises an absorbent pad, preferably placed at the bottom of the package, in order to absorb any leaked liquid from the water-soluble unit dose pouches. The absorbent pad may also help to absorb humidity which has entered the container.

Detergent Composition

[0046] The detergent composition may be a laundry detergent composition, an automatic dishwashing composition, a hard surface cleaning composition, or a combination thereof. The detergent composition may comprise a solid, a liquid or a mixture thereof. The term liquid includes a gel, a solution, a dispersion, a paste, or a mixture thereof.

[0047] The solid may be a powder. By powder we herein mean the detergent composition may comprise solid particulates or may be a single homogenous solid. Preferably, the powder detergent composition comprises particles. This means the powder detergent composition comprises individual solid particles as opposed to the solid being a single homogenous solid. The particles may be free-flowing or may be compacted, preferably free-flowing.

[0048] Preferably, the detergent composition is a laundry detergent composition, most preferably a liquid laundry detergent composition.

[0049] The laundry detergent composition can be used in a fabric hand wash operation or may be used in an automatic machine fabric wash operation, preferably an automatic machine fabric wash operation.

[0050] The laundry detergent composition comprises a non-soap surfactant, wherein the non-soap surfactant comprises an anionic non-soap surfactant and a non-ionic surfactant. Preferably, the laundry detergent composition comprises between 10% and 60%, more preferably between 20% and 55% by weight of the laundry detergent composition of the non-soap surfactant.

[0051] The weight ratio of non-soap anionic surfactant to nonionic surfactant is from 1:5 to 20:1, preferably from 1:3 to 15:1, more preferably from 1:2 to 10:1, most preferably from 1:1.5 to 5:1.

[0052] The non-soap anionic surfactant comprises linear alkylbenzene sulphonate, alkyl sulphate anionic surfactant, or a mixture thereof. The weight ratio of linear alkylbenzene sulphonate to alkyl sulphate is from 1:2 to 9:1, preferably

from 1:1 to 7:1, more preferably from 1.25:1 to 5:1, most preferably from 1.4:1 to 3:1. Alternatively the non-soap anionic surfactant is free of alkyl sulphate anionic surfactant, preferably consists of linear alkylbenzene sulphonate anionic surfactant.

[0053] Exemplary linear alkylbenzene sulphonates are C₁₀-C₁₆ alkyl benzene sulfonic acids, or C₁₁-C₁₄ alkyl benzene sulfonic acids. By 'linear', we herein mean the alkyl group is linear. Alkyl benzene sulfonates are well known in the art.

[0054] The alkyl sulphate anionic surfactant may comprise alkoxylated alkyl sulphate or non-alkoxylated alkyl sulphate or a mixture thereof. The alkoxylated alkyl sulphate anionic surfactant preferably is an ethoxylated alkyl sulphate anionic surfactant.

[0055] The alkyl sulphate anionic surfactant may comprise an ethoxylated alkyl sulphate anionic surfactant, preferably with a mol average degree of ethoxylation from 1 to 5, more preferably from 1 to 3, most preferably from 2 to 3.

[0056] The alkyl sulphate anionic surfactant may comprise a non-ethoxylated alkyl sulphate and an ethoxylated alkyl sulphate wherein the mol average degree of ethoxylation of the alkyl sulphate anionic surfactant is from 1 to 5, more preferably from 1 to 3, most preferably from 2 to 3.

[0057] The alkyl sulphate anionic surfactant may be free of alkoxylated alkyl sulphate anionic surfactant.

[0058] The alkyl fraction of the alkyl sulphate anionic surfactant can preferably be derived from fatty alcohols, oxo-synthesized alcohols, guerbet alcohols, ziegler alcohols, or mixtures thereof.

[0059] Preferably, the laundry detergent composition comprises between 10% and 50%, more preferably between 15% and 45%, most preferably between 20% and 40%, by weight of the laundry detergent composition of the non-soap anionic surfactant.

[0060] Preferably, the non-ionic surfactant is selected from a fatty alcohol alkoxylate, an oxo-synthesised alcohol alkoxylate, Guerbet alcohol alkoxylates, Ziegler alcohol alkoxylates, alkyl phenol alcohol alkoxylates, or a mixture thereof. Preferably the alkoxylate consists of ethoxylate, wherein the mol average degree of ethoxylation of the alkoxylated nonionic surfactant is from 1 to 15, more preferably from 5 to 12, most preferably from 7 to 9.

[0061] The laundry detergent composition comprises between 1% and 40%, preferably between 3% and 30%, most preferably between 5% and 25% by weight of the liquid laundry detergent composition of a non-ionic surfactant.

[0062] Preferably, the laundry detergent composition comprises between 1.5% and 20%, more preferably between 2% and 15%, most preferably between 4% and 10% by weight of the laundry detergent composition of soap, preferably a fatty acid salt, more preferably an amine neutralized fatty acid salt, wherein preferably the amine is an alkanolamine more preferably selected from monoethanolamine, diethanolamine, triethanolamine or a mixture thereof, more preferably monoethanolamine.

[0063] Preferably, the laundry detergent composition is a liquid laundry detergent composition, more preferably the liquid laundry detergent composition comprises less than 15%, more preferably less than 12% by weight of the liquid laundry detergent composition of water.

