(11) Application No. AU 2004208552 B2

(19) AUSTRALIAN PATENT OFFICE

(54) Title

Aqueous cleaning compositions

(51)[6] International Patent Classification(s)

C11D 1/34 (2006.01) 20060101ALI2005111
C11D 1/65 (2006.01) 0BMEP C11D
C11D 1/78 (2006.01) 3/36
C11D 3/36 (2006.01) 20060101ALI2006072
C11D 3/39 (2006.01) 2BMEP C11D
C11D 1/29 (2006.01) 3/39
C11D 1/52 (2006.01) 20060101ALI2006072
C11D 1/34 2BMEP C11D
20060101AFI2005111 1/29
0BMEP C11D 20060101ALN200607
1/65 22BMEP C11D
20060101ALI2006072 1/52
2BMEP C11D 20060101ALN200607
1/78 22BMEP
PCT/GB2004/000393

(21) Application No: 2004208552 (22) Application Date: 2004.01.30

(87) WIPO No: WO04/067194

(30) Priority Data

(31) Number	(32) Date	(33) Country
0302245.6	2003.01.31	GB

(43) Publication Date : 2004.08.12

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(56) Related Art

EP 0906404 B1
WO 1991/009807 A2
DE 4418847 A1

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
12 August 2004 (12.08.2004)

PCT

(10) International Publication Number
WO 2004/067194 A3

(51) International Patent Classification[7]: C11D 1/34, 1/78, 3/39

(21) International Application Number: PCT/GB2004/000393

(22) International Filing Date: 30 January 2004 (30.01.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0302245.6 31 January 2003 (31.01.2003) GB

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for all designations*
— *of inventorship (Rule 4.17(iv)) for US only*

Published:
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report: 18 November 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 2004/067194 A3

(54) Title: AQUEOUS CLEANING COMPOSITIONS

(57) Abstract: The present invention relates to stabilised aqueous compositions that contain hydrogen peroxide, an ethoxylated aliphatic phospono surfactant of formula: (I) $(HO)_{(3-m)}OP(R^1-(CH_2CH_2O)_n-R^1)_m$ or $(HO)_{(3-m)}OP(O-(CH_2-CH_2-O)_n-R^1)_m$ or $(HO)_{(3-m)}OP(O-R^1-(CH_2-CH_2-O)_n-H)_m$ and at least one additional detersive surfactant.

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Aqueous Cleaning Compositions

The present invention relates to stabilised aqueous compositions that contain hydrogen peroxide, an ethoxylated aliphatic phospono surfactant of formula (I), at least one additional detersive surfactant.

One drawback to the use of hydrogen peroxide compositions is that without the use of a stabiliser, or a combination of stabilisers, the aqueous peroxide compositions characteristically decompose over a relatively short time period. The actual rate at which hydrogen peroxide compositions decompose will, of course, be dependent upon such factors as pH and the presence of trace amounts of various metal impurities, such as copper or chromium, which may act to catalytically decompose the same. Moreover, at moderately elevated temperatures, the rate of decomposition of such dilute hydrogen peroxide compositions is greatly accelerated.

The present invention desirably provides a hydrogen peroxide containing composition that is stable to light, in particular UV light. Preferably the product should also be physically stable, as well as chemically stable. Ideally the product is viscous and has a viscosity of greater than 100 cps, preferably greater than 300, 400 or 500 (as measured in a Brookfield viscometer at 20°C, spindle no.2 and 15 rpm). In addition, preferably, the product is transparent.

We present as a feature of the invention a cleaning composition comprising

a) hydrogen peroxide,
b) a compound of formula (I)

$(HO)_{(3-m)}OP(R\text{-}(CH_2\text{-}CH_2\text{-}O)_n\text{-}R^1)_m$

or

$(HO)_{(3-m)}OP(O\text{-}(CH_2\text{-}CH_2\text{-}O)_n\text{-}R^1)_m$

or

$(HO)_{(3-m)}OP(O-R^1-(CH_2-CH_2-O)_n-H)_m$

wherein each n is independently an integer from 1 to 10; each R is independently a 1-14C alkylene or alkenylene chain; and R^1 is 1-14C alkyl or alkenyl chain, provided that the total number of carbons in R and R^1 does not exceed 20, preferably less than 16;

c) at least one additional detersive surfactant; and

d) water.

