(54) Title: LIQUID CLEANING COMPOSITION WITH ABRASIVE POWDER FROM OLIVE KERNELS


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(72) Inventors: GONZALES, Denis, Alfred; Avenue Louise 512, B-1050 Brussels (BE). PEREZ - PRAT VINUESA, Eva, Maria; NV Procter & Gamble Services Company SA, Temselaan 100 1853 Strombeek-Bever, B-1180 Brussels (BE). ASMANIDOU, Anna; Rue Leys 11, B-1000 Brussels (BE). OKIDAK, Aicha; rue de Passchendaele 19, B-1000 Brussels (BE).

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(57) Abstract: The present invention relates to a liquid, cleaning composition comprising abrasive cleaning particles derived from the olive pits.
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The present invention relates to liquid compositions for cleaning a variety of inanimate surfaces, including hard surfaces in and around the house, dish surfaces, car and vehicles surfaces, etc. More specifically, the present invention relates to liquid scouring composition comprising suitable particles for cleaning and/or cleansing.

BACKGROUND OF THE INVENTION

Scouring compositions such as particulate compositions or liquid (incl. gel, paste-type) compositions containing abrasive components are well known in the art. Such compositions are used for cleaning a variety of surfaces; especially those surfaces that tend to become soiled with difficult to remove stains and soils.

Amongst the currently known scouring compositions, the most popular ones are based on abrasive particles with shapes varying from spherical to irregular. The most common abrasive particles are either inorganic like carbonate salt, clay, silica, silicate, shale ash, perlite and quartz sand or organic polymeric beads like polypropylene, PVC, melamine, urea, polycrylate and derivatives, and come in the form of liquid composition having a creamy consistency with the abrasive particles suspended therein.

The surface safety profile of such currently known scouring compositions is inadequate alternatively, poor cleaning performances is shown for compositions with an adequate surface safety profile. Indeed, due to the presence of very hard abrasive particles, these compositions can damage, i.e., scratch, the surfaces onto which they have been applied. Indeed, the formulator needs to choose between good cleaning performance but featuring strong surface damage or compromising on the cleaning performance while featuring acceptable surface safety profile. In addition, such currently known scouring compositions at least in certain fields of application (e.g., hard surface cleaning) are perceived by consumers as outdated, and are often disliked due to unpleasant feel on the hands during usage.
Abrasive particles derived from natural material such as nut shells e.g.: walnut and almond or derived from seed pits e.g.: apricot and cherry are sometimes meeting above mentioned requirements, however, they appear in nature with dark color and their inclusion in a cleaning product yield an unaesthetic muddy-like liquid composition. This is highly undesirable by consumer/users because it compromises the aspect of the liquid composition and its cleaning performance. Therefore, there is a real need to identify an abrasive particle derived from a natural material that fulfills equally the aesthetic and performance requirements for cleaning liquid composition.

It is thus an objective of the present invention to provide a liquid cleaning composition suitable to clean a variety of surfaces, including inanimate surfaces, such hard surfaces in and around the house, dish surfaces, etc., wherein the composition provides good cleaning performance, whilst providing a good surface safety profile and aesthetic profile.

It has been found that the above objective can be met by the composition according to the present invention.

It is an advantage of the compositions according to the present invention that they may be used to clean/cleanse inanimate surfaces made of a variety of materials like glazed and non-glazed ceramic tiles, enamel, stainless steel, Inox®, Formica®, vinyl, no-wax vinyl, linoleum, melamine, glass, plastics, Teflon®, painted surfaces and the like.

A further advantage of the present invention is that in the compositions herein, the particles can be formulated at very low levels, whilst still providing the above benefits. Indeed, in general for other technologies, high levels of abrasive particles are needed to reach good cleaning performance, thus leading to high formulation and process cost, difficult rinse and end cleaning profiles, as well as limitation for aesthetics and a pleasant hand feel of the cleaning composition.

SUMMARY OF THE INVENTION

The present invention relates to a liquid cleaning composition comprising olive pit particles having an average degree of whiteness (L*) of greater than 65, measured under D 65
illumination and wherein said olive pit particles are derived from olive pit from olives collected from the olive tree Olea europaea tree species.

The present invention further encompasses a process of cleaning a surface with a liquid, cleaning composition comprising abrasive cleaning particles, wherein said surface is contacted with said composition, preferably wherein said composition is applied onto said surface.

**BRIEF DESCRIPTION OF THE FIGURES**

Fig. 1 is an image showing olive pit particles (Olea europaea species, cultivar Rotondella and Carpelesa) as abrasive cleaning particles according to the present invention. Angular Olive pit particle having ECD 275 μηι (sieved 150-250 μηι) and 0.54 circularity.

Fig. 2 is an image showing olive pit particles (Olea europaea species, cultivar Rotondella and Carpelesa) as abrasive cleaning particles according to the present invention. Angular Olive pit particle having ECD 438 μηι (sieved 250-355 μηι) and 0.66 circularity.

Fig. 3 is an image showing olive pit particles (Olea europaea species, cultivar Rotondella and Carpelesa) as with suboptimal angularity e.g.: Olive pit particle having ECD 274 μηι (sieved 150-250μηι) and 0.7 circularity.

Fig. 4 is an image showing olive pit particles (Olea europaea species, cultivar Rotondella and Carpelesa) as with suboptimal angularity e.g.: Olive pit particle having ECD 380 μηι and 0.74 circularity.

