(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 074 606 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
07.04.2010 Bulletin 2010/14

(21) Application number: **00115988.8**

(22) Date of filing: **26.07.2000**

(51) Int Cl.:
C11D 1/94 *(2006.01)* *C11D 1/14* *(2006.01)*
C11D 1/29 *(2006.01)* *C11D 1/66* *(2006.01)*
C11D 1/72 *(2006.01)* *C11D 1/90* *(2006.01)*

(54) **Detergent formulation**

Reinigungsmittel

Agent de nettoyage

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

(30) Priority: **03.08.1999 GB 9918143**

(43) Date of publication of application:
07.02.2001 Bulletin 2001/06

(73) Proprietor: **Cognis IP Management GmbH**
40589 Düsseldorf (DE)

(72) Inventors:
- **Elsner, Michael**
  42967 Solingen (DE)
- **Herd, Helen Elizabeth**
  Bacup,
  OL13 8BT,
  Lancashire (GB)

(56) References cited:
WO-A-96/18712 **WO-A-98/05743**
GB-A- 2 321 253

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 1 074 606 B1

Description

[0001] The present invention relates to a detergent formulation intended particularly but not exclusively as a so-called "washing up" liquid for use in washing crockery, cutlery, pans and other domestic utensils which have been used in the preparation and/or consumption of food and which have deposits of dirt, food, grease, burnt residues etc. The detergent formulation is also intended, not exclusively, as a "hard surface" cleaner.

[0002] Purchasers of "washing up" cleaning liquids generally regard two particular properties as being of importance. One is that a relatively small quantity of the liquid will suffice for washing a particular number of utensils. In other words, the purchasers like to feel that the liquid is economical to use. The other property is that the liquid generates a relatively large volume of suds (i.e. the liquid has good lathering characteristics) since it is generally assumed that such suds contribute to the efficiency of the liquid.

[0003] GB-A-2 290 301 discloses "washing-up" liquid having good cleaning and lathering performance without the use of LABS (linear alkyl benzene sulphonic acid - usually used as the sodium salt) or diethanolamides (which are associated with nitrosamines). GB-A-2 321 253 also discloses "washing-up" liquid, containing 10-20wt% of an alkyl sulphate, 1-10wt% of an alkyl ether sulphate, 1-7wt% of an amine oxide, 1-7wt% of an amphoteric betaine surfactant, 1-15wt% of an ethoxylated alcohol and up to 3wt% of an alkyl polyglycoside, although only up to 0.95wt% of the alkyl polyglycoside is specifically used. The present invention aims to provide detergent formulations demonstrating improved performance.

[0004] According to the present invention there is provided a liquid detergent formulation comprising, by weight, 5-10% of an alkyl (C_{8-22}) sulphate, 5-10% of an alkyl (C_{8-22}) ether sulphate, 0-3% of an amine oxide containing at least one C_{8-22} alkyl group, 1-6% of an amphoteric betaine surfactant containing at least one C_{8-22} alkyl group, 2-10% of an ethoxylated alcohol (C_{8-22}), 2.5-9% of an alkyl (C_{8-22}) polyglycoside and a balance of water.

[0005] It has been found that a liquid detergent in accordance with the present invention has excellent cleaning properties. In particular the liquid detergent provides an outstanding foam height, which persists for a long time both on standing and in washing greasy plates, both properties being desirable to the user. More importantly the liquid detergent is not only effective at removing greasy deposits from hard surfaces but also for retaining said grease particles in solution stopping them from being re-deposited.

[0006] This result shows a surprising improvement over the disclosure contained within GB-A-2 321 253. It is proposed that this improvement is due to the higher amount of polyglycoside.

[0007] The composition of the invention includes at least one C_{8-22} alkyl sulphate used in an amount of 5-10% by weight of the formulation, more preferably 8-10% and most preferably 9-10%.

[0008] The invention is particularly beneficial with the use of an amount of alkyl (C_{8-22}) sulphate lower than that disclosed in GB-A-2 321 253. In particular, the benefits of the invention may be obtained with the use of less than 10% by weight of alkyl (C_{8-22}) sulphate, particularly in the range of 8% to less than 10%.

[0009] The alkyl sulphate is preferably an alkali metal alkyl sulphate with the preferred alkali metal being sodium.

[0010] For preference, the alkyl group of the alkyl sulphate has 8-16 carbon atoms. The alkyl sulphate may be a single compound (preferably C_{12}) or may comprise a mixture of alkyl sulphates of different chain lengths, preferably with C_{12} predominating. For preference the alkyl groups are primary alkyl groups and preferably straight chain.

