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AQUEOUS BUILT LIQUID DETERGENTS CONTAINING ALKYL GLYCOSIDES

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11 Claims

ABSTRACT OF THE DISCLOSURE

Disclosed are aqueous built liquid detergent compositions which do not require the presence of a hydrotrope to prevent phase separation. The detergent compositions are an aqueous solution of an alkyl glycoside and a builder selected from the group consisting of potassium nitrilotriacetate, sodium nitrilotriacetate, and a potassium polyphosphate.

This invention relates to liquid detergents. More particularly, this invention relates to aqueous built liquid detergents which exhibit stability against phase separation.

In recent years, built liquid detergent compositions have become increasingly popular with consumers because they are easy to store, dispense and measure, and they do not cake as some granulated detergent products have a tendency to do when stored for lengthy periods of time or when they become damp. The chief disadvantage of built liquid detergent compositions has been their cost as compared to the correspondingly granular products. The cost of built liquid detergents has been excessive because it has proved rather difficult to prepare homogeneous built liquid detergent compositions.

Most of the built liquid detergent compositions commercially available at the present time contain one or more synthetic detergents and a builder such as potassium polyphosphate in an aqueous medium. The chief problem encountered in formulating such built liquid detergent compositions has been the difficulty of including in a homogeneous solution sufficient detergent and builder to provide the performance expected of a product intended for washing soiled clothing and for other household chores. The search for means of incorporating enough of these constituents in a homogeneous liquid has led to the development of complicated formulae with large numbers of ingredients. These formulations usually include a hydrotrope and/or an organic solvent. The hydrotropes, such as potassium toluene sulfonate or potassium xylene sulfonate, and the solvent, such as ethyl alcohol or ethylene glycol, contribute little, if any, to the performance of the liquid detergent. Thus, the expense of their incorporation must be charged solely to achievement of higher concentrations of detergent and builder in solution.

It is, accordingly, an object of this invention to provide an aqueous built liquid detergent composition which does not require a hydrotrope to prevent phase separation.

It is another object of this invention to provide a stable homogeneous aqueous built liquid detergent composition.

It is another object of this invention to provide a stable homogeneous aqueous built liquid detergent composition which gives a high level of cleaning at an acceptable level of usage of the product.

It is another object of this invention to provide an aqueous built liquid detergent composition which will be efficient and economical and which will possess excellent detergent properties.

It is a further object of this invention to provide an aqueous built detergent composition containing a non-ionic detergent and a builder.

The foregoing objects and still further objects are

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accomplished according to the present invention by providing a homogeneous aqueous built liquid detergent composition consisting essentially of an aqueous solution of an alkyl glycoside and a builder selected from a group consisting of sodium nitrilotriacetate, potassium nitrilotriacetate, and potassium polyphosphate.

The amounts of alkyl glycoside and builder which are present in the aqueous detergent compositions of this invention may vary over a rather wide range. In general, satisfactory results may be achieved by mixing the alkyl glycoside and builder with water in sufficient amounts to furnish a weight ratio of alkyl glycoside to builder of from about 0.1 to 5, and preferably from about 0.2 to 0.8, and a weight ratio of the sum of the said builder and alkyl glycoside to water of from about 0.1 to 3, and preferably from about 0.5 to 2.

The alkyl glycosides which are used in the liquid detergent compositions of the present invention are glycosides of monohydric alcohols containing from 8 to 25 carbon atoms and a reducing saccharide selected from the group consisting of monosaccharides and polysaccharides containing from 5 to 6 carbon atoms in each monomeric unit of the saccharide. These glycosides may be represented by the formula AOR wherein R is a monovalent radical resulting from the removal of a hydroxyl group from a monohydric alcohol having from 8 to 25 carbon atoms and wherein A is a monovalent radical resulting from the removal of a hydroxyl group and from a reducing monosaccharide or a reducing polysaccharide and is selected from the group consisting of $(C_{6n}H_{10n+1}O_{5n})$ and $(C_{5n}H_{8n+1}O_{4n})$ wherein n is from 1 to 50. A preferred class of alkyl glycosides are the alkyl glucosides of monohydric alcohols containing from 10 to 14 carbon atoms and polyglucose containing from 1 to 20 glucose units. A particularly preferred class of alkyl glycosides are those containing from 1 to 4 glucose units.