Fig. 5 is a guideline for attribution of maturity score for plain olives and sliced olives.

**DETAILED DESCRIPTION OF THE INVENTION**

The liquid cleaning composition
The compositions according to the present invention are designed as cleaners for a variety of inanimate surfaces.

In a preferred embodiment, the compositions herein are suitable for cleaning inanimate surfaces selected from the group consisting of household hard surfaces; dish surfaces; surfaces like leather or synthetic leather; and automotive vehicles surfaces.

By "household hard surface", it is meant herein any kind of surface typically found in and around houses like kitchens, bathrooms, e.g., floors, walls, tiles, windows, cupboards, sinks, showers, shower plastified curtains, wash basins, WCs, fixtures and fittings and the like made of different materials like ceramic, vinyl, no-wax vinyl, linoleum, melamine, glass, Inox®, Formica®, vitroceramic, any plastics, plastified wood, metal or any painted or varnished or sealed surface and the like. Household hard surfaces also include household appliances including, but not limited to refrigerators, freezers, washing machines, automatic dryers, ovens, microwave ovens, dishwashers and so on. Such hard surfaces may be found both in private households as well as in commercial, institutional and industrial environments.

By "dish surfaces" it is meant herein any kind of surfaces found in dish cleaning, such as dishes, cutlery, cutting boards, pots, pans, and the like made of different materials like stainless steel, glass, ceramic, china, metal, any plastics, wood, enamel, Inox®, Teflon®, or any other material commonly used in the making of articles used for eating and/or cooking. Such dish surfaces may be found both in private households as well as in commercial, institutional and industrial environments.

The compositions according to the present invention are liquid compositions as opposed to a solid or a gas. Liquid compositions include compositions having a water-like viscosity as well as thickened compositions, such as gels and pastes.

In a preferred embodiment herein, the liquid compositions herein are aqueous compositions. Therefore, they may comprise from 35% to 99.5% by weight of the total composition of water, preferably from 65% to 98, preferably from 75% to 98% and more preferably from 80% to 95%.

In another preferred embodiment herein, the liquid compositions herein are mostly non-aqueous compositions although they may comprise from 0% to 10% by weight of the total composition of
water, preferably from 0% to 5%, more preferably from 0% to 1% and most preferably 0% by weight of the total composition of water.

In a preferred embodiment herein, the compositions herein are neutral compositions, and thus have a pH, as is measured at 25°C, of 6 - 8, more preferably 6.5 - 7.5, even more preferably 7.

In other preferred embodiment compositions have pH preferably above pH 4 and alternatively have pH preferably below pH 10.

Accordingly, the compositions herein may comprise suitable bases and acids to adjust the pH.

A suitable base to be used herein is an organic and/or inorganic base. Suitable bases for use herein are the caustic alkalis, such as sodium hydroxide, potassium hydroxide and/or lithium hydroxide, and/or the alkali metal oxides such, as sodium and/or potassium oxide or mixtures thereof. A preferred base is a caustic alkali, more preferably sodium hydroxide and/or potassium hydroxide.

Other suitable bases include ammonia, ammonium carbonate, all available carbonate salts such as K2CO3, Na2CC>3, CaCC>3, MgCC>3, etc., alkanolamines (as e.g. monoethanolamine), urea and urea derivatives, polyamine, etc.

Typical levels of such bases, when present, are of from 0.01% to 5.0%, preferably from 0.05% to 3.0% and more preferably from 0.1% to 0.6% by weight of the total composition.

The compositions herein may comprise an acid to trim its pH to the required level, despite the presence of an acid, if any, the compositions herein will maintain their neutral to alkaline, preferably alkaline, pH as described herein above. A suitable acid for use herein is an organic and/or an inorganic acid. A preferred organic acid for use herein has a pKa of less than 6. A suitable organic acid is selected from the group consisting of citric acid, lactic acid, glycolic acid, succinic acid, glutaric acid and adipic acid and a mixture thereof. A mixture of said acids may be commercially available from BASF under the trade name Sokalan® DCS. A suitable inorganic acid is selected from the group consisting hydrochloric acid, sulphuric acid, phosphoric acid and a mixture thereof.
A typical level of such an acid, when present, is of from 0.01% to 5.0%, preferably from 0.04% to 3.0% and more preferably from 0.05% to 1.5% by weight of the total composition.

In a preferred embodiment according to the present invention the compositions herein are thickened compositions. Preferably, the liquid compositions herein have a viscosity of up to 7500 cps at 20 s\(^{-1}\), more preferably from 5000 cps to 50 cps, yet more preferably from 2000 cps to 50 cps and most preferably from 1500 cps to 300 cps at 20 s\(^{-1}\) and 20°C when measured with a Rheometer, model AR 1000 (Supplied by TA Instruments) with a 4 cm conic spindle in stainless steel, 2° angle (linear increment from 0.1 to 100 sec\(^{-1}\) in max. 8 minutes).

In another preferred embodiment according to the present invention the compositions herein have a water-like viscosity. By "water-like viscosity" it is meant herein a viscosity that is close to that of water. Preferably the liquid compositions herein have a viscosity of up to 50 cps at 60 rpm, more preferably from 0 cps to 30 cps, yet more preferably from 0 cps to 20 cps and most preferably from 0 cps to 10 cps at 60 rpm and 20°C when measured with a Brookfield digital viscometer model DV II, with spindle 2.