We have found that the compound of formula (I) provides the composition with very good aesthetic properties (a transparent gel) and helps stabilise the formula even at high temperatures (around 40°C for up to 6 months).

Hydrogen peroxide is commercially available in different grades, at 8%, 35% and 50%w/v active, and it is generally stabilised by the use of chelating agents. Preferred levels of hydrogen peroxide (as 100% active) are 0.1%w/v to 12%w/v, preferably from 2%w/v to 10%w/v, and ideally from 4%w/v to 9%w/v.

Examples of preferred detersive surfactants considered in this invention are either anionic or non-ionic surfactants and mixtures thereof. Preferred total levels of surfactant are from 1 to 50% w/v, ideally from 10 to 40%w/v and preferably 20 to 35%w/v.

The non-ionic surfactant is preferably a surfactant having a formula RO(CH2CH2O)nH wherein R is a saturated or unsaturated (preferably saturated) hydrocarbon chain ranging from C12 to C16 and n represents the number of repeating units and is a number of from 1 to 12. Examples of other non-ionic surfactants include higher aliphatic primary alcohols containing 12 to 16 carbon atoms which are condensed with three to thirteen moles of ethylene oxide.

Other examples of non-ionic surfactants include primary alcohol ethoxylates

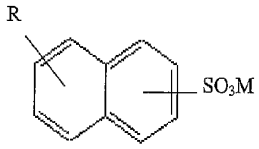
Other examples of non-ionic surfactants suitable for use in the present invention include ethylene oxide condensate products of secondary aliphatic alcohols containing 11 to 18 carbon atoms in a straight or branched chain configuration condensed with 5 to 30 moles of ethylene oxide. Examples of commercially available non-ionic detergents of the foregoing type are C11-15 secondary alkanol condensed with either 9 moles of ethylene oxide (such as Tergitol 15-S-9) or 12 moles of ethylene oxide (such as Tergitol 15-S-12) marketed by Union Carbide, a subsidiary of Dow Chemical.

Octylphenoxy polyethoxyethanol type non-ionic surfactants, for example, Triton X-100, as well as amine oxides can also be used as a non-ionic surfactant in the present invention.

A further preferred class of non-ionic surfactants are the C10-20alkanol amides, the amide being a mono or di C2-4alkanolamine.

A preferred surfactant is an anionic surfactant. Such anionic surfactants are frequently provided in a salt form, such as alkali metal salts, ammonium salts, amine salts, amino alcohol salts or magnesium salts. Contemplated as useful are one or more sulfate or sulfonate compounds including: alkyl sulfates, alkyl ether sulfates, alkylamidoether sulfates, alkyl benzene sulfates, alkyl benzene sulfonates, alkylaryl polyether sulfates, monoglyceride sulfates, alkylsulfonates, alkylamide sulfonates, alkylarylsulfonates, olefinsulfonates, paraffin sulfonates, alkyl sulfosuccinates, alkyl ether sulfosuccinates, alkylamide sulfosuccinates, alkyl sulfosuccinamate, alkyl sulfoacetates, alkyl carboxylates, alkyl phosphates, alkyl ether phosphates, acyl sarconsinates, acyl isethionates, and N-acyl taurates. Generally, the alkyl or acyl radical in these various compounds comprise a carbon chain containing 12 to 20 carbon atoms.

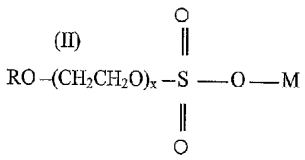
Preferred surfactants are also alkyl naphthalene sulfonate anionic surfactants of the formula:



wherein R is a straight chain or branched alkyl chain having from about 1 to about 25 carbon atoms, saturated or unsaturated, and the longest linear portion of the alkyl chain is 15 carbon atoms or less on the average, M is a cation which makes the compound water soluble especially an alkali metal such as sodium or magnesium, ammonium or substituted ammonium cation.

Particularly preferred are alkyl sulfate anionic surfactants of the formula (II)

(II)



wherein R is a straight chain or branched alkyl chain having from about 8 to about 18 carbon atoms, saturated or unsaturated, and the longest linear portion of the alkyl chain is no more than15 carbon atoms, M is a cation, preferably one which makes the compound water-soluble especially an alkali metal such as sodium or magnesium, ammonium or substituted ammonium cation, and x is from 0 to about 4, preferably x is 2 or 3, ideally x is 2. When x is 0 then most preferred are the non-ethoxylated C12-15 primary and secondary alkyl sulfates, especially sodium lauryl sulfate.

