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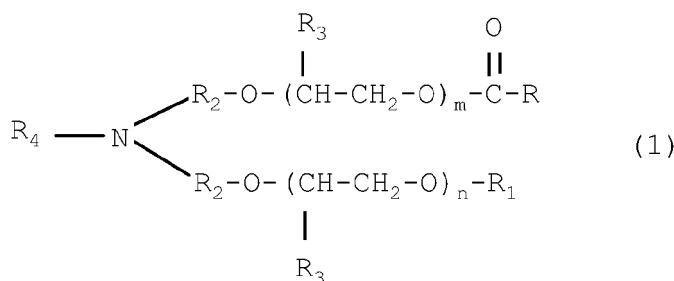
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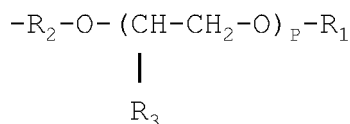
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28020 Madrid (ES)**(54) **Composition for rinsing and drying vehicles**

(57) The invention relates to a composition for rinsing and drying vehicles comprising at least one addition salt of an ester amine with formula (1)



wherein m and n independently of each other are 0 or a whole number between 1 and 10, R is an alkyl or alkenyl group having 6 to 22 linear or branched, saturated or unsaturated carbon atoms, R₁ is hydrogen or a -CO-R group, R₂ is an alkylene group having 1 to 4 carbon atoms, R₃ is hydrogen or an alkyl group having 1 to 4 carbon atoms, R₄ is hydrogen or an alkyl group having 1 to 4 carbon atoms or a group



wherein R₁, R₂ and R₃ have the aforementioned meaning and p is 0 or a whole number between 1 and 10, with at least one organic or inorganic acid.

Said composition makes it possible to rinse previously washed vehicles, enabling the fast and effective removal of water and particles left on the surface of the vehicles during the washing process, as well as providing adequate shine.

Description**Technical field**

[0001] The present invention relates to a composition for rinsing and drying vehicles, which makes it possible to rinse previously washed vehicles, enabling the fast and effective removal of the water and particles left on the surface of the vehicles during the washing process, as well as providing adequate shine.

Prior art

[0002] Generally, vehicle washing, meaning by vehicle any means of transport for passengers or goods, including cars, vans, lorries, buses, motorcycles, three-wheeler vans, golf carts, train and/or underground carriages and engines, light aircraft and commercial and/or passenger aeroplanes, etc., is carried out in automatic installations (automated vehicle wash) or semi-automatic installations (using high pressure hoses).

[0003] Automated vehicle washes can be classified as follows

- stationary (based on an endless conveyor that moves the vehicle along rails, with different washing devices, such as cloth washing curtains, tilting brushes or high pressure arches with oscillating nozzle systems and, optionally, one or more nozzles to facilitate the drying process using air blowers. Said devices are situated along the track on which the vehicle moves and is washed),
- or mobile (with at least one gantry that can move in relation to the stationary vehicle in its longitudinal direction by means of a travelling motor, and which generally has washing brushes that rotate around vertical axes and washing brushes of a variable height that rotate around a horizontal axis and, optionally, one or more nozzles to facilitate the drying process using air blowers).

During the washing process detergents are used that include surfactants to bring about the formation of firmly adhered films of water on the surface of the vehicles. Said films must be removed to prevent the formation of marks or scratches caused by lime scale and other impurities in the water.

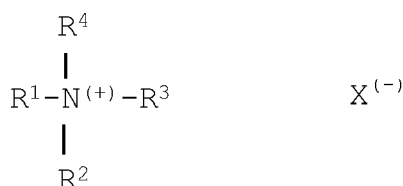
To achieve this, before the vehicle is dried, a final rinsing procedure takes place (final finish) with completely demineralised water and/or with rinsing compositions whose purpose is to remove residues of detergent and particles left on the surface of the vehicles. It is also intended to break the films of water by forming droplets that are easier to remove, thus ensuring that the subsequent drying process is fast and leaves it as free as possible of marks and lime scale residues.

Finally, the vehicle can be dried using air blowers, manual drying and/or evaporation.

Paraffin and/or aromatic hydrocarbons, waxes and silicones are commonly used to provide a shiny finish and to help remove films of water from the surface of the vehicles. However, said compounds are questionable from the environmental point of view.

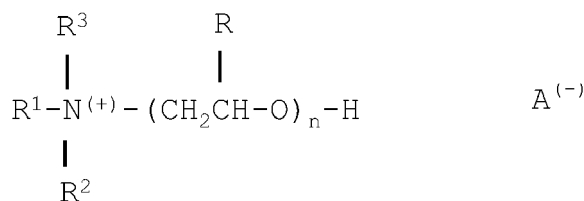
For this reason, the aforementioned compounds have gradually been replaced by other compounds, generally quaternary ammonium compounds.

EP-A-0003775 thus discloses an agent for drying and polishing cars that consists of 30-90% by weight of a quaternary ammonium compound with formula

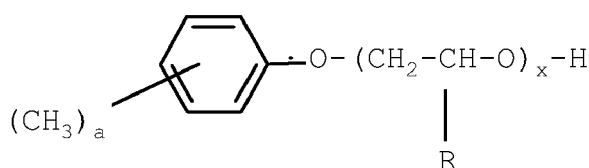


wherein R^1 and R^2 are a $\text{C}_8\text{-C}_{20}$ alkyl or alkenyl group, R^3 and R^4 are the same or independent of each other, a $\text{C}_1\text{-C}_4$ alkyl or hydroxyalkyl group, and X is an anion; and between 15-70%, preferably between 15-40% by weight of a $\text{C}_8\text{-C}_{20}$ alkanol or alkenol or a $\text{C}_1\text{-C}_4$ alkyl ester of a $\text{C}_8\text{-C}_{20}$ carboxylic acid.