[0064] Preferably, the laundry detergent composition is a liquid laundry detergent composition comprising a non-aqueous solvent selected from 1,2-propanediol, dipropylene glycol, tripropyleneglycol, glycerol, sorbitol, polyethylene glycol, or a mixture thereof. Preferably, the liquid laundry detergent composition comprises between 10% and 40%, preferably between 15% and 30% by weight of the liquid laundry detergent composition of the non-aqueous solvent.

[0065] Preferably the laundry detergent composition comprises a perfume.

[0066] Preferably the laundry detergent composition comprises a perfume capsule.

[0067] Benefit agents such as perfumes are expensive and generally less cost effective when employed at high levels in fabric care compositions. As a result, there is a desire to maximize the effectiveness of such benefit agents. One method of achieving such objective is to improve the delivery efficiency and active lifetime of the benefit agent. This can be achieved by providing the benefit agent as a component of a capsule. Such capsules are made either by supporting the benefit agent on a water-insoluble porous carrier or by encapsulating the benefit agent in a water-insoluble shell. In the latter category encapsulates are made by precipitation and deposition of polymers at the interface, such as in coacervates, for example as disclosed in GB-A-O 751 600., US-A- 3 341 466 and EP-A-O 385 534, or other polymerisation routes such as interfacial condensation US-A-3 577 515, US-A-2003/0125222, US-A-6 020 066, WO2003/101606, US-A-5 066 419. A particularly useful means of encapsulation is using the melamine/urea - formaldehyde condensation reaction as described in US-A-3 516 941, US-A-5 066 419 and US-A-5 154 842. Such capsules are made by first emulsifying a benefit agent in small droplets in a pre-condensate medium obtained by the reaction of melamine/urea and formaldehyde and then allowing the polymerisation reaction to proceed along with precipitation at the oil-water interface. The encapsulates ranging in size from a few micrometer to a millimeter are then obtained in a suspension form in an aqueous medium. Such capsules provide several benefits. They have the benefit of protecting the benefit agent from physical or chemical reactions with incompatible ingredients in the composition, volatilization or evaporation. Such capsules have the further advantage in that they can deliver the benefit agent to the substrate and can be designed to rupture under desired conditions, such as when a fabric becomes dry. Such capsules can be particularly effective in the delivery and preservation of perfumes. Perfumes can be delivered to and retained within the fabric by a capsule that only ruptures, and therefore releases the perfume, when the fabric is dry. The capsule of the present invention comprises

an aldehyde-containing resin. More preferably the capsule has a core-in-shell structure. More preferably the shell is an aminoplast. Most preferably the capsule comprises a formaldehyde-containing shell.

[0068] The capsule preferably comprises a core material and a shell wall material that at least partially, preferably completely surrounds the core material. Said capsule preferably has an average particle size of from about 1 micron to about 100 microns, from about 5 microns to about 80 microns, or even from about 15 microns to about 50 microns.

[0069] Suitable capsule wall materials include materials selected from the group consisting of reaction products of one or more amines with one or more formaldehydes, such as urea cross-linked with formaldehyde or glutaraldehyde, melamine cross-linked with formaldehyde; gelatin-polyphosphate coacervates cross-linked with glutaraldehyde; and mixtures thereof. In one aspect, the wall material comprises melamine cross-linked with formaldehyde.

[0070] Useful core benefit agents include perfume raw materials. In one aspect, said perfume raw material is selected from the group consisting of alcohols, ketones, formaldehydes, esters, ethers, nitriles alkenes. In one aspect, said perfume may comprise a perfume raw material selected from the group consisting of perfume raw materials having a boiling point (B. P.) lower than about 250°C and a ClogP lower than about 3, perfume raw materials having a B. P. of greater than about 250°C and a ClogP of greater than about 3, perfume raw materials having a B. P. of greater than about 250°C and a ClogP lower than about 3, perfume raw materials having a B. P. lower than about 250°C and a ClogP greater than about 3 and mixtures thereof. Perfume raw materials having a boiling point B. P. lower than about 250°C and a ClogP lower than about 3 are known as Quadrant I perfume raw materials, perfume raw materials having a B. P. of greater than about 250°C and a ClogP of greater than about 3 are known as Quadrant IV perfume raw materials, perfume raw materials having a B. P. of greater than about 250°C and a ClogP lower than about 3 are known as Quadrant II perfume raw materials, perfume raw materials having a B. P. lower than about 250°C and a ClogP greater than about 3 are known as a Quadrant III perfume raw materials. In one aspect, said perfume comprises a perfume raw material having B. P. of lower than about 250°C. In one aspect, said perfume comprises a perfume raw material selected from the group consisting of Quadrant I, II, III perfume raw materials and mixtures thereof. In one aspect, said perfume comprises a Quadrant III perfume raw material. Suitable Quadrant I, II, III and IV perfume raw materials are disclosed in U.S. patent 6,869,923 B1.

[0071] Such capsules are commercially available. Processes of making said capsules are described in the art. More particular processes for making suitable capsules are disclosed in US 6,592,990 B2 and/or US 6,544,926 B1. A slurry of capsules results from this manufacturing process. Said slurry comprises capsules, water and precursor materials for making the capsules. The slurry may comprise other minor ingredients, such as an activator for the polymerization process and/or a pH buffer. To the slurry, a formaldehyde scavenger may be added.