[0011] The carbon chain of the alkyl sulphate may be produced synthetically or may be derived from natural products (e.g. coconut oil) so that the chain length distribution of the alkyl group will correspond to that in the natural product from which it is derived.

[0012] The alkyl sulphate may be a "narrow cut" lauryl sulphate having carbon chains principally of C_{12} to C_{14} (C_{12} predominating), e.g. 60-70% C_{12}, 20-30% C_{14} plus minor amounts of C_{10} and C_{16}.

[0013] A preferred alkyl sulphate is available under the name Empicol LX28 (Albright & Wilson).

[0014] The alkyl (C_{8-22}) ether sulphate is preferably used in an amount of 5-10%, by weight of the formulation, more preferably 6-9% and most preferably 7-8%.

[0015] The invention is particularly beneficial with the use of an amount of alkyl (C_{8-22}) ether sulphate lower than that disclosed in GB-A-2 321 253. In particular, the benefits of the invention may be obtained with the use of less than 8% by weight of alkyl (C_{8-22}) ether sulphate, particularly in the range of 7% to less than 8%.

[0016] The cation present in this material may, for example, be an alkali metal (particularly sodium) or ammonium. It is particularly preferred that the alkyl ether sulphate be an alkyl (C_{8-22}) ethoxylated (n = 1 to 5, preferably 2 or 3) sulphate.

[0017] The alkyl group of the ether sulphate may be as described for the alkyl sulphate.

[0018] The most preferred alkyl ether sulphate for use in the invention is sodium lauryl ether sulphate where n = 2 or 3.

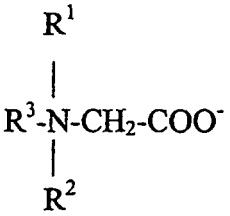
[0019] An alkyl ether sulphate which may be used is available under the name Empicol 0251 (Albright & Wilson).

[0020] The formulation of the invention contains 0 to 3%, more preferably 1 to 3%, of an amine oxide containing at least one C_{8-22} alkyl group. The amine oxide preferably has one such group of C_{8-22} carbon atoms and two C_{1-4} alkyl groups. Most preferably the latter alkyl groups are methyl groups. Preferred amine oxides are therefore (C_{8-22}) alkyl dimethyl amine oxides. The long chain alkyl group may, for example, have 8-18 carbon atoms and the compound may

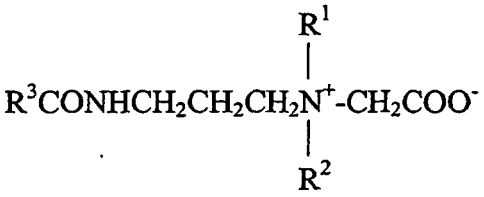
comprise a mixture of alkyl groups, which are preferably C_{10} to C_{18} (with C_{12} predominating).

[0021] A suitable amine oxide is available under the name Genaminox CSX (Hoechst).

[0022] The betaine surfactant is used in the formulation of the invention in an amount of 1-6%, more preferably 0.5-4%. Preferred betaines may be either of the formula (I) or (II).



(I)



(II)

[0023] In the above formula, R^1 and R^2 may be the same or different C_{1-4} alkyl groups whereas R^3 is an alkyl group having 8-22 carbon atoms, e.g. mixed C_{10} to C_{14}.

[0024] The preferred betaine for use in the formulation of the invention is cocoamidopropyl betaine.

[0025] A suitable betaine is available under the name Rewoteric AMB14 (Witco).

[0026] A further component of the formulation of the invention is the ethoxylated alkanol (C_{8-22}) which is used in an amount of 2-10%, more preferably 2-9% and most preferably 2-7%.

[0027] Examples of such ethoxylated alkanols which may be used are those in which the alkanol (from which the product is derived) is a primary alcohol and is preferably linear. Preferably the alkanol has 6 to 11 carbon atoms (e.g. mixed C_9-C_{11}) and in which the degree of ethoxylation is 5-15 (particularly 8-10).

[0028] A suitable fatty alcohol ethoxylate is available under the name Lutensol ON80 (BASF).

