



(51) International Patent Classification:

C11D 17/00 (2006.01) *C11D 1/22* (2006.01)
C11D 3/30 (2006.01)

(21) International Application Number:

PCT/GB2012/051387

(22) International Filing Date:

15 June 2012 (15.06.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

1110241.5 17 June 2011 (17.06.2011) GB
1113959.9 15 August 2011 (15.08.2011) GB

(71) Applicant (for all designated States except MN, US):

RECKITT BENCKISER N.V. [NL/NL]; Siriusdreef 14,
2132 WT Hoofddorp (NL).

(71) Applicant (for MN only): **RECKITT & COLMAN**

(OVERSEAS) LIMITED [GB/GB]; 103-105 Bath Road,
Slough Berkshire SL1 3UH (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **COSTINITI, Fabio**

[IT/IT]; Reckitt Benckiser Italia, Piazza S. Nicolò 12/3, I-
VE 30034 Mira (IT). **ROSCIOLI, Laura** [IT/IT]; Reckitt
Benckiser Italia, Piazza S. Nicolò 12/3, I-VE 30034 Mira
(IT). **SCOZZATO, Simone** [IT/IT]; Reckitt Benckiser
Italia, Piazza S. Nicolò 12/3, I-VE 30034 Mira (IT). **SI-
MONATO, Luigina** [IT/IT]; Reckitt Benckiser Italia,
Piazza S. Nicolò 12/3, I-VE 30034 Mira (IT).

WIEDEMANN, Ralf [DE/IT]; Reckitt Benckiser Italia,
Piazza S. Nicolò 12/3, I-VE 30034 Mira (IT). **BELLO,
Irene** [IT/IT]; Reckitt Benckiser Italia, Piazza S. Nicolò
12/3, I-VE 30034 Mira (IT).

(74) Agents: **BOWERS, Craig** et al.; Dansom Lane, Hull
Humberside HU8 7DS (GB).

(81) Designated States (unless otherwise indicated, for every

kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME,
MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD,
SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR,
TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every

kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))



COMPOSITION

This invention relates to aqueous liquid detergents, preferably for use as a laundry composition or in
5 conjunction with a laundry detergent.

Liquid based laundry compositions have been known for many years. A major issue encountered with such compositions has been the achievement of a suitable
10 viscosity for the liquid: the liquid has to be viscous enough so that any particles are suspended yet have a sufficiently high degree of flow for ease of manufacture and dispense by a consumer.

15 To achieve the desired rheology typically thickeners are used. These thickeners are rheology modifiers suitable for liquid detergents. They are used to associate a higher concentration of active ingredients and to aggregate them in a stable matrix.

20 Numerous thickening systems have been developed over the years but there is still room for improvement in such systems, particularly as regards cost effectiveness and environmental concerns.

25 Different kinds of thickener are commercially available. One class of thickener that is used extensively are those based upon polymeric-carboxylic acids and their salts.

30 Whilst generally these thickeners are highly effective one significant disadvantage in their use is that their efficacy is highly dependent on the pH and ionic strength of the liquid in which they are employed.
35 Indeed the thickening effect of carboxylic acid based thickeners is only significant in alkaline solutions and / or solution having low ionic strength when the carboxylic acid based thickeners are in a dissociate state.

40 In such a condition the thickening mechanism is based on 2 main effects:

In an alkaline environment the carboxylic acid
45 dissociates to carboxylate anions. As a result the electrostatic repulsion of the anions causes the stretching of the polymer chain. This phenomenon reduces the degrees of freedom of the structure in the liquid matrix.

50

Moreover the carboxylate anions interact with the hydrophilic heads of the surfactant micelles, creating a tri-dimensional network between the thickener backbone and the micelles (associative effect).

5

The result of these two effects in the right conditions is the increase of viscosity of the liquid.

10 It is therefore a primary object of this invention to develop stabilised laundry detergent composition (or a composition to be used in conjunction with a laundry detergent) which incorporates a low cost, but effective, thickening system over a broad range of conditions.