The alkyl glycosides may be prepared by reacting a monosaccharide, or a compound hydrolyzable to a monosaccharide, with a monohydric alcohol having from 8 to 25 carbon atoms, in the presence of an acid catalyst and in the presence of a solvent selected from the group consisting of primary and secondary alcohols having from 3 to 5 carbon atoms, an aliphatic ether-alcohol having a boiling point at atmospheric pressure of no more than about 200° C., and an aliphatic glycol containing from 3 to 5 carbon atoms. A more detailed description of the nature and preparation of the alkyl glycosides may be found in U.S. patent application Ser. No. 703,539, entitled Polyglycosides and Process of Preparing Mono- and Polyglycosides, filed by Baak W. Lew on Feb. 7, 1968, now U.S. Pat. No. 3,598,865; U.S. patent application Ser. No. 844,625, entitled Glycoside Compositions and Process for the Preparation Thereof, filed by Baak W. Lew on July 24, 1969; and U.S. patent application Ser. No. 844,651, entitled Process for Preparing Mono- and Polyglycosides, filed by Baak W. Lew on July 24, 1969. The disclosures of the aforementioned U.S. patent applications are hereby incorporated into this application by reference.

The following examples are illustrative of the preparation of alkyl glycosides which may be used in the preparation of the liquid detergent compositions of the present invention. It will be appreciated, of course, that the proportions of reactants, time of reaction, and temperature of reaction are somewhat variable; and selection of different sugars, alcohols, solvents, and catalysts can readily be effected in light of the guiding principles and teachings which are disclosed herein.

EXAMPLE A

A mixture of 500 grams of glucose, 2500 ml. of n-butyl alcohol, 0.145 ml. of concentrated sulfuric acid, and 750

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grams of n-decyl alcohol are refluxed (115–117° C.) for 3.5 hours in a 5 liter, 3-necked flask provided with a stirrer, thermometer, and reflux condenser. The n-butyl alcohol is then distilled from the reaction mixture until a temperature of 130° C. is reached, at which time the pressure is slowly reduced to 50 mm. of mercury over a period of one hour while the temperature is held at 126° C. At this time all of the n-butyl alcohol along with the water of reaction has been distilled off. The catalyst is neutralized by the addition of 0.31 gram of sodium carbonate dissolved in 5 ml. of water. The unreacted n-decyl alcohol is then removed by distillation to 125° C. at 15 mm. mercury pressure to yield 644 grams of an amber colored glassy product. An analysis of this product shows 0.1% free reducing sugar. The yield indicated that the product contained on the average 2.3 glucose units condensed onto each n-decyl alcohol unit. This value is calculated from the weight of glucose recited and the yield of glucoside, employing 180 and 158 as the molecular weights of glucose and n-decyl alcohol, respectively, and recognizing that 1 mol of water splits out per each mol of glucose reacted.

$$\text{Weight of glucose radical in product} = \frac{500 \times 162}{180} = 450$$

$$\text{Weight of alcohol in product} = 644 - 450 = 194$$

$$\text{Glucose units per alcohol unit} = \frac{450}{162} \times \frac{158}{194} = 2.3$$

EXAMPLE B

A mixture of 720 grams of glucose, 3200 ml. of n-butyl alcohol, 126.6 grams of n-decyl alcohol and 0.3 ml. of concentrated sulfuric acid is refluxed at 112–117° C. for two hours. The n-butyl alcohol is then distilled from the reaction mixture until a temperature of 125° C. is reached. Partial pressure is then applied to the distillation slowly so that in 50 minutes the pressure is at 50 mm. of mercury, while the temperature is allowed to drop to 100° C. After 30 minutes of distillation under partial pressure, the reaction mixture becomes a porous solid cake and the stirrer is turned off and the reaction is continued without the stirrer. After one hour and twenty-five minutes of this distillation under reduced pressure, the porous friable cake is broken up and the reaction is resumed by stirring to a fluidized bed with the temperature at 108° C. and the pressure at 154 mm. mercury. After a total of two and one half hours under reduced pressure, all of the n-butyl alcohol has been distilled off. The unreacted n-decyl alcohol is removed from the reaction product by washing with n-butyl alcohol, along with 0.46 gram of sodium carbonate dissolved in 15 ml. of water to neutralize the catalyst, followed by acetone and filtration. The yield is 652 grams of a light tan powder. Analysis: 0.5% reducing sugar, 0.3% free n-decyl alcohol. The yield indicated that an average of 16 glucose units has condensed onto each n-decyl alcohol unit.