[0029] The formulations of the invention contains 2.5-9% alkyl (C_{8-22}) polyglycoside by weight. It is known by those skilled in the art that a glycoside is a sugar derivative, wherein one or more of the hydroxyl functions, which may preferably be on the first carbon atom of the sugar molecule, is/are replaced by another group such as an alcoholic or phenolic group. It is also known that such functionalised sugar molecules may be linked to one or more other sugar molecules, either before or after functionalisation, to form a polyglycoside. The preferred glycoside employed in the present invention is a glucoside (i.e. based on glucose), functionalised with a primary alcohol (e.g. C_{12}-C_{14}). More preferably the glucoside is in the form of a polyglucoside, with a preferable average degree of polymerisation of between 1-2, most preferably about 1.4.

[0030] A suitable polyglycoside is available under the name Glucopan 600CSUP (Henkel).

[0031] A further optional component which may be used in the formulation of the invention is a hydrotrope which may be used in an amount up to 7%, e.g. 3%, of the formulation. A particular preferred hydrotrope is sodium xylene sulphonate.

[0032] The formulation may contain the usual minor addition such as preservatives, dyes and/or perfumes.

[0033] The invention will be illustrated with reference to the following non-limiting Examples.

Examples

[0034] Formulations A to K were prepared as shown below.

% by Weight											
	A	B	C	D	E	F	G	H	I	J	K
Sodium Lauryl Sulphate (Empicol L28)	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6
Sodium Lauryl Ether Sulphate (Empicol 0251)	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.8
Fatty Alcohol Ethoxylate (Lutensol ON80)	-	12.0	4.0	2.0	-	6.0	8.0	-	6.0	2.0	5.0
Cocoamidopropyl Betaine (Rewoteric AMB14)	6.0	-	4.0	2.0	12.0	-	2.0	-	6.0	8.0	3.0
Alkyl Polyglycoside (Glucopon 600CSUP)	6.0	-	4.0	8.0	-	6.0	2.0	12.0	-	2.0	3.2
Sodium Xylene Sulphonate	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Preservatives, Dyes, Perfumes	Minor Additions										
Water	To 100										

[0035] In the above table, the percentages represent amount of active material. It should be noted that only formulations C,D and K were prepared in accordance with the present invention. Formulations A,B and E to J were prepared as comparative examples.

[0036] The above formulations were compared for their effectiveness in preventing oily soil being re-deposited on clean surfaces by a plate washing test.

[0037] The plate washing test was a standard test used to determine the number of plates which could be washed using a predetermined quantity (0.2g/litre) of the detergent formulation. The plates had each been soiled with 2 ml of melted lard, which contained a red dye (Red number 17 90095 available from Ellis and Everard) for ease of visibility on the white plates and which was applied in the form of small drops and then allowed to harden for 24 hours. For each formulation test 25 such plates were prepared.

[0038] The plates were washed one at a time in a 5 litre bowl of water, which had been preheated to 50°C and which contained 0.2g/litre of detergent formulation. The washing was stopped when the foam produced by the formulation no longer covered the surface of the water. After washing the plates were assessed for cleanliness, being divided into three categories, as follows:

1) Not cleaned at all, i.e. not washed because the foam no longer covered the surface of the water in the bowl.
2) Superficially clean but observed to be slightly soiled upon close examination.
3) Totally clean.

[0039] The above formulations were tested using the plate washing test as described above.

1) Standard Platewash (Lard Soil)

[0040]

Platewash (Lard soil)											
	A	B	C	D	E	F	G	H	I	J	K
Number of Plates not cleaned	3	15	3	2	3	7	6	4	3	3	2
Number of Plates superficially clean	12	3	6	6	9	3	7	6	9	14	4
Number of Plates cleaned	10	7	16	17	13	15	12	15	13	14	19

[0041] Formulations C,D and K not only were observed to clean the highest number of plates but also demonstrated a relatively low number of superficially clean plates. Both properties are of utmost importance to the user.

[0042] Formulations A (lacking the fatty alcohol ethoxylate), E (lacking fatty alcohol ethoxylate and the polyglycoside)

and H (lacking the fatty alcohol ethoxylate and betaine) performed considerably worse, leading to a lower number of plates cleaned and an equal or higher number of superficially clean plates. Formulation B (lacking the polyglycoside) performed worse still, leading to a very high number of dirty plates.

[0043] Similarly formulations G, I, J (not containing enough of the polyglycoside) and F (lacking the betaine) did not perform as effectively as formulations C,D and K.