Abrasive cleaning particles

The liquid cleaning composition herein comprises abrasive cleaning particles formed by shearing and/or grinding olive pits.

The applicant has discovered that olive pit particles are suitable to be used as abrasive cleaning particles in liquid cleaning compositions due their biodegradable nature and light color when the olive fruit is harvested and/or selected at a substantially immature / unripe state. Additionally the olive pit particles are hard enough to provide the cleaning effect, however, soft enough to provide good surface safety profile.

The particles used in the present invention are preferably white. The suitable olive pit particles are preferably white having degree of whiteness (L\(^*\)) of greater than 65, preferably greater than 70 and most preferably greater than 80 measured under D 65 illumination.
In order to achieve sufficient whiteness of the olive pit particles, these particles must be produced from olive pits featuring preferably degree of whiteness (L*) of greater than 50, preferably above 65 and most preferably greater than 70 measured under D 65 illumination. Olive pits will undergo slight whitening during process to reduce them into particles - when particle size reduces the whiteness degree (L*) increases.

The whiteness of the olive pit (endocarp) is affected by the maturation of the olive fruits. During maturation, the olive undergoes change in colour from green to yellow-green to green-gray to rose to red-brown to dark red to purplish-black and finally to black. Especially, the color change during the veraison period from green/yellow to purple/black is detectable from the olive skin (exocarp). Therefore, it is desirable that the olive pit be selected from the olive fruit, wherein the maturation process has not darkened the olive pit.

Suitable olive pits can be extracted from fruits derived from Olea europaea tree species, preferably from Olea europaea L. subspecie europaea species. However, any cultivars can be used, provided that the olive fruits are harvested and/or selected accordingly to the fruit maturity.

Suitable olive cultivars for use herein are selected from the group consisting of Aberquina, Abu Satel Echlot, Acebuche, Adraminiti, Aglandau (Beruguette), Agrinion, Albania Zalmati, Alfarfa, Amellau, Amfissa, Amigdaloa Nana, Amigdalolia, Amphissis, Arauco, Arauco, Arbequina, Arbosana, Arbosana, Ascolana, Ascolana del Piceno, Ascolana Tenera, Ascolano, Ayrouni, Ayvalik, Badaroz, Bardheu Tiranes, Barnea, Barnea (Israel), Barouni, Beyaz Yaglik, Biancolilfa, Bical, Blanqueta, Bosana, Bouteillan, Buga, Cacerena, Cailletier, Cahir, Callosina, Canivano Blanco, Carolea, carpellesa, Carrasquenha, Castellana, Cayon, Cellina, Cerignola, Chalkidiki, Chalkiendi (Chondrolia), Changlot Real, Chemlal de Kabylie, Chemlali, Chetoui, Cima di Bitonto, Cipresino, Cobrancosa, Coratina, Cordovil de Serpa, Cornesuolo, Cornicabra, Crnica, Daebli, Dam, Daphnoelia, Dolce Agogia, Domat, Dopia, Elmacik, Empeltre, Farga, Frantoio, Gaeta, Galega, Gemlik, Gerboui, Germaine, Gordal, Gordal sevillana, Grappolo, Grossane, Hamed, Haouzia, Hojiblanca, Istarska Belica, Itrana, Izmir Sofralik, Kaissy, Kalamata, Kalamonia, Kalinjot, Kalokerida, Kan Celebi, Karidolia, kerkiras, Kiraz, Kolovi, Konservolia, Koroneiki, Kothreiki, Koutsourelia, Kura, La bella daunia, Lastovska, Leccino, Leccio del corno, Lechinl, Lechin de Granada, Lecin de sevilla, Lemen, Lianolia, Liguria, Lucques, Lugano, Maalot, Majatica di ferandina, Malissi, Manaki, Manzanilla, Manzanillo, Manzannillo de cabra, Manzannillo de Cordobes, Manzannillo de Jaen, Manzannillo de Sevilla,
Mastoidis (tsunati), Maurino, Megaritiki, Megaritiki, Memecik, Menara, Merhavia, Meski, 
Mirtoia, Mission, Mixani, Moraiolo, Morisca, Morrut, M'Slalla, Nabali, Naphlion, Negrinha, 
Nera di Gonnos, Nera di Oliena, Nevadillo Blanco, Nevadillo nero, Nicoise, Nocellara del 
Belice, Oblaca, Oleastrum, Oliva Itrana, Oliviere, Olivo Quercetano, Ouslati, Palomar olesana, 
Pendolino, Picholine, Picholine Marociane, Pico limon, Picual, Picual de Estepa, Picual de Jaen, 
Picudo, Pizz'e, Carroga, Ponetine, Prassinolia, Pratini, Psiloelia, Raggia, Redondil, Rosciola, 
Rotondella, Royal (e.g.: Cazorla), Sabine, Salonenque, Santa caterina, Sevillano, Sevillenca, 
Sicilian, Sigoise, Souri, Taggiasca, Tanche, Thasitiki (throumpa thassou), Toffahi, Uslu, 
Valanolia, Vera, Verdala, Verdial (e.g.: Badajoz, Huevar, Velez malaga), Verdiell, Vilallonga, 
Zaity, Zinzala and mixtures thereof.

