



(11) **EP 2 305 785 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
06.04.2011 Bulletin 2011/14

(51) Int Cl.:
C11D 3/20 (2006.01) **C11D 3/33** (2006.01)
C11D 3/34 (2006.01)

(21) Application number: **09172116.7**

(22) Date of filing: **02.10.2009**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL
PT RO SE SI SK SM TR**

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(54) **Use of a carboxylic or amino compound as cleaning aid for hard surfaces and method of cleaning such hard surfaces**

(57) The present invention relates to hard surface cleaning, and has as an object to provide a next time cleaning benefit. The invention provides the use of specific carboxylic or amino compounds for facilitating the removal of soil, in particular fatty soil, from a hard surface. The present invention further relates to a method for removing soil or stains from a hard surface. The method

comprises the sequential steps of: treating the surface with a composition comprising at least one carboxylic or amino compound according to the current invention at a concentration of between 0.05 % and 10 % by weight; allowing the soil or stain to deposit and toughen; and cleaning the surface to remove the soil or stains.

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Description**Field of the invention**

5 **[0001]** The present invention relates to the use of at least one carboxylic or amino compound, or a salt thereof, in cleaning compositions for cleaning hard surfaces, to obtain a next time cleaning benefit. Moreover the invention relates to a method for cleaning hard surfaces.

Background of the invention

10 **[0002]** Hard surfaces in the home or office are usually cleaned using liquid compositions which comprise one or more surfactants and possibly also pH adjusters like citric acid or sodium salts of citrate. Such compositions may further comprise additional components for targeting specific stains or soils. The cleaning compositions can be applied in diluted (in water) or undiluted form, in a spray, or rubbed using a cloth and any other convenient way. Optionally the cleaning
15 composition may be rinsed from the surface after the cleaning. It would be advantageous if the hard surface to be cleaned could be treated with a material which would assist in easier removal of soil and/or stains during subsequent cleaning. This is referred to as the next time cleaning benefit.

[0003] Soils on hard surfaces can become more difficult to remove when not cleaned soon after deposition. When not cleaned promptly, soils can become more adherent to surfaces, more viscous and generally tougher, and require more effort to clean. While not being bound by theory, this more difficult removal of soils can arise from the effects of drying out of soils, from chemical changes in soils, from reactions of soils with environmental agents such as oxygen, etc. Some soils are more susceptible than others to toughening reactions and processes. Soils comprising or containing chemically unsaturated oils and fats can become very tough and difficult to clean over time, especially when exposed to elevated temperatures. Even light can cause such fatty soils to toughen over time. As well as environmental factors, the processes
25 of toughening of soils can be affected by the nature and composition of the surface on which the soil is located.

[0004] Hard-surface cleaning compositions may be either acidic or alkaline. Acidic compositions often contain carboxylic acids which may be mono-, di- or polycarboxylic acids, such as citric acid, sorbic acid, acetic acid, formic acid, maleic acid, adipic acid, lactic acid, malic acid and glycolic acid. Acidic cleaners are generally used for removing acid sensitive soil, such as limescale. For removal of fatty soil alkaline compositions are generally preferred.

30 **[0005]** WO 02/18531 discloses a method for cleaning hard surfaces, wherein the surface is treated with an antioxidant, followed by allowing the surface to become dirty, and subsequently cleaning the surface. The treatment of the surface with the antioxidant prior to the soiling, leads to easier removal of the soil during the subsequent cleaning step. The antioxidant may be present in a cleaning composition, or in a rinse composition that is applied after the cleaning. In addition cleaning compositions comprising antioxidants, preferably at a concentration of 0.1-10 % by weight, are disclosed. Tannic acid was exemplified to be notably efficient.

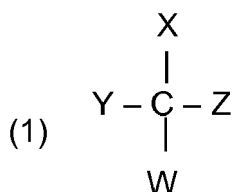
[0006] WO 03/07289 A1 discloses a method for removing fatty soil from a hard surface, the process comprising the sequential steps of (a) treating the hard surface with a liquid cleaning composition comprising a radical scavenging antioxidant and hydrogen peroxide; (b) allowing the fatty soil to deposit; and (c) cleaning the surface to remove the fatty soil. Preferably natural antioxidants are used in the process. Liquid hard surface cleaning compositions comprising a natural radical scavenging antioxidant, hydrogen peroxide and preferably a surfactant are also disclosed. Tannic acid
40 is the most preferred antioxidant of this disclosure.

[0007] WO 2006/108475 A1 discloses a method for removing soil or stains from a hard surface, the method comprising the steps in sequence of treating the surface with a malonic acid derivative, allowing the soil or stain to deposit and cleaning the surface to remove the soil or stains. Compositions and uses for said method are also disclosed. The method
45 and composition provide an improved next time cleaning benefit, allowing easier removal of stains and soils upon a subsequent cleaning step.

[0008] In spite of the advantages, the antioxidants as disclosed by the prior art also may suffer from disadvantages. When tannic acid is formulated into alkaline liquid cleaning compositions it produces aesthetically less-pleasing yellow-brown coloured solutions, and it may lead to browning of cement in joints between tiles. An antioxidant like malonic acid
50 needs relatively high concentrations to achieve a next time cleaning benefit. Moreover consumers may regard residues of malonic acid on the hard surfaces in e.g. kitchen and bathroom to be harmful and undesired.

[0009] Accordingly it is an object of the present invention to achieve a next time cleaning benefit without the need of high concentrations of antioxidants in the compositions. A further objective is that the composition does not contain compounds which lead to undesired colouring of materials on which the composition is applied. It is yet another objective
55 to achieve a next time cleaning benefit without leaving residues of compounds that can be considered to be harmful by the consumer.

[0010] We have surprisingly found that the above objectives can be obtained by using a compound of formula 1, or salts thereof,



wherein X is selected from NH₂, NR and OH;

wherein R is part of an N-heterocyclic ring structure and wherein the N can carry 0 or 1 H atoms;

wherein Y is a side chain containing polar functionality, wherein the polar functionality comes from a structural unit selected from the group consisting of a primary amine, an imine, an amide, a carboxylic group, a N-heterocyclic aromatic group and combinations thereof;

wherein X and Y may be parts of the same N-heterocyclic ring structure;

wherein Z is selected from C(=O)OH, C(=O)NH₂ and C(=NH)NH₂; and

wherein W is absent or selected from H, OH, NH₂ and C(=O)OH.

[0011] We have found that such carboxylic or amino compounds or salts thereof, can be used for facilitating easier removal of soil from hard surfaces, at surprisingly low concentrations.

[0012] After a surface has been treated with the carboxylic or amino compounds of interest (or their salts), soils or stains subsequently deposited on that surface are more easily removed than without the previous treatment. This effect is generally referred to as 'next time cleaning benefit'. This is especially notable on soils which experience toughening reactions and processes. The effect is notably experienced when the soil comprises fatty and/or oily dirt, more particularly chemically toughened fatty soil. Such dirt is often, although not exclusively, found on kitchen surfaces and surfaces associated with cooking.

[0013] Carboxylic or amino compounds that may fall within the definition of the carboxylic or amino compounds according to the current invention are known components of hard surface cleaning compositions. Such hard surface cleaning compositions may for example comprise certain amino acids or hydroxy (di or poly)carboxylic acids. Examples of publications that disclose such hard surface cleaning compositions are given below:

GB 458,163 discloses a process for the removal of deposits and incrustations on apparatus and containers in the foodstuff and table-luxury industries wherein an affected surface is treated with an aqueous solution of one or more acid-reacting-stable nitric acid salts of organic compounds containing an NH₂-group.

[0014] According to the invention disclosed in DE 2014883, clean surfaces of metal such as copper and its alloys are prevented from tarnishing by a mixture from (A) a non-ionic or anionic surface-active material and (B) a compound containing a glutamate radical, a copolymer of methyl vinyl ester and anhydrous maleic acid and/or a mixture of such a copolymer with triazobenzene.