Formulations A1 to A7 were prepared as shown in the table below

[0044]

% by Weight							
	A1	A2	A3	A4	A5	A6	A7
Sodium Lauryl Sulphate (Empicol L28)	6.8	9.6	9.6	6.8	9.6	9.6	16
Sodium Lauryl Ether Sulphate (Empicol 0251)	5.2	7.4	7.4	5.2	7.4	7.4	2.0
Fatty Alcohol Ethoxylate (Lutensol ON80)	6.0	4.64	4.38	6.0	4.64	4.38	8.5
Cocoamidopropyl Betaine (Rewoteric AMB14)	6.0	4.3	5.93	5.4	4.1	4.5	2.1
Alkyl Polyglycoside (Glucopon 600CSUP)	4.0	3.06	1.69	4.5	3.25	2.75	0.05
Sodium Xylene Sulphonate	2.5	2.5	2.5	1.8	2.0	1.8	2.2
Formalin	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Preservatives, Dyes, Perfumes	Minor Additions						
Water	To 100						

[0045] In the above table, the percentages represent amount of active material. It should be noted that formulations A1-A2 and A4-A6 were prepared in accordance with the present noted that formulations A1-A2 and A4-A6 were prepared in accordance with the present invention. Formulations A3 and A7 were prepared as comparative examples.

[0046] The above formulations were tested using the plate washing test as described above.

1) Standard Platewash (Lard Soil)

[0047]

Platewash (Lard soil)			
	A1	A2	A3
Number of Plates not cleaned	1	2	1
Number of Plates superficially clean	13	13	16
Number of Plates cleaned	11	10	8

[0048] Formulations A1 and A2 were observed to clean the highest number of plates but also demonstrated the lowest number of superficially clean plates.

[0049] Formulation A3 did not contain enough of the polyglycoside to perform as effectively as formulations A1 and A2.

[0050] The above formulations were also tested using a mixed soil plate washing test. In this test 3 grams of food residue, comprising 40% potato, 30% lard, 10% egg and 20% minced beef by weight, was applied to each plate and allowed to harden for 24 hours.

[0051] The plates were washed as in the lard soil platewash and assessed for cleanliness using the same criteria.

2) Mixed Soil Platewash

[0052]

Platewash (Mixed Soil)				
	A4	A5	A6	A7
Number of Plates not cleaned	6	6	7	9
Number of Plates superficially clean	-	-	-	-
Number of Plates cleaned	19	19	18	16

[0053] Formulation A7 performed worse than formulations A4 and A5, as a result of lower polyglycoside content even though the formulation A7 had an equal if not considerably greater concentration of sodium lauryl sulphate.

3) Foam Heights

[0054] The lathering performance was judged by a standard test in which 200 ml of a 1% solution of the formulation is drained into a measuring cylinder from a separating funnel positioned 75 cm above the base of the cylinder. The height of the lather produced after 1 minute and after 30 minutes was measured.

[0055] The results of the foam height testing are shown in the table below.

Foam Height (mm)			
	A1	A2	A3
Initial	123	120	115
After 30 minutes	117	116	110

[0056] This consideration is also very important to the user. Formulation A3 produced a significantly lower foam that formulations A1 and A2 in both parts of the test, as a result of a lower polyglycoside content.

[0057] It will be appreciated from the information presented above that formulations in accordance with the invention are of considerably improved performance as compared to the prior art.

Claims

1. A liquid detergent formulation comprising, by weight, 5-10% of an alkyl (C_{8-22}) sulphate, 5-10% of an alkyl (C_{8-22}) ether sulphate, 0-3% of an amine oxide containing at least one C_{8-22} alkyl group, 1-6% of an amphoteric betaine surfactant containing at least one C_{8-22} alkyl group, 2-10% of an ethoxylated alcohol (C_{8-22}), 2.5-9% of an alkyl (C_{8-22}) polyglycoside and a balance of water.

2. A formulation as claimed in claim 1 wherein the alkyl sulphate is present in an amount of 8-10% by weight, preferably 9-10%.

3. A formulation as claimed in claim 1 or 2 wherein the alkyl sulphate is an alkali metal alkyl sulphate.

4. A formulation as claimed in claim 3 wherein the alkali metal is sodium.

5. A formulation as claimed in any one of claims 1 to 4 wherein the alkyl group of the alkyl sulphate has 8-16 carbon atoms.

6. A formulation as claimed in claim 5 wherein the alkyl sulphate is or is predominantly a lauryl sulphate.

7. A formulation as claimed in any one of claims 1 to 6 wherein the alkyl ether sulphate is present in an amount of 6-9% by weight.

8. A formulation as claimed in claim 7 wherein the alkyl ether sulphate is present in an amount of 7-8% by weight

9. A formulation as claimed in any one of claims 1 to 8 wherein the cation of the alkyl ether sulphate is an alkali metal (preferably sodium) or ammonium.