The following cultivars are most preferred because they are traditionally harvested as green 
olives (at stage when the color of the ripe fruit is green): Aglandau (Beruguette), Agrinion, 
Arauco, Ascolana, Ascolana del Piceno, Ascolana Tenera, Ascolano, Barnea, Cerignola, 
Coratina, Frantoio, Hojiblanca, Kura, Leccino, Lucques, Manzanilla, Manzanillo, Mission, 
Naphlion, Picholine, Picual, Salonenque, Sevillano, Sicilian and mixtures thereof.

The term "cultivar" refers to any cultivated variety produced by horticultural or agricultural 
techniques and not normally found in natural populations. These are preferred as all natural-
 occurring materials in practice suffer from internal defect e.g.: genetic alteration or defect in 
maturation process or alternatively undergo external spoiling / rottening phenomenon.

Olive pits having suitable colour preferably undergo a sorting process in order to exclude olives 
and/or olive pits, which are not meeting the maturity index and/or not meeting the whiteness 
requirements. The sorting process can be done manually, but it is more effective if it is done with 
automatic sorting machinery e.g.: equipped with an optical camera and digital imaging software 
compatible with the measurement of the degree of maturity and/or the degree of whiteness L*.
Examples of suitable sorting equipment are Buhler Sortex series modified to measure degree of 
maturity or L* value and compute surface area ratio for varying color measurement.

The sorting process can be done prior to extraction of the olive pits, wherein the sorting 
parameters are set based on the maturity index. Alternatively the sorting process can be done for 
the extracted olive pits preferably after the olive pits have undergone a washing process, wherein 
the sorting parameters are set based on the degree of whiteness L*.
As a consequence of the selection of the olive fruit based on the maturity index, followed optionally by the sorting process of the olive pits based on their degree of whiteness $L^*$, the olive pit abrasive cleaning particles have an average degree of whiteness ($L^*$) above 65, more preferably above 70 and most preferably above 80.

The selection of the olive fruit is based on a maturity index available from the University of California Davis.

The maturity index depends on the color of the olive fruit skin and also the color of the olive flesh (fig. 5). The calculation of the maturity index is based on 100 olives picked randomly. The olives are sorted accordingly to 8 maturity scores (e.g.: 0,1,2,3 maturity scores focusing on the external skin color, 4,5,6,7 maturity scores focusing on the internal olive flesh color) ranging from 0-7. The number of olives classified in respective maturity scores is counted. The maturity index of the olive fruit population is the calculated as per below:

\[
\text{Maturity Index} = \frac{(O \times NO + 1 \times N1 + 2 \times N2 + 3 \times N3 + 4 \times N4 + 5 \times N5 + 6 \times N6 + 7 \times N7)}{100}
\]

<table>
<thead>
<tr>
<th>Color</th>
<th>Maturity Score</th>
<th>Number</th>
<th>Calculated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep or dark Green</td>
<td>0</td>
<td>NO</td>
<td>0</td>
</tr>
<tr>
<td>Yellow or Yellowish- Green</td>
<td>1</td>
<td>N1</td>
<td>1</td>
</tr>
<tr>
<td>Yellow-Green with &lt;1/2 olive with reddish / violet</td>
<td>2</td>
<td>N2</td>
<td>2xN2</td>
</tr>
<tr>
<td>Red-Purple on &gt;1/2 olive</td>
<td>3</td>
<td>N3</td>
<td>3xN3</td>
</tr>
<tr>
<td>Light Purple to Black</td>
<td>4</td>
<td>N4</td>
<td>4xN4</td>
</tr>
<tr>
<td>White</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>5</td>
<td>N5</td>
<td>5xN5</td>
</tr>
<tr>
<td>Violet until below halfway from skin to pit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>6</td>
<td>N6</td>
<td>6xN6</td>
</tr>
<tr>
<td>Violet until almost to the pit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>7</td>
<td>N7</td>
<td>7xN7</td>
</tr>
<tr>
<td>Violet-dark black</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Maturity Index</td>
<td></td>
<td></td>
<td>Sum above/100</td>
</tr>
</tbody>
</table>
Fig. 5 is a guideline for attribution of maturity score. Olives suitable to be used in the present invention have the maturity index below 6, preferably below 5, more preferably below 4 and most preferably below 3.

**Whiteness measurement:**
As used herein, the term average "degree of whiteness (L\(^*\))" means the whiteness value of sample of olive pits or olive pit particles measured using for instance Gretag machbeath™ 7000 a color-eye instrument or equivalent used in reflectance mode. This instrument provides a choice of light sources; "D65" represents roughly a mid-day sun in western and northern Europe, whilst "illuminant A" is intended to represent typical, domestic, tungsten-filament lighting and "CWF2" represents cool white fluorescent. The instrument thus provides a standard measure of whiteness (L\(^*\)) that can be determined for daylight, tungsten and fluorescent lighting conditions. Under each set of lightning conditions L\(^*\) is defined such that 100 is fully white and 0 has no white components. For the purposes of the present invention, the "D65" illuminant is used to measure whiteness.

Samples can be prepared by filling olive pits or olive pit particles in a holder to ensure good packing of the olive pits or olive pit particles so to make a continuous layer of material. Eventually the olive pits or olive pit particles are pelletized under pressure. Measurements are made by placing the olive pit or olive pit particle sample in the holder of the color-eye instrument. The area if view was 3mm by 8mm with degree observer angle 10°. The specular component was included. Measurements were generally made duplicate and an average was taken.