[0072] The capsules are preferably present at a total level, based on total liquid composition weight, of from about 0.01% to about 2.0%, more preferably from about 0.1% to about 1.0%.

[0073] Preferably the laundry detergent composition comprises an antioxidant, wherein the antioxidant preferably is a sulphur based antioxidant. The sulfur-based anti-oxidant is preferably selected from sulfites and derivatives of sulfite. More particularly it is selected from the group consisting of alkali or alkali earth metal pyrosulfites, sulfites, bisulfite, metasulfite, monoalkyl sulfite, dialkyl sulfite, dialkylene sulfite, or mixtures thereof. Preferably said sulfur-based antioxidant is selected from alkali or alkali earth metal sulfite, bisulfite or mixtures thereof. Most preferably the sulfur-based scavenger is potassium sulfite. The sulfur-based antioxidant is preferably present at a total level, based on total liquid composition weight, of from about 0.001% to about 2.0%, more preferably from about 0.01% to about 0.5%.

[0074] Preferably the laundry detergent composition comprises a polymer system, wherein the polymer system preferably comprises nonionic or anionic polyester terephthalate soil release polymer, ethoxylated polyethyleneimine polymers, or mixtures thereof. Most preferably the polymer system comprises a mixture of an ethoxylated polyethyleneimine and a polyester terephthalate soil release polymer. The polymer system may comprise further soil release polymers such as those selected from amphiphilic graft copolymers, carboxymethyl cellulose, modified carboxymethylcellulose, hydroxyethylcellulose, modified hydroxyethylcellulose, or a mixture thereof. The detergent composition may also comprise a zwitterionic polyamine.

Polyester terephthalate soil release polymer

[0075] The polyester terephthalate is a polyester terephthalate backbone optionally grafted with one or more anionic groups, more preferably, a polyester of propylene terephthalate.

[0076] Suitable (anionic) polyesters are those that are derived from terephthalic acid, (5-sulfoisophthalic acid or the salt of 5-sulfoisophthalic acid, - solely for anionic grafted polyesters) from ethylene glycol or polyethylene glycol, propylene glycol or polypropylene glycol and polyalkyleneglycol monoalkyl ether, and optionally from further monomers having 3 to 6 functions capable of polycondensation, in particular acid, alcohol or ester functions.

[0077] Preferably, the polyester terephthalate comprises the combination of structural units (I) to (III) when grafted with anionic groups, or structural units (I) and (III) when ungrafted with anionic groups :

- (I) $-(\text{OCHR}^1\text{-CHR}^2)_a\text{-O-OC-Ar-CO-}]_d$
- (II) $-(\text{OCHR}^3\text{-CHR}^4)_b\text{-O-OC-sAr-CO-}]_e$
- (III) $-(\text{OCHR}^5\text{-CHR}^6)_c\text{-OR}^7]_f$

wherein:

a, b and c are from 1 to 200;

d, e and f are from 1 to 50 (e is zero for nonionic polyester terephthalate soil release polymer);

Ar is a 1,4-substituted phenylene;

sAr is 1,3-substituted phenylene substituted in position 5 with SO_3Me ;

Me is Li, K, Mg/2, Ca/2, Al/3, ammonium, mono-, di-, tri-, or tetraalkylammonium wherein the alkyl groups are ($\text{C}_1\text{-C}_{22}$) alkyl or ($\text{C}_2\text{-C}_{10}$) hydroxyalkyl, or mixtures thereof;

R^1 , R^2 , R^3 , R^4 , R^5 and R^6 are independently selected from H or ($\text{C}_1\text{-C}_{18}$) n- or iso-alkyl preferably methyl; and R^7 is a linear or branched ($\text{C}_1\text{-C}_{18}$) alkyl, or a linear or branched ($\text{C}_2\text{-C}_{30}$) alkenyl, or a cycloalkyl group with 5 to 9 carbon atoms, a ($\text{C}_6\text{-C}_{30}$) aryl group or a ($\text{C}_6\text{-C}_{50}$) arylalkyl group preferably phenyl or benzyl.

[0078] Preferably, the polyester terephthalate comprises the structural units (I) to (III) when grafted with anionic groups, or (I) and (III) when ungrafted with anionic groups, wherein;

R^1 to R^6 independently are H or methyl,

R^7 is methyl,

a, b and c are a number from 1 to 20, preferably a and b are 1 and c is a number from 2 to 10,

d is a number between 1 and 25, preferably between 1 and 10, more preferably between 1 and 5,

e is a number between 1 and 30, preferably between 2 and 15, more preferably between 3 and 10, (e is zero when ungrafted with anionic groups) and

f is a number between 0.05 and 15, preferably between 0.1 and 10, more preferably between 0.25 and 3.

[0079] The polyester terephthalates according to the invention generally have a number average molecular weight in the range of 700 to 50000 g/mol, preferably 800 to 25000 g/mol, more preferably 1000 to 15000 g/mol, most preferably 1200 to 12000 g/mol.

[0080] Suitable anionic and nonionic polyester terephthalate soil release polymers are sold by Clariant under the TexCare® series of polymers, e.g. TexCare® SRA300 (anionic) and Texcare SRN® series of polymers (nonionic).