In a preferred feature of the invention we have found that transparent viscous compositions of the invention are ideally formed from the combination of compounds of formula (I), (II) and C10-20alkanol amides, the amide is preferably a C10-20

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alkanolamide of a mono or di C2-4 alkanolamine.

We present as a further feature of the invention a cleaning composition comprising

a) a compound of formula (I);
b) a compound of formula (II);
c) a C10-20alkanol amide, the amide is preferably a C10-20 alkanolamide of a mono or di C2-4alkanolamine;
d) hydrogen peroxide; and
e) water.

The composition may include one or more further optional ingredients, such as buffers, inorganic salts, fragrance, chelating agents, dispersants, enzyme stabilisers, solvents, dye transfer inhibitors and polymers. The total amount of optional ingredients present in the composition is up to 25%w/v, ideally up to 20%w/v, or up to 15%w/v.

Suitable inorganic salts include metal oxides and halides, such as calcium chloride, for example.

Suitably pH buffers may be added to the composition in an amount of up to 5%w/v, suitable buffers include borate buffers.

The present invention provides a transparent packaging item containing a cleaning composition comprising

a) hydrogen peroxide,
b) a compound of formula (I)

$$(HO)_{(3-m)}OP(R\text{-}(CH_2\text{-}CH_2\text{-}O)_n\text{-}R^1)_m$$

or

$$(HO)_{(3-m)}OP(O\text{-}(CH_2\text{-}CH_2\text{-}O)_n\text{-}R^1)_m$$

or

$(HO)_{(3-m)}OP(O\text{-}R^1\text{-}(CH_2\text{-}CH_2\text{-}O)_n\text{-}H)_m$ (1)

wherein each n is independently an integer from 1 to 10; each R is independently a 1-14C alkylene or alkenylene chain and each R^1 is independently 1-14C alkyl or alkenyl chain, provided that the total number of carbons in R and R^1 does not exceed 20; and wherein m is an integer from 1 to 3; and

c) at least one additional detersive surfactant; and

d) water.

Throughout this specification the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated element, integer or step, or group of elements, integers or steps, but not the exclusion of any other element, integer or step, or group of elements, integers or steps.

Any discussion of documents, acts, materials, devices, articles or the like which has been included in the present specification is solely for the purpose of providing a context for the present invention. It is not to be taken as an admission that any or all of these matters form part of the prior art base or were common general knowledge in the field relevant to the present invention as it existed before the priority date of each claim of this application.

Stabilising Agent

Suitable stabilising agents include chelating agents, radical scavengers, antioxidants and mixtures of any thereof.

1. Chelating Agent

The compositions of the present invention may comprise a chelating agent or a mixture thereof as a preferred optional ingredient. Suitable chelating agents may be any of those

known to those skilled in the art such as the ones selected from the group comprising phosphonate chelating agents, amino carboxylate chelating agents, other carboxylate chelating agents, polyfunctionally-substituted aromatic chelating agents, ethylenediamine N,N'-disuccinic acids, or mixtures thereof. The chelating agents inactivate the metal ions present on the surface of the fabrics and/or in the cleaning compositions (neat or diluted) that otherwise would contribute to the radical decomposition of any peroxygen bleach.

Suitable phosphonate chelating agents to be used herein may include alkali metal ethane 1-hydroxy diphosphonates (HEDP) also known as ethydronic acid, alkylene poly (alkylene phosphonate), as well as amino phosphonate compounds, including amino aminotri(methylene phosphonic acid) (ATMP), nitrilo trimethylene phosphonates (NTP), ethylene diamine tetra methylene phosphonates, and diethylene triamine penta methylene phosphonates (DTPMP). The phosphonate compounds may be present either in their acid form or as salts of different cations on some or all of their acid functionalities. Preferred phosphonate chelating agents to be used herein are diethylene triamine penta methylene phosphonate (DTPMP) and ethane 1-hydroxy diphosphonate (HEDP or ethydronic acid). Such phosphonate chelating agents are commercially available from Monsanto under the trade name DEQUEST®.

Polyfunctionally-substituted aromatic chelating agents may also be useful in the compositions herein. See U.S. Pat. No. 3,812,044, issued May 21, 1974, to Connor et al. Preferred compounds of this type in acid form are dihydroxydisulfobenzenes such as 1,2-dihydroxy -3,5- disulfobenzene.