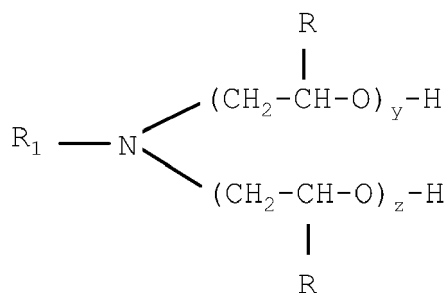
[0004] EP-A-0264634 discloses an agent for drying and polishing cars that consists of 5-90% by weight, preferably between 8-80% by weight, of a compound with formula



wherein R¹ and R² are a C₈-C₂₀ alkyl or alkenyl group, R³ is a C₁-C₄ alkyl group, R is hydrogen, n is a number between 1 and 20, and A is a benzoate or propionate anion;
and between 5-70%, preferably between 8-50% by weight, of a non-ionic emulsifier with formula

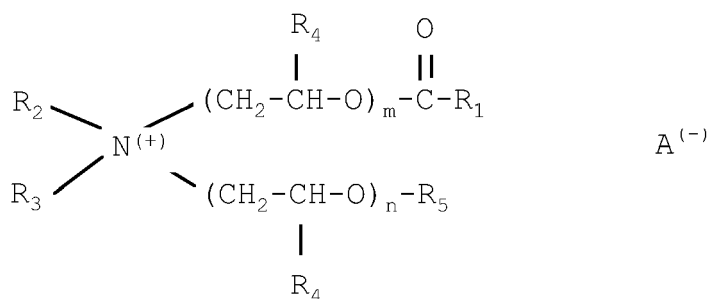


or formula

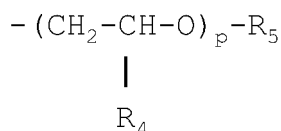


wherein a is 1 or 2, x is a number between 1 and 20, preferably between 3 and 5, y and z are each numbers between 2 and 20, preferably 2;
and the rest, up to 100% by weight, is water or an organic solvent.

[0005] Finally, EP-A-0703291 discloses an agent for drying and polishing cars that comprises between 1-30% by weight of a quaternary ammonium compound with formula



wherein R₁ is independently a C₆-C₂₀ alkyl or alkenyl group, m and n are independently of each other a number from 1 to 6, R₂ is a C₁-C₄ alkyl group, R₄ is hydrogen or a C₁-C₄ alkyl group, R₅ is hydrogen or a group with formula C(O)R₁, R₃ is a C₁-C₄ alkyl group or a group with formula



wherein R_4 and R_5 are as defined above and p is a number between 1 and 6;
and $\text{A}^{(-)}$ is an anion;

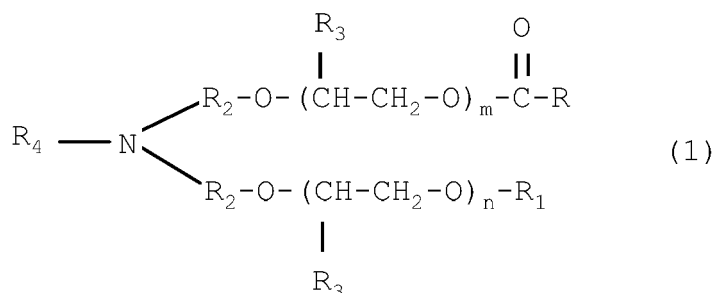
and water, and optionally, additional additives selected from non-ionic emulsifiers, dihydric alcohols, C_1 - C_6 alkyl ethers of dihydric alcohols, C_8 - C_{18} alcohols with a mean molecular weight (M_w) ranging between 200 and 5000 by weight, or mixtures thereof up to 100% by weight.

[0006] However, some of these quaternary ammonium compounds do not present an adequate biodegradability (those that do not present ester bonds). Moreover, the production of quaternary ammonium compounds (with or without ester bonds) requires highly toxic (carcinogenic) alkylating agents, such as methyl chloride, dimethyl sulphate, benzyl chloride, etc., which require very particular handling conditions.

[0007] It can be concluded that improvements are still required in the field of rinsing and drying vehicles to make it possible to improve different properties such as the shine on the surface of the washed vehicle, the speed with which water is removed, the formation of droplets of water on the surface of the vehicle, minimising or forming larger droplets that are easier to remove, the stability of the rinsing and drying compositions, both in a concentrated form and in a diluted form, the use of compounds that are cheaper, easier to obtain and more ecological (biodegradability), etc.

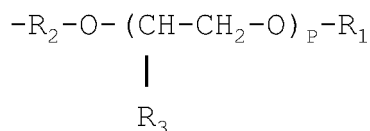
Brief description of the invention

[0008] The present invention offers an efficient solution to the problems mentioned in the prior art, providing a composition for rinsing and drying vehicles that comprises at least one addition salt of an ester amine with formula (1)



wherein

- m and n independently of each other are 0 or a whole number between 1 and 10,
- R is an alkyl or alkenyl group having 6 to 22 linear or branched, saturated or unsaturated carbon atoms,
- R_1 is hydrogen or a $-\text{CO}-\text{R}$ group
- R_2 is an alkylene group having 1 to 4 carbon atoms,
- R_3 is hydrogen or an alkyl group having 1 to 4 carbon atoms,
- R_4 is hydrogen or an alkyl group having 1 to 4 carbon atoms or a group



wherein R_1 , R_2 and R_3 have the aforementioned meaning and p is 0 or a whole number between 1 and 10, with at least one organic or inorganic acid.

[0009] Diluted aqueous compositions for rinsing and drying vehicles, which can be produced by diluting in water a

composition comprising at least one addition salt of an ester amine with formula (1) with at least one organic or inorganic acid, also forms part of the object of the invention.

[0010] Another additional object of the present invention is the use of the aforementioned compositions comprising at least one addition salt of an ester amine with formula (1) with at least one organic or inorganic acid for rinsing and drying vehicles.