EXAMPLE C

A mixture of 720 grams of d-glucose, 3200 ml. of n-butyl alcohol, 193.9 grams of n-hexadecyl alcohol (0.2 mol per mol of glucose), and 0.3 ml. of concentrated sulfuric acid is refluxed for two hours at 114–117° C. Butyl alcohol is then distilled from the reaction mixture until a temperature of 125° C. is reached (40 minutes). Partial pressure is then applied to the distillation so that in 45 minutes the pressure is at 20 mm. Hg while the temperature is allowed to drop to 110° C. After 25 minutes under partial pressure, the reaction mixture becomes a porous, solid cake and the stirrer is turned off. After 75 minutes of reaction under reduced pressure, the porous cake is broken up and the reaction resumed by stirring to a fluidized bed and at a temperature of 115–120° C. and a pressure of 15 mm. of mercury. After a total of 3½ hours of reaction under reduced pressure, all of the n-butyl alcohol has been distilled off. One liter of acetone and 0.595

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gram of sodium carbonate in 10 ml. of water is added to extract unreacted n-hexadecyl alcohol. The insoluble product is filtered off, washed with acetone again, and filtered. The product is a light tan powder, soluble in water. Analysis: reducing sugar, 0.7%; free n-hexadecyl alcohol, 0.7%. The yield is 698 grams which indicates that the product has an average of 19 glucose residues condensed on each alcohol residue.

EXAMPLE D

A mixture of 720 grams of d-glucose, 3200 ml. of n-butyl alcohol, 162.3 grams of n-octadecyl alcohol (0.15 mol per mol of glucose), and 0.3 ml. of concentrated sulfuric acid is refluxed at 115–119° C. for 2 hours. N-butyl alcohol is then distilled off until a temperature of 123° C. is reached. Partial pressure is applied to the distillation so that in 20 minutes the pressure is at 40 mm. mercury while the temperature is allowed to drop to 100° C. After one hour of reaction under reduced pressure, the reaction mixture turns to a honeycombed cake. After a further reaction of 45 minutes, the honeycombed cake is broken up and reaction continued by stirring to a fluidized bed with the temperature at 100–105° C. and the pressure at 5 mm. mercury. After a total reaction of 3¾ hours under reduced pressure, all the n-butyl alcohol has been distilled off. Powdered sodium carbonate (0.595 gram) is added to the reaction product, followed by the addition of one liter of recovered n-butyl alcohol and one liter of acetone to remove unreacted n-octyldecyl alcohol. The insoluble product is filtered off and washed with acetone. The product is a water-soluble, light tan powder. Analysis: reducing sugar, 0.3%; free n-octadecyl alcohol, 0.2%. The yield is 705 grams which indicates that an average of 19 glucose units has condensed on each n-octadecyl alcohol unit.

EXAMPLE E

A mixture of 20 grams of methyl glucoside, 100 ml. of n-butyl alcohol and 0.01 ml. of concentrated sulfuric acid is refluxed for 3 hours at 115° C. whereupon 40.8 grams of n-decyl alcohol is added. The reaction mixture is distilled for 15 minutes until a temperature of 130° C. is reached. A partial vacuum is then applied to the distillation so that in 20 minutes the pressure is at 60 mm., while the temperature is held at 125° C. In 1¼ hours of distillation under reduced pressure, all of the n-butyl alcohol is distilled off. The catalyst is neutralized by the addition of 0.021 gram of sodium carbonate dissolved in 5 ml. of water and unreacted n-decyl alcohol is removed by distillation. A yield of 25 grams of an amber glass material is obtained which indicates a degree of glucosidation of the n-decyl alcohol of 2. It analyzed 0% reducing sugar.