A preferred biodegradable chelating agent for use herein is ethylene diamine N,N'-disuccinic acid, or alkali metal, or alkaline earth, ammonium or substitutes ammonium salts thereof or mixtures thereof. Ethylenediamine N,N'-disuccinic acids, especially the (S,S) isomer have been extensively described in U.S. Pat. No. 4,704,233, Nov. 3, 1987, to Hartman and Perkins. Ethylenediamine N,N'-disuccinic acids is, for instance, commercially available under the tradename ssEDDS® from Palmer Research Laboratories.

Suitable amino carboxylates to be used herein include ethylene diamine tetra acetates, diethylene triamine pentaacetates, diethylene triamine pentaacetate (DTPA),N-hydroxyethylethylenediamine triacetates, nitrilotri- acetates, ethylenediamine tetrapropionates, triethylenetetraaminehexa- acetates, ethanol-diglycines, propylene diamine tetracetic acid (PDTA) and methyl glycine di-acetic acid (MGDA), both in their acid form, or in their alkali metal, ammonium, and substituted ammonium salt forms. Particularly suitable amino carboxylates to be used herein are diethylene triamine penta acetic acid, propylene diamine tetracetic acid (PDTA) which is, for instance, commercially available from BASF under the trade name Trilon FS® and methyl glycine di-acetic acid (MGDA).

Further carboxylate chelating agents to be used herein include salicylic acid, aspartic acid, glutamic acid, glycine, malonic acid or mixtures thereof.

Particularly preferred chelating agents to be used herein are amino aminotri(methylene phosphonic acid), di-ethylene-triamino-pentaacetic acid, diethylene triamine penta methylene phosphonate, 1-hydroxy ethane diphosphonate, ethylenediamine N,N'-disuccinic acid, and mixtures thereof.

Typically, the compositions according to the present invention comprise up to 5%w/v of the total composition of a chelating agent, or mixtures thereof, preferably from 0.01 to 1.5%w/v and more preferably from 0.01 to 0.5%w/v.

2. Radical Scavenger

The compositions of the present invention may comprise a radical scavenger or a mixture thereof. Suitable radical scavengers for use herein include the well-known substituted mono and dihydroxy benzenes and their analogs, alkyl and aryl carboxylates and mixtures thereof. Preferred such radical scavengers for use herein include di-tert-butyl hydroxy toluene (BHT), hydroquinone, di-tert-butyl hydroquinone, mono- tert-butyl hydroquinone, tert-butyl-hydroxy anysole, benzoic acid, toluic acid, catechol, t-butyl catechol, benzylamine, 1,1,3-tris(2-methyl-4- hydroxy-5-t-butylphenyl) butane, n-propyl-gallate or mixtures thereof and highly preferred is di-tert-butyl hydroxy toluene. Such radical scavengers like N-propyl-gallate may be commercially available from Nipa

Laboratories under the trade name Nipanox S1®. Radical scavengers when used, are typically present herein in amounts ranging from up to 10%w/v of the total composition and preferably from 0.001 to 0.5%w/v.

3. Antioxidant

The compositions according to the present invention may further comprise an antioxidant or mixtures thereof. Typically, the compositions herein comprise up to 10% by weight of the total composition of an antioxidant or mixtures thereof, preferably from 0.002 to 5%w/v, more preferably from 0.005 to 2%w/v, and most preferably from 0.01 to 1%w/v.

Suitable antioxidants to be used herein include organic acids like citric acid, ascorbic acid, tartaric acid, adipic acid and sorbic acid, or amines like lecithin, or aminoacids like glutamine, methionine and cysteine, or esters like ascorbil paimitate, ascorbil stearate and triethylcitrate, or mixtures thereof. Preferred antioxidants for use herein are citric acid, ascorbic acid, ascorbil palmitate, lecithin or mixtures thereof.

Such stabilising agent(s) may be present typically in an amount of 0 to 8 weight %, ideally 0.5 to 6 weight %, of the first aqueous composition.

Other components

The overall composition of the dispenser or each of the first and/or second aqueous compositions may further contain up to 25, 20, 15, 10, 5 or 1%w/v of at least one component selected from a fragrance, inorganic salt, solvent, dye transfer inhibitors, water-soluble polymers, dye, germicide and preservative.

