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(54) **Polymer coated detergent tablet**

(57) The present invention relates to a coated detergent and/or additive composition e.g. for the dish washing or laundry machine or water softener tablets coated with a water soluble / dissolvable /dispersible material com-

prising at least a polyvinyl alcohol - polyethylene glycol graft copolymer.

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Description

[0001] The present invention relates to a coated detergent and/or additive composition e.g. for the dish washing or laundry machine or water softener tablets coated with a water or temperature dissolvable polymer material and a process of manufacturing thereof.

[0002] The traditional form of detergent and/or additive compositions for use in dish washing or washing machines is granules or non particulate solids such as bars or tablets or briquettes. In the following, the term tablet will refer to any form of non particulate solids. For automatic dish washing or washing machines, said detergent and/or additive tablets or granules are respectively placed or poured in the dispenser located in said machine or in an adequate dispensing device which is then placed in said machine.

[0003] One common embodiment is to provide detergent tablets as packaged pieces, either in a package which has to be opened before the tablet is put in the dish washing machine or washing machine, or packaged in a water soluble package left around the tablet when putted in the machine. Water soluble packages comprising an agent to be dispensed in an aqueous medium are well known.

[0004] In order to simplify the dosing of detergents for a washing cycle in a machine and to avoid wasting through spillage during the dosing action, EP-A 700 989 describes a unit packaged detergent. Said unit packaged detergent is a detergent packaged in a water soluble polymer film or sheet in such a form that it is suitable for one wash. This unit packaged detergent is placed in the detergent dispenser of the machine without unwrapping the contained detergent from the packaging.

[0005] To avoid the unwrapping of the detergent from the packaging has several advantages. First, said unit packaged detergent prevents wasting through spillage of the detergent and/or additive composition. Second, said unit packaged detergent eliminates the need for the user to estimate the dosage of said composition required and ensures that the correct dosage of said composition per wash cycle is used by the user. Third, the fingers of a user do not come in contact with the wrapped detergent composition.

[0006] Unwrapped tablets having a coating primarily are provided for laundry dishwashing compositions, particularly for increasing mechanical resistance of the tablet and for stabilise them. WO00/66701 describe shaped detergent tablets coated with several types of water soluble polymers, particularly with (co)polymers comprising acid monomers and/or unsaturated monomers.

[0007] US 6,576,599 discloses dishwashing tablets having a water insoluble coating for improving mechanical stability of the tablets.

[0008] WO 04/20569 A1 describes a detergent particle having a base layer of a fine powder dispersed in a binder on the surface of the particle, said base layer is coated with a surface modifier.

[0009] EP 1 903 099 A1 describes coated tablets, particularly automatic dishwashing tablets coated with proteins, sugars or shellac.

[0010] The object of the present invention was to provide a detergent composition providing safe and easy handling for the user and good dissolution properties of the tablet.

[0011] This object is met by a unit coated detergent composition, wherein the detergent composition is coated with a water dissolvable or dispersible coating comprising at least one polyvinyl alcohol-polyethylene glycol graft copolymer.

[0012] In the following any detergent and/or additive compositions will be encompassed by the term "detergent". This detergent composition may be in the form of granules or of any non particulate solids such as bars or tablets or briquettes. The word "tablet" encompasses in the following any form of non particulate solids, e.g. compressed detergent compositions or tablets comprising a compressed as well as a non-compressed portion. Said tablet may have any shape, including so-called "mould tablets" having a cavity for filling with detergent ingredients not contained in the compressed portion. Such mould tablets are well known in the art. Even the compressed portion of the tablet may comprise several phases like e.g. different layers comprising different detergent ingredient compositions. Preferably, said detergent tablet is formed in a shape to ensure the uniform or the step-wise dissolution of the tablet in the wash liquor. According to one preferred embodiment of the present invention the detergent and/or additive composition may comprise any ingredients known in the art for dish washing, laundry or water softening. Such ingredients may include for example surfactants, suds suppressers, bleach systems, chelating agents, builders, enzymes, fillers and perfumes, however, is not limited to these.

[0013] One particular preferred embodiment of the present invention is a shaped body for automatic dishwashing formed of a particulate detergent composition, wherein the detergent composition comprises any of the ingredients which are typical for such compositions. Such ingredients are not limiting the invention, however, examples of suitable ingredients are mentioned below.