EXAMPLE F

830 grams of a corn syrup with a dextrose equivalent of 72–75 and a water content of 35% is concentrated to approximately 5% water content. There is then added to this concentrated corn syrup 540 grams of ethylene glycol monomethyl ether, 106 grams of CO-10S (a mixture of 85% n-decyl alcohol with some n-octyl and n-dodecyl alcohols, a product of Procter and Gamble) and 0.42 ml. of concentrated sulfuric acid. This mixture is refluxed for 105 minutes at 120° C. at which point the reflux is changed to distillation to distill off the ethylene glycol monomethyl ether. After five minutes of distillation at atmospheric pressure, the pressure is reduced slowly so that the pressure is 20 mm. mercury in 30 minutes while the temperature is allowed to drop to 110° C. After 20 minutes of distillation under a reduced pressure, the reaction mixture becomes a porous, honeycombed, solid cake. The stirrer is turned off and the reaction is continued for a total of two hours of reaction under reduced pressure at 110° C., at which time about 96% of the ethylene glycol monomethyl ether has been distilled off. The porous cake is broken up and the unreacted

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CO-10S is extracted by the addition of acetone along with 0.75 gram of sodium hydroxide dissolved in 10 ml. of water. The insoluble product is filtered and washed with acetone again. The yield of light gray powder is 565 grams, which indicates that an average of 10 glucose units has condensed onto each n-decyl alcohol unit. Analysis indicated that the product contained 1.9% free reducing sugar and 0.3% free n-decyl alcohol.

EXAMPLE G

A mixture of 324 grams of the glucose (1.8 mols), 206 grams of propylene glycol (2.7 mols), 227 grams of n-decanol (1.44 mols) and 0.2 ml. of concentrated sulfuric acid is heated in a one liter, 3-necked flask provided with a stirrer, thermometer, and distillation neck at 110–115° C. to remove the water at evolution at vapor temperatures of 95–100° C. under an initial pressure of 150 mm. mercury. The pressure is gradually decreased to 60 mm. in 45 minutes. The reaction is continued for another 30 minutes at 120° C. and 60 mm. pressure at which time the evolution of water of reaction has ceased, as indicated by vapor temperature of 35° C. At this time the distillate amounts to 55.5 grams, of which 32.4 grams is water of reaction, 9.5 grams is n-decanol and 13.6 grams is propylene glycol which co-distilled along with the water. The catalyst is neutralized with 0.22 gram of sodium hydroxide dissolved in 2 ml. of water, and the remaining unreacted propylene glycol and n-decanol is distilled off to a temperature of 125° C. at 3 mm. pressure. There is obtained a product yield of 398 grams of a light amber glass material. The distillate weighs 303 grams, of which 175 grams is n-decanol and 126 grams is propylene glycol. Analysis of the product shows 0.25% free reducing sugar, hydroxyl number 1010, and 1.8% free n-decanol, 20 mol percent of n-decyl glucoside and a degree of glucosidation of 1.6.

EXAMPLE H

A mixture of 54 grams of glucose (0.3 mol), 137 grams of propylene glycol (1.8 mols), 569 grams of n-decanol (3.6 mols), and 0.2 ml. of concentrated sulfuric acid is heated with stirring in a one liter, 3-necked flask provided with a stirrer, thermometer, and distillation neck, to a temperature of 120° C. at 150 mm. mercury pressure whereupon the water of reaction is distilled at a vapor temperature of 95–100° C. The pressure is gradually decreased to 65 mm. mercury in 15 minutes, at which time evolution of water of reaction ceases, the pressure is decreased to 30 mm. in another 15 minutes, to 20 mm. in another 20 minutes, to 15 mm. in another 20 minutes, and held at 10–15 mm. for a total of one hour and 50 minutes of reaction time. During this time the vapor temperature is at 110–115° C., resulting in the distillation of a total of 421 grams of distillate, consisting of 135 grams of propylene glycol and 281 grams of n-decanol. The catalyst is then neutralized by the addition of 0.32 gram of sodium hydroxide dissolved in 2 ml. of water. The product is then stripped to a temperature of 120° C. at 2 mm. pressure to yield 244 grams of n-decanol and 92.4 grams of product, an amber, waxy solid. Analysis of the product shows a free reducing sugar content of 0.19%, hydroxyl number 717, and a free n-decanol content of 7.4%. The amount of propylene glycol and n-decanol found reacted into glucosides shows that the product consisted of 90 mol percent of n-decyl glucosides and 10 mol percent of propylene glycol glucosides, with an average degree of glucosidation of 1.1.