[0081] The laundry detergent preferably comprises between 0.1% and 10% preferably between 0.3% and 5% by weight of the detergent composition of the polyester terephthalate soil release polymer. The polyester terephthalate is present in the wash liquor, preferably at a concentration between 1ppm and 200ppm, preferably between 5ppm and 150ppm, more preferably between 10ppm and 100ppm.

Ethoxylated polyethyleneimine

[0082] The composition of the invention comprises between 0.5% and 10%, preferably between 0.75% and 7.5%, most preferably between 1% and 5% by weight of the liquid detergent composition of an ethoxylated polyethyleneimine.

[0083] The ethoxylated polyethyleneimine may have a polyethyleneimine backbone of weight average molecular weight of between 100g/mol and 2000g/mol, preferably between 200g/mol and 1500g/mol, more preferably between 300g/mol and 1000g/mol, even more preferably between 400g/mol and 800g/mol, most preferably between 500g/mol and 700g/mol, preferably about 600g/mol.

[0084] The ethoxylation chains within the ethoxylated polyethyleneimine may be from 200g/mol to 2000g/mol weight average molecular weight, preferably from 400g/mol to 1500g/mol weight average molecular weight, more preferably from 600g/mol to 1000g/mol weight average molecular weight, most preferably about 880g/mol weight average molecular weight per ethoxylated chain.

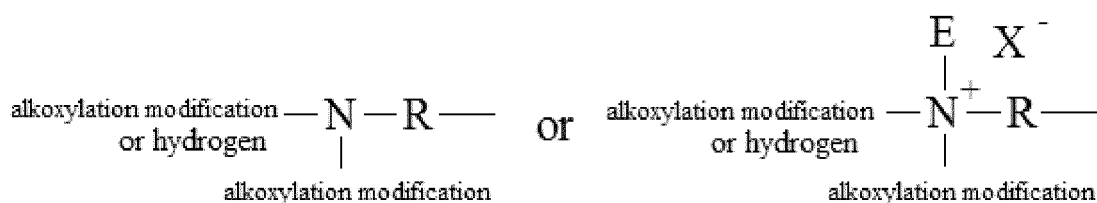
[0085] The ethoxylation chains within the ethoxylated polyethyleneimine polymer of the present composition have on average 5 to 40, preferably 10 to 30, more preferably 15 to 25, even more preferably 18 to 22, most preferably about 20 ethoxy units per ethoxylation chain.

[0086] The ethoxylated polyethyleneimine may have a total weight average molecular weight of from 5000g/mol to 20000g/mol, preferably from 7500g/mol to 17500g/mol, more preferably from 10000g/mol to 15000g/mol, even more preferably from 12000g/mol to 13000g/mol, most preferably about 12700g/mol.

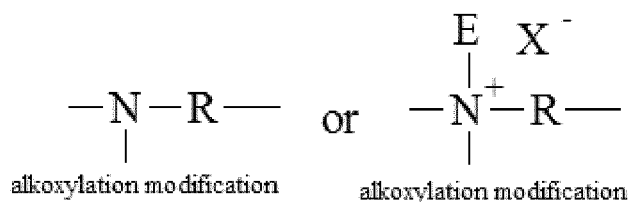
[0087] The ethoxylation of the polyethyleneimine backbone preferably includes: (1) one or two ethoxylation modifica-

tions per nitrogen atom, dependent on whether the modification occurs at a internal nitrogen atom or at a terminal nitrogen atom, in the polyethyleneimine backbone, the ethoxylation modification consisting of the replacement of a hydrogen atom by a polyethoxylene chain having an average of about 5 to about 40 ethoxy moieties per modification, wherein the terminal alkoxy moiety of the alkoxylation modification is capped with hydrogen, a C₁-C₄ alkyl or mixtures thereof, preferably hydrogen; or (2) an addition of one C₁-C₄ alkyl moiety and one or two ethoxylation modifications per nitrogen atom, dependent on whether the substitution occurs at a internal nitrogen atom or at an terminal nitrogen atom, in the polyethyleneimine backbone, the ethoxylation modification consisting of the replacement of a hydrogen atom by a polyethoxylene chain having an average of about 5 to about 40 ethoxy moieties per modification wherein the terminal ethoxy moiety is capped with hydrogen, a C₁-C₄ alkyl or mixtures thereof, preferably hydrogen; or (3) a combination thereof. According to the present invention the ethoxylation route of the polyethyleneimine described under (1) is preferred.

[0088] For example, but not limited to, below is shown possible modifications to terminal nitrogen atoms in the polyethyleneimine backbone where R represents an ethylene spacer and E represents a C₁-C₄ alkyl moiety and X⁻ represents a suitable water soluble counterion.

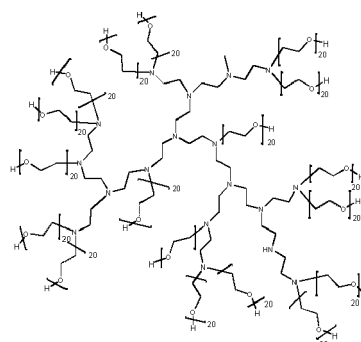


[0089] Also, for example, but not limited to, below is shown possible modifications to internal nitrogen atoms in the polyethyleneimine backbone where R represents an ethylene spacer and E represents a C₁-C₄ alkyl moiety and X⁻ represents a suitable water soluble counterion.