[0014] According to the present invention, a predosed quantity of detergent is coated on at least one surface side with a water soluble or dissolvable polymer material to provide a coated detergent shaped body as a "unit coated detergent". The wording "unit coated detergent" means an amount of detergent composition suitable for one wash. Nevertheless, two or more unit coated detergents according to the present invention may be used in a single wash to meet different washing conditions, like dirtiness of washing, amount of washing, volume of washing machine, hardness of water, temperature of water and type of detergent. Said coating is made of a water dissolvable or water and temperature dissolvable material. The unit coated detergent according to the present invention may contain between 5 grams and 60 grams

of detergent.

[0015] This unit coated detergent of the present invention is placed in the machine without any further handling step. This is possible, since said coating is made of a water solvable, dissolvable or dispersible material. Providing the detergent in coated form has several advantages. First, said unit coated detergent prevents wasting through spillage of the detergent and/or additive composition. Spillage may occur during the measuring and/or dispensing into the dispenser of the washing machine or into a dispensing device. Second, said unit coated detergent eliminates the need for the user to estimate the dosage of said composition required and ensures that the correct dosage of said composition per wash cycle is used by the user. Therefore, separate measuring and/or dosing devices are superfluous. Third, the fingers of a user do not come in contact with the detergent composition, which means that the user avoids to soil its fingers and/or hands. Either in case of water solvable films wrapped around the detergent unit people may be confused and try to open said wrapping.

[0016] As one feature of the present invention, the coating of the unit coated detergent is made of a material which is water soluble or dissolves in water or is dispersible in water, is harmless for the user and can be processed at high speed during manufacture of the coating of detergent compositions and allows fast and residue-free dissolution of the tablet.

[0017] The coating is provided at least on one surface side of the shaped body, preferably on at least two surface sides, e.g. on the both "top surfaces", which means the upper and the lower surface of the detergent tablet, including or excluding any non-compressed portion of the tablet, which means that either compressed portion is coated, non-compressed portion is not or both portions are coated. Further preferred the coating is applied on all surfaces of the detergent tablet.

[0018] In the preferred embodiments said coating material comprises at least on polyvinyl alcohol-polyethylene glycol graft copolymer. A particularly preferred polyvinyl alcohol-polyethylene glycol graft copolymer according to the invention is the polymer Kollicoat® IR from BASF, Germany.

[0019] The polymeric ingredient portion of the coating may consist essentially of said polymer or can be a combination of said polymer with

(A) at least one further polymer selected from

- a1) polyvinyl alcohol or quaternized polyvinyl alcohol
- a2) vinyl alcohol- maleic acid copolymer
- a3) ethoxylated polyvinyl alcohol, e.g. the copolymer which is described in detail in EP 1 326 787 A1
- a4) polyethylene glycol (PEG)
- a5) polyvinylpyrrolidone(s)
- a6) vinyl pyrrolidone/vinyl ester copolymers like

vinylpyrrolidone-vinyl acetate copolymer

a7) ethyl acrylate - methyl methacrylate copolymer

a8) poly(meth)acrylic acid (co)polymers like methacrylic acid - ethyl acrylate copolymers

a9) polyvinylacetate

a10) vinylpyrrolidone - vinylimidazol copolymer

a11) non-ionic surfactant based on alkoxylation, particularly fatty acids or fatty alcohols comprising EO,EO-PO,PO, BuO units or any combination thereof

a11) or derivatives thereof.

B.) low molecular weight compounds like sugars comprising 1 to 10 sugar units or any amino acid, preferably natural amino acids or a mixture of sugars, a mixture of amino acids or a mixture of sugars and amino acids.