15 According to the first aspect of the present invention there is provided a liquid detergent composition having a thickening system which comprises triethanolamine.

20 Preferably the thickening system further comprises a LAS (linear alkylbenzene sulphonate) surfactant.

25 With the thickening system of the present invention it has been found that superior thickening of a liquid detergent composition can be achieved. Without wishing to be limited by theory it is postulated that the superior thickening is brought about by generation of a LAS-TEA salt, which gives rise to the formation of micelles, and high viscosity.

30 Preferably the triethanolamine is present in an amount of up to 10wt%, more preferably from 0.1 to 5wt%, more preferably from 1 to 4wt% and most preferably from 1.4 to 3wt%.

35

40 Preferably the composition comprises from 0.001% to 99.99%, preferably 0.001% to 20%, preferably 4% to 18%, e.g. most preferably about 4.5% or 13%, by weight, of bleach. The bleach is preferably peroxide bleach, most preferably hydrogen peroxide. Peroxide sources other than H₂O₂ can be used.

45 Preferably the composition comprises a surfactant. Where present the composition comprises from 0.001% to 99.99%, preferably 0.05% to 40%, preferably 10% to 30%, e.g. about 25%, by weight of surfactant.

50 The surfactant is, for example, an anionic or nonionic surfactant or mixture thereof (most preferably a nonionic surfactant). The nonionic surfactant is preferably a surfactant having a formula RO(CH₂CH₂O)_nH where-

- in R is a mixture of linear, even carbon-number hydrocarbon chains ranging from $C_{12}H_{25}$ to $C_{16}H_{33}$ and n represents the number of repeating units and is a number of from about 1 to about 12. Examples of other non-ionic surfactants include higher aliphatic primary alcohol containing about twelve to about 16 carbon atoms which are condensed with about three to thirteen moles of ethylene oxide.
- 5
- 10 Other examples of nonionic surfactants include primary alcohol ethoxylates (available under the Neodol trade name from Shell Co.), such as C_{11} alkanol condensed with 9 moles of ethylene oxide (Neodol 1-9), C_{12-13} alkanol condensed with 6.5 moles ethylene oxide (Neodol 23-6.5),
- 15 C_{12-13} alkanol with 9 moles of ethylene oxide (Neodol 23-9), C_{12-15} alkanol condensed with 7 or 3 moles ethylene oxide (Neodol 25-7 or Neodol 25-3), C_{14-15} alkanol condensed with 13 moles ethylene oxide (Neodol 45-13), C_{9-11} linear ethoxylated alcohol, averaging 2.5 moles of ethylene oxide per mole of alcohol (Neodol 91-2.5), and the like.
- 20

Other examples of nonionic surfactants suitable for use in the present invention include ethylene oxide condensate products of secondary aliphatic alcohols containing

25 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 C_{11-15} secondary alkanol condensed with either 9 moles of ethylene oxide (Tergitol 15-S-9) or 12 moles of ethylene oxide (Tergitol 15-S-12) marketed by Union Carbide, a subsidiary of Dow Chemical.

30

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

40 Other examples of linear primary alcohol ethoxylates are available under the Tomadol trade name such as, for example, Tomadol 1-7, a C_{11} linear primary alcohol ethoxylate with 7 moles EO; Tomadol 25-7, a $C_{12-C_{15}}$ linear primary alcohol ethoxylate with 7 moles EO; Tomadol 45-7, a

45 $C_{14-C_{15}}$ linear primary alcohol ethoxylate with 7 moles EO; and Tomadol 91-6, a $C_{9-C_{11}}$ linear alcohol ethoxylate with 6 moles EO.