[0090] The modification may result in permanent quaternization of the polyethyleneimine backbone nitrogen atoms. The degree of permanent quaternization may be from 0% to about 30% of the polyethyleneimine backbone nitrogen atoms. It is preferred to have less than 30% of the polyethyleneimine backbone nitrogen atoms permanently quaternized. Most preferably the degree of quaternization is 0%.

[0091] A preferred polyethyleneimine has the general structure of formula (I):



formula (I)

wherein the polyethyleneimine backbone has a weight average molecular weight of about 600g/mol, n of formula (I) has an average of about 20. Each polyethoxy chain is hydrogen capped. The degree of permanent quaternization of formula (I) is about 0% of the polyethyleneimine backbone nitrogen atoms. The molecular weight of this polyethyleneimine preferably is between 10000 and 15000g/mol, more preferably about 12700 g/mol.

[0092] The described ethoxylated polyethyleneimines can be made using techniques previously described in the art, and as such those skilled in the art would understand how to produce such compounds. These polyethyleneimines can be prepared, for example, by polymerizing ethyleneimine in the presence of a catalyst such as carbon dioxide, sodium bisulfite, sulfuric acid, hydrogen peroxide, hydrochloric acid, acetic acid, and the like, followed by an ethoxylations step.

Amphiphilic graft polymer :

[0093] Preferably, the amphiphilic graft polymer is based on polyalkylene oxides and vinyl esters, preferably based on water-soluble polyalkylene oxides (A) as a graft base and side chains formed by polymerization of a vinyl ester component (B), said polymer having an average of < 1 graft site per 50 alkylene oxide units, more preferably wherein the molar ratio of grafted to ungrafted alkylene oxide units is from 0.002 to 0.05, preferably from 0.002 to 0.035, more preferably from 0.003 to 0.025, most preferably from 0.004 to 0.02.

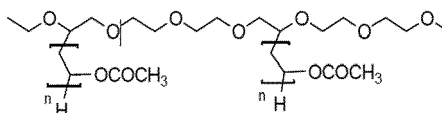
[0094] The amphiphilic graft polymer preferably has a mean molecular mass Mw of from 3000 g/mol to 100 000 g/mol. Preferably, the amphiphilic graft polymer has a polydispersity Mw/Mn of less than 3, wherein Mn is the mean molar mass.

[0095] The amphiphilic graft polymer may have from 20% to 70%, preferably from 25% to 60% by weight of the amphiphilic graft polymer of the polyalkylene oxide (A), preferably the water-soluble polyalkylene oxide (A) as a graft base. Preferably, the polyalkylene oxide graft base (A) is a polyethylene glycol.

[0096] Preferably, the amphiphilic graft polymer comprises from 30% to 80% by weight of the vinyl ester component (B), preferably wherein the vinyl ester component (B) comprises a vinyl acetate, vinyl propionate or a mixture thereof (B1), and optionally an C1-C8-alkyl acrylate (B2) more preferably from 70% to 100% by weight of vinyl acetate (B1) and from 0% to 30% by weight of a C1-C8-alkyl acrylate (B2).

[0097] Preferably, the amphiphilic graft polymer comprises less than 10% by weight of the amphiphilic graft polymer of polyvinyl ester (B) in ungrafted form.

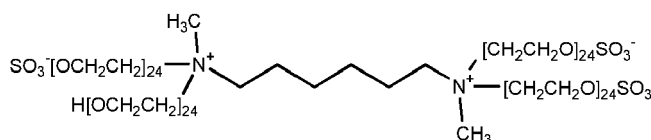
[0098] Preferably, the amphiphilic graft polymer is a polyethylene glycol graft base and vinyl acetate side chains, as according to the following structure;



wherein, preferably the ethylene oxide / vinyl acetate content is from 30%/70% to 50%/50%, and wherein preferably the amphiphilic graft polymer has a mean molar mass (Mn) value of from 10000g/mol to 20000g/mol, more preferably from 10000g/mol to 15000g/mol, and wherein preferably the amphiphilic graft polymer has a mean molecular mass (Mw) value of from 20000g/mol to 30000g/mol, preferably from 25000g/mol to 30000g/mol, more preferably, yielding a polydispersity Mw/Mn of from 1 to 3, preferably 1.5 to 2.5, wherein preferably the amphiphilic graft polymer has an average degree of grafted units per polyethyleneglycol polymer graft base preferably is less than 2.7, preferably between 0.5 and 2.5, more preferably between 1 and 2, wherein preferably the amphiphilic graft polymer has an average n value of between 30 and 70, more preferably between 40 and 60, most preferably between 50 and 55.

Zwitterionic polyamine

[0099] The water-soluble unit dose article may comprise between 0.01% to about 20%, preferably from 0.1% to 10%, more preferably from 0.5% to 7%, even more preferably from 1% to 5%, most preferably from 1.5% to 4% by weight of the laundry detergent composition of a zwitterionic polyamine, preferably an ethoxylated zwitterionic hexamethylene diamine, more preferably a zwitterionic hexamethylene diamine represented by the following formula:



in which approximately 40% of the polyethoxy groups are sulfonated, the remaining polyethoxy groups being hydrogen capped, the degree of quaternization preferably is more than 90%, most preferably about 100%, and where preferably the water soluble counter-anion is selected from the group consisting of chlorine, bromine, iodine, methylsulfate, and mixtures thereof, more preferably chloride.