C.)

a) water-soluble nonionic polymers from the group of

a2) starch

a3) cellulose ethers

b) water-soluble amphoteric polymers from the group of

b1) alkyl acrylamide/acrylic acid copolymers,

b2) alkyl acrylamide/methacrylic acid copolymers,

b3) alkyl acrylamide/methyl methacrylic acid copolymers,

b4) alkyl acrylamide/acrylic acid/alkylaminoalkyl (meth)acrylic acid copolymers,

b5) alkyl acrylamide/methacrylic acid/alkylaminoalkyl (meth)acrylic acid copolymers,

b6) alkyl acrylamide/methyl methacrylic acid/alkylaminoalkyl (meth)acrylic acid copolymers,

b7) alkyl acrylamide/alkyl methacrylate/alkylaminoethyl methacrylate/alkyl methacrylate copolymers,

b8) copolymers of

b8i) unsaturated carboxylic acids,

b8ii) cationically derivatized unsaturated carboxylic acids,

b8iii) optionally other ionic or nonionic monomers,

c) water-soluble zwitterionic polymers from the group of

c1) acrylamidoalkyl trialkylammonium chloride/acrylic acid copolymers and alkali metal and ammonium salts thereof,

c2) acrylamidoalkyl trialkylammonium chloride/methacrylic acid copolymers and alkali metal and ammonium salts thereof,

c3) methacryl ethyl betaine/methacrylate copolymers,

d) water-soluble anionic polymers from the group of

d1) vinyl acetate/crotonic acid copolymers,

d2) vinyl pyrrolidone/vinyl acrylate copolymers,

d3) acrylic acid/ethyl acrylate/N-tert.-butyl acrylamide terpolymers,

d4) graft polymers of vinyl esters, esters of acrylic acid or methacrylic acid individually or in admixture copolymerized with crotonic acid, acrylic acid or methacrylic acid with polyalkylene oxides and/or polyalkylene glycols,

d5) grafted and crosslinked copolymers from the copolymerization of

d5i) at least one monomer of the nonionic type,

d5ii) at least one monomer of the ionic type,

d5iii) polyethylene glycol and

d5iv) a crosslinking agent,

d6) copolymers obtained by copolymerization of at least one monomer of each of the following three groups:

d6i) esters of unsaturated alcohols and short-chain saturated carboxylic acids and/or esters of short-chain saturated alcohols and unsaturated carboxylic acids, d6ii) unsaturated carboxylic acids, d6iii) esters of long-chain carboxylic acids and unsaturated alcohols and/or esters of the carboxylic acids of group d6ii) with saturated or unsaturated, linear or branched C₈₋₁₈ alcohols,

d7) terpolymers of crotonic acid, vinyl acetate and an allyl or methallyl ester,

d8) tetrapolymers and pentapolymers of

d8i) crotonic acid or allyloxyacetic acid,

d8ii) vinyl acetate or vinyl propionate,

d8iii) branched allyl or methallyl esters,

d8iv) vinyl ethers, vinyl esters or straight-chain allyl or methallyl esters,

d9) crotonic acid copolymers with one or more monomers from the group consisting of ethylene, vinyl benzene, vinyl methyl ether, acrylamide and water-soluble salts thereof,

d10) terpolymers of vinyl acetate, crotonic acid and vinyl esters of a saturated aliphatic monocarboxylic acid branched in the α -position,

e) water-soluble cationic polymers from the group of

e1) quaternized cellulose derivatives,

e2) polysiloxanes containing quaternary groups,

e3) cationic guar derivatives,

e4) polymeric dimethyl diallylammonium salts and copolymers thereof with esters and amides of acrylic acid and methacrylic acid,

e5) copolymers of vinyl pyrrolidone with quaternized derivatives of dialkylaminoacrylate and methacrylate,

e6) vinyl pyrrolidone/methimidazolium chloride copolymers,

e7) quaternized polyvinyl alcohol,

e8) polymers known by the INCI names of polyquaternium 2, polyquaternium 17, polyquaternium 18 and polyquaternium 27.

[0020] All the compounds of C.) are described in detail in EP 1 173 539 B1.

[0021] The compositions mentioned under items A.) to C.) optionally can comprise a binder material.

[0022] The coating comprises at least 1% by weight or at least 5% by weight, preferably at least 15 % by weight, more preferably at least 35 % by weight, most preferably at least 50 % by weight and up to 100% by weight, or up to 99 % by weight, up to 95 % by weight, up to 90% by weight or maybe up to 75 % by weight of the polyvinyl alcohol - polyethylene glycol graft copolymer. Additionally the coating may comprise any of the materials mentioned in A.) to C.), preferred of the materials mentioned in A.) or B.), particularly preferred the materials mentioned in A.). The materials mentioned in A.) are mostly preferred for the reason that the materials are easily providing a coating, are clearly non-toxic, non-expensive and can be easily and fast dissolved in water or in wash load, particularly in heated water/wash load like in an automatic dishwashing apparatus.