One suitable way of reducing olive pits to the abrasive cleaning particles herein is to grind or mill the olive pits. Other suitable means include the use of eroding tools such as a high speed eroding wheel with dust collector wherein the surface of the wheel is engraved with a pattern or is coated with abrasive sandpaper or the like to form the abrasive cleaning particles herein. Other typical mills can also be employed such as blade mills, rotor mills, air jet mills, attrition mills, mortar, hammer, bead mills, etc. Preferably grinding tools and process that are suitable to produce angular olive pit powder are preferred. Example of preferable grinding tools are eroding wheel mills, blade or rotor mills. Less preferable grinding tools as mortar, hammer, bead mills since less angular olive pit particles are typically achieved via these grinding means.
Alternatively in a preferred embodiment herein, the material may be reduced to particles in several stages namely first the olive pits can be broken into pieces of a 1-3 mm dimensions by manually chopping or cutting, or using a mechanical tool such as a lump breaker, for example the Model 2036 from S Howes, Inc. of Silver Creek, NY. Then the broken piece can undergo a further cleaning or separation process e.g.: via air classification, such as to retain only the hard lumps of the olive pits accordingly to processes commonly available at olive or olive oil factories. At last, the hard lumps are undergoing finer grinding operation with grinding tools described above. The reduction process of olive pits into particles is set to not reach excessive temperature, which risks discolouring the abrasive particles. Typically, the parameters for the grinding operation are set so that temperature is not exceeding 150°C, preferably not exceeding 100°C.

In a preferred embodiment the abrasive cleaning particles are preferably non-rolling. Alternatively in another preferred embodiment the abrasive cleaning particles are preferably sharp. By non-rolling is meant that the abrasive cleaning particle and the surface are in contact with each other by sliding.

Indeed the applicant has found that non-rolling and/or sharp abrasive cleaning particles provide good soil removal.

Preferred olive pit particles according to present invention have certain degree of circularity. Circularity is a quantitative, 2-dimension image analysis shape description and is being measured according to ISO 9276-6:2008(E) section 8.2 as implemented via the Occhio Nano 500 Particle Characterisation Instrument with its accompanying software Callistro version 25 (Occhio s.a. Liege, Belgium). Circularity is a preferred mesoshape descriptor and is widely available in shape analysis instrument such as in Occhio Nano 500 or in Malvern Morphologi G3. Circularity is sometimes described in literature as being the difference between a particle's shape and a perfect sphere. Circularity values range from 0 to 1, where a circularity of 1 describes a perfectly spherical particles or disc particle as measured in a two dimensional image.

\[
C = \sqrt{\frac{4 \pi A}{P^2}}
\]
Where A is projection area, which is 2D descriptor and P is the length of the perimeter of the particle.

The applicant has found out that the abrasive cleaning particles having a mean circularity from 0.1 to 0.7, preferably from 0.3 to 0.6 and more preferably from 0.4 to 0.5 are providing improved cleaning performance and surface safety. Mean data are extracted from volume-based vs. number-based measurements.

Thus, in a preferred embodiment of the present invention the abrasive particles herein have a mean circularity from 0.1 to 0.7, preferably from 0.3 to 0.6, and more preferably from 0.4 to 0.5.

Figures 1-3 show two olive pit particle populations (from Olea europaea species, cultivar Rotondella and Carpellesa). The particles are having ECD ranging from 450 to 465 µm 3 ηd having mean circularity from 0.5 to 0.7 as abrasive cleaning particles according to the present invention. Fig. 4 is an example of olive pit particle population outside of the scope of the present invention (circularity 0.74).

In a preferred embodiment, the abrasive cleaning particles have a mean ECD from 50 µm to 550 µm, more preferably from 100 µm to 450 µm and most preferably from 200 to 300 µm.

Indeed, the Applicant has found that the abrasive particle size can be critical to achieve efficient cleaning performance whereas excessively abrasive population with small particle sizes e.g.: typically below 10 micrometers feature polishing action vs. cleaning despite featuring a high number of particles per particle load in cleaner inherent to the small particle size. On the other hand, abrasive population with excessively high particle size, e.g.: above 1000 micrometers, do not deliver optimal cleaning efficiency, because the number of particles per particle load in cleaner, decreases significantly inherently to the large particle size. Additionally, excessively small particle size are not desirable in cleaning task, since in practice, small and numerous particles are often hard to remove from the various surface topologies which requires excessive effort to remove from the user unless leaving the surface with visible particles residue. On the other hand, excessively large particle are too easily detected visually or provide bad tactile experience while handling or using the cleaner. Therefore, the applicant defines herein an optimal particle size range that delivers both optimal cleaning performance and usage experience.
Particles having circularity value below 0.7 are preferred, and therefore the particle shape differs significantly from an ideal sphere. Therefore, the particle size is not selected by using the standard particle diameter proposed by conventional size measurement equipment. Instead, the abrasive particles have a size defined by their area-equivalent diameter (ISO 9276-6:2008(E) section 7) also called Equivalent Circle Diameter ECD (ASTM F1877-05 Section 11.3.2). Mean ECD of particle population is calculated as the average of respective ECD of each particles of a particle population of at least 10,000 particles, preferably above 50,000 particles, more preferably above 100,000 particles after excluding from the measurement and calculation the data of particles having area-equivalent diameter (ECD) of below 10 micrometers. Mean data are extracted from volume-based vs. number-based measurements.

Preferred abrasive cleaning particles in the present invention have hardness from 60 to 90, more preferably from 70 to 90 and most preferably from 75 to 85 before being immersed in the liquid cleaning composition, measured according to Shore D hardness scale.