[0100] Preferably, the laundry detergent composition comprises an adjunct ingredient selected from the group com-

prising builders including citrate, enzymes including proteases, amylases, cellulases, mannanases and lipases, bleach, bleach catalyst, dye, hueing dye, brightener, dye transfer inhibitors, chelant, polycarboxylates, structurant, pH trimming agents, and mixtures thereof.

[0101] Preferably, the laundry detergent composition has a pH between 6 and 10, more preferably between 6.5 and 8.9, most preferably between 7 and 8, wherein the pH of the laundry detergent composition is measured as a 10% product concentration in demineralized water at 20°C.

[0102] When liquid, the laundry detergent composition may be Newtonian or non-Newtonian. Preferably, the liquid laundry detergent composition is non-Newtonian. Without wishing to be bound by theory, a non-Newtonian liquid has properties that differ from those of a Newtonian liquid, more specifically, the viscosity of non-Newtonian liquids is dependent on shear rate, while a Newtonian liquid has a constant viscosity independent of the applied shear rate. The decreased viscosity upon shear application for non-Newtonian liquids is thought to further facilitate liquid detergent dissolution. The liquid laundry detergent composition described herein can have any suitable viscosity depending on factors such as formulated ingredients and purpose of the composition.

[0103] Those skilled in the art will know how to formulate and make a suitable detergent composition using known knowledge and techniques.

Manufacture

[0104] Those skilled in the art will be aware of standard techniques and methods to make the consumer product according to the present invention. Those skilled in the art will be aware of methods to make the at least one water-soluble unit dose article. Those skilled in the art will be aware of standard methods to make the container. Preferably, the container body is constructed from a first blank and the container cover is constructed from a second blank.

EXAMPLES

[0105] The following are exemplary water-soluble unit dose formulations. The composition can be part of a single chamber water-soluble unit dose article or can be split over multiple compartments resulting in below "averaged across compartments" full article composition. The below composition is enclosed in a polyvinylalcohol based water-soluble film, more specifically a water-soluble film comprising a blend of a polyvinylalcohol homopolymer and a carboxylated anionic polyvinylalcohol copolymer, alternatively a water soluble film comprising a carboxylated anionic polyvinylalcohol copolymer such as M8630 or M8310 ex the MonoSol company. The film has been printed with black, white and red inks using gravure roll printing technique. Printed pouches are disclosed where the ink is on the inner side of the film, on the outer side of the film or on both sides of the film. Solely one film has been printed on.

Table 1

<u>Ingredients</u>	Composition 1 (wt%)	Composition 2 (wt%)	Composition 3 (wt%)
Fatty alcohol ethoxylate non-ionic surfactant, C ₁₂₋₁₄ average degree of ethoxylation of 7	3.8	5.6	23.5
Lutensol XL100	0.5	-	-
Linear C ₁₁₋₁₄ alkylbenzene sulphonate	24.6	25.2	21.2
C12-14 AE3S Ethoxylated alkyl sulphate with an average degree of ethoxylation of 3	12.5	13.0	-
Citric acid	0.7	0.7	-
Palm Kernel Fatty acid	5.3	6.5	8.6
Nuclease enzyme* (wt% active protein)	0.01	-	-
Protease enzyme (wt% active protein)	0.07	0.1	0.05
Amylase enzyme (wt% active protein)	0.005	0.01	0.0075
Xyloglucanase enzyme (wt% active protein)	0.005	0.01	0.0075
Mannanase enzyme (wt% active protein)	0.003	0.005	0.002
Ethoxylated polyethyleneimine**	1.6	2.5	3.0

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(continued)