10. A formulation as claimed in any one of claims 1 to 9 wherein the alkyl ether sulphate is an alkyl ethoxylated sulphate.

11. A formulation as claimed in claim 10 wherein the alkyl ethoxylated sulphate has 1 to 5 units of ethoxylation.

12. A formulation as claimed in claim 11 wherein the alkyl ethoxylyated sulphate has 2 or 3 units of ethoxylation.

13. A formulation as claimed in claim 12 wherein the alkyl ether sulphate is sodium lauryl ether sulphate.

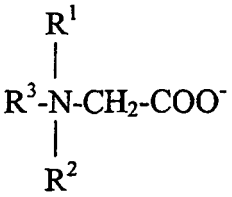
14. A formulation as claimed in any one of claims 1 to 13 containing 1 to 3% of the amine oxide.

15. A formulation as claimed in any one of claims 1 to 14 wherein the amine oxide has one alkyl group of C_{8-22} carbon atoms and two C_{1-4} alkyl groups.

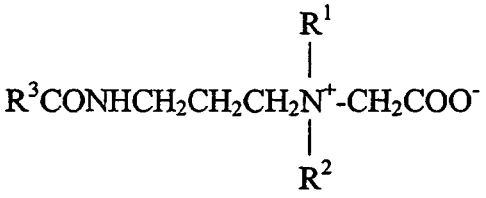
16. A formulation as claimed in claim 15 wherein the amine oxide is a (C_{8-22}) alkyl dimethyl amine oxide.

17. A formulation as claimed in any one of claims 1 to 16 wherein the betaine surfactant is present in an amount of 0.5 to 4% by weight.

18. A formulation as claimed in any one of claims 1 to 17 wherein the betaine is of the formula



(I)



(II)

in which R^1 and R^2 may be the same or different C_{1-4} alkyl groups and R^3 is an alkyl group having 8-22 carbon atoms.

19. A formulation as claimed in claim 18 wherein the betaine is cocoamidopropyl betaine.

20. A formulation as claimed in any one of claims 1 to 19 wherein the ethoxylated alcohol is present in an amount of 2-9% by weight

21. A formulation as claimed in claim 20 wherein the ethoxylated alcohol is present in an amount of 2-7% by weight.

22. A formulation as claimed in any one of claims 1 to 21 wherein the alkanol from which the ethoxylated alkanol is derived is linear.

23. A formulation as claimed in any one of claims 1 to 22 wherein the alkanol from which the ethoxylated alkanol is derived has 6 to 11 carbon atoms.

24. A formulation as claimed in any one of claims 1 to 23 in which the degree of ethoxylation in the ethoxylated alkanol is 5-15.

25. A formulation as claimed in claim 24 wherein said degree of ethoxylation is 8-10.

26. A formulation as claimed in any one of claims 1 to 25 wherein the alkyl (C_{8-22}) polyglycoside is a polymer of glucose having a degree of polymerisation between 1 to 2.

27. A formulation as claimed in claim 26 wherein the alkyl (C_{8-22}) polyglycoside is a polymer of glucose having a degree of polymerisation of about 1.4.

28. A formulation as claimed in any one of claims 1 to 27 additionally containing a hydrotrope.

29. A formulation as claimed in claim 28 wherein the hydrotrope is present in an amount up to 7% by weight.

30. A formulation as claimed in claim 28 or 29 wherein the hydrotrope is sodium xylene sulphonate.

31. A liquid detergent formulation as claimed in claim 1 comprising, by weight, 5 % to less than 10 % of an alkyl (C_{8-22}) sulphate, 7-8 % of an alkyl (C_{8-22}) ether sulphate, 0-3 % of an amine oxide containing at least one C_{8-22} alkyl group, 1-6 % of an amphoteric betaine surfactant containing at lest one C_{8-22} alkyl group, 2-10 % of an ethoxylated alcohol C_{8-22}, 2.5-9 % of an alkyl C_{8-22} polyglycoside and a balance of water.

32. A formulation as claimed in claim 31 wherein the alkyl (C_{8-22}) polyglycoside is present in an amount greater than 3% by weight.

33. A formulation as claimed in claim 32 wherein the alkyl (C_{8-22}) polyglycoside is present in an amount greater than 3.5% by weight.