EXAMPLE J

A mixture of 93 grams of corn syrup (dextrose equivalent—72–75 and a water content of 44%), 137 grams of propylene glycol, 142 grams of CO-10S (a mixture of 85% n-decyl alcohol with some n-octyl and n-dodecyl alcohol, a product of Procter and Gamble), and 0.2 ml. of concentrated sulfuric acid is heated to distillation by gradually reducing the pressure to 130 mm. in 15 minutes

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while the temperature is raised to 120° C. The distillation is continued for another 15 minutes while reducing the pressure to 60 mm. with the temperature at 116° C. Then another 426 grams of CO-10S is added and the distillation is resumed at a temperature of 120° C. and a pressure of 30 mm. for another 20 minutes. The pressure is then reduced to 10 mm. and the distillation continued for another 35 minutes. 0.32 gram of sodium hydroxide dissolved in 2 ml. of water is added to neutralize the catalyst and then unreacted CO-10S is removed by distillation. The yield is 98 grams of an amber waxy solid, which is analyzed to have 0 reducing sugar and to be approximately 90 mol percent n-decyl glucosides with 10 mol percent propylene glycol glucosides, with a degree of glucosidation of approximately 1.

EXAMPLE K

500 grams of glucose, 2500 ml. of n-butyl alcohol, 0.174 ml. of concentrated sulfuric acid and 1099.3 grams of n-decyl alcohol are charged to a 3-necked flask provided with a stirrer thermometer and reflux condenser and reacted in accordance with the procedure of Example A. The final product is 688 grams of an amber glass material, with a reducing sugar value of 0.06%. This yield of product indicated that an average of 1.8 glucose units has reacted onto each n-decyl alcohol unit.

EXAMPLE L

400 grams of a corn syrup, with a dextrose equivalent of 72–75 and a water content of 35% is concentrated to 100° C. at 15 mm. mercury pressure to a water content of approximately 2%. 274 grams of propylene glycol, 356 grams of n-decyl alcohol, and 0.3 ml. of concentrated sulfuric acid are then added to the corn syrup. This mixture is so heated to 120° C. while partial vacuum is applied so that in 25 minutes the pressure is at 150 mm. mercury while the vapor pressure is at 95–100° C. The pressure is gradually reduced to 60 mm. mercury in 55 minutes, whereupon the temperature is reduced to 115–116° C. while the pressure is further reduced to 25–30 mm. mercury. After two hours of reaction, the clear reaction mixture becomes turbid with a slight amount of flocculant precipitate. An amount of 0.48 gram of sodium hydroxide dissolved in 2 ml. of water is added to neutralize the catalyst and the reaction mixture is stripped of volatiles to 125° C. and a pressure of 4 mm. mercury. There is obtained 338 grams of an amber glass material. Analysis show a reducing sugar value of 0.05% and a free n-decyl alcohol content of 1.5%. The amount of n-decyl alcohol and propylene glycol found reacted with the glucose indicates that the product is 39 mol percent n-decyl glucosides and 61 mol percent of propylene glycol glucosides with an average degree of glucosidation of 1.6.

The builders which are used in the liquid detergent compositions of this invention are known compounds, and are frequently used in liquid detergents as builders. The polyphosphates contain more than one phosphorus atom per molecule, as distinguished from orthophosphates which contain only one phosphorus atom per molecule; and they are non-cyclic (and usually linear) phosphates, as distinguished from ring or cyclic phosphates such as trimetaphosphate and tetrametaphosphate. Illustrative examples of such potassium polyphosphates include the potassium pyrophosphates and polyphosphates such as tetrapotassium pyrophosphate, and pentapotassium tri-polyphosphate. The preferred potassium polyphosphate is tetrapotassium pyrophosphate.