The hardness Shore D is measured with a durometer type D according to a procedure described in ASTM D2240.

The abrasive cleaning particles used in the present invention can be a mixture of Olive pit particles and other suitable abrasive cleaning particles. However, all abrasive cleaning particles need to have Shore D hardness scale below or equal to 90. The other abrasive cleaning particles can be selected from the group consisting of plastics, hard waxes, inorganic and organic abrasives, and natural materials. The other abrasive cleaning particles are substantially insoluble or partially soluble in water. Most preferably the other abrasives if present, have the same degree of whiteness \( L^* \) than olive pit particles. Most preferably the other abrasives are calcium carbonate or derived from natural vegetable abrasives.

With above physico-chemical parameters, it has surprisingly been found that the abrasive cleaning particles of the present invention show a good cleaning performance even at relatively low levels from 0.1% to 20%, preferably from 0.5% to 10%, more preferably from 1% to 8%, and most preferably from 3% to 6% by weight of the total composition of said abrasive cleaning particles.

Optional ingredients
The compositions according to the present invention may comprise a variety of optional ingredients depending on the technical benefit aimed for and the surface treated.

Suitable optional ingredients for use herein include suspending aids, chelating agents, surfactants, radical scavengers, perfumes, cleaning and surface-modifying polymers, solvents, builders, buffers, antimicrobial agents, hydrotropes, colorants, stabilizers, bleaches, bleach activators, suds controlling agents both for suds boosting and suds suppression like fatty acids, enzymes, soil suspenders, brighteners, anti dusting agents, dispersants, pigments, dyes, pearlescent agents, rheology modifiers, skin care actives such as emollients, humectants and/or conditioning polymers.

**Suspending aid**

The abrasive cleaning particles present in the composition herein are solid particles in a liquid composition. Said abrasive cleaning particles may be suspended in the liquid composition. However, it is well within the scope of the present invention that such abrasive cleaning particles are not stably suspended within the composition and either settle or float on top of the composition. In this case, a user may have to temporally suspend the abrasive cleaning particles by agitating (e.g., shaking or stirring) the composition prior to use.

However, it is preferred herein that the abrasive cleaning particles are stably suspended in the liquid compositions herein. Thus the compositions herein comprise a suspending aid.

The suspending aid herein may either be a compound specifically chosen to provide a suspension of the abrasive cleaning particles in the liquid compositions of the present invention, such as a structurant, or a compound that also provides another function, such as a thickener or a surfactant (as described herein elsewhere).

Any suitable organic and inorganic suspending aids typically used as gelling, thickening or suspending agents in cleaning compositions and other detergent or cosmetic compositions may be used herein. Indeed, suitable organic suspending aids include polysaccharide polymers. In addition or as an alternative, polycarboxylate polymer thickeners may be used herein. In addition or as an alternative of the above, layered silicate platelets e.g.: hectorite, bentonite or montmorillonites can also be used. Suitable commercially available layered silicates are
Laponite RD® or Optigel CL® available from Rockwood Additives. Also, in addition or as an alternative of the above Hydroxyl-containing crystalline structuring agents such as a hydroxyl-containing fatty acid, fatty ester or fatty soap wax-like materials or the like such as the ones described in US patent 6,080,707 can be used. Said crystalline hydroxyl-containing structuring agent is insoluble in water under ambient to near ambient conditions. Some preferred hydroxyl-containing suspending aids include 12-hydroxystearic acid, 9,10-dihydroxystearic acid, tri-9,10-dihydroxystearin and tri-12-hydroxystearin. Castor wax or hydrogenated castor oil is produced by the hydrogenation (saturation of triglyceride fatty acids) of pure castor oil and is mainly composed of tri-12-hydroxistearin. Commercially available, castor oil-based, crystalline, hydroxyl-containing stabilizers include THIXCIN® from Rheox, Inc. (now Elementis).

Suitable polycarboxylate polymer thickeners include (preferably lightly) cross linked polyacrylate. A particularly suitable polycarboxylate polymer thickener is carbopol commercially available from Lubrizol under the trade name Carbopol 674®.

Suitable polysaccharide polymers for use herein include substituted cellulose materials like carboxymethylcellulose, ethyl cellulose, hydroxyethylcellulose, hydroxypropylcellulose, hydroxymethylcellulose; micro fibril cellulose (MFC) such as described in US 2008/0108714 (CP Kelco) or US2010/0210501 (Procter & Gamble Company); succinoglycan and naturally occurring polysaccharide polymers like xanthan gum, gellan gum, guar gum and its derivatives, locust bean gum, tragacanth gum, succinoglucon gum, or derivatives thereof, or mixtures thereof. Xanthan gum is commercially available from Kelco under the tradename Kelzan T.

Most preferred suspending aids used herein are tri-12-hydroxystearin and xanthan gum. In an alternative embodiment, the suspending aid herein is a polycarboxylate polymer thickeners preferably a (preferably lightly) cross linked polyacrylate. In a highly preferred embodiment herein, the liquid compositions comprise a combination of a polysaccharide polymer or a mixture thereof, preferably xanthan gum, with a polycarboxylate polymer or a mixture thereof, preferably a cross linked polyacrylate.

As a preferred example, xanthan gum is preferably present at levels from 0.1% to 5% by weight of the total composition, more preferably from 0.5% to 2%, even more preferably from 0.8% to 1.2%.
As a preferred example, tri-12-hydroxystearin is present at levels between 0.05% and 5% by weight of the total composition, more preferably 0.08% and 3%, even more preferably 0.1% and 2.5%.