[0015] US 5,877,132 discloses a range of novel biodegradable aqueous acid cleaning systems for removing limescale from surfaces, especially stainless steel and porcelain surfaces, wherein said system comprises a biodegradable aqueous acid system, said system having a pH of less than 7.0, said system comprising at least one of the following acids: i) iminodiacetic acid; ii) aspartic acid; iii) derivatives selected from N-alkyl, N-alkylaryl and N-cycloaliphatic derivatives of iminodiacetic acid; iv) derivatives selected from N-alkyl, N-alkylaryl and N-cycloaliphatic derivatives of aspartic acid; and v) C2-C10 polycarboxylic acids, said polycarboxylic acids containing a heteroatom in the main chain thereof, said heteroatom being selected from S, O and N; said system optionally comprising mixtures of said acids (i) to (v). There is also provided a method of removing limescale from surfaces employing such compositions.

[0016] DE 1942236 discusses enzymatic washing agents and detergents containing C4-C11 amino acids or their salts optionally containing further carboxyl and/or amino groups. The compositions are used to remove protein stains.

[0017] WO 95/03389 discloses powdered, paste or liquid media for cleaning and/or degreasing hard surfaces, especially surfaces of organic polymers (PVC), containing an active agent composed of amino-acids, carboxylic acids and non-ionic tensides, possibly supplemented by action-reinforcing auxiliaries and/or demulsifying additives, and process for degreasing using these agents.

[0018] In WO 94/29420 the invention pertains to automatic dish-washing detergents containing, as good biodegradable alkali carriers, amino acids and their salts, especially short-chain alpha-amino acids, primarily glycine or glycinate. These

dish-washing detergents containing amino acids show markedly better properties of inhibiting calcium build-up than conventional dish-washing detergents based on carbonate and/or hydrocarbonate.

[0019] This prior art shows that carboxylic or amino compounds (or their salts) falling within the definition of the carboxylic or amino compounds according to the current invention are known ingredients for household cleaning products. However, none of the prior art discloses the use of the specific carboxylic or amino compounds of interest (or their salts) for obtaining a next time cleaning benefit for removing of (fatty) soil from hard surfaces.

Summary of the invention

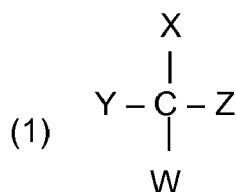
[0020] Accordingly in a first aspect the present invention provides the use of at least one carboxylic or amino compound of formula 1, or a salt thereof, for facilitating the removal of soil, in particular fatty soil, more particularly chemically toughened fatty soil, from a hard surface, wherein the surface is treated with the at least one carboxylic or amino compound prior to deposition of the soil.

[0021] In a second aspect the invention provides a method for removing soil or stains from a hard surface, the method comprising the sequential steps:

- a) treating the surface with a cleaning composition comprising the carboxylic or amino compound (or a salt thereof) of interest at a concentration of between 0.05 % and 10 % by weight.
- b) allowing the soil or stain to deposit and toughen; and
- c) cleaning the surface to remove the soil or stains.

Detailed description

[0022] The current invention relates to the use of at least one compound of formula 1, or salts thereof,



wherein X is selected from NH₂, NR and OH;

wherein R is part of an N-heterocyclic ring structure and wherein the N can carry 0 or 1 H atoms;

wherein Y is a side chain containing polar functionality, wherein the polar functionality comes from a structural unit selected from the group consisting of a primary amine, an imine, an amide, a carboxylic group, a N-heterocyclic aromatic group and combinations thereof;

wherein X and Y may be parts of the same N-heterocyclic ring structure;

wherein Z is selected from C(=O)OH, C(=O)NH₂ and C(=NH)NH₂; and

wherein W is absent or selected from H, OH, NH₂ and C(=O)OH;

for facilitating the removal of soil, in particular fatty soil, more particularly chemically toughened fatty soil, from a hard surface, wherein the surface is treated with the at least one carboxylic or amino compound prior to deposition of the soil.

[0023] It is to be understood that for compounds falling under formula 1 also the stereoisomers of such compounds are included.

[0024] The expressions 'soil' and 'stain' as used herein generally comprise all kinds of soils and stains generally encountered in the household, either of organic or inorganic origin, whether visible or invisible to the naked eye, including soiling solid debris and/or with bacteria or other pathogens. Specifically the method and compositions according to the invention may be used to treat surfaces susceptible to fatty or greasy soil and stains, more specifically those caused by natural fat or oil.

[0025] The phrase 'facilitating the removal of soil' as used in this application refers to an improved ease of removal of soil. This improved easy may be indicated by an increased amount of soil being removed from a hard surface using a certain fixed cleaning effort (e.g. same number of wiping actions using the same force per wiping action). In this case,

the amount of soil

removed from a hard surface treated with a composition containing the carboxylic or amino compound according to the current invention prior to deposition of the soil will be higher than the amount of soil removed from a similar hard surface that is pre-treated with the same composition but without the carboxylic or amino compound.

[0026] Evidence of this type of improved ease of removal of soil is shown in the examples. Under the conditions of the experiments as shown in the examples compounds that show a % Soil Removal (calculated as explained under the heading '*Calculation of Results*') of less than 15 % at a concentration of 8 wt% are considered ineffective. Suitable compounds according to the current invention preferably show a % Soil Removal of 35 % or more at a concentration of 0.8 wt% or less. More preferably, such suitable compounds show a % Soil Removal of 40 % or more at a concentration of 0.8 wt% or less. Even more preferably, such suitable compounds show a % Soil Removal of 50 % or more at a concentration of 0.8 wt% or less. Most preferably, such suitable compounds show a % Soil Removal of 60 % or more at a concentration of 0.8 wt% or less.

[0027] However, the improved ease of removal of soil may also be indicated by the lower effort (e.g. less wiping actions, less force per wiping action, or a combination thereof) necessary to reach a similar level of soil removal. In this case, less effort would be required to remove a certain amount of soil from a hard surface that is treated with a composition containing the carboxylic or amino compound according to the current invention prior to deposition of the soil, compared to the effort required to remove an equal amount of soil from a similar hard surface that is pre-treated with the same composition but without the carboxylic or amino compound.

[0028] Clearly, the improved ease of removal may also be indicated by a combination of the above mentioned effects (i.e. increased amount of soil removed with less effort).

[0029] Preferably the carboxylic or amino compound according to formula 1 is selected from the group of compounds of formula 1 wherein Z is C(=O)OH, wherein W is H, wherein X is NH₂ or OH and wherein Y is a structural unit containing:

- at least one amino group in the terminal position; or
- at least one amine group in a heterocyclic ring; or
- at least one carboxylic acid group in the terminal position; or
- combinations thereof;

or salts thereof.

[0030] More preferably the carboxylic or amino compound according to formula 1 is selected from the group of compounds of formula 1 wherein Z is C(=O)OH, wherein W is H, wherein X is NH₂ or OH, and wherein the structural unit Y is selected from the group consisting of:

- NH₂-R1,
- imidazole ring-CH₂-,
- indole ring-CH₂-,
- HO(O=C)-R2,
- and equivalent salts of these units;

wherein R1 is selected from the group consisting of:

- CH₂-CH₂-CH₂-CH₂-,
- C(=O)-CH₂-,
- C(=O)-CH₂-CH₂-,
- C(=NH)-NH-CH₂-CH₂-CH₂-, and
- C(=O)-NH-CH₂-CH₂-CH₂-;

and wherein R2 is selected from the group consisting of:

- CH₂-
- CH₂-CH₂-
- CH₂-S-CH₂-
- CH(OH)-,
- CH(OH)-CH(OH)-,
- C(OH)(CH₂(OH))-,
- CH(OH)-CH(OH)-CH(OH)-,
- CH(OH)-C(OH)(CH₂(OH))-,
- C(OH)(CH₂(OH))-CH(OH)-, and

- $C(OH)(CH(OH)(CH_2(OH)))$ -.