In addition to alkyl glycoside, water, and said builders, the liquid detergent compositions of this invention may also contain, if desired, minor amounts of compatible perfumes, optical dyes, optical brighteners, hydrotropes, foam stabilizers, alkali metal silicates, anti-redeposition agents such as alkali metal salts of carboxymethyl cellulose, corrosion inhibitors, tarnish inhibitors, and other desirable adjuvants. The built liquid detergents of this in-

vention may also contain an anionic synthetic detergent, for example, an alkali metal salt of dodecylbenzene sulfonate. The amount of anionic detergent present is usually not more than the amount of alkyl glycoside present. Thus, the built liquid detergent compositions may contain from 0 to 1 part by weight of anionic detergent per part of alkyl glycoside.

The following examples are illustrative of liquid detergent compositions of the present invention. It will be appreciated, of course, that the proportions of ingredients are somewhat variable and that the selection of additional alkyl glycosides may readily be effected in the light of the guiding principles and teachings which are disclosed herein. The examples therefore, are not in any way to be construed as limitative of the scope of the present invention. All parts and percentages are by weight, unless otherwise specified.

In Examples 1-4, liquid laundry detergents are prepared by mixing 15 parts of the indicated glycoside with 35 parts of tetra-potassium pyrophosphate, 1 part of carboxy methyl cellulose, and 49 parts of distilled water to give clear liquids. The detergency of these clear liquid detergents is compared with that of a standard liquid detergent, Wisk (Lever Bros.), by washing four swatches of standardized soiled cotton cloth (American Conditioning House #115, Roll 363/165/70) for each detergent by the standard Baker Terg-O-Tometer method in water of 300 p.p.m. hardness at 120° F. for 15 minutes at 0.2% liquid detergent concentration, rinsing twice for three minutes, and drying overnight at 60° C. before measuring the reflectance. The results are shown in Table I.

TABLE I

Example No.:	Glycoside of example No.	Units of soil removed ¹
1.....	A.....	23.9
2.....	B.....	21.3
3.....	C.....	26.8
4.....	D.....	25.9
Wisk.....		20.0

¹ (Hunter reflectance of washed cloth—Hunter reflectance of soiled cloth) X100.

In Examples 5-8, liquid detergents are prepared by dissolving 15 parts of the indicated glycoside, 35 parts of tetrapotassium pyrophosphate and 1 part of carboxymethyl cellulose in 49 parts of distilled water. The detergency of these liquid detergents is determined by washing four swatches of standardized soiled cotton cloth (American Conditioning House #115, Roll 566/368/48) for each detergent by the standard Baker Terg-O-Tometer method in water of 300 p.p.m. hardness at 120° F. for 15 minutes at 0.4% liquid detergent concentration, rinsing twice for three minutes, and drying overnight at 60° C. before measuring the reflectance. The results are shown in Table II.

TABLE II

Example No.:	Glycoside of example No.	Units of soil removed
5.....	E.....	40.1
6.....	G.....	41.5
7.....	H.....	40.7
8.....	J.....	39.5
Wisk.....		34.2

In Examples 9-15, liquid detergents are prepared by adding 15 parts of the indicated glycoside, 35 parts of the tetrapotassium pyrophosphate and 0.5 part of carboxy methyl cellulose to 49.5 parts of distilled water. The detergency of these liquid detergents is compared with that of Wisk by washing four swatches of standardized soiled cotton cloth (American Conditioning House #115-A) for each detergent by the standard Baker Terg-O-Tometer method in water of 300 p.p.m. hardness at 120° F. for 15 minutes at the indicated liquid detergent concentration, rinsing twice for three minutes, and drying overnight at 60° C. before measuring the reflectance. The results are shown in Table III.

TABLE III

Example No.:	Glycoside of example No.	Units of soil removed	
		0.1% detergent	0.2% detergent
9.....	E.....	15.6	25.8
10.....	F.....	13.7	27.8
11.....	G.....	13.7	26.1
12.....	H.....	16.0	27.0
13.....	J.....	16.3	26.4
14.....	K.....	15.7	27.5
15.....	L.....	14.9	24.0
Wisk.....		10.8	22.4

Examples 16-23 show additional formulations of liquid built detergent compositions of this invention which have excellent detergent properties. All parts are by weight.