Other examples of linear primary alcohol ethoxylates are

50 available under the Lutensol trade name such as, for example, Lutensol A3N, a C_{13-15} linear primary alcohol eth-

oxylate with 3 moles EO; Lutensol LA60, a C₁₃₋₁₅ linear primary alcohol ethoxylate with 7 moles EO. Also Genapol such as, for example, Genapol LA3, a C₁₃₋₁₅ linear primary alcohol ethoxylate with 3 moles EO; Genapol
5 LA070, a C₁₃₋₁₅ linear primary alcohol ethoxylate with 7 moles EO

Tomadol 45-7, a C_{14-C15} linear primary alcohol ethoxylate with 7 moles EO; and Tomadol 91-6, a C_{9-C11} linear alcohol ethoxylate with 6 moles EO.
10

Other nonionic surfactants are amine oxides, alkyl amide oxide surfactants.

15 Preferred anionic surfactants are frequently provided 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 benzene sulfates, alkyl sulfates, alkyl
20 ether sulfates, alkylamidoether sulfates, alkylaryl polyether sulfates, monoglyceride sulfates, alkyl-sulfonates, alkylamide sulfonates, alkylarylsulfonates, olefinsulfonates, paraffin sulfonates, alkyl sulfosuccinates, alkyl ether sulfosuccinates, alkylamide sul-
25 fosuccinates, alkyl sulfosuccinamate, alkyl sulfoacetates, 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
30 carbon atoms.

Other surfactants which may be used are alkyl naphthalene sulfonates and acyl / oleoyl sarcosinates and mixtures thereof.

35 The composition may various optional ingredients, including enzymes, builders, solvents, dye transfer inhibition agents, dye catchers, preservatives, anti-oxidants, anti-static agents, fragrances, odour absorbing components, optical brighteners, acidifying agents,
40 alkalizing agents, thickeners (e.g. hydroxyethylcellulose and / or xanthan gum).

The pH range of the fabric treatment composition is typically from about 1 to about 8, e.g. from 3 to 5, more preferably from 3.6-4.3.
45

The composition is preferably used in a washing machine cycle and / or as a pre-soaker / soaker in a clothes
50 cleaning operation, e.g. as a fabric treatment composition.

The invention will be illustrated with reference to the following non-limiting Examples.

5 **Examples**

A base formulation was prepared having the formulation below.

Raw materials	wt%
Water	59.6
NaOH 50%	1.4
Thickener	See Below
Surfactant – Anionic (LAS)	10.0
Surfactant – Non Ionic	17.0
Bleach Agent 50%	16.0
Minors	1.3

10

Thickener	Viscosity (cps)
Base as above no thickener	700
Base + 1.5wt% TEA	1300
Base + 2.7wt% TEA	2000
Base + 0.5wt% polyacrylate	1900
Base + 0.5wt% polyacrylate + + 2.4wt% TEA	2200

15 Viscosity was measured using an AR 550 rheometer from TA instruments using a plate steel spindle at 40 mm diameter and a gap size of 500 micrometres.

CLAIMS

- 5 1. A liquid detergent composition having a thickening system which comprises triethanolamine.
2. Preferably the thickening system further comprises a LAS (linear alkylbenzene sulphonate) surfactant.
- 10 3. A composition according to claim 1, wherein the triethanolamine is present in the composition in an amount of 0.1 to 5wt%.
- 15 4. Use of a composition in accordance with claims 1 to 3 in a laundry washing / fabric treatment operation.

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2012/051387

A. CLASSIFICATION OF SUBJECT MATTER
 INV. C11D17/00 C11D3/30 C11D1/22
 ADD.
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 C11D
 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 376 446 B1 (SMADI RAEDA [US] ET AL) 23 April 2002 (2002-04-23) claims column 1, line 58 - line 63 column 10, line 1 - line 7 column 10, line 59 - line 67 examples 1-3,6,7,8	1-4
X	EP 2 295 530 A1 (PROCTER & GAMBLE [US]) 16 March 2011 (2011-03-16) example B claims page 3, line 36 - line 55 page 8, line 1 - line 5 ----- -/--	1-4

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search 30 August 2012	Date of mailing of the international search report 06/09/2012
---	--