[0031] An imidazole ring is defined as an aromatic heterocyclic organic compound having a five-membered ring structure containing 3 C atoms and 2 N atoms.

[0032] An indole ring is defined as an aromatic heterocyclic organic compound having a bicyclic structure, consisting of a six-membered benzene ring fused to a five-membered nitrogen-containing pyrrole ring.

[0033] Most preferably the carboxylic or amino compound of the present invention is selected from the group consisting of lysine, asparagine, glutamine, aspartic acid, glutamic acid, arginine, histidine, tryptophan, citrulline, S-carboxymethyl-cysteine, beta-imidazole-lactic acid, ribaric acid or its isomers, glucaric acid or its isomers, tartaric acid and salts of these compounds.

[0034] Non limiting examples of isomers of ribaric acid include xylaric acid, arabinaric acid and lyxaric acid. Similarly, non limiting examples of isomers of glucaric acid include mannaric acid and galactaric acid.

[0035] Carboxylic or amino compounds according to the current invention which are most preferred are selected from the group consisting of lysine, asparagine, glutamine, aspartic acid, glutamic acid, arginine, citrulline, tartaric acid, glucaric acid and salts of these compounds. At pHs greater than 7 especially preferred carboxylic or amino compounds according to the current invention are selected from the group consisting of asparagine, arginine, citrulline, glutamic acid, tartaric acid, glucaric acid and salts of these compounds.

[0036] An example of a compound according to formula 1, wherein W is absent and X and Y are parts of the same N-heterocyclic ring structure is 1 H-imidazole-4,5-dicarboxylic acid.

[0037] Where in this description is referred to the salts of the carboxylic or amino compound according to the current invention it is meant to refer to a compound according to formula 1 wherein:

- the compound contains one or more acidic groups of which one or more of the acidic H atoms were substituted by one or more positively charged counter ions; or
- the compound contains one or more basic groups to which one or more additional H atoms are bound and which additionally contains one or more negatively charged counter ions to compensate for the charge introduced with the added H atoms.

[0038] Depending on the number of H atoms substituted or added and the charge (valence) of the counter ions, the salts may contain a single, two, or more counter ions. The number of H atoms that can be substituted or added to the compound depends on the number of acidic or basic groups present in the carboxylic or amino compound, which in turn is determined by the selection of W, X, Y and Z.

[0039] Salts of carboxylic or amino compounds according to the invention based on one or more positively charged counter ions can comprise salts of the alkali metals (such as lithium, sodium and potassium cations), the alkaline earth metals (such as magnesium and calcium cations), the transition metals (such as zinc and copper cations), ammonium or organo-substituted ammonium cations (such as short chain alkyl or alkylol (C1-C4) ammonium cations, of varying degrees of substitution of hydrogen of the ammonium ion and varying lengths of short alkyl or alkylol chain (C1-C4), e.g. tetra-methyl ammonium cation; in substitution of the ammonium cation, substituents can be the same or different). Salts of the carboxylic or amino compounds of the invention having

[0040] lower solubility in water (such as magnesium and calcium salts) can provide superior next-time cleaning under conditions of more efficient rinsing, because of their greater retention on surfaces after cleaning. Salts of one or more positively charged counter ions of carboxylic or amino compounds according to the invention are more suited to alkaline compositions.

[0041] The preferred salts of the carboxylic or amino compounds of the current invention for use in alkaline compositions are the sodium, potassium and ammonium salts.

[0042] Salts of carboxylic or amino compounds according to the invention based on one or more negatively charged counter ions can comprise salts of the common inorganic anions, such as hydroxide, chloride, bromide, nitrate, bicarbonate, sulphate and phosphate and salts of the common organic anions, such as low molecular weight carboxylates (e.g. formate, acetate, lactate), sulphonates, sulphamates and phosphonates. Salts of one or more negatively charged counter ions of carboxylic or amino compounds according to the invention are more suited to acidic compositions.

[0043] The preferred salts of the carboxylic or amino compounds of the current invention for use in acidic compositions are the chloride, bicarbonate and acetate salts.

[0044] Where in the remainder of this description is referred to 'carboxylic or amino compound(s) of interest' or to 'specific carboxylic or amino compound(s)' in fact reference is made to any one of the carboxylic or amino compounds of the current invention as specified in the detailed description above, including their salts, unless specified otherwise.

[0045] Any percentages mentioned in this application are by weight calculated on the total composition unless specified otherwise. The abbreviation 'wt%' is to be understood as % by weight of the total composition.

[0046] The use and the method according to the present invention are useful for treating any household surface such

as found in kitchens and bathrooms, including cooker tops, extractor fans, tiles, floors, baths, toilets, wash basins, showers, dishwashers and other appliances, taps, sinks, work surfaces. These surfaces may, for example, be made of plastics, glass, enamel, ceramic, mineral (e.g. granite, marble or otherwise), wood (painted, lacquered or otherwise) or metal (e.g. stainless steel or chrome). The use and method according to the present invention are especially useful for treating household surfaces where fatty soils are especially common, e.g. kitchen work surfaces, cabinets, cooker tops, extractor fans, tiles, sinks. The use and method according to the present invention are especially useful for treating household surface materials on which fatty soils are especially susceptible to ageing and toughening reactions and processes, e.g. hard surfaces in kitchens and surfaces associated with cooking. Examples of such kitchen surfaces are stainless steel, chrome, vitreous enamel, vitroceramic, or ceramic tile.

[0047] The present invention may also deliver other benefits such as improved surface feel (e.g. smoothness) during and/or after cleaning, olfactory benefits (e.g. reduction in rancid odour) before cleaning, less surface corrosion and less noise during cleaning. Further aspects of the present invention comprise use of specific carboxylic or amino compounds for obtaining one or more of these other benefits in a hard surface cleaning operation and/or use of the specific carboxylic or amino compounds in the manufacture of products for delivering one or more such other benefits. Furthermore, the specific carboxylic or amino compounds do not discolour, which is a particular advantage for a cleaning method according to the invention.

[0048] Whilst not being bound by any particular theory or explanation, we believe that the specific carboxylic or amino compound exerts its effect by depositing on the surface, by interacting with the surface and exerting an influence on soil or stains subsequently depositing on the surface such that such soil or stains are prevented from getting strongly attached to that surface and are prevented from toughening and becoming difficult to clean.

Form of utilisation

[0049] The invention provides the use of specific carboxylic or amino compounds for facilitating the removal of soil, in particular fatty soil, from a hard surface, wherein the surface is treated with the specific carboxylic or amino compound prior to deposition of the soil. Preferably the specific carboxylic or amino compound is applied to the surface as a solution, preferably an aqueous solution, which is thereafter left to dry on the surface.

[0050] Preferably the soil or stain is a fatty soil or stain, or a soil or stain containing fatty material, which has undergone a toughening reaction. Accordingly in a preferred embodiment the invention provides the use of a specific carboxylic or amino compound for facilitating the removal of soil, in particular fatty soil, from a hard surface, wherein the surface is treated with the specific carboxylic or amino compound prior to deposition and toughening of the soil.

[0051] The specific carboxylic or amino compound is preferably applied to the surface in the form of a composition containing the specific carboxylic or amino compound or by means of a wipe impregnated with the specific carboxylic or amino compound or with a composition containing the specific carboxylic or amino compound.

Hard surface treatment compositions

[0052] The specific carboxylic or amino compound can be employed according to the present invention in any suitable composition.

[0053] The composition must be suitable for depositing the specific carboxylic or amino compound material onto a hard surface. The specific carboxylic or amino compound may be present in the composition in any suitable form, for example in the form of a solution or dispersion. Except where expressed or implied to the contrary, the component may also be in solid form, to be wetted upon use. However, in preferred embodiments they are liquids. The term 'liquid' includes solutions, dispersions, emulsions, gels, pastes and the like. In liquid form, they preferably have a pH between 2 and 13.