As a preferred example, MFC is present at concentrations from about 0.01% to about 1%, more preferably from 0.02% to 0.5%, even more preferably 0.03% to 0.1%. Preferably, MFC is used with co-agents and/or co-processing agents such as CMC, xanthan and/or guar gum. US2008/0108714 describes MFC in combination with xanthan gum, and carboxymethyl cellulose (CMC) in a ratio of 6:3:1, and MFC, guar gum, and CMC in a ratio of 3:1:1. These blends allow preparing MFC as a dry product which can be "activated" with high shear or high extensional mixing into water or other water-based solutions. "Activation" occurs when the MFC blends are added into water and the co-agents/co-processing agents are hydrated. After the hydration of the co-agents/co-processing agents, high shear is generally needed to effectively disperse the MFC to produce a three-dimensional functional network that exhibits a true yield point. One example of a commercially available MFC is Cellulon® from CPKelko.

**Organic Solvent**

As an optional but highly preferred ingredient the composition herein comprises an organic solvents or mixtures thereof.

The compositions herein comprise from 0% to 30%, more preferably 1.0% to 20% and most preferably, 2% to 15% by weight of the total composition of an organic solvent or a mixture thereof.

Suitable solvents can be selected from the group consisting of: aliphatic alcohols, ethers and diethers having from about 4 to about 14 carbon atoms, preferably from about 6 to about 12 carbon atoms, and more preferably from about 8 to about 10 carbon atoms; glycols or alkoxylated glycols; glycol ethers; alkoxylated aromatic alcohols; aromatic alcohols; terpenes; and mixtures thereof. Aliphatic alcohols and glycol ether solvents are most preferred.

Aliphatic alcohols, of the formula R-OH wherein R is a linear or branched, saturated or unsaturated alkyl group of from about 1 to about 20 carbon atoms, preferably from about 2 to about 15 and more preferably from about 5 to about 12, are suitable solvents. Suitable aliphatic
alcohols are methanol, ethanol, propanol, isopropanol or mixtures thereof. Among aliphatic alcohols, ethanol and isopropanol are most preferred because of their high vapour pressure and tendency to leave no residue.

Suitable glycols to be used herein are according to the formula HO-CR1R2-OH wherein R1 and R2 are independently H or a C2-C10 saturated or unsaturated aliphatic hydrocarbon chain and/or cyclic. Suitable glycols to be used herein are dodecaneglycol and/or propanediol.

In one preferred embodiment, at least one glycol ether solvent is incorporated in the compositions of the present invention. Particularly preferred glycol ethers have a terminal C3-C6 hydrocarbon attached to from one to three ethylene glycol or propylene glycol moieties to provide the appropriate degree of hydrophobicity and, preferably, surface activity. Examples of commercially available solvents based on ethylene glycol chemistry include mono-ethylene glycol n-hexyl ether (Hexyl Cellosolve®) available from Dow Chemical. Examples of commercially available solvents based on propylene glycol chemistry include the di-, and tri-propylene glycol derivatives of propyl and butyl alcohol, which are available from Arco under the trade names Arcosolv® and Dowanol®.

In the context of the present invention, preferred solvents are selected from the group consisting of monopropylene glycol monopropyl ether, dipropylene glycol monopropyl ether, monopropylene glycol monobutyl ether, dipropylene glycol monopropyl ether, dipropylene glycol monobutyl ether; tripropylene glycol monobutyl ether; ethylene glycol monobutyl ether; diethylene glycol monobutyl ether, ethylene glycol monohexyl ether and diethylene glycol monohexyl ether, and mixtures thereof. "Butyl" includes normal butyl, isobutyl and tertiary butyl groups. Monopropylene glycol and monopropylene glycol monobutyl ether are the most preferred cleaning solvent and are available under the tradenames Dowanol DPNP® and Dowanol DPNB®. Dipropylene glycol mono-t-butyl ether is commercially available from Arco Chemical under the tradename Arcosolv PTB®.

In a particularly preferred embodiment, the cleaning solvent is purified so as to minimize impurities. Such impurities include aldehydes, dimers, trimers, oligomers and other by-products. These have been found to deleteriously affect product odour, perfume solubility and end result. The inventors have also found that common commercial solvents, which contain low levels of aldehydes, can cause irreversible and irreparable yellowing of certain surfaces. By purifying the
cleaning solvents so as to minimize or eliminate such impurities, surface damage is attenuated or eliminated.

Though not preferred, terpenes can be used in the present invention. Suitable terpenes to be used herein monocyclic terpenes, dicyclic terpenes and/or acyclic terpenes. Suitable terpenes are: D-limonene; pinene; pine oil; terpinene; terpene derivatives as menthol, terpineol, geraniol, thymol; and the citronella or citronellol types of ingredients.

Suitable alkoxylated aromatic alcohols to be used herein are according to the formula R-(A)\textsubscript{n}-OH wherein R is an alkyl substituted or non-alkyl substituted aryl group of from about 1 to about 20 carbon atoms, preferably from about 2 to about 15 and more preferably from about 2 to about 10, wherein A is an alkoxy group preferably butoxy, propoxy and/or ethoxy, and \( n \) is an integer of from about 1 to about 5, preferably about 1 to about 2. Suitable alkoxylated aromatic alcohols are benzoxyethanol and/or benzoxypropanol.