[0011] A procedure for rinsing and drying vehicles that consists of applying an aqueous composition comprising at least one addition salt of an ester amine with formula (1) with at least one organic or inorganic acid to a vehicle after the process of washing said vehicle also forms part of the object of the invention.

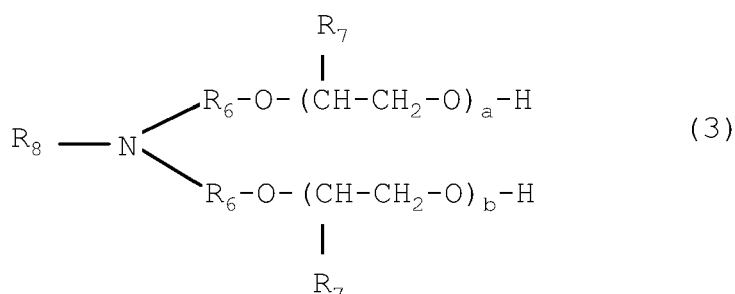
Detailed description of the invention

The ester amine

[0012] The ester amine with formula (1) is produced by condensing a fatty acid with general formula (2)

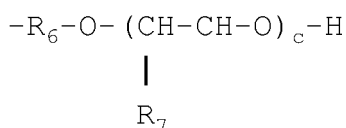


with an alkanol amine with general formula (3)



in whose formulas

- a and b independently of each other are 0 or a whole number between 1 and 10,
- R_5 is an alkyl or alkenyl group having 6 to 22 linear or branched, saturated or unsaturated carbon atoms,
- R_6 is an alkylene group having 1 to 4 carbon atoms,
- R_7 is hydrogen or an alkyl group having 1 to 4 carbon atoms,
- R_8 is hydrogen, an alkyl group having 1 to 4 carbon



atoms or a group

wherein R_6 and R_7 have the aforementioned meaning and c is 0 or a whole number between 1 and 10.

[0013] Examples of fatty acids with general formula (2) that are condensed (esterified) with an alkanol amine with general formula (3) are those from oils and vegetable and animal fats, such as coconut, tallow, palm, sunflower, soy, olein, olive, pomace, rapeseed, tall oil, etc., possibly fully or partially hydrogenated, and purified or synthetic fatty acids such as capronic acid, caprylic acid, caprinic acid, lauric acid, myristic acid, palmitic acid, palmoleic acid, stearic acid, isostearic acid, 2-ethylhexanoic acid, oleic acid, elaidinic acid, petroselinic acid, linoleic acid, linolenic acid, arachinic acid, gadoleic acid, behenic acid and erucic acid, or mixtures thereof.

[0014] Preferably, the fatty acid is a C_{16} - C_{22} acid containing a degree of insaturation such that the Iodine Value falls within the 5-200 range, or more preferably 60-160. It is particularly preferable for the Iodine Value to fall between either the 70-95 range or the 95-130 range. It is also preferable for the fatty acid(s) used to have a cis-trans isomer ratio of 80:20 to 95:5. More preferably, the isomer trans content of said fatty acid(s) is lower than 10%. An optimum trans isomer

content is between 0.5 and 5%.

[0015] The following can be cited as examples of alkanol amines with general formula (3) that can be used: triethanolamine, N-methyldiethanolamine, N-methyldiisopropanolamine, propanol diethanolamine, ethanol diisopropanolamine and triisopropanolamine, possibly alkoxyated with ethylene oxide, or mixtures thereof, non-alkoxyated alkanol amines being preferred, especially triethanolamine and N-methyldiethanolamine.

[0016] Esterification can be carried out using known methods, as has been disclosed for instance in patent application ES-A-2021900. Preferably, the esterification reaction is carried out by condensing the fatty acid using an alkanol amine or mixture of alkanol amines at a temperature of between 120°C and 220°C for a period of 2 to 10 hours, preferably at a low pressure of about 5 to 200 mbar and in the presence of some of the catalysts already known for esterification, e.g. hypophosphorous acid or paratoluene sulphonic acid, and also in the presence of some of the usual stabilisers and antioxidants, such as tocopherols, BHT, BHA, citric acid, etc.

[0017] Usually, the molar ratio between the fatty acid and the alkanol amine ranges between 1.0:1.0 and 3.0:1.0.

[0018] The result of the esterification reaction is a mixture of mono-, di- and triesters of fatty acids or mono- and diesters, depending on the number of hydroxyl groups of the alkanol amine that is made to react with the fatty acid.

[0019] In the case of the alkanol amine being triethanolamine, it is preferable for the reaction product to be a mixture containing between 10-40% by weight, preferably between 19-35% by weight of monoester, between 40-60% by weight, preferably between 46-52% by weight of diester, and between 10-40% by weight, preferably between 16-35% by weight of triester.

20 Addition salts of the ester amine

[0020] Suitable acids for producing addition salts of the ester amine with formula (1) can be organic or inorganic acids.

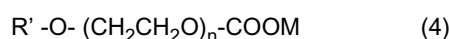
[0021] Suitable inorganic acids are hydrochloric acid, phosphoric acid (orthophosphoric acid), nitric acid, sulphuric acid or a mixture thereof. Phosphoric acid is preferred.

[0022] Suitable organic acids are C₁-C₆ chain carboxylic acids, C₁-C₆ chain α-hydroxy-carboxylic acids, C₆-C₂₂ chain fatty acids, di- or tricarboxylic acids and C₆-C₂₂ ether carboxylic acids, or a mixture thereof. Examples of suitable carboxylic acids or C₁-C₆ chain α-hydroxycarboxylic acids are formic acid, acetic acid, propionic acid, butyric acid, valeric acid, caproic acid, glycolic acid, or mixtures thereof. Formic acid, acetic acid and glycolic acid are preferred, formic acid being the most preferable.