[0023] In case of coating comprises any of the materials of A.) to C.) or mixtures thereof said compositions may comprise at least 1 % by weight or at least 5% by weight, preferably at least 15 % by weight, more preferably at least 35 % by weight, most preferably at least 50 % by weight of any of the compounds mentioned in A.) B.) or C.) or mixtures of compounds mentioned there, and up to 99 %, or up to 95 %, preferably up to 75 %, more preferably up to 50 % by weight of at least one of the compounds mentioned in A.) B.) or C.) as further compounds.

[0024] The coating can consist of the above mentioned ingredients or can contain as further ingredients any of them mentioned below.

[0025] A preferred water soluble low molecular weight compound is any type of sugar, amino acid or other low molecular acids, e.g. citric acid or the like.

One particular advantage of these materials is on one side the water solubility /dispersibility on the other hand the non-toxicity of the compounds.

[0026] When referring to the material, water-soluble/

dissolvable/dispersible is herein defined when more than 99% of a coating (layer) of such material dissolves within 15 minutes, preferably within 5 min in a beaker containing 1 L of deionised water at 40° C which is stirred with a stirrer revolving at 200 r. p.m. It is pointed out that materials can be used as ingredients for the coating which itself may not be soluble, but e.g. dispersible, as long as the coating comprising said material is dissolved by water.

[0027] Preferred additional water soluble / dissolvable / dispersible materials are cellulose, particularly preferred cellulose fibres or microcrystalline cellulose with an average particle size in dry state of below 1000µm, preferably below 500µm, more preferred 250µm or smaller and particularly preferred of between 20 and 150µm; starch or starch derivatives, pectine like glycogene or - most preferred - proteins or peptides (at least 10mer), particularly gelatine or derivatives or peptide fragments thereof.

[0028] Further suitable compounds are "low molecular weight compounds" like C₃-C₆ sugars in aldose or ketose form like allose, altrose, glucose, mannose, gulose, idose, galactose, talose, psicose, fructose, sorbose, tagatose, xylulose, ribulose, ribose, arabinose, xylose, lyxose, threose, erythrose, erythrulose, dihydroxy acetone or glycerol aldehyde or disaccharides like for example saccharose, lactose, maltose or Isomalt or oligosaccharides comprising 3 to 10 sugar units or amino acids, preferably natural amino acids (commonly contained in natural proteins) without being restricted to the mentioned examples. One particularly preferred low molecular weight compound is the sugar Isomalt ST, comprising 6-O-α-D-glucopyranosyl-D-sorbitol and 1-O-α-D-glucopyranosyl-D-mannitol dihydrate units. Further information about said sugar is available under www.chemistryworld.de/preise/prs-html/analysen/2444-spz.htm.

[0029] As an additional ingredient e.g. for lowering stickiness of the coating polymorphic SiO₂ (e.g. of the Aerosil type from Degussa, Germany) can be added to the coating

[0030] The above mentioned water soluble / dissolvable / dispersible compounds may be used in combination with an additional water soluble or dispersible polymer. In case water soluble/dispersible polymer is used it will be appreciated that the water soluble polymer may comprise a homopolymer or a copolymer. In case the water soluble polymer comprises a copolymer the copolymer may be a random or block copolymer.

[0031] A suitable additional water soluble polymer may comprise a cellulose derivative such as a cellulose ether e.g. hydroxypropyl cellulose, carboxymethyl cellulose, or the polymer comprises monomers of polyvinyl alcohol, polyvinyl pyrrolidone, partially hydrolysed polyvinyl acetate, polyvinyl acetate, modified acrylic, fumaric, maleic, itaconic, aconitic, mesaconic, citraconic and methylenemalononic acid or their salts, maleic anhydride, acrylamide, alkylene, vinylmethyl ether or styrene. Such polymers can either be homo- or copolymers of the mentioned

monomer units. Preferred are polyvinyl pyrrolidone homopolymers or copolymers of polyvinylalcohol, preferably copolymers of polyvinylalcohol and polycarboxylates, most preferred are copolymers of polyvinylalcohol with maleic acid or (meth)acrylic acid.