[0054] When using the specific carboxylic or amino compound in such a composition, the composition may be applied by any suitable means in diluted or concentrated form. For example, it can be poured or sprayed onto the surface from a container or from an aerosol can or from a spray gun applicator. Alternatively it may be applied using a cloth, wipe or other implement which has been wetted with the composition. In liquid diluted form the composition preferably comprises at least 40% by weight, more preferably at least 50% by weight, of a liquid carrier.

[0055] Suitable liquid compositions include solutions, dispersions or emulsions in a liquid carrier, which may be an organic solvent or water or a combination thereof. Preferably the solvent is predominantly (i.e. 50% or more) water. The compositions may be used only to deposit the specific carboxylic or amino compound, or they may have additional functions such as cleaning. In a preferred embodiment the first aspect of the invention provides the use of a specific carboxylic or amino compound in a composition comprising a detergent surfactant at a concentration between 0.01 to 50 % by weight, and the specific carboxylic or amino compound at a concentration between 0.05 % by weight and 10 % by weight, preferably between 0.05 and 5 % by weight, more preferably between 0.05 and 2 % by weight.

[0056] If said liquid composition will be applied in the method according to the invention, and a rinsing step will be

applied after treating the surface with the specific carboxylic or amino compound, then the required amount of the specific carboxylic or amino compound will be relatively high as compared to a composition that will be used in the method according to the invention without rinsing step. A sufficient amount of the specific carboxylic or amino compound should be deposited on the hard surface prior to deposition of the soil, in order to obtain the next time cleaning benefit. If a

[0057] Accordingly in a preferred embodiment the invention provides use of the specific carboxylic or amino compound, wherein the specific carboxylic or amino compound is comprised in a composition at a concentration between 0.05 % by weight and 2 % by weight, and wherein no rinsing step is applied after the surface has been treated with the specific carboxylic or amino compound. More preferred said composition comprises the specific carboxylic or amino compound

[0058] In another preferred embodiment the invention provides use of the specific carboxylic or amino compound, wherein the specific carboxylic or amino compound is comprised in a composition at a concentration between 0.25 % by weight and 10 % by weight, and wherein a rinsing step is applied after the surface has been treated with the specific carboxylic or amino compound and before deposition of the soil. More preferred said composition comprises the specific carboxylic or amino compound at a concentration between 1 % by weight and 10 % by weight.

[0059] Said compositions may include ingredients well known for use in hard surface cleaning compositions. In a preferred embodiment the invention provides the use of the specific carboxylic or amino compound in a composition comprising a detergent surfactant at a concentration between 0.01 to 50 % by weight, and the specific carboxylic or amino compound at a concentration between 0.05 % by weight and 10 % by weight. Said compositions optionally comprise other hard surface cleaning components.

[0060] It is especially preferred that the composition is a 'liquid'. Compositions can be waterthin or have a viscosity of at least 50 mPa.s as measured at a shear rate of 21 s⁻¹ at room temperature (using Haake Model RT20 viscometer), but preferably no more than 5,000 mPa.s. This viscous liquid composition may be in the form of a viscous liquid per se, or a gel, foam, mousse or paste. The viscosity may be due to one or more other components in the system, for example an 'external polymeric thickener', which may be a synthetic polymer, e.g. of the polycarboxylate type such as Carbopol™, or a natural polysaccharide gum such as xanthan gum or guar gum. Alternatively, an 'internal structuring' system may be used, employing one or more surfactants and optionally electrolyte, to create an ordered or liquid crystalline phase within the composition. These various techniques for increasing viscosity are all very well known to those skilled in the art.

[0061] Foams and mousses are normally supplied from a dispenser which gassifies or aerates the product that is dispensed therefrom.

Surfactants

[0062] In a preferred embodiment the invention provides use of the specific carboxylic or amino compound in a composition comprising a detergent surfactant at a concentration between 0.01 to 50 % by weight. Said surfactant (detergent actives) is generally chosen from both anionic and nonionic detergent actives. The composition may further comprise cationic, amphoteric and zwitterionic surfactants. In surfactant-containing compositions of the present invention, the total amount of surfactant to be employed will generally be from 0.01 to 50%. Preferably, the amount is at least 0.1%, more preferably at least 0.5%, still more preferably at least 1%. The maximum amount is usually 30% or less, preferably not more than 20%, or even at or below 10%.

[0063] If said liquid composition will be applied in the method or use according to the invention, and no rinsing step will be applied after treating the surface with the specific carboxylic or amino compound, then the required amount of surfactant may advantageously be relatively low as compared to a composition that will be used in the method according to the invention with a rinsing step. Such liquid compositions with relatively lower amounts of surfactant can provide better residues and end-results performance, without jeopardising the next time cleaning benefit. Said residues are surfactants and other solid components of the cleaning composition.

[0064] Suitable synthetic (non-soap) anionic surfactants are water-soluble salts of organic sulphuric acid mono-esters and sulphonic acids which have in the molecular structure a branched or straight chain alkyl group containing from 6 to 22 carbon atoms in the alkyl part.

[0065] Examples of such anionic surfactants are water soluble salts of:

- (primary) long chain (e.g. 6-22 C-atoms) alcohol sulphates (hereinafter referred to as PAS), especially those obtained by sulphating the fatty alcohols produced by reducing the glycerides of tallow or coconut oil;
- alkyl benzene sulphonates, such as those in which the alkyl group contains from 6 to 20 carbon atoms;
- secondary alkanesulphonates;

and mixtures thereof.

[0066] Also suitable are the salts of:

- alkylglyceryl ether sulphates, especially of the ethers of fatty alcohols derived from tallow and coconut oil;
- fatty acid monoglyceride sulphates;
- sulphates of ethoxylated aliphatic alcohols containing 1-12 ethyleneoxy groups;
- alkylphenol ethyleneoxy-ether sulphates with from 1 to 8 ethyleneoxy units per molecule and in which the alkyl groups contain from 4 to 14 carbon atoms;
- the reaction product of fatty acids esterified with isethionic acid and neutralised with alkali,

and mixtures thereof.

[0067] The preferred water-soluble synthetic anionic surfactants are the alkali metal (such as sodium and potassium) and alkaline earth metal (such as calcium and magnesium) salts of alkyl-benzenesulphonates and mixtures with olefin-sulphonates and alkyl sulphates, and the fatty acid mono-glyceride sulphates.

[0068] The most preferred anionic surfactants are alkyl-aromatic sulphonates such as alkylbenzenesulphonates containing from 6 to 20 carbon atoms in the alkyl group in a straight or branched chain, particular examples of which are sodium salts of alkylbenzenesulphonates or of alkyl-toluene-, -xylene- or -phenolsulphonates, alkylnaphthalene-sulphonates, ammonium diarylnaphthalene-sulphonate, and sodium dinonyl-naphthalene-sulphonate.

[0069] If synthetic anionic surfactant is to be employed the amount present in the compositions of the invention will generally be at least 0.1%, preferably at least 0.5%, more preferably at least 1.0%, but not more than 20%, preferably at most 15%, more preferably at most 10%.

[0070] A suitable class of nonionic surfactants can be broadly described as compounds produced by the condensation of simple alkylene oxides, which are hydrophilic in nature, with an aliphatic or alkyl-aromatic hydrophobic compound having a reactive hydrogen atom. The length of the hydrophilic or polyoxyalkylene chain which is attached to any particular hydrophobic group can be readily adjusted to yield a compound having the desired balance between hydrophilic and hydrophobic elements. This enables the choice of nonionic surfactants with the right HLB. Particular examples include:

- the condensation products of aliphatic alcohols having from 8 to 22 carbon atoms in either straight or branched chain configuration with ethylene oxide, such as a coconut alcohol/ethylene oxide condensates having from 2 to 15 moles of ethylene oxide per mole of coconut alcohol;
- condensates of alkylphenols having C6-C15 alkyl groups with 5 to 25 moles of ethylene oxide per mole of alkylphenol;
- condensates of the reaction product of ethylene-diamine and propylene oxide with ethylene oxide, the condensates containing from 40 to 80% of ethyleneoxy groups by weight and having a molecular weight of from 5,000 to 11,000.