[0023] Examples of suitable C₆-C₂₂ chain fatty acids are lauric acid, myristic acid, palmitic acid, stearic acid, oleic acid, linoleic acid, ricinoleic acid, arachinic acid, behenic acid, or a mixture thereof. Oleic acid and linoleic acid are preferred.

[0024] Examples of suitable di- or tricarboxylic acids are succinic acid, malic acid, glutaric acid, adipic acid, sebacic acid, pimelic acid, suberic acid, maleic acid, and terephthalic acid and those produced by heat-induced oligomerisation of unsaturated fatty acids, citric acid (3-hydroxy-1,3,5-pentanotricarboxylic acid), or mixtures thereof. Adipic acid, maleic acid and citric acid are preferred.

[0025] Examples of suitable C₆-C₂₂ ether carboxylic acids are those that follow formula (4)



wherein R' is an alkyl or alkenyl residue having 6 to 22 carbon atoms, n has a value that falls within the 1 to 15 range, most preferably from 2 to 10, and M is hydrogen or a suitable cation, preferably an alkaline metal cation such as sodium or potassium.

[0026] Particularly preferable are the compounds of the above formula (4) wherein R is an alkyl or alkenyl residue having 12 to 22 carbon atoms.

[0027] The aliphatic hydrocarbon chain containing 6 to 22 carbon atoms, preferably 12 to 22 carbon atoms, is preferably derived from fats and oils of natural origin, as well as from synthetic triglycerides. Preferred fats and oils include palm oil, coconut oil, sunflower oil, rapeseed oil, castor oil, olive oil, soy oil and animal fats and oils such as beef tallow, bone oil, fish fats and oils, fully and partially hydrogenated oils thereof, and mixtures thereof.

[0028] Particularly preferred are acyl groups derived from coconut oil, palm oil and olive oil, preferably from olive oil.

[0029] C₆-C₂₂ ether carboxylic acids with general formula (4) can be produced using methods known by a person skilled in the art. The production process consists of two steps, the first being the reaction of an alcohol with a hydrocarbon chain of the desired length with ethylene oxide in normal reaction conditions, known by a person skilled in the art. It is also possible to use a previously ethoxylated alcohol. The ethoxylated alcohol is then made to react with a strong base, e.g. sodium or potassium hydroxide in the presence of a reducing agent such as sodium borohydride, to form the corresponding sodium or potassium alkoxylate. This product is made to react with sodium monochloroacetate to form the corresponding ethercarboxylate in salt form. Said salt is converted into the corresponding acid by washing with sulphuric acid.

[0030] Specific examples of C₆-C₂₂ ether carboxylic acids are AKYPO® RO 10 VG (oleic type ether carboxylic acid with an average degree of ethoxylation of 1), AKYPO® RO 20 VG (oleic type ether carboxylic acid with an average degree of ethoxylation of 2), AKYPO® RO 50 VG (oleic type ether carboxylic acid with an average degree of ethoxylation of 5) and AKYPO® RO 50 VG (oleic type ether carboxylic acid with an average degree of ethoxylation of 9) marketed by KAO Chemicals Europe.

Compositions for rinsing and drying vehicles

[0031] Also forming part of the object of the invention are aqueous compositions for rinsing and drying vehicles comprising, expressed as a weight percentage,

- (a) 1-40% of at least one addition salt of an ester amine with formula (1) with at least one organic or inorganic acid
- (b) 0-10% of an organic or inorganic acid
- (c) 0-10% of a fatty acid ester with a monohydric alcohol
- (d) 0-10% of an emulsifier
- (e) 0-10% of a hydrotrope
- (f) 0-25% of a polyhydric alcohol or an ether thereof
- (g) water up to 100%.

[0032] It is preferable for the organic or inorganic acid(s) (component b) to be the same that served to neutralise the ester amine to form its addition salt(s).

[0033] It is also particularly preferable for the organic or inorganic acid content (component b) in the composition of the present invention to be between 0.1-10% by weight in relation to the total weight of the composition. The organic or inorganic acid(s) (component b) is therefore above the stoichiometric quantity needed to neutralise the ester amine to form its addition salt.

[0034] Examples of fatty acid esters with a monohydric alcohol (component c) are cetyl 2-ethylhexanoate, methyl coconoate, methyl laurate, isopropyl myristate, isopropyl palmitate, 2-ethylhexyl palmitate, 2-octyldodecyl myristate, methyl stearate, butyl stearate, 2-ethylhexyl stearate, isotridecyl stearate, methyl oleate, myristyl myristate, stearyl stearate, isobutyl oleate, or mixtures thereof. Cetyl 2-ethylhexanoate and 2-ethylhexyl palmitate are preferred.

[0035] Specific examples of fatty acid esters with monohydric alcohols are those marketed under the name EXCEPARL® by KAO Corporation.

[0036] Examples of suitable emulsifiers (component d) are non-ionic surfactants from at least one of the following groups:

- addition products with 1 to 30 moles of ethylene oxide and/or 0 to 5 moles of propylene oxide on C₈-C₂₂ linear fatty alcohols, C₁₂-C₂₂ fatty acids and alkylphenols with 8 to 15 carbon atoms in the alkyl group and alkyl amines with 8 to 22 carbon atoms in the alkyl group;
- alkyl and/or alkenyl oligosaccharides with 8 to 22 carbon atoms in the alkyl group and similar ethoxylates thereof;
- addition products with 1 to 15 moles of ethylene oxide on castor oil and/or hydrogenated castor oil;
- addition products with 15 to 60 moles of ethylene oxide on castor oil and/or hydrogenated castor oil;
- partial esters of glycerol and/or sorbitan with C₁₂-C₂₂ saturated or unsaturated, linear or branched fatty acids and/or hydroxycarboxylic acids with 3 to 18 carbon atoms and addition products thereof with 1 to 30 moles of ethylene oxide;
- mixtures of alkoxylated glycerides and alkoxylated glycerine as disclosed in European patent applications EP-A-0579887, EP-A-0586323 and EP-A-1045021, marketed under the name LEVENOL® by KAO Chemicals Europe;
- partial esters of polyglycerol (with an average degree of self-condensation of 2 to 8), polyethylene glycol (with a mean molecular weight of 400 to 5000 by weight), trimethylolpropane, pentaerythritol, sugar alcohols (e.g. sorbitol), alkylglucosides (e.g. methylglucoside, butylglucoside, laurylglucoside) and polyglucosides (e.g. cellulose) with C₁₂-C₂₂ saturated or unsaturated, linear or branched fatty acids and/or hydroxycarboxylic acids with 3 to 18 carbon atoms and addition products thereof with 1 to 30 moles of ethylene oxide
- mixed esters of pentaerythritol, fatty acids, citric acid and fatty alcohols and/or mixed fatty acid esters with 6 to 22 carbon atoms, methylglucose and polyols, preferably glycerol or polyglycerol;
- mono-, di- and trialkylphosphates and mono-, di- and/or tri-PEG-alkylphosphates and salts thereof;
- wool wax alcohols;
- polysiloxane/polyalkyl/polyether copolymers and the corresponding derivatives
- block copolymers, e.g. polyethylene glycol-30 dipolyhydroxystearate;
- emulsifying polymers;
- polyalkylene glycols;
- alkylglyceryl ethers; and

- glycerol carbonate.

[0037] According to the invention the emulsifier (component d) is selected from C₈-C₂₂ alkoxyated fatty alcohols, C₁₂-C₂₂ alkoxyated fatty acids, C₈-C₁₅ alkoxyated alkylphenols and C₁₂-C₂₂ alkoxyated alkylamines containing 2 to 15 moles of ethylene oxide; alkylpolyglucosides with 8 to 22, preferably with 10 to 18 carbon atoms in the carbon chain and 1 to 20, preferably 1.1 to 5, units of glucoside; alkoxyated glycerides or mixtures of alkoxyated glycerides and alkoxyated glycerine; and alkylglyceryl ethers, or mixtures thereof. C₈-C₂₂ alkoxyated fatty alcohols, C₁₂-C₂₂ alkoxyated fatty acids and C₁₂-C₂₂ alkoxyated alkylamines containing 2 to 15 moles of ethylene oxide are preferred.

[0038] According to the invention, the hydrotrope (component e) is selected from sodium cumenesulphonate, ammonium cumenesulphonate, ammonium xylenesulphonate, potassium toluenesulphonate, sodium toluenesulphonate, sodium xylenesulphonate, toluenesulphonic acid, xylenesulphonic acid, sodium polynaphthalenesulphonate, sodium polystyrene sulphonate, sodium methylnaphthalenesulphonate, disodium succinate, or mixtures thereof. Sodium cumenesulphonate and ammonium cumenesulphonate are preferred.

[0039] Preferably, the content of polyhydric alcohol or the ether thereof (component f) in the composition according to the invention ranges between 0.1-25% by weight.

[0040] According to the invention, the polyhydric alcohol or the ether thereof (component f) is selected from ethylene glycol, propylene glycol, 1,3-butylene glycol, 1,4-butylene glycol, dipropylene glycol, tripropylene glycol, polyethylene glycol with a mean molecular weight (M_w) between 100 and 1000 by weight, glycerol, polyglycerol, methyl glycol, ethyl glycol, propyl glycol, butyl glycol, methyl diglycol, ethyl diglycol, propyl diglycol, butyl diglycol, ethyl triglycol, butyl triglycol, or mixtures thereof. Dihydric alcohols or their ethers are preferred. Particularly preferred are dihydric alcohol ethers such as methyl glycol, ethyl glycol, propyl glycol, butyl glycol, methyl diglycol, ethyl diglycol, propyl diglycol, butyl diglycol. A mixture of butyl glycol and butyl diglycol, wherein the weight ratio between butyl glycol and butyl diglycol ranges between 1:1 and 6:1, and more preferably between 2:1 and 4:1, is particularly advantageous.

[0041] Particularly preferred is an aqueous composition for rinsing and drying vehicles comprising, expressed as a weight percentage,

- (a) 5-25% of at least one addition salt of the ester amine with formula (1) with at least one organic or inorganic acid
- (b) 1-8% of at least one organic or inorganic acid
- (c) 2-6% of at least one fatty acid ester with a monohydric alcohol
- (d) 1-5% of at least one emulsifier
- (e) 1-5% of at least one hydrotrope
- (f) 5-20% of at least one polyhydric alcohol or an ether thereof
- (g) water up to 100%.

[0042] The active substance of the aqueous compositions for rinsing and drying vehicles according to the present invention is preferably up to 60% by weight, more preferably up to 45% by weight, even more preferably up to 30% by weight, the active substance substantially comprising addition salts of the ester amine with formula (1) (component a) and, optionally, also components (b), (c), (d), (e) and (f). It is thus considered that said aqueous compositions are concentrated.

[0043] The pH of said concentrated aqueous compositions for rinsing and drying vehicles preferably falls between 2.0 and 6.5, more preferably between 2.0 and 4.5.

[0044] The viscosity of the concentrated aqueous compositions for rinsing and drying vehicles of the present invention ranges between 1 and 5000 mPa·s at 20°C, more preferably between 1 and 1000 mPa·s at 20°C.

[0045] Aqueous compositions for rinsing and drying vehicles are usually applied in a very diluted form, so that the active concentration that is applied to the vehicles is between 0.001 and 1% by weight, more preferably between 0.005 and 0.5% by weight, the active substance substantially comprising addition salts of the ester amine with formula (1) (component a) and, optionally, also components (b), (c), (d), (e) and (f).

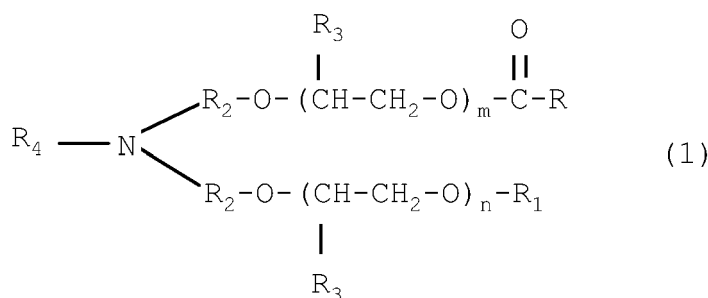
[0046] Concentrated aqueous compositions for rinsing and drying vehicles to produce diluted aqueous compositions, which are those applied to vehicles, can be diluted with hard water, semi-hard water or soft water (demineralised water). Preferably, concentrated aqueous compositions are diluted with demineralised water.

[0047] The viscosity of the diluted aqueous compositions for rinsing and drying vehicles of the present invention ranges between 1 and 100 mPa·s at 20°C, more preferably between 1 and 50 mPa·s at 20°C.

[0048] Aqueous compositions for rinsing and drying vehicles that can be produced by diluting a concentrated aqueous composition in water also form part of the object of the present invention. Said aqueous compositions for rinsing and drying vehicles are produced by diluting a concentrated composition as described above in water by a factor of between 2 and 2000 by volume, preferably between 5 and 1000, more preferably between 10 and 500, even more preferably between 150 and 400.

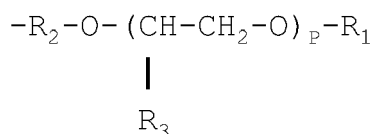
[0049] Another additional object of the present invention is the use of aqueous compositions comprising at least one

addition salt of an ester amine with formula (1) with at least one organic or inorganic acid



wherein

- m and n independently of each other are 0 or a whole number between 1 and 10,
- R is an alkyl or alkenyl group having 6 to 22 linear or branched, saturated or unsaturated carbon atoms,
- R₁ is hydrogen or a -CO-R group
- R₂ is an alkylene group having 1 to 4 carbon atoms,
- R₃ is hydrogen or an alkyl group having 1 to 4 carbon atoms,
- R₄ is hydrogen or an alkyl group having 1 to 4 carbon atoms or a group



wherein R₁, R₂ and R₃ are the same as before and p is 0 or a whole number between 1 and 10,

for rinsing and drying vehicles.

[0050] Suitable acids for producing addition salts of the ester amine with formula (1) can be organic or inorganic acids.

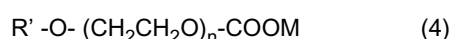
[0051] Suitable inorganic acids are hydrochloric acid, phosphoric acid (orthophosphoric acid), nitric acid, sulphuric acid or a mixture thereof. Phosphoric acid is preferred.

[0052] Suitable organic acids are C₁-C₆ chain carboxylic acids, C₁-C₆ chain α-hydroxy-carboxylic acids, C₆-C₂₂ chain fatty acids, di- or tricarboxylic acids and C₆-C₂₂ ether carboxylic acids, or a mixture thereof. Examples of suitable carboxylic acids or C₁-C₆ chain α-hydroxycarboxylic acids are formic acid, acetic acid, propionic acid, butyric acid, valeric acid, caproic acid, glycolic acid (hydroxyacetic acid), or mixtures thereof. Formic acid, acetic acid and glycolic acid are preferred, formic acid being the most preferable.

[0053] Examples of suitable C₆-C₂₂ chain fatty acids are lauric acid, myristic acid, palmitic acid, stearic acid, oleic acid, linoleic acid, ricinoleic acid, arachinic acid, behenic acid, or a mixture thereof. Oleic acid and linoleic acid are preferred.

[0054] Examples of suitable di- or tricarboxylic acids are succinic acid, malic acid, glutaric acid, adipic acid, sebacic acid, pimelic acid, suberic acid, maleic acid, and terephthalic acid and those produced by heat-induced oligomerisation of unsaturated fatty acids, citric acid (3-hydroxy-1,3,5-pentanotricarboxylic acid), or mixtures thereof. Adipic acid, maleic acid and citric acid are preferred.

[0055] Examples of suitable C₆-C₂₂ ether carboxylic acids are those that follow formula (4)



wherein R' is an alkyl or alkenyl residue having 6 to 22 carbon atoms, n has a value that falls within the 1 to 15 range, most preferably from 2 to 10, and M is hydrogen or a suitable cation, preferably an alkaline metal cation such as sodium or potassium.

[0056] Particularly preferable are the compounds of the above formula (4) wherein R is an alkyl or alkenyl residue having 12 to 22 carbon atoms.

[0057] A procedure for rinsing and drying vehicles, which consists of applying a diluted aqueous composition comprising

at least one addition salt of an ester amine with formula (1) with at least one organic or inorganic acid, which can be produced as described above, to a vehicle after the process of washing said vehicle, also forms part of the object of the invention. Generally, the washing process consists of a step of washing with a detergent, and a step of rinsing with water, generally demineralised. Finally, the aqueous composition of the present invention is applied to the vehicles,

which is generally done by spraying or sprinkling.

[0058] The examples that follow below are given to provide a sufficiently clear and complete explanation of the present invention for a person skilled in the art, but they must not be considered as limitations to the essential aspects of the object thereof, which have been presented in the previous sections of this description.

Examples

Example 1. Compositions for rinsing and drying vehicles

[0059] The following compositions in Table 1 are prepared for rinsing and drying vehicles. Composition A is prepared according to the present invention, whilst C1 (Market product) and C2 (composition based on Esterquat) are comparative examples.

Table 1.- Compositions for rinsing and drying vehicles (weight percentages representing 100% of the active substance for each component)

	A	C1	C2
Butyl glycol	8.0%	10.0%	8.0%
Butyl diglycol	4.0%	---	4.0%
¹ Oleic type ester quat	---	4.0%	12.0%
² Oleic type ester amine	12.0%	---	---
³ Fatty ester	4.0%	2.0%	4.0%
⁴ Aliphatic hydrocarbon	---	2.0%	---
⁵ Emulsifier	4.0%	3.0%	2.0%
Sodium cumenesulphonate	3.5%	---	---
Acetic acid	---	1.0%	1.0%
Orthophosphoric acid	3.5%	---	---
Demineralised water	Up to 100%	Up to 100%	Up to 100%
¹ Ester quat derived from triethanolamine and oleic acid (Tetranyl ® AO-1 from Kao Chemicals Europe) ² Ester amine derived from triethanolamine and oleic acid ³ Cetyl 2-ethylhexanoate (Exceparl ® HO from Kao Corporation) ⁴ Petroleum distillate, boiling range 175-220°C, % aromatics: max. 25% by weight; (20A 19/22 solvent from Petresa) ⁵ Ethoxylated oleic amine (2 moles of ethylene oxide)(Amiet ® OD/14.2 from Kao Chemicals Europe)			

[0060] The compositions in Table 1 were evaluated in an automated vehicle wash, using a dark blue Renault Megane vehicle.

[0061] The car was previously washed with a standard shampoo, it was rinsed with demineralised water by osmosis and, finally, the compositions in Table 1 were applied, diluted with water in a proportion of 1/300 by volume.

[0062] A visual assessment was carried out on one of the sides of the wet car, taking into account the following aspects:

- Opening time of the layer of water (the lower the value the better)
- Quantity and size of the remaining droplets (the smaller the quantity and the greater the size the better)

[0063] Once dry, the shine of the treated surface was also measured using a gloss meter (MINOLTA GLOSS 265), taking a reading at an angle of 20°. The results of the evaluation are shown in Table 2.

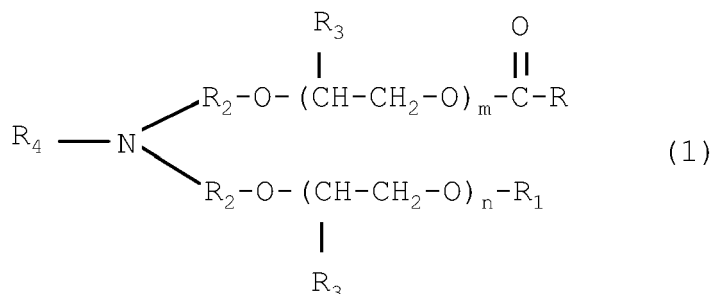
Table 2.- Evaluation of the compositions for rinsing and drying vehicles

	A	C1	C2
Opening time of the layer of water	8 s	15 s	12 s
Quantity of droplets	few	average	average
Size	large	medium	medium
Shine (20°)	83	77	80

[0064] The formula prepared with the ester amine (composition A) presents a better overall behaviour than that of the formula prepared with ester quat and that of the formula prepared with a standard market product.

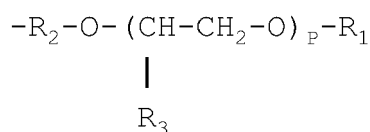
Claims

1. An aqueous composition for rinsing and drying vehicles comprising at least one addition salt of an ester amine with formula (1)



wherein

- m and n independently of each other are 0 or a whole number between 1 and 10,
- R is an alkyl or alkenyl group having 6 to 22 linear or branched, saturated or unsaturated carbon atoms,
- R₁ is hydrogen or a -CO-R group
- R₂ is an alkylene group having 1 to 4 carbon atoms,
- R₃ is hydrogen or an alkyl group having 1 to 4 carbon atoms,
- R₄ is hydrogen or an alkyl group having 1 to 4 carbon atoms or a group



wherein R₁, R₂ and R₃ have the aforementioned meaning and p is 0 or a whole number between 1 and 10,

with at least one organic or inorganic acid.

2. Aqueous composition according to claim 1, wherein the inorganic acid is selected from hydrochloric acid, phosphoric acid, nitric acid, sulphuric acid or a mixture thereof.
3. Aqueous composition according to claim 1, wherein the organic acid is selected from C₁-C₆ chain carboxylic acids, C₁-C₆ chain α-hydroxy-carboxylic acids, C₆-C₂₂ chain fatty acids, di- or tricarboxylic acids and C₆-C₂₂ ether carboxylic acids, or a mixture thereof.

4. Aqueous composition according to claim 3, wherein the organic acid is selected from formic acid, acetic acid, propionic acid, butyric acid, valeric acid, caproic acid, glycolic acid, adipic acid, maleic acid and citric acid, lauric acid, myristic acid, palmitic acid, stearic acid, oleic acid, linoleic acid, ricinoleic acid, arachnic acid, behenic acid and C₁₂-C₂₂ ether carboxylic acids, or a mixture thereof.

5. Aqueous composition according to claims 1 to 4, comprising, expressed as a weight percentage,

- (a) 1-40% of at least one addition salt of an ester amine with formula (1) with at least one organic or inorganic acid
- (b) 0-10% of an organic or inorganic acid
- (c) 0-10% of a fatty acid ester with a monohydric alcohol
- (d) 0-10% of an emulsifier
- (e) 0-10% of a hydrotrope
- (f) 0-25% of a polyhydric alcohol or an ether thereof
- (g) water up to 100%.

6. Aqueous composition according to claim 5, wherein the content of organic or inorganic acid(s) (component b), expressed as a weight percentage, ranges between 0.1-10%.

7. Aqueous composition according to claims 5 or 6, wherein the content of polyhydric alcohol or the ether thereof (component f), expressed as a weight percentage, ranges between 0.1-25%.

8. Aqueous composition according to any of claims 5 to 7, wherein the organic or inorganic acid(s) (component b) is/are the same that served to neutralise the ester amine to form its addition salt(s).

9. Aqueous composition according to claims 5 or 8, wherein the fatty ester (component c) is selected from cetyl 2-ethylhexanoate, methyl coconate, methyl laurate, isopropyl myristate, isopropyl palmitate, 2-ethylhexyl palmitate, 2-octyldodecyl myristate, methyl stearate, butyl stearate, 2-ethylhexyl stearate, isotridecyl stearate, methyl oleate, myristyl myristate, stearyl stearate, isobutyl oleate, or mixtures thereof.

10. Aqueous composition according to claims 5 to 9, wherein the emulsifier (component d) is selected from C₈-C₂₂ alkoxyated fatty alcohols, C₁₂-C₂₂ alkoxyated fatty acids, C₈-C₁₅ alkoxyated alkylphenols and C₁₂-C₂₂ alkoxyated alkylamines containing 2 to 15 moles of ethylene oxide; alkylpolyglucosides with 8 to 22, preferably with 10 to 18 carbon atoms in the carbon chain and 1 to 20, preferably 1.1 to 5, units of glucoside; alkoxyated glycerides or mixtures of alkoxyated glycerides and alkoxyated glycerine; and alkylglyceryl ethers, or mixtures thereof.

11. Aqueous composition according to claims 5 to 10, wherein the hydrotrope (component e) is selected from sodium cumenesulphonate, ammonium cumenesulphonate, ammonium xylenesulphonate, potassium toluenesulphonate, sodium toluenesulphonate, sodium xylenesulphonate, toluenesulphonic acid, xylenesulphonic acid, sodium polynaphthalenesulphonate, sodium polystyrene sulphonate, sodium methylnaphthalenesulphonate, disodium succinate, or mixtures thereof.

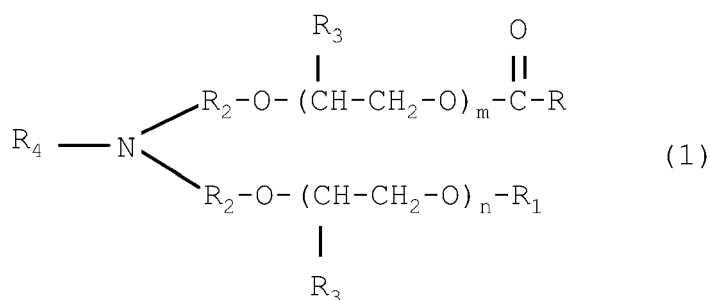
12. Aqueous composition according to claims 5 to 11, wherein the polyhydric alcohol or ether thereof (component f) is selected from ethylene glycol, propylene glycol, 1,3-butylene glycol, 1,4-butylene glycol, dipropylene glycol, tripropylene glycol, polyethylene glycol with a mean molecular weight of between 100 and 1000 by weight, glycerol, polyglycerol, methyl glycol, ethyl glycol, propyl glycol, butyl glycol, methyl diglycol, ethyl diglycol, propyl diglycol, butyl diglycol, ethyl triglycol, butyl triglycol, or mixtures thereof.

13. Aqueous composition according to claims 5 to 12, comprising, expressed as a weight percentage,

- (a) 5-25% of at least one addition salt of an ester amine with formula (1) with at least one organic or inorganic acid
- (b) 1-8% of at least one organic or inorganic acid
- (c) 2-6% of at least one fatty acid ester with a monohydric alcohol
- (d) 1-5% of at least one emulsifier
- (e) 1-5% of at least one hydrotrope
- (f) 5-20% of at least one polyhydric alcohol or an ether thereof
- (g) water up to 100%.

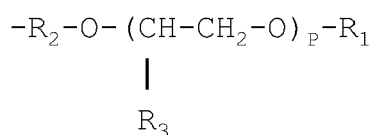
14. The use of an aqueous composition comprising at least one addition salt of an ester amine with formula (1) with at

least one organic or inorganic acid



wherein

- m and n independently of each other are 0 or a whole number between 1 and 10,
- R is an alkyl or alkenyl group having 6 to 22 linear or branched, saturated or unsaturated carbon atoms,
- R₁ is hydrogen or a -CO-R group
- R₂ is an alkylene group having 1 to 4 carbon atoms,
- R₃ is hydrogen or an alkyl group having 1 to 4 carbon atoms,
- R₄ is hydrogen or an alkyl group having 1 to 4 carbon atoms or a group



wherein R₁, R₂ and R₃ have the aforementioned meaning and p is 0 or a whole number between 1 and 10,

for rinsing and drying vehicles.

15. Use according to claim 14, wherein the inorganic acid is selected from hydrochloric acid, phosphoric acid, nitric acid, sulphuric acid or a mixture thereof.
16. Use according to claim 15, wherein the organic acid is selected from C₁-C₆ chain carboxylic acids, C₁-C₆ chain α-hydroxy-carboxylic acids, C₆-C₂₂ chain fatty acids, di- or tricarboxylic acids and C₆-C₂₂ ether carboxylic acids, or a mixture thereof.
17. Use according to claim 16, wherein the organic acid is selected from formic acid, acetic acid, propionic acid, butyric acid, valeric acid, caproic acid, glycolic acid, adipic acid, maleic acid and citric acid, lauric acid, myristic acid, palmitic acid, stearic acid, oleic acid, linoleic acid, ricinoleic acid, arachnic acid, behenic acid and C₁₂-C₂₂ ether carboxylic acids, or a mixture thereof.
18. Aqueous composition that can be produced by diluting a composition according to claims 1 to 13 in water by a factor of between 2 and 2000 by volume, preferably between 50 and 1000.
19. Use of an aqueous composition according to claim 18 for rinsing and drying vehicles.
20. Procedure for rinsing and drying vehicles consisting of applying an aqueous composition according to claim 18 to a vehicle after the process of washing said vehicle.



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 07 10 1949

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Place of search Munich		Date of completion of the search 11 May 2007	Examiner Péntek, Eric
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