EXAMPLE 16

	Parts
Water	50
Glycoside of Example G	15
Tetrapotassium pyrophosphate	35

EXAMPLE 17

	Parts
Water	40
Glycoside of Example H	10
Alkyl glycoside of Example G	10
Tetrapotassium pyrophosphate	40

EXAMPLE 18

	Parts
Water	58.9
Glycoside of Example B	10
Tetrapotassium pyrophosphate	30
Sodium carboxymethyl cellulose	0.5
Potassium silicate	0.5
Optical dye	0.1
Perfume, q.s.	

EXAMPLE 19

	Parts
Water	50
Glycoside of Example L	20
Tetrapotassium pyrophosphate	30

EXAMPLE 20

	Parts
Water	65
Glycoside of Example G	10
Tetrapotassium pyrophosphate	25

EXAMPLE 21

	Parts
Water	50
Glycoside of Example B	15
Sodium nitrilotriacetate	35

EXAMPLE 22

	Parts
Water	45
Glycoside of Example B	15
Sodium nitrilotriacetate	40

EXAMPLE 23

	Parts
Water	45
Glycoside of Example F	15
Sodium dodecylbenzenesulfonate	5
Tetrapotassium pyrophosphate	35

Although this invention has been described with reference to specific materials, including specific alkyl glycosides, builders, detergents, and adjuvants, it will be apparent that still other different and equivalent materials may be substituted for those described.

The term "consisting essentially of" as used throughout this application, includes compositions containing the named ingredients and other ingredients which do not deleteriously affect the compositions for the purposes stated in the specification.

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What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A built liquid detergent composition consisting essentially of an aqueous solution of a builder selected from the groups consisting of sodium nitrilotriacetate, potassium nitrilotriacetate, and potassium polyphosphates and an alkyl glycoside of a monohydric alcohol containing from 8 to 25 carbon atoms and a reducing saccharide selected from the group consisting of monosaccharides and polysaccharides containing from 5 to 6 carbon atoms in each monomeric unit of the saccharide and containing from 2 to 50 monomeric units, wherein the weight ratio of alkyl glycoside to builder is from about 0.1 to 5 and wherein the weight ratio of the sum of the alkyl glycoside and builder to water is from 0.1 to about 3.

2. A built liquid detergent composition of claim 1 wherein the builder is a potassium polyphosphate.

3. A built liquid detergent composition of claim 2 wherein the alkyl glycoside is a glycoside of a monohydric alcohol containing from 10 to 14 carbons and the reducing saccharide is glucose or polyglucose.

4. A built liquid detergent composition of claim 2 wherein the alkyl glycoside contains from 2 to 20 glucose units.

5. A built liquid detergent composition of claim 2 wherein the ratio of alkyl glycoside to potassium polyphosphate is from 0.2 to 0.8 and the ratio of the sum of the alkyl glycoside and alkali metal polyphosphate to water is from 0.5 to 2.

6. A built liquid detergent composition of claim 2 wherein the potassium polyphosphate is tetrapotassium pyrophosphate.

7. A built liquid detergent composition of claim 6 wherein the alkyl glycoside is a glycoside of a monohydric alcohol containing from 10 to 14 carbon atoms and a glucose containing from 2 to 20 glucose units.

8. A built liquid detergent of claim 7 wherein the ratio of alkyl glycoside to tetrapotassium pyrophosphate is from

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0.2 to 0.8 and wherein the ratio of the sum of the alkyl glycoside and tetrapotassium pyrophosphate to water is from 0.5 to 2.

9. A built liquid detergent composition of claim 8 wherein the ratio of alkyl glycoside to tetrapotassium pyrophosphate is about 0.4 and the ratio of the sum of the alkyl glycoside and tetrapotassium pyrophosphate to water is about 1 and wherein the alkyl glycoside is a glycoside of decyl alcohol and a glucose containing from 2 to 4 glucose units.

10. A built liquid detergent composition of claim 8 wherein the alkyl glycoside is a glycoside of a monohydric alcohol containing from 10 to 14 carbon atoms and a glucose containing from 2 to 4 glucose units.

11. A built liquid detergent composition of claim 1 wherein the alkyl glycoside is a glycoside of a monohydric alcohol containing from 10 to 18 carbon atoms.

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