[0071] Other classes of nonionic surfactants are:

- alkyl polyglycosides, which are condensation products of long chain aliphatic alcohols and saccharides;
- tertiary amine oxides of structure $R^1R^2R^3N-O$, where R^1 is an alkyl group of 8 to 20 carbon atoms and R^2 and R^3 are each alkyl or hydroxyalkyl groups of 1 to 3 carbon atoms, e.g. dimethyldodecylamine oxide;
- tertiary phosphine oxides of structure $R^1R^2R^3P-O$, where R^1 is an alkyl group of 8 to 20 carbon atoms and R^2 and R^3 are each alkyl or hydroxyalkyl groups of 1 to 3 carbon atoms, for instance dimethyl-dodecylphosphine oxide;
- dialkyl sulphoxides of structure $R^1R^2S=O$, where R^1 is an alkyl group of from 10 to 18 carbon atoms and R^2 is methyl or ethyl, for instance methyl-tetradecyl sulphoxide;
- fatty acid alkylolamides, such as the ethanol amides;
- alkylene oxide condensates of fatty acid alkylolamides;
- alkyl mercaptans.

[0072] In a preferred embodiment the invention provides use of the specific carboxylic or amino compound in a composition wherein the nonionic surfactant is present in a concentration of less than 25 % by weight. The concentration of nonionic surfactant to be employed in said cleaning composition of the invention will preferably be at least 0.1%, more preferably at least 0.5%, most preferably at least 1%. The amount is suitably at most 20%, preferably not more than 15% and most preferably not more than 10%.

[0073] The compositions may contain amounts of both anionic and nonionic surfactants which are chosen, bearing in mind the level of electrolyte if present, so as to provide a structured liquid detergent composition, i.e. one which is 'self-thickened'. Thus, in spite of the presence of organic solvent, thickened liquid cleaning compositions can be made without the need to employ any additional thickening agent and which nevertheless have a long shelf life over a wide temperature range.

[0074] The weight ratio of anionic surfactant to nonionic surfactant may vary, taking the above considerations in mind, and will depend on their nature, but in a preferred embodiment the first aspect of the invention provides use of the specific

carboxylic or amino compound in a composition wherein the detergent surfactant comprises anionic and nonionic surfactants in a ratio between 20:1 and 1:10, more preferably from 15:1 to 1:5, and ideally from 10:1 to 1:2.

[0075] According to an embodiment illustrating any aspect of the invention, the compositions may comprise from 0.05% to 10% by weight of the specific carboxylic or amino compound, from 0 to 20%, preferably from 0.5% to 10% by weight of water-soluble, synthetic anionic sulphate or sulphonate surfactant salt containing an alkyl radical having from 8 to 22 carbon atoms in the molecule, and from 0.5 to 10% by weight of ethoxylated nonionic surfactant derived from the condensation of an aliphatic alcohol having from 8 to 22 carbon atoms in the molecule with ethylene oxide, such that the condensate has from 2 to 15 moles of ethylene oxide per mole of aliphatic alcohol, the balance being other optional ingredients and water.

[0076] It is also possible optionally to include amphoteric, cationic or zwitterionic surfactants in said compositions.

[0077] Suitable amphoteric surfactants are derivatives of aliphatic secondary and tertiary amines containing an alkyl group of 8 to 20 carbon atoms and an aliphatic group substituted by an anionic water-solubilising group, for instance sodium 3-dodecylamino-propionate, sodium 3-dodecylaminopropane-sulphonate and sodium N-2-hydroxy-dodecyl-N-methyltaurate.

[0078] Examples of suitable cationic surfactants can be found among quaternary ammonium salts having one or two alkyl or aralkyl groups of from 8 to 20 carbon atoms and two or three small aliphatic (e.g. methyl) groups, for instance cetyltrimethylammonium chloride.

[0079] A specific group of surfactants are the tertiary amines obtained by condensation of ethylene and/or propylene oxide with long chain aliphatic amines. The compounds behave like nonionic surfactants in alkaline medium and like cationic surfactants in acid medium.

[0080] Examples of suitable zwitterionic surfactants can be found among derivatives of aliphatic quaternary ammonium, sulphonium and phosphonium compounds having an aliphatic group of from 8 to 18 carbon atoms and an aliphatic group substituted by an anionic water-solubilising group, for instance betaine and betaine derivatives such as alkyl betaine, in particular C₁₂-C₁₆ alkyl betaine, 3-(N,N-dimethyl-N-hexadecylammonium)-propane-1-sulphonate betaine, 3-(dodecylmethyl-sulphonium)-propane-1-sulphonate betaine, 3-(cetylmethyl-phosphonium)-propane-1-sulphonate betaine and N,N-dimethyl-N-dodecyl-glycine. Other well known betaines are the alkylamidopropyl betaines e.g. those wherein the alkylamido group is derived from coconut oil fatty acids.

[0081] Further examples of suitable surfactants are compounds commonly used as surface-active agents given in the well-known textbooks: 'Surface Active Agents' Vol.1, by Schwartz & Perry, Interscience 1949; 'Surface Active Agents' Vol.2 by Schwartz, Perry & Berch, Interscience 1958; the current edition of 'McCutcheon's Emulsifiers and Detergents' published by Manufacturing Confectioners Company; 'Tenside-Taschenbuch', H. Stache, 2nd Edn., Carl Hauser Verlag, 1981.

pH

[0082] In the first aspect the invention provides the use of the specific carboxylic or amino compound for facilitating the removal of soil, in particular fatty soil, from a hard surface. In a preferred embodiment the specific carboxylic or amino compound is comprised in a composition having a pH of from 2 to 13, more preferably at least 3, and not more than 12.5, preferably not less than 3.5, more preferably not more than 12. Compositions intended for cleaning kitchen hard surfaces may advantageously have a pH in the alkaline range, while bathroom cleaners preferably have a pH in the acidic range. Preferably the composition either has a pH between 8.5 and 12, more preferred between 10 and 11.5, or between 3 and 6.5, more preferred between 3 and 5. Suitably the composition has a pH of at least 6.5, more suitably between 6.5 and 12.5, even more suitably between 7 and 11, and most suitably between 8 and 10.5.

[0083] The pH of the solution may be adjusted with organic or inorganic acids or bases. Preferred inorganic bases are preferably alkali or alkaline earth hydroxides, ammonia, carbonates or bicarbonates. The alkali metal preferably being sodium or potassium or the alkaline earth metal preferably being calcium or magnesium. The organic bases are preferably amines, alkanolamines and other suitable amino compounds. Inorganic acids may include hydrochloric acid, sulphuric acid or phosphoric acid, and organic acids may include acetic acid or formic acid as well as dicarboxylic acid mixtures such as Radimix (trade mark, Radici Group) and Sokalan DCS (trade mark, BASF).

Other optional ingredients

[0084] The compositions according to the present invention may include abrasives. However, these are generally not preferred as abrasives tend to damage or remove the thin layer of the specific carboxylic or amino compound being deposited on the surface. In a preferred embodiment the composition according to the present invention does not contain an abrasive. The compositions may contain other ingredients which aid in their cleaning performance. For example, they may contain detergent builders and mixtures of builders in an amount of up to 25%, in particular when the composition contains one or more anionic surfactants. Some of these builders can additionally function as abrasives if present in an

amount in excess of their solubility in water. If present, the builder preferably will form at least 0.1% of the composition. Suitable inorganic and organic builders are well known to those skilled in the art.

[0085] A further optional ingredient for compositions according to the invention is a suds regulating material, which can be employed in compositions which have a tendency to produce excessive suds in use. Examples thereof are fatty acids or their salts (soap), isoparaffins, silicone oils and combinations thereof.