Water

Water may be present in the overall composition of the dispenser in an amount of at least 50%w/v, more preferably at least 60%w/v of the composition or 0 to up to 100%w/v, preferably, 30 to 99%w/v or 50 to 99%w/v, more preferably, 50 to 90%w/v or 55 to 85%w/v, for example, 60 to 80%w/v of the composition.

Preferably the composition in the form of a stain pretreating composition which is applied onto a fabric item prior to it being washed. The composition is packaged in suitable packaging to facilitate application of the composition to the fabric. The packaging could comprise, a squeezy bottle, a roller ball applicator or a spray device. An item of packaging containing the composition constitutes a further aspect of the invention, especially where the packaging item is transparent, given the light stability of the product. Preferably the packaging item is transparent. A feature of the invention is that transparent packaging items do not need to have included a UV filter.

A further feature of the invention is a method of treating stains on fabric which method comprises applying a composition as described herein to the stained fabric.

The invention is illustrated by the following non-limiting examples

	%w/v	%w/v
Hydrogen Peroxide (50%)	7.5	5.5
Chelating Agent	0.12	0.12
Oxo Alcohol C13-C15 + 7EO and 3EO - nonionic	13	10.5
Compound of formula (II)	3.92	4.5
Compound of formula (I)	4.2	3.4
Coconut diethanolamide	3	1.5
Dye	0.001	0.001
Fragrance	0.3	0.25
Sodium hydroxide (48%)	0.5	0.4
Deionized Water	69.459	73.829
FINISHED PRODUCT	100	100

STABILITY TEST Exposed to SUN LIGHT							
Packaging:	Transparent PP bottle without UV filter						
Parameters	time 0	1 week	2 w.	3 w.	4 w.	6 w.	8 w.
pH	4.5	4.4	4.3	4.3	4.3	4.4	4.5
Viscosity	910	850	820	873	1200	1320	1250
H_2O_2	7.50%	7.50%	7.50%	7.4%	7.40%	7.40%	7.40%
Colour	as ref.	as ref.	as ref.	as ref.	as ref.	as ref.	as ref.

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Claims

1. A transparent packaging item containing a cleaning composition comprising

a) hydrogen peroxide,

b) a compound of formula (I)

$(HO)_{(3-m)}OP(R\text{-}(CH_2\text{-}CH_2\text{-}O)_n\text{-}R^1)_m$

or

$(HO)_{(3-m)}OP(O\text{-}(CH_2\text{-}CH_2\text{-}O)_n\text{-}R^1)_m$

or

$(HO)_{(3-m)}OP(O\text{-}R^1\text{-}(CH_2\text{-}CH_2\text{-}O)_n\text{-}H)_m$ (1)

wherein each n is independently an integer from 1 to 10; each R is independently a 1-14C alkylene or alkenylene chain and each R^1 is independently 1-14C alkyl or alkenyl chain, provided that the total number of carbons in R and R^1 does not exceed 20; and wherein m is an integer from 1 to 3; and

c) at least one additional detersive surfactant; and

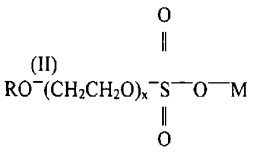
d) water.

2. A transparent packaging item containing a cleaning composition comprising

a) a compound of formula (I), as defined in claim 1;

b) a compound of formula (II)

(II)



wherein R is a straight chain or branched alkyl chain having from about 8 to about 18 carbon atoms, saturated or unsaturated, and the longest linear portion of the alkyl

chain is 15 carbon atoms, M is a cation, preferably one which makes the compound water-soluble especially an alkali metal such as sodium or magnesium, ammonium or substituted ammonium cation, and x is from 0 to about 4, preferably x is 2 or 3, ideally x is 2;

c) a C10-20 alkanolamide, the amide is preferably a C10-20 alkanolamide of a mono or di C2-4alkanolamine; and
d) hydrogen peroxide.
e) water.

3. A transparent packaging item as claimed in either claim 1 or 2, wherein the composition has 0.1% w/v to 12% w/v of hydrogen peroxide (as 100% active) present.

4. A transparent packaging item as claimed in claim 1, wherein the additional detersive surfactant in the composition comprises a mixture of an anionic and a nonionic surfactant.

5. A method of treating stains on fabric which method comprises applying a composition as defined in any claim from 1 to 4 to the stained fabric.

6. A transparent packaging item substantially as hereinbefore described with reference to the examples and/or the preferred embodiments excluding, if any, comparative examples.