Patentansprüche

1. Ein Flüssigwaschmittel, enthaltend 5-10 Gew.-% an Alkyl(C8-22)sulfaten, 5-10 Gew.% an Alkyl(C8-22)ethersulfaten, 0-3 Gew.-% an Aminoxiden, die mind. eine C8-22 Alkylgruppe aufweisen, 1-6 Gew.-% an amphoterischen Betaintensiden, die mind. eine C8-22 Alkylgruppe aufweisen, 2-10 Gew.-% an ethoxyliertem Alkoholen (C8-22), 2,5-9 Gew.-% an Alkyl(C8-22)polyglycosiden und den Rest Wasser.

2. Ein Mittel gem. Anspruch 1, wobei die Alkylsulfate in Mengen von 8-10 Gew.-%, vorzugsweise 9-10 Gew.-% enthalten sind.

3. Ein Mittel entsprechend den Ansprüchen 1 oder 2, wobei die Alkylsulfate Alkalimetallsulfate sind.

4. Ein Mittel gem. Anspruch 3, wobei das Alkalimetall Natrium ist.

5. Ein Mittel gemäß einem der Ansprüche 1 bis 4, wobei die Alkylgruppe der Alkylsulfate 8-16 Kohlenstoffatome aufweist.

6. Eine Formulierung gem. Anspruch 5, wobei die Alkylsulfate überwiegend Laurylsulfat darstellen.

7. Eine Formulierung gem. einem der Ansprüche 1-6, wobei die Alkylethersulfate in Mengen von 6-9 Gew.-% enthalten sind.

8. Ein Mittel gem. Anspruch 7, wobei die Alkylethersulfate in Mengen von 7-8 Gew.-% enthalten sind.

9. Ein Mittel gem. den Ansprüchen 1-8, wobei das Kation der Alkylethersulfate ein Alkalimetallkation ist, vorzugsweise Natrium oder Ammonium.

10. Ein Mittel gem. den Ansprüchen 1-9, wobei das Alkylethersulfat ein ethoxyliertes Alkylethersulfat ist.

11. Ein Mittel gem. Anspruch 10, wobei das ethoxylierte Alkylethersulfat 1-5 Teile Ethylenoxid aufweist.

12. Ein Mittel gem. Anspruch 11, wobei das ethoxylierte Alkylethersulfat 2 oder 3 Teile EO enthält.

13. Ein Mittel gem. Anspruch 12, wobei das Alkylethersulfat Natriumlaurylethersulfat ist.

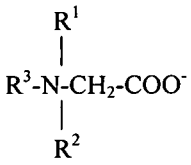
14. Ein Mittel gem. einem der Ansprüche 1-13, das 1-3 Gew.-% Aminoxid enthält.

15. Ein Mittel gem. einem der Ansprüche 1-14, wobei das Aminoxid eine Alkylgruppe mit C8-22 C-Atomen und zwei Alkylgruppen mit C1-C4 Alkylgruppen enthält.

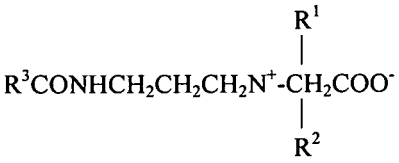
16. Ein Mittel gem. dem Anspruch 15, wobei als Aminoxid C8-22 Alkyldimethylaminoxid ausgewählt ist.

17. Ein Mittel gem. einem der Ansprüche 1-16, wobei das Betaintensid in Mengen von 0,5-4 Gew.-% enthalten ist.

18. Ein Mittel gem. einem der Ansprüche 1-17, wobei das Betaintensid in



(I)



(II)

in denen R^1 und R^2 gleich oder unterschiedlich sind oder unterschiedliche C1-C4 Alkylgruppen darstellt und R^3 eine Alkylgruppe mit 8-22 C-Atomen darstellt.

19. Ein Mittel gem. Anspruch 18, wobei das Betaincocoamidopropylbetain ist.

20. Ein Mittel gem. einem der Ansprüche 1-19, wobei die ethoxylierten Alkohole in Mengen von 2-9 Gew.-% enthalten sind.

21. Ein Mittel gem. Anspruch 20, wobei der ethoxylierter Alkohol in Mengen von 2-7 Gew.-% enthalten ist.

22. Ein Mittel gem. einem der Ansprüche 1-21, wobei der Alkohol, von dem der ethoxylierte Alkohol abstammt, linear ist.

23. Ein Mittel gem. einem der Ansprüche 1-22, wobei der Alkohol, von dem der ethoxylierte Alkohol abstammt, 6-11 Kohlenstoffatome aufweist.