[0086] Soaps are salts of fatty acids and include alkali metal soaps such as the sodium, potassium and ammonium salts of fatty acids containing from about 8 to about 24 carbon atoms, and preferably from about 10 to about 20 carbon atoms. Particularly useful are the sodium and potassium and mono-, di- and triethanolamine salts of the mixtures of fatty acids derived from palm oil, coconut oil and ground nut oil. When employed, the amount of fatty acid or soap can form at least 0.005%, preferably 0.1% to 2% by weight of the composition.

[0087] Where a hydrocarbon co-solvent is present at a sufficiently high level this may itself provide some or all of the required antifoaming activity.

[0088] Compositions may also contain, in addition to the ingredients already mentioned, various other optional ingredients such as colourants, whiteners, optical brighteners, soil suspending agents, detergent enzymes, compatible bleaching agents (particularly peroxide compounds and active chlorine releasing compounds), gel-control agents, further freeze-thaw stabilisers, bactericides, preservatives (for example 1,2-benzisothiazolin-3-one), hydrotropes and perfumes.

[0089] In a preferred embodiment the composition of the present invention does not comprise tannic acid or related compounds such as gallic acid and/or propyl gallate. It was found that when tannic acid is formulated into alkaline liquid cleaning compositions it produces aesthetically less-pleasing yellow-brown coloured solutions, and it may lead to browning of cement in joints between tiles.

[0090] In another preferred embodiment the composition of the present invention does not comprise malonic acid. An antioxidant like malonic acid needs relatively high concentrations to achieve a next time cleaning benefit. Moreover consumers may regard residues of malonic acid on the hard surfaces in e.g. kitchen and bathroom to be harmful and undesired.

[0091] In yet another preferred embodiment the composition of the present invention does not comprise formic acid. Formic acid has a pungent odour, and residues on hard surfaces are aesthetically undesirable.

[0092] In a further preferred embodiment the composition of the present invention does not comprise citric acid (or a salt thereof).

Polymers

[0093] In a preferred embodiment the first aspect of the invention provides the use of the specific carboxylic or amino compound in a composition wherein the composition further comprises a polymer, and wherein ratio (by weight) between the polymer and the specific carboxylic or amino compound is in the range of 0.1:1 to 2:1. In particular polymers are preferred that aid the binding of the specific carboxylic or amino compound to the surface and thus providing additional rinse resistance, if a rinsing step is applied after treating the surface with the specific carboxylic or amino compound in the method according to the invention. Preferred polymers are nonionic and anionic polymers.

Ratio between Polymer and the specific carboxylic or amino compound

[0094] For optimal benefits, the ratio (by weight) of polymer to the specific carboxylic or amino compound should be in the range 0.1:1 to 2:1, preferably in the range 0.2:1 to 1:1.5, most preferably in the range 0.4:1 to 1:1.

[0095] Preferred polymers are those polymers having an average molecular weight above 4,000 Dalton. More preferably the molecular weight is at least 10,000 D, even more preferably above 50, 000 D or even above 100, 000 D. The polymers normally have a molecular weight below 2,000,000 Dalton, preferably below 1,000,000 D.

[0096] Suitable polymers are either water-soluble or water-dispersible, preferably water-soluble.

Non-ionic polymer

[0097] The non-ionic polymer may be chosen from cellulose-based nonionic polymers such as celluloses, alkylcelluloses, hydroxyalkylcelluloses, cellulose ethers, cellulose esters and cellulose amides, such as methylcellulose, ethylcellulose, hydroxymethylcellulose, hydroxypropylcellulose, hydroxypropylmethylcellulose. Other polysaccharide polymers, such as starches and modified starches, and dextrans, such as maltodextrin, are also suitable.

[0098] Furthermore, the non-ionic polymer may be chosen from fully synthetic polymers such as polyvinyl alcohols, polyvinylpyrrolidones, polyalkylene glycols such as polyethylene glycol, polyalkylene oxides, polyamides, polyacrylamides, polyvinylethers such as polymethylvinylether, polyvinyl acetates, and copolymers thereof.

[0099] Polyacrylic acids, polymethacrylic acids and their homologues, and other polycarboxylic acids may also be used in compositions where the polymers behave as nonionic polymers. Such compositions are typically acidic compo-

sitions with pH values below about 4.

[0100] Most preferably the non-ionic polymer is selected from polyvinyl pyrrolidone (PVP), polyvinyl alcohol (PVA) and combinations thereof. The PVP includes substituted and unsubstituted vinyl pyrrolidone polymerization products.

[0101] Preferably said compositions comprise at least 0.1%, more preferably at least 0.2% by weight non-ionic polymer and at most 10%, preferably at most 5%, more preferably at most 2%.

Anionic polymer

[0102] Preferred anionic polymers are water soluble anionic polymers. Suitable polymers are mainly synthetic, but natural or nature-derived polymers may also be used. Suitable polymers include polyacrylic acids and polymethacrylic acids and their homologues, other polycarboxylic acids, polyaminoacids or peptides, polyanhydrides, polystyrene sulfonic acids, polyvinylsulfonic acids, and their copolymers and their copolymers with nonionic monomers and polymers. Natural gums, such as xanthan, locust bean and carrageenans, and cellulose derivatives, such as carboxymethylcellulose, may also be suitable.

[0103] As mentioned herein, some anionic polymers may behave as non-ionic polymers at acidic pHs.

[0104] If anionic polymers are present, the compositions preferably comprise at least 0.1%, more preferably at least 0.2% by weight anionic polymer and at most 10%, preferably at most 5%, more preferably at most 2%.

Liquid Dispensers

[0105] Liquid compositions may be stored in and dispensed by any suitable means, but spray applicators are particularly preferred. Pump dispensers (whether spray or non-spray pumps) and pouring applicators (bottles etc) are also possible. Thus, in a preferred embodiment the first aspect of the invention provides the use of the specific carboxylic or amino compound in a composition, wherein the composition comprising the specific carboxylic or amino compound is comprised in a reservoir in a container, wherein the container further comprises a spray dispenser for dispensing said composition in the form of a spray. The spray dispenser is preferably a trigger spray but may be any mechanical means for ejecting the liquid in spray or aerosol form.

Wipes

[0106] Wipes can be impregnated with the neat specific carboxylic or amino compound or with a composition containing the specific carboxylic or amino compound. The material may be impregnated dry, or more preferably in wet form (i.e. as a thin or a viscous liquid). Suitable wipes include woven or nonwoven cloths, natural or synthetic sponges or spongy sheets, 'squeegee' materials and the like.

[0107] In a preferred embodiment the invention provides use of the specific carboxylic or amino compound, wherein a wipe is impregnated with a composition comprising the specific carboxylic or amino compound. The composition can be any composition as preferred elsewhere in this specification.

Method of the invention

[0108] In a second aspect the present invention provides a method for removing soil or stains from a hard surface, the method comprising the sequential steps:

- a) treating the surface with a composition comprising the specific carboxylic or amino compound at a concentration of between 0.05 wt% and 10 wt%.
- b) allowing the soil or stain to deposit and toughen; and
- c) cleaning the surface to remove the soil or stains.

[0109] Preferably the soil or stain is a fatty soil or stain, or a soil or stain containing fatty material, which has undergone a toughening reaction. The soil or stain experiences toughening reactions and processes after having been deposited on the surface, and therewith requires more effort to clean. Without wishing to be bound by theory, toughening can arise from the effects of drying out of soils, from chemical changes in soils, from reactions of soils with environmental agents such as oxygen, etc. Some soils are more susceptible than others to toughening reactions and processes. Soils comprising or containing chemically unsaturated oils and fats can become very tough and difficult to clean over time, especially when exposed to elevated temperatures.

[0110] Even light can cause such fatty soils to toughen over time. As well as environmental factors, the processes of toughening of soils can be affected by the nature and composition of the surface on which the soil is located.