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Neys, Patricia
--	--

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2012/051387

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 935 129 A (JABALEE WALTER J) 27 January 1976 (1976-01-27) claims examples	1-4
X	----- JP 2010 189612 A (LION CORP) 2 September 2010 (2010-09-02) the whole document	1-4
X	----- GB 2 204 609 A (SANDOZ LTD SANDOZ LTD [CH]) 16 November 1988 (1988-11-16) claims 1-4	1-4
X	----- US 3 869 399 A (COLLINS JEROME HOWARD) 4 March 1975 (1975-03-04) claims column 5, line 5 - line 61 examples	1-4
X	----- EP 0 518 401 A1 (PROCTER & GAMBLE [US]) 16 December 1992 (1992-12-16) claims 1,6 examples 3,6	1,3,4
X	----- GB 1 093 935 A (COLGATE PALMOLIVE CO) 6 December 1967 (1967-12-06) claims examples page 1, line 11 - line 23	1-4
X	----- WO 94/05769 A1 (PROCTER & GAMBLE [US]) 17 March 1994 (1994-03-17) examples II, IV	1,3

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2012/051387

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6376446	B1	23-04-2002	NONE
EP 2295530	A1	16-03-2011	AR 078174 A1 19-10-2011 AT 534721 T 15-12-2011 CA 2769425 A1 17-03-2011 CN 102549133 A 04-07-2012 EP 2295530 A1 16-03-2011 ES 2378018 T3 04-04-2012 US 2011065626 A1 17-03-2011 WO 2011031702 A1 17-03-2011
US 3935129	A	27-01-1976	NONE
JP 2010189612	A	02-09-2010	NONE
GB 2204609	A	16-11-1988	CH 676007 A5 30-11-1990 FR 2615202 A1 18-11-1988 GB 2204609 A 16-11-1988 IT 1234993 B 16-06-1992 JP 63292000 A 29-11-1988
US 3869399	A	04-03-1975	AT 334487 B 25-01-1976 AU 469169 B2 05-02-1976 AU 5125273 A 25-07-1974 BE 794713 A1 30-07-1973 CA 992835 A1 13-07-1976 CH 564599 A5 31-07-1975 DE 2304098 A1 16-08-1973 FI 57610 B 30-05-1980 FR 2170036 A1 14-09-1973 GB 1365464 A 04-09-1974 IE 37148 B1 11-05-1977 IT 978641 B 20-09-1974 JP 1200656 C 05-04-1984 JP 48086907 A 16-11-1973 JP 58033280 B 19-07-1983 NL 7301276 A 02-08-1973 PH 9911 A 08-06-1976 SE 413905 B 30-06-1980 US 3869399 A 04-03-1975
EP 0518401	A1	16-12-1992	AT 129742 T 15-11-1995 AU 667481 B2 28-03-1996 BR 9206153 A 27-12-1994 CA 2110413 A1 23-12-1992 DE 69205730 D1 07-12-1995 DE 69205730 T2 30-05-1996 DK 0518401 T3 04-03-1996 EP 0518401 A1 16-12-1992 ES 2079138 T3 01-01-1996 GR 3018145 T3 29-02-1996 IE 921922 A1 16-12-1992 JP H06508393 A 22-09-1994 NZ 243138 A 26-07-1995 TR 25965 A 01-11-1993 WO 9222628 A1 23-12-1992
GB 1093935	A	06-12-1967	BE 665532 A 16-12-1965

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2012/051387

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		CH 461684 A	31-08-1968
		DE 1467570 A1	16-01-1969
		DK 135777 B	20-06-1977
		FR 1436523 A	22-04-1966
		GB 1093935 A	06-12-1967
		SE 325660 B	06-07-1970
		ZA 652648 A	30-08-2012

WO 9405769	A1	17-03-1994	CA 2143328 A1
			CN 1088251 A
			EP 0658191 A1
			US 5739092 A
			WO 9405769 A1
			17-03-1994