[0032] The additional water soluble polymer preferably has dispersant, anti-redeposition, soil releasing or other detergency properties.

[0033] The additional water soluble polymer may further be a polymer comprising sulfonic acid groups like e.g. the polymers described in EP-A 1 299 513, EP-A 1 363 986, WO 95/12654 or EP-A 0 877 002

[0034] The water soluble polymer system may comprise a soil release agent.

[0035] Examples of polymeric soil release agents include those having: (a) one or more nonionic hydrophile components consisting essentially of (i) polyoxyethylene segments with a degree of polymerization of at least 2, or (ii) oxypropylene or polyoxypropylene segments with a degree of polymerization of from 2 to 10, wherein said hydrophile segment does not encompass any oxypropylene unit unless it is bonded to adjacent moieties at each end by ether linkages, or (iii) a mixture of oxyalkylene units comprising oxyethylene and from 1 to 30 oxypropylene units, said hydrophile segments preferably comprising at least 25% oxyethylene units and more preferably, especially for such components having 20 to 30 oxypropylene units, at least 50% oxyethylene units; or (b) one or more hydrophobe components comprising (i) C₃ oxyalkylene terephthalate segments, wherein, if said hydrophobe components also comprise oxyethylene terephthalate, the ratio of oxyethylene terephthalate:C₃ oxyalkylene terephthalate units is 2:1 or lower, (ii) C₄-C₆ alkylene or oxy C₄-C₆ alkylene segments, or mixtures therein, (iii) poly(vinyl ester) segments, preferably polyvinyl acetate, having a degree of polymerization of at least 2, or (iv) C₁-C₄ alkyl ether or C₄ hydroxyalkyl ether substituents, or mixtures therein, wherein said substituents are present in the form of C₁-C₄ alkyl ether or C₄ hydroxyalkyl ether cellulose derivatives, or mixtures therein, or a combination of (a) and (b). Typically, the polyoxyethylene segments of (a)(i) will have a degree of polymerization of from 1 to 200, although higher levels can be used, preferably from 3 to 150, more preferably from 6 to 100. Suitable oxy C₄-C₆ alkylene hydrophobe segments include, but are not limited to, end-caps of polymeric soil release agents such as MO₃S(CH₂)_nOCH₂:CH₂O-, where M is sodium and n is an integer from 4-6. Other soil release agents useful herein also include celulosic derivatives such as hydroxyether celulosic polymers, copolymeric blocks of ethylene terephthalate or propylene terephthalate with polyethylene oxide or polypropylene oxide terephthalate, and the like. Such agents are commercially available and include hydroxyethers of cellulose such as METHOCEL (Dow). Cellulosic soil release agents for use herein also include those selected from the group consisting of C₁-C₄ alkyl and C₄ hydroxyalkyl cellulose. Further suitable surfactants include wa-

ter-soluble cationic ethoxylated amine compounds with particulate soil/claysoil removal and/or anti-redeposition properties. Particularly preferred of these cationic compounds are ethoxylated cationic monoamines, diamines or triamines.

[0036] The coating system in accordance with the invention meets one or more of the following physical parameters:

- a) High suitability for coated materials (e.g. detergents) such as providing an effective barrier to the materials coated therewith and displaying compatibility with hygroscopic and caustic materials.
- b) High solubility in water, for example a 0.1 -1g of the coating composition material of the present invention dissolves within 10 minutes in a 1 L beaker of water at 40° C when stirred at 200 r.p.m and within 20 minutes at 20° C under the same conditions. To meet these properties the coating may include a solubility modifying additive. Preferred examples of such additives include plasticizers.

[0037] In a preferred embodiment the water soluble coating system may contain a plasticizer with a content of more than 0.01 %, preferably more than 0.1 %, more preferred more than 0.5% and most preferred 1 % or more and up to 30%, preferably less than 30 wt %, more preferably 10% or less than 10%.

[0038] Suitable types of plasticizers include solvents.

[0039] Preferred examples of solvents include water, alkylene glycol mono lower alkyl ethers, glycerol, polyalcohols, propylene glycols, ethoxylated or propoxylated ethylene or propylene, glycerol esters, glycerol triacetate, polyethylene glycols, methyl esters and amides.