Suitable aromatic alcohols to be used herein are according to the formula R-OH wherein R is an alkyl substituted or non-alkyl substituted aryl group of from about 1 to about 20 carbon atoms, preferably from about 1 to about 15 and more preferably from about 1 to about 10. For example a suitable aromatic alcohol to be used herein is benzyl alcohol.

**Surfactants**

The compositions herein may comprise nonionic, anionic, zwitterionic, amphoteric, cationic surfactants or mixtures thereof. Suitable surfactants are those selected from the group consisting of nonionic, anionic, zwitterionic, cationic and amphoteric surfactants, having hydrophobic chains containing from 8 to 20 carbon atoms. Examples of suitable surfactants are described in McCutcheon's Vol. 1: Emulsifiers and Detergents, North American Ed., McCutcheon Division, MC Publishing Co., 2002.

Preferably, the composition herein comprises from 0.01% to 50%, more preferably from 0.5% to 40%, and most preferably from 1% to 36% by weight of the total composition of a surfactant or a mixture thereof.
Non-ionic surfactants are highly preferred for use in the compositions of the present invention. Non-limiting examples of suitable non-ionic surfactants include alcohol alkoxylates, alkyl polysaccharides, amine oxides, block copolymers of ethylene oxide and propylene oxide, fluoro surfactants and silicon based surfactants. Nonionic surfactant, when present as co-surfactant, is comprised in a typical amount of from 0.01% to 15%, preferably 0.1% to 12%, more preferably from 0.5% to 10% by weight of the liquid detergent composition. When present as main surfactant, it is comprised in a typical amount of from 0.8% to 40%, preferably 1% to 38%, more preferably 2% to 35% by weight of the total composition.

A preferred class of non-ionic surfactants suitable for the present invention is alkyl ethoxylates. The alkyl ethoxylates of the present invention are linear or branched, primary or secondary, and contain from 8 carbon atoms to 22 carbon atoms in the hydrophobic tail, and from 1 ethylene oxide units to 25 ethylene oxide units in the hydrophilic head group. Examples of alkyl ethoxylates include Neodol 91-6®, Neodol 91-8® supplied by the Shell Corporation (P.O. Box 2463, 1 Shell Plaza, Houston, Texas), and Alfonic 810-60® supplied by Condea Corporation, (900 Threadneedle P.O. Box 19029, Houston, TX). More preferred alkyl ethoxylates comprise from 9 to 15 carbon atoms in the hydrophobic tail, and from 4 to 12 oxide units in the hydrophilic head group. A most preferred alkyl ethoxylate is C9-11EO5, available from the Shell Chemical Company under the tradename Neodol 91-5®. Non-ionic ethoxylates can also be derived from branched alcohols. For example, alcohols can be made from branched olefin feedstocks such as propylene or butylene. In a preferred embodiment, the branched alcohol is either a 2-propyl-1-heptyl alcohol or 2-butyl-1-octyl alcohol. A desirable branched alcohol ethoxylate is 2-propyl-1-heptyl E07/A07, manufactured and sold by BASF Corporation under the tradename Lutensol XP 79/XL 79®.

Another preferred class of non-ionic surfactant suitable for the present invention is amine oxide, especially coco dimethyl amine oxide or coco amido propyl dimethyl amine oxide. Amine oxide may have a linear or mid-branched alkyl moiety. Typical linear amine oxides include water-soluble amine oxides of formula R1 - N(R2)(R3) →O, wherein R1 is a C8-18 alkyl moiety; R2 and R3 are independently selected from the group consisting of C1-3 alkyl groups and C1-3 hydroxylalkyl groups and preferably include methyl, ethyl, propyl, isopropyl, 2-hydroxethyl, 2-hydroxypropyl and 3-hydroxypropyl. The linear amine oxide surfactants in particular may include linear C10-C18 alkyl dimethyl amine oxides and linear C8-C12 alkoxy ethyl dihydroxy
ethyl amine oxides. Preferred amine oxides include linear C_{10}, linear C_{10-C12}, and linear C_{12-C14} alkyl dimethyl amine oxides. As used herein "mid-branched" means that the amine oxide has one alkyl moiety having ni carbon atoms with one alkyl branch on the alkyl moiety having n_{2} carbon atoms. The alkyl branch is located on the a carbon from the nitrogen on the alkyl moiety. This type of branching for the amine oxide is also known in the art as an internal amine oxide. The total sum of n_{1} and n_{2} is from 10 to 24 carbon atoms, preferably from 12 to 20, and more preferably from 10 to 16. The number of carbon atoms for the one alkyl moiety (ni) should be approximately the same number of carbon atoms as the one alkyl branch (n_{2}) such that the one alkyl moiety and the one alkyl branch are symmetric. As used herein "symmetric" means that In - n_{2} Is less than or equal to 5, preferably 4, most preferably from 0 to 4 carbon atoms in at least 50 wt%, more preferably at least 75 wt% to 100 wt% of the mid-branched amine oxides for use herein.

The amine oxide further comprises two moieties, independently selected from a C_{1-3} alkyl, a C_{1-3} hydroxyalkyl group, or a polyethylene oxide group containing an average of from about 1 to about 3 ethylene oxide groups. Preferably the two moieties are selected from a C_{1-3} alkyl, more preferably both are selected as a Ci alkyl.

Another class of non-ionic surfactant suitable for the present invention