24. Ein Mittel gem. einem der Ansprüche 1-23, in dem der Grad der Ethoxylierung in dem ethoxylierten Alkohol 5-15 ist.

25. Ein Mittel gem. Anspruch 24, wobei der Ethoxylierungsgrad 8-10 ist.

26. Ein Mittel gem. einem der Ansprüche 1-25, wobei das Alkyl(C8-C22)polyglycosid ein Polymer der Glucose ist und einen Polymerisationsgrad zwischen 1 und 2 aufweist.

27. Ein Mittel gem. Anspruch 26, wobei das Alkyl(C8-22)polyglycosid ein Polymer der Glucose mit einem Polymerisationsgrad von 1,4 ist.

28. Ein Mittel gem. einem der Ansprüche 1-27, **dadurch gekennzeichnet, dass** es zusätzliche Hydrotope enthält.

29. Ein Mittel gem. Anspruch 28, wobei das Hydrotop in Mengen von bis zu 7 Gew.-% enthalten ist.

30. Ein Mittel gem. den Ansprüchen 28 oder 29, wobei das Hydrotop ausgewählt ist aus Natriumxylolsulfonat.

31. Ein flüssiges Waschmittel gem. Anspruch 1, das enthält 5 Gew.-% bis weniger als 10 Gew.-% an Alkyl(C8-22)sulfat, 7-8 Gew.-% an Alkyl(C8-22)ethersulfat, 0-3 Gew.-% eines Aminoxids enthaltend mind. eine C8-22 Alkylgruppe, 1-6 Gew.-% eines amphoterischen Betaintensids, enthaltend mind. einen C8-22 Alkylgruppe, 2-10 Gew.-% an ethoxylierten Alkoholen mit 8-22 C-Atomen, 2,5-9 Gew.-% an Alkyl(C8-22)polyglycosiden und den Rest Wasser.

32. Ein Mittel gem. Anspruch 31, wobei das Alkyl(C8-22)polyglycosid in Mengen von größer 3 Gew.-% enthalten ist.

33. Ein Mittel gem. Anspruch 33, wobei das Alkyl(C8-22)polyglycosid in Mengen von größer 3,5 Gew.-% enthalten ist.

Revendications

1. Formulation de détergent liquide comprenant, en poids, 5-10 % d'un alkyl (C_{8-22}) sulfate, 5-10 % d'un alkyl (C_{8-22}) éthersulfate, 0-3 % d'un oxyde d'amine contenant au moins un groupement alkyle en C_{1-22}, 1-6 % d'un tensioactif de bétaïne amphotère contenant au moins un groupement alkyle en C_{8-22}, 2-10 % d'un alcool en (C_{8-22}) éthoxylé, 2,5-9 % d'un alkyl (C_{8-22}) polyglycoside et le reste de l'eau.

2. Formulation selon la revendication 1, **caractérisée en ce que** l'alkylsulfate est présent dans une quantité de 8-10 % en poids, de préférence 9-10 %.

3. Formulation selon la revendication 1 ou 2,
caractérisée en ce que l'alkylsulfate est un alkylsulfate de métal alcalin.

4. Formulation selon la revendication 3, **caractérisée en ce que** le métal alcalin est le sodium.

5. Formulation selon l'une quelconque des revendications 1 à 4, **caractérisée en ce que** le groupement alkyle de l'alkylsulfate a 8-16 atomes de carbone.

6. Formulation selon la revendication 5, **caractérisée en ce que** l'alkylsulfate est, ou est majoritairement, un laurylsulfate.

7. Formulation selon l'une quelconque des revendications 1 à 6, **caractérisée en ce que** l'alkyléthersulfate est présent dans une quantité de 6-9 % en poids.

8. Formulation selon la revendication 7, **caractérisée en ce que** l'alkyléthersulfate est présent dans une quantité de 7-8 % en poids.

9. Formulation selon l'une quelconque des revendications 1 à 8, **caractérisée en ce que** le cation de l'alkyléthersulfate est un métal alcalin (de préférence le sodium) ou l'ammonium.

10. Formulation selon l'une quelconque des revendications 1 à 9, **caractérisée en ce que** l'alkyléthersulfate est un alkylsulfate éthoxylé.

11. Formulation selon la revendication 10, **caractérisée en ce que** l'alkylsulfate éthoxylé a de 1 à 5 motifs d'éthoxylation.

12. Formulation selon la revendication 11, **caractérisée en ce que** l'alkylsulfate éthoxylé a 2 ou 3 motifs d'éthoxylation.

13. Formulation selon la revendication 12, **caractérisée en ce que** l'alkyléthersulfate est le lauryléthersulfate de sodium.