[0040] One of the preferred plasticizers is glycerol. Another preferred type of plasticizers comprises the medium molecular weight polyethylene glycols (PEGs). Such materials preferably have molecular weights of at least 150. PEGs of molecular weight ranging from 200 to 3000 are most preferred. Yet another preferred type of plasticizers comprises lower molecular weight methyl esters. Such materials are those of the general formula: R-C(O)-OCH₃ wherein R ranges from 1 to 18. Examples of suitable lower molecular weight methyl esters include methyl acetate, methyl propionate, methyl octanoate, and methyl dodecanoate.

[0041] Suitable types of plasticisers also include non-ionic surfactants.

[0042] Preferred nonionic surfactants incorporated into the resin provide a suds suppression benefit. The alkyl ethoxylate condensation products of an alcohol with from 1 to 80 moles of an alkylene (linear/branched aliphatic / aromatic optionally substituted C₂ to C₂₀ alkylene) oxide are suitable for this use. The alkyl chain of the alcohol can either be straight or branched, primary or secondary, and generally contains from 6 to 22 carbon atoms. Particularly preferred are the condensation products of alcohols having an alkyl group containing from 8 to 20 car-

bon atoms with from 2 to 10 moles of ethylene oxide per mole of alcohol. In this regard Suitable surfactants include POLY-TERGENT(R) SLF-18B nonionic surfactants by Olin Corporation.

[0043] Ethoxylated C₆-C₁₈ fatty alcohols and C₆-C₁₈ mixed ethoxylated/propoxylated fatty alcohols are suitable surfactants for use herein. Preferably the ethoxylated fatty alcohols are the C₁₀-C₁₈ ethoxylated fatty alcohols with a degree of ethoxylation of from 3 to 50, most preferably these are the C₁₂-C₁₈ ethoxylated fatty alcohols with a degree of ethoxylation from 3 to 40. Preferably the mixed ethoxylated/propoxylated fatty alcohols have an alkyl chain length of from 10 to 18 carbon atoms, a degree of ethoxylation of from 3 to 30 and a degree of propoxylation of from 1 to 10.

[0044] The condensation products of ethylene oxide with a hydrophobic base formed by the condensation of propylene oxide with propylene glycol are suitable for use herein. The hydrophobic portion of these compounds preferably has a molecular weight of from 1500 to 1800 and exhibits water insolubility. Examples of compounds of this type include certain of the commercially-available Pluronic (TM) surfactants, marketed by BASF.

[0045] The condensation products of ethylene oxide with the product resulting from the reaction of propylene oxide and ethylenediamine are suitable for use herein. The hydrophobic moiety of these products consists of the reaction product of ethylenediamine and excess propylene oxide, and generally has a molecular weight of from 2500 to 3000. Examples of this type of nonionic surfactant include certain of the commercially available Tetronic(TM) compounds, marketed by BASF.

[0046] In a preferred embodiment of the present invention the polymer system may comprises a mixed nonionic surfactant system.

[0047] Suitable compounds include fatty esters of mono- or polyhydric alcohols having from 1 to 40 carbon atoms in the hydrocarbon chain. The fatty acid portion of the fatty ester can be obtained from mono- or polycarboxylic acids having from 1 to 40 carbon atoms in the hydrocarbon chain. Suitable examples of monocarboxylic fatty acids include behenic acid, stearic acid, oleic acid, palmitic acid, myristic acid, lauric acid, acetic acid, propionic acid, butyric acid, isobutyric acid, Valeric acid, lactic acid, glycolic acid and beta,beta'-dihydroxyisobutyric acid. Examples of suitable polycarboxylic acids include: n-butyl-malonic acid, isocitric acid, citric acid, maleic acid, malic acid and succinic acid. The fatty alcohol radical in the fatty ester can be represented by mono- or polyhydric alcohols having from 1 to 40 carbon atoms in the hydrocarbon chain. Examples of suitable fatty alcohols include; behenyl, arachidyl, cocoyl, oleyl and lauryl alcohol, ethylene glycol, glycerol, ethanol, isopropanol, vinyl alcohol, diglycerol, xylitol, sucrose, erythritol, pentaerythritol, sorbitol or sorbitan. Preferably, the fatty acid and/or fatty alcohol group of the fatty ester adjunct material has from 1 to 24 carbon atoms in the alkyl chain. Preferred fatty esters herein are ethylene glycol, glycerol and sorb-