Ingredients	Composition 1 (wt%)	Composition 2 (wt%)	Composition 3 (wt%)
Amphiphilic graft copolymer***	2.6	-	-
Zwitterionic polyamine****	1.8	-	-
Anionic polyester terephthalate *****	0.6	-	-
Nonionic polyester terephthalate *****	-	0.5	0.9
HEDP chelant (Dequest 2010)	2.2	2.9	-
DTPMP chelant (Dequest 2066)	-	-	0.65
Brightener 49	0.4	0.4	0.4
Silicone anti-foam	0.3	-	-
Hueing dye	0.05	-	-
1,2-PropaneDiol	12.3	12.8	8.3
Glycerine	4.7	7.7	13.1
DPG (DiPropyleneGlycol)	1.7	-	-
TPG (TriPropyleneGlycol)	0.1	-	-
Sorbitol	0.1	-	-
Monoethanolamine	10.2	10.5	6.5
K2SO3	0.4	0.2	0.3
MgCl2	0.3	-	-
water	10.8	9.0	11
Hydrogenated castor oil	0.1	-	-
Perfume	2.1	1.5	1.8
Perfume capsule (melamine-formaldehyde-urea)	0.4	0.3	0.35
Perfume capsule (polyacrylate)	0.1	-	-
Aesthetic dye & Minors	Balance to 100	Balance to 100	Balance to 100
pH (10% product concentration in demineralized water at 20°C)	7.4	7.5	8.0
*Nuclease enzyme is as claimed in co-pending European application 19219568.3 **Lutensol FP620 ex BASF - ethoxylated polyethyleneimine (PEI600 EO20) ***polyethylene glycol graft polymer comprising a polyethylene glycol backbone (Pluriol E6000) and hydrophobic vinyl acetate side chains, comprising 40% by weight of the polymer system of a polyethylene glycol backbone polymer and 60% by weight of the polymer system of the grafted vinyl acetate side chains **** Lutensit Z96 (zwitterionic polyamine ex BASF - zwitterionic hexamethylene diamine according to below formula : 100% quaternized and about 40% of the polyethoxy (EO24) groups are sulfonated). $\begin{array}{c} \text{H}_3\text{C} \\ \\ \text{SO}_3^- [\text{OCH}_2\text{CH}_2]_{24} \text{N}^+ \text{---} \text{C}_6\text{H}_{12} \text{---} \text{N}^+ [\text{CH}_2\text{CH}_2\text{O}]_{24} \text{SO}_3^- \\ \qquad \qquad \qquad \\ \text{H} [\text{OCH}_2\text{CH}_2]_{24} \qquad \qquad \qquad [\text{CH}_2\text{CH}_2\text{O}]_{24} \text{SO}_3^- \\ \qquad \qquad \qquad \\ \qquad \qquad \qquad \text{CH}_3 \end{array}$ ***** Texcare SRA300 ex Clariant ***** Texcare SRN series ex Clariant (especially Texcare SRN 172 and Texcare SRN 260)			

[0106] The following is a multi-compartment water soluble unit dose laundry article comprising a larger bottom com-

partment while having two smaller compartments in a side by side configuration superposed on top of the bottom compartment, following the Ariel All-in-1 Pods design, as commercially available in the UK in January 2022. The below compositions are enclosed in a polyvinyl alcohol based water soluble outer film, more specifically a water soluble film comprising a blend of a polyvinylalcohol homopolymer and a carboxylated anionic polyvinylalcohol copolymer, and a water soluble middle film comprising a blend of polyvinyl alcohol homopolymers, alternatively a blend of a polyvinylalcohol homopolymer and a carboxylated anionic polyvinylalcohol copolymer. The outer film of the single bottom compartment has been printed on using gravure roll flexographic printing technique.

Table 2

<u>Ingredients</u>	Full article Composition (wt%)	Bottom compartment Composition (wt%)	Top compartment Composition 1 (wt%)	Top compartment Composition 2 (wt%)
Volume	25.5ml	22.3ml	1.6ml	1.6ml
Fatty alcohol ethoxylate non-ionic surfactant, C ₁₂₋₁₄ average degree of ethoxylation of 7	3.5	3.7	2.6	1.6
Lutensol XL100	0.4	0.5	-	-
Linear C ₁₁₋₁₄ alkylbenzene sulphate	24.2	24.9	18.9	19.4
C12-15 AE3S Ethoxylated alkyl sulphate with an average degree of ethoxylation of 3	12.3	12.6	9.7	9.7
Citric acid	0.7	0.7	0.5	0.5
Palm Kernel Fatty acid	5.2	5.4	4.1	4.1
Nuclease enzyme* (wt% active protein)	0.009	0.011	-	-
Protease enzyme (wt% active protein)	0.05	0.06	-	-
Amylase enzyme (wt% active protein)	0.004	0.005	-	-
Xyloglucanase enzyme (wt% active protein)	0.005	-	0.073	-
Mannanase enzyme (wt% active protein)	0.003	0.003	-	-
Lipase enzyme (wt% active protein)	0.012	-	0.187	-
Ethoxylated polyethyleneimine**	1.5	1.6	1.2	1.2
Amphiphilic graft copolymer***	2.0	2.3	-	-
Zwitterionic polyamine****	1.8	1.9	1.4	1.4
Anionic polyester terephthalate *****	0.4	-	-	5.8
HEDP chelant	2.2	2.2	1.7	1.7
Brightener 49	0.3	0.4	0.01	0.01
Silicone anti-foam	0.3	0.3	-	-
Hueing dye	0.04	-	0.69	-
1,2-PropaneDiol	13.6	12.8	11.3	26.4

(continued)

<u>Ingredients</u>	Full article Composition (wt%)	Bottom compartment Composition (wt%)	Top compartment Composition 1 (wt%)	Top compartment Composition 2 (wt%)
Glycerine	6.0	5.0	17.3	8.3
DPG (DiPropyleneGlycol)	0.8	0.8	0.6	0.6
TPG (TriPropyleneGlycol)	0.06	0.06	-	-
Sorbitol	0.6	0.05	8.8	-
Monoethanolamine	10.0	10.4	7.9	8.0
K2SO3	0.4	0.4	0.04	0.4
MgCl2	0.3	0.3	0.2	0.2
water	10.9	10.9	11.8	9.9
Hydrogenated castor oil	0.1	0.1	-	0.1
Perfume	1.6	1.9	-	-
Perfume capsule	0.4	0.4	-	-
Perfume capsule	0.1	0.1	-	-
Aesthetic dye & Minors (incl. preservative)	Balance to 100	Balance to 100	Balance to 100	Balance to 100
pH (10% product concentration in demineralized water at 20°C)	7.4	7.4	7.4	7.4
*Nuclease enzyme is as claimed in co-pending European application 19219568.3 **Lutensol FP620 ex BASF - ethoxylated polyethyleneimine (PEI600 EO20) ***polyethylene glycol graft polymer comprising a polyethylene glycol backbone (Pluriol E6000) and hydrophobic vinyl acetate side chains, comprising 40% by weight of the polymer system of a polyethylene glycol backbone polymer and 60% by weight of the polymer system of the grafted vinyl acetate side chains **** Lutensit Z96 (zwitterionic polyamine ex BASF - zwitterionic hexamethylene diamine according to below formula : 100% quaternized and about 40% of the polyethoxy (EO24) groups are sulfonated). ***** Texcare SRA300 ex Clariant				