[0111] Step (c) of the method is advantageously effected using a hard surface cleaning composition comprising the

specific carboxylic or amino compound again so that soil or stain is removed and new deposit of the specific carboxylic or amino compound is applied, effectively constituting step (a) of a subsequent process according to the second aspect of the invention.

[0112] If a rinsing step is applied after treating the surface with the specific carboxylic or amino compound according to the method of the invention, the required amount of the specific carboxylic or amino compound in the composition will be higher than when no rinsing step is applied after treating the surface with the specific carboxylic or amino compound. Accordingly in a preferred embodiment of the second aspect, the invention provides a method for removing soil or stains from a hard surface, wherein said composition comprises the specific carboxylic or amino compound at a concentration of between 0.05 % by weight and 2 % by weight, and wherein no rinsing step is applied after treating the surface with said composition. More preferred said composition comprises the specific carboxylic or amino compound at a concentration between 0.05 % by weight and 1 % by weight.

[0113] In another preferred embodiment of the second aspect, the invention provides a method for removing soil or stains from a hard surface, wherein the composition comprises the specific carboxylic or amino compound at a concentration of between 0.25 % by weight and 10 % by weight, and wherein a rinsing step is applied after treating the surface with said composition. More preferred said composition comprises the specific carboxylic or amino compound at a concentration between 1 % by weight and 10 % by weight.

[0114] In another preferred embodiment of the second aspect, the invention provides a method for removing soil or stains from a hard surface, wherein the composition comprising the specific carboxylic or amino compound does not comprise an abrasive compound.

[0115] In other preferred embodiments, the invention provides a method for removing soil or stain as described above, wherein in step a) the composition comprising the specific carboxylic or amino compound is selected from the compositions which have been identified as preferred compositions for use of facilitating the removal of soil, in particular fatty soil, from a hard surface.

USE OF SPECIFIC CARBOXYLIC OR AMINO COMPOUNDS AS CLEANING AID FOR HARD SURFACES

EXAMPLES

[0116] The following non-limiting examples further illustrate the present invention.

[0117] The next-time cleaning effect on tough oily soil was assessed for a variety of carboxylic or amino compounds using a laboratory methodology to simulate the practical cleaning situation.

Method for assessing contribution of various complexing agents to easier cleaning of toughened dehydrated castor oil (DHCO) soil

[0118] The basic steps in the methodology are:

- Pre-cleaning of test piece surface
- Treatment of surface with test solution
- Application of a film of DHCO soil on treated surface
- Heat treatment of surface to induce oxidative toughening of DHCO soil
- Cleaning of soiled surface under standard scrubbing conditions, using Abrasion Tester apparatus
- Expression of cleaning results (% soil removal), based on gravimetric analysis of soiled versus cleaned surface

Test Surface

[0119] Treatments are evaluated on 10.0 x 10.0 cm pieces of 304 grade brushed stainless steel. Test pieces are previously unused, and are pre-cleaned prior to use.

Pre-cleaning of Stainless Steel Test Surfaces

[0120] Test pieces are soaked for at least 1 hour in ~17 % by weight potassium hydroxide in 50/50 % by weight aqueous methylated spirits to remove any surface contamination from the metal-working process, which might influence wetting of the surface by the test treatment or DHCO soil. After soaking, surfaces are thoroughly rinsed in running tap water and allowed to dry naturally in air, stored vertically.

Treatment of Surfaces

[0121] The stainless steel tile is pre-weighed (to 4 decimal places). A 5.0 x 5.0 cm area in the centre of the stainless steel surface is marked out by a square of adhesive masking tape. 0.01 ml of test solution is applied to the central 25cm² area of surface and distributed uniformly over the area using a glass spreader. The treatment is allowed to dry naturally.

Soiling of Surfaces

[0122] 0.040 gram (+/-4 mg) of DHCO (John L Seaton & Co, Humberside, UK) is applied to the central templated area of the treated surface and distributed over the 25cm² area of surface using a purpose-made spreader, to produce an even film of oil. The masking tape template is carefully removed and the soiled tile is reweighed.

Oxidative Toughening of DHCO Soil

[0123] To simulate the oxidative toughening that an unsaturated oil might experience on a cooker top, test surfaces are heated in an oven at 100°C for 60 minutes. Test surfaces are allowed to cool and equilibrate for at least 1 hour. The test surface is reweighed and the weight of aged oil (W_{initial}) calculated.

Cleaning

[0124] Cleaning is carried out in a Martindale Abrasion Tester apparatus (SDL International) over one full lissajous figure (16 cycles) using a 1.5 cm diameter circle of non-woven cleaning cloth ('Ballerina', Unilever) attached to the cleaning head. By each full lissajous figure, the entire surface of the tile is cleaned once. The head has a total mass of 994 gram, applying a cleaning force of about 560 gram/cm² to the soiled test surface. Cleaning is carried out using a simple detergent base (5.0% Neodol 91-8, adjusted to the required pH with sodium hydroxide or hydrochloric acid, as necessary).

[0125] The soiled tile is fixed centrally in the abrasion tester's sample well and 20.0 gram cleaning product is introduced. Immediately, the cleaning head is secured in place and the Abrasion Tester apparatus run for one full lissajous figure. The cleaned tile is removed and rinsed free from cleaning product and any loose soil under a running tap. The surface is allowed to dry, stored vertically, and then reweighed. The weight of any remaining DHCO soil (W_{final}) is calculated.

Calculation of Results

[0126] Cleaning performance is expressed as % Soil Removal, derived from the weights of the tiles at the different stages in the method:

$$\text{Soil Removal (\%)} = \frac{W_{\text{initial}} - W_{\text{final}}}{W_{\text{initial}}} \cdot 100\%$$

where W_{initial} = weight of initial DHCO, before cleaning

W_{final} = weight of residual DHCO, after cleaning

Compositions & Results - test 1, alkaline conditions

[0127] Materials were evaluated for next-time cleaning of tough oily soil in a simple nonionic surfactant base composition (5.0% Neodol 91-8, pH 10). Materials were examined at three levels - 0.2%, 0.5% and 0.8% (by weight) in the composition. Materials were laboratory chemicals supplied by Sigma Aldrich. All compositions were at a fixed pH (10.0), adjusted by addition of sodium hydroxide or hydrochloric acid, as required. The compositions were made to 100% with demineralised water. The evaluation included a system with no carboxylic or amino compound, as a control, i.e. nonionic surfactant base composition alone at pH 10.

[0128] Cleaning in the Abrasion Tester apparatus was with a simple detergent base at pH 10.0 (5% Neodol 91-8). Results are summarised in Table 1, where Examples designated with a C are comparative examples falling outside the scope of the current invention.

[0129] Table 1 indicates that carboxylic or amino compounds according to the invention (Examples 2 to 13) when examined under alkaline conditions (pH 10) provide a much superior next-time cleaning effect compared to a surface

treated with detergent alone (Example 1 C). The compounds show improved next-time cleaning at higher levels of incorporation. Carboxylic or amino compounds falling outside the invention (Examples 14C to 19C) show no or a much smaller next-time cleaning effect when tested under the same conditions.

Table 1 Soil removal (%) (next-time cleaning) by carboxylic or amino compounds (at pH 10.0)

Example	Additive	Level of Compound, wt%		
		0%		
1C	none	1.5		
		Level of Compound, wt%		
		0.2%	0.5%	0.8%
2	arginine	83.4	100	Not tested
3	asparagine	33.1	100	Not tested
4	histidine	60.9	87.0	98.9
5	glutamic acid	46.7	73.2	Not tested
6	aspartic acid	35.0	52.5	Not tested
7	glutamine	53.2	Not tested	Not tested
8	lysine	15.4	60.2	62.8
9	tryptophan	19.8	38.5	Not tested
10	tartaric acid	61.9	68.0	67.1
11	S-carboxymethyl-L-cysteine	Not tested	51.9	78.5
12	L-b-imidazolelactic acid	95.5	95.8	96.4
13	citrulline	88.7	89.1	Not tested
14C	leucine	Not tested	15.2	32.9
15C	valine	3.0	Not tested	9.3
16C	methionine	17.4	23.1	33.0
17C	tyrosine	4.5	9.0	10.4
18C	sarcosine	4.8	4.4	Not tested
19C	taurine	4.4	14.4	11.7

Compositions & Results - test 2, acidic conditions

[0130] Materials were evaluated for next-time cleaning of tough oily soil in a simple nonionic surfactant base composition (5.0% Neodol 91-8, pH 4). Materials were examined at three levels - 0.2%, 0.5% and 0.8% (by weight) in the composition.