itan esters wherein the fatty acid portion of the ester normally comprises a species selected from behenic acid, stearic acid, oleic acid, palmitic acid or myristic acid. The glycerol esters are also highly preferred. Specific examples of fatty alcohol esters for use herein include: stearyl acetate, palmityl all-lactate, cocoyl isobutyrate, oleyl maleate, oleyl dimaleate, and tallowyl propionate. Fatty acid esters useful herein include: xylitol monopalmitate, pentaerythritol monostearate, sucrose monostearate, glycerol mono stearate, ethylene glycol mono stearate, sorbitan esters. Suitable sorbitan esters include sorbitan monostearate, sorbitan palmitate, sorbitan monolaurate, sorbitan monomyristate, sorbitan monobehenate, sorbitan mono-oleate, sorbitan dilaurate, sorbitan distearate, sorbitan dibehenate, sorbitan dioleate, and also mixed tallow alkyl sorbitan mono- and all-esters. Glycerol monostearate, glycerol mono-oleate, glycerol monopalmitate, glycerol monobehenate, and glycerol distearate are preferred glycerol esters herein. Further suitable agents include triglycerides, mono or diglycerides, and wholly or partially hydrogenated derivatives thereof, and any mixtures thereof. Suitable sources of fatty acid esters include vegetable and fish oils and animal fats. Suitable vegetable oils include soy bean oil, cotton seed oil, castor oil, olive oil, peanut oil, safflower oil, sunflower oil, rapeseed oil, grapeseed oil, palm oil and corn oil.

[0048] Waxes, including microcrystalline waxes are possible lubricants, although much less preferred in the present invention due to their poor solubility in water. Preferred waxes have a melting point in the range from 35° C to 110° C and comprise generally from 12 to 70 carbon atoms. Preferred are petroleum waxes of the paraffin and microcrystalline type which are composed of long-chain saturated hydrocarbon compounds.

[0049] The addition of a plasticizing agent allows the reduction of the water content in the coating composition before/during the application of the composition to the detergent tablet. Since the detergent tablet consists itself of water dissolvable/dispersible components it is not desirable to apply a high water amount to the tablet during the coating process. Further the plasticizer provides the coating after drying with an increased smoothness and elasticity, resulting in less brittleness and more comfortable handling of the tablet.

[0050] The coating may include a colourant. Colourant when present as a component in the resin is preferably present at a level of from 0.001wt % to 2wt %, preferably from 0.01wt % to 1.7wt %, most preferably from 0.1wt % to 1.5wt %.

[0051] The colourant may comprise a dye or a pigment. Examples of suitable dyes include reactive dyes, direct dyes, azo dyes. Preferred dyes include phthalocyanine dyes, anthraquinone dye, quinoline dyes, monoazo, diazo and polyazo. More preferred dyes include anthraquinone, quinoline and monoazo dyes. Preferred dyes include SANDOLAN E-HRL 180% (tradename), SANDOLAN MILLING BLUE (tradename), TURQUOISE ACID BLUE (tradename) and SANDOLAN BRILLIANT

GREEN (tradename) all available from Clariant UK, HEXACOL QUINOLINE YELLOW (tradename) and HEXACOL BRILLIANT BLUE (tradename) both available from Paintings, UK, ULTRA MARINE BLUE (tradename) available from Holliday or LEVAFIX TURQUOISE BLUE EBA (tradename) available from Bayer, USA and liquid colourants e.g. of the type Liquitit® of Miliken

[0052] The coating liquid usable for the coating process for preparing the coating layer may further also contain;

- preservatives
- dyes
- gloss enhancers
- plasticizer
- foam controller
- dispersing agent
- pigments
- emulsifiers
- pH adjusting agents
- perfume
- viscosity adjusting agents
- wetting agents
- hydrophilic organic solvents
- stabilizers

[0053] All these ingredients are commonly used and are known to those skilled in the art. In this regard it will be appreciated that any additives are substantially water soluble or dispersible so that the overall system retains its water solubility / water dispersibility.

[0054] The shaped body article preferably comprises a cleaning composition or a water softener composition. The cleaning composition may be an automatic dishwashing detergent or additive, a laundry detergent or additive, a hard surface cleaning composition (such as an all-purpose cleaner) or a toilet reservoir cleaner.

[0055] Such a coated article has been found to be particularly suitable since the coating material is formed of components allowing a fast decomposition of the coating; in use the article has been found to overcome the problem of residue formation on items being cleaned, said residue being formed of packaging material having poor solubility.

[0056] The cleaning composition may comprise of among others a builder system, a bleach system, a silver protecting system, a protecting system for glass (against glass corrosion), an enzyme system, a viscosity modifier, a perfume or odor control system, one or more colourants, an acidity modifier, a bactericide / fungicide, a surfactant system, and a polymer system comprising a polymer supporting spotting characteristics and/or a polymer supporting filming characteristics (like for example discussed in EP-A 1299 513, 1 363 986, WO 95/12654 or EP-A 0 877 002) and a tablet disintegrate without being limited to these ingredients. The ingredients of the composition, however, do not limit the present invention and any suitable detergent composition for different purposes

can be used. Typical components of automatic dishwashing compositions are disclosed for example in EP-A 1 268 729, EP-A 1 299 513, EP-A 1 571 198, EP-A 1 520 908 and EP-A 1 524 313. All the components described therein may be part of the compositions coated according to the present invention.

[0057] The composition may be formulated having regard to the fact that the user will not come into contact with the composition, whether by inhalation or by skin contact. For example, the composition may include an enzyme, without concern about physical contact between the composition containing the enzyme, and the user.

[0058] Preferred are dishwashing compositions, particularly preferred dishwashing compositions comprising bleaching systems, complexing agents and/or a polymer system providing good spotting and filming characteristics.

[0059] A fast dissolving rate is achieved by a thin coating of said water dissolvable material. Preferably, the present invention uses coatings of water dissolvable materials with amounts of from 0.07 mg/cm² to 15 mg/cm² resulting e.g. preferably in thicknesses between 5 µm and 1000 µm, more preferably between 20 µm and 600 µm.

[0060] Accordingly the coating corresponds to about 0.01 % by weight to 5% by weight, preferably about 0.01 % by weight to 2.8% by weight of the total amount of the detergent unit.

[0061] As a further option, said unit coated detergent may comprise an additive which provides an unbearable bitter taste, particularly in case the coating comprises any sugar. This additive may be coated onto said detergent composition, either as part of the water soluble coating or as a separate coating. This improves the prevention that children may accidentally ingest the complete detergent.

[0062] The water soluble material, provided as powder or prepared as a solution, melt or dispersion or a combination thereof comprising all components desired to be in the coating, is coated onto the material by any suitable method. Preferably the material is coated by powdering, spraying, dipping, immersing or similar or any combination of said techniques.

Claims

1. A unit coated detergent composition, wherein the detergent composition is coated with a water dissolvable or dispersible coating comprising from at least 1% up to 100% of a polyvinyl alcohol - polyethylene glycol graft copolymer.
2. A unit coated detergent composition, wherein the coating comprises at least 50% to 99% of a polyvinyl alcohol - polyethylene glycol graft copolymer and any further coating material.

3. A unit coated detergent composition according to claim 1 or 2, wherein the amount of coating material providing the coating is between 0.07 and 15 mg/cm².
4. A unit coated detergent composition according to any of claims 1 to 3, wherein the detergent composition is a dish washing, laundry detergent or water softener composition.
5. A unit coated detergent composition according to claim 4, wherein the dish washing composition is tablet shaped, having at least one compressed portion and optionally a non-compressed portion.
6. A unit coated detergent composition according to any of claims 1 to 5, wherein the coating is provided at least on one surface side of the shaped body, preferably on at least two surface sides, more preferably on at least one of the both "top surfaces", which means the upper and the lower surface of the detergent tablet, including or excluding any non-compressed portion of the tablet
7. Method for preparing a unit shaped body according to any of claims 1 to 6 comprising spraying a coating material as defined in any of claims 1 or 2 on at least one surface side of the shaped body.



EUROPEAN SEARCH REPORT

Application Number
EP 08 02 1163

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Place of search Munich		Date of completion of the search 6 May 2009	Examiner Pfannenstein, Heide
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