[0107] The dimensions and values disclosed herein are not to be understood as being strictly limited to the exact numerical values recited. Instead, unless otherwise specified, each such dimension is intended to mean both the recited value and a functionally equivalent range surrounding that value. For example, a dimension disclosed as "40 mm" is intended to mean "about 40 mm".

Claims

1. A consumer product comprising at least one water-soluble unit dose article and a container; wherein the at least one water-soluble unit dose article comprises at least one water-soluble film orientated to create at least one unit dose internal compartment, wherein the at least one unit dose internal compartment comprises a liquid detergent composition; and wherein the container comprises a container body,

wherein the container body comprises a first compartment in which the at least one water-soluble unit dose

article is contained, and wherein the first compartment is accessible through a first opening; and wherein the container comprises a container cover, wherein the container cover is positioned so that it prevents access through the first opening when the container is not in use, but is moveable to allow access to the container body when the container is in use; wherein the container body comprises an interior surface and an exterior surface, wherein the interior surface faces the first compartment; wherein at least part of the interior surface of the container body is constructed from paper-based material; and **characterised in that** the paper-based material has an interior surface which is covered by a barrier layer so that the water-soluble film of at least one unit dose article directly contacts the barrier layer on the internal surface of the paper-based material.

2. The consumer product according to claim 1 wherein the liquid detergent comprises components selected from the list consisting of:

perfume capsules;
nonionic or anionic polyester terephthalate soil release polymer, ethoxylated polyethyleneimine polymers; and mixtures thereof.

3. The consumer product according to claim 2 wherein the liquid detergent composition comprises perfume capsules, and further comprises a sulfur-based antioxidant.

4. The consumer product according to claim 2 wherein the liquid detergent composition comprises nonionic or anionic polyester terephthalate soil release polymer, ethoxylated polyethyleneimine polymers, or mixtures thereof, and wherein the water-soluble film further comprises indicia, wherein the indicia is provided by ink on the outer surface of the water-soluble film.

5. The consumer product according to any of the preceding claims, wherein the entire interior surface of the container body is constructed from a paper-based material.

6. The consumer product according to any of the preceding claims, wherein the container cover comprises an interior surface and an exterior surface and wherein at least part of the interior surface of the container cover is constructed from a paper-based material.

7. The consumer product according to any of the preceding claims, wherein the paper-based material comprises paper, cardboard, or a mixture thereof, wherein preferably, cardboard comprises paper-board, corrugated fibre-board, or a mixture thereof.

8. The consumer product according to any of the preceding claims, wherein the barrier layer on the internal surface of the paper-based material comprises a water-soluble dispersion.

9. The consumer product according to claim 8, wherein the water-soluble dispersion comprises a thermoplastic elastomer.

10. The consumer product according to claim 9, wherein the thermoplastic elastomer comprises from 40% by weight to 60% by weight of the water-soluble dispersion.

11. The consumer product according to either of claims 9 or 10 wherein the thermoplastic elastomer is selected from the group consisting of: a PTFE dispersion, perfluoroalkoxy (PFA) polymer dispersion, fluorinated ethylene-propylene (FEP), copolymer of hexafluoropropylene, and mixtures thereof.

12. The consumer product according to any of claims 8-11, wherein the water-soluble dispersion further comprises a resin selected from the group consisting of: polyamideimide, polyphenylene sulfide (PPS), polyether sulfone (PES), polyether ether ketone (PEEK), silicone resin, polysulfone and mixtures thereof.

13. The consumer product according to any of the preceding claims, wherein the interior surface of the container body is a bleached surface, and wherein the interior bleached surface is covered by the barrier layer.

14. The consumer product according to any preceding claims, wherein the water-soluble film comprises a polymer wherein the polymer comprises a homopolymer, copolymer, or mixture thereof selected from the group consisting

of: polyvinyl alcohols, polyvinyl pyrrolidone, polyalkylene oxides, acrylamide, acrylic acid, cellulose, cellulose ethers, cellulose esters, cellulose amides, polyvinyl acetates, polycarboxylic acids and salts, polyaminoacids or peptides, polyamides, polyacrylamide, copolymers of maleic/acrylic acids, polysaccharides including starch and gelatine, xanthum, carragum or a mixture thereof.

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- 15.** The consumer product according to claim 14, wherein the polymer is selected from the group consisting of: polyvinylalcohol homopolymers, anionic polyvinylalcohol copolymers, and mixtures thereof.

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EUROPEAN SEARCH REPORT

Application Number

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