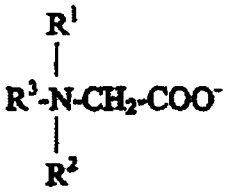
14. Formulation selon l'une quelconque des revendications 1 à 13, contenant de 1 à 3 % d'oxyde d'amine.

15. Formulation selon l'une quelconque des revendications 1 à 14, **caractérisée en ce que** l'oxyde d'amine a un groupement alkyle d'atomes de carbone en C_{8-22} et deux groupements alkyle en C_{1-4}.

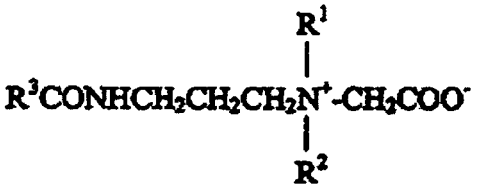
16. Formulation selon la revendication 15, **caractérisée en ce que** l'oxyde d'amine est un oxyde d'alkyl(C_{8-22})diméthylamine.

17. Formulation selon l'une quelconque des revendications 1 à 16, **caractérisée en ce que** le tensioactif de bétaïne est présent dans une quantité de 0,5 à 4 % en poids.

18. Formulation selon l'une quelconque des revendications 1 à 17, **caractérisée en ce que** la bétaïne est de formule



(I)



(II)

dans lesquelles R^1 et R^2 peuvent être des groupements alkyle en C_{1-4} identiques ou différents et R^3 est un groupement alkyle ayant 8-22 atomes de carbone.

19. Formulation selon la revendication 18, **caractérisée en ce que** la bétaïne est la cocoamidopropylbétaïne.

20. Formulation selon l'une quelconque des revendications 1 à 19, **caractérisée en ce que** l'alcool éthoxylé est présent dans une quantité de 2-9 % en poids.

21. Formulation selon la revendication 20, **caractérisée en ce que** l'alcool éthoxylé est présent dans une quantité de 2-7 % en poids.

22. Formulation selon l'une quelconque des revendications 1 à 21, **caractérisée en ce que** l'alcanol dont l'alcanol éthoxylé est issu est linéaire.

23. Formulation selon l'une quelconque des revendications 1 à 22, **caractérisée en ce que** l'alcanol dont l'alcanol éthoxylé est issu a de 6 à 11 atomes de carbone.

24. Formulation selon l'une quelconque des revendications 1 à 23, **caractérisée en ce que** le degré d'éthoxylation dans l'alcanol éthoxylé est de 5-15.

25. Formulation selon la revendication 24, **caractérisée en ce que** ledit degré d'éthoxylation est de 8-10.

26. Formulation selon l'une quelconque des revendications 1 à 25, **caractérisée en ce que** l'alkyl (C_{8-22}) polyglycoside est un polymère du glucose ayant un degré de polymérisation compris entre 1 et 2.

27. Formulation selon la revendication 26, **caractérisée en ce que** l'alkyl(C_{8-22})polyglycoside est un polymère du glucose ayant un degré de polymérisation d'environ 1,4.

28. Formulation selon l'une quelconque des revendications 1 à 27, contenant en outre un hydrotrope.

29. Formulation selon la revendication 28, **caractérisée en ce que** l'hydrotrope est présent dans une quantité allant jusqu'à 7 % en poids.

30. Formulation selon la revendication 28 ou 29, **caractérisée en ce que** l'hydrotrope est le xylènesulfonate de sodium.

31. Formulation de détergent liquide selon la revendication 1 comprenant, en poids, de 5 % à moins de 10 % d'un alkyl (C_{8-22}) sulfate, 7-8 % d'un alkyl(C_{8-22})éthersulfate, 0-3 % d'un oxyde d'amine contenant au moins un groupement alkyle en C_{8-22}, 1-6 % d'un tensioactif de bétaïne amphotère contenant au moins un groupement alkyle en C_{8-22}, 2-10 % d'un alcool en (C_{8-22}) éthoxylé, 2,5-9 % d'un alkyl (C_{8-22}) polyglycoside et le reste de l'eau.

32. Formulation selon la revendication 31, **caractérisée en ce que** l'alkyl (C_{8-22}) polyglycoside est présent dans une quantité supérieure à 3 % en poids.

33. Formulation selon la revendication 32, **caractérisée en ce que** l'alkyl(C_{8-22})polyglycoside est présent dans une quantité supérieure à 3,5 % en poids.

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- GB 2290301 A **[0003]**
- GB 2321253 A **[0003] [0006] [0008] [0015]**