[0131] Materials were laboratory chemicals supplied by Sigma Aldrich. All compositions were at a fixed pH (4.0), adjusted by addition of sodium hydroxide or hydrochloric acid, as required. The compositions were made to 100% with demineralised water. The evaluation included a system with no carboxylic or amino compound, as a control, i.e. nonionic surfactant base composition alone at pH 4.

[0132] Cleaning in the Abrasion Tester apparatus was with a simple detergent base at pH 4.0 (5% Neodol 91-8). Results are summarised in Table 2, where Examples designated with a C are comparative examples falling outside the scope of the current invention.

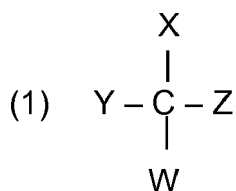
[0133] Table 2 indicates that carboxylic or amino compounds according to the invention (Examples 21 to 25) when examined under acidic conditions (pH 4) provide a much superior next-time cleaning effect compared to a surface treated with detergent alone at pH 4 (Example 20C). The compounds show improved next-time cleaning at higher levels of incorporation. Carboxylic or amino compounds falling outside the invention (Examples 26C and 27C) show no or a very small next-time cleaning effect when tested under the same conditions

Table 2 Soil removal (%) (next-time cleaning) by carboxylic or amino compounds (at pH 4.0)

Example	Additive	Level of Compound, wt%		
		0%		
20C	none	1.5		
		Level of Compound, wt%		
		0.2%	0.5%	0.8%
21	arginine	13.4	63.4	78.8
22	asparagine	30.5	40.9	52.5
23	glutamic acid	14.8	66.5	81.5
24	aspartic acid	23.9	64.8	70.5
25	tryptophan	Not tested	33.4	60.8
26C	glycine	9.2	7.0	14.7
27C	alanine	1.7	1.2	2.3

Claims

1. Use of at least one carboxylic or amino compound of formula 1, or salts thereof,



wherein X is selected from NH₂, NR and OH;

wherein R is part of an N-heterocyclic ring structure and wherein the N can carry 0 or 1 H atoms;

wherein Y is a side chain containing polar functionality, wherein the polar functionality comes from a structural unit selected from the group consisting of a primary amine, an imine, an amide, a carboxylic group, a N-heterocyclic aromatic group and combinations thereof;

wherein X and Y may be parts of the same N-heterocyclic ring structure;

wherein Z is selected from C(=O)OH, C(=O)NH₂ and C(=NH)NH₂; and

wherein W is absent or selected from H, OH, NH₂ and C(=O)OH;

for facilitating the removal of soil, in particular fatty soil, more particularly chemically toughened fatty soil, from a hard surface, wherein the surface is treated with the at least one carboxylic or amino compound prior to deposition of the soil.

2. Use according to claim 1, wherein Z is C(=O)OH; wherein W is H; wherein X is NH₂ or OH and wherein Y is a structural unit containing:

- at least one amino group in the terminal position, or
- at least one amine group in a heterocyclic ring, or
- at least one carboxylic acid group in the terminal position, or
- combinations thereof;

or salts thereof.

3. Use according to claim 2, wherein Y is selected from the group consisting of:

- $\text{NH}_2\text{-R}^1$,
- imidazole ring- $\text{CH}_2\text{-}$,
- indole ring- $\text{CH}_2\text{-}$,
- HO(O=)C-R^2 ,
- and equivalent salts of these units;

wherein R^1 is selected from the group consisting of:

- $\text{CH}_2\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-}$,
- $\text{C(=O)-CH}_2\text{-}$,
- $\text{C(=O)-CH}_2\text{-CH}_2\text{-}$,
- $\text{C(=NH)-NH-CH}_2\text{-CH}_2\text{-CH}_2\text{-}$, and
- $\text{C(=O)-NH-CH}_2\text{-CH}_2\text{-CH}_2\text{-}$;

and wherein R^2 is selected from the group consisting of:

- $\text{CH}_2\text{-}$
- $\text{CH}_2\text{-CH}_2\text{-}$
- $\text{CH}_2\text{-S-CH}_2\text{-}$
- CH(OH)- ,
- CH(OH)-CH(OH)- ,
- $\text{C(OH)(CH}_2\text{(OH))}-$,
- $\text{CH(OH)-CH(OH)-CH(OH)-}$,
- $\text{CH(OH)-C(OH)(CH}_2\text{(OH))}-$,
- $\text{C(OH)(CH}_2\text{(OH))-CH(OH)-}$, and
- $\text{C(OH)(CH(OH)(CH}_2\text{(OH))))-}$;

or salts thereof.

4. Use according to claims 1 to 3 wherein the at least one carboxylic or amino compound is selected from the group consisting of lysine, asparagine, glutamine, aspartic acid, glutamic acid, arginine, histidine, tryptophan, citrulline, S-carboxymethyl-cysteine, beta-imidazole-lactic acid, tartaric acid, ribaric acid or its isomers, glucaric acid or its isomers, tartaric acid and salts of these compounds.
5. Use according to any of the preceding claims wherein the carboxylic or amino compound is applied to the surface in liquid diluted form.
6. Use of the carboxylic or amino compound according to any of the preceding claims, in a composition comprising a detergent surfactant at a concentration between 0.01 to 50 % by weight, and the carboxylic or amino compound at a concentration between 0.05 % and 10 % by weight.
7. Use according to claim 6, wherein the surfactant is a nonionic surfactant and is present in a concentration of less than 25% by weight.
8. Use according to claim 6 or 7, wherein the composition has a pH of 2 to 13.
9. Use according to any of claims 6 to 8, wherein the composition further comprises a polymer, and wherein the ratio (by weight) between the polymer and the carboxylic or amino compound is in the range of 0.1:1 to 2:1.
10. Use according to any of the preceding claims, wherein the carboxylic or amino compound is comprised in a composition at a concentration between 0.05 % by weight and 2 % by weight, and wherein no rinsing step is applied after the surface has been treated with the carboxylic or amino compound.
11. Use according to any of claims 1 to 9, wherein the carboxylic or amino compound is comprised in a composition at a concentration between 0.25 % by weight and 10 % by weight, and wherein a rinsing step is applied after the surface has been treated with the carboxylic or amino compound and before deposition of the soil.
12. Use according to any of the preceding claims for cleaning hard surfaces in kitchens and surfaces associated with

cooking.

13. A method for removing soil or stains, preferably fatty soil or stains, from a hard surface, the method comprising the sequential steps:

- treating the surface with a composition comprising at least one carboxylic or amino compound as defined in any of claims 1 to 4 at a concentration of between 0.05 % by weight and 10 % by weight;
- allowing the soil or stain to deposit and toughen; and
- cleaning the surface to remove the soil or stains.

14. A method according to claim 13, wherein the composition comprises the carboxylic or amino compound at a concentration of between 0.05 % by weight and 2 % by weight, and wherein no rinsing step is applied after treating the surface with said composition.

15. A method according to claim 13, wherein the composition comprises the carboxylic or amino compound at a concentration of between 0.25 % by weight and 10 % by weight, and wherein a rinsing step is applied after treating the surface with said composition.



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Application Number
EP 09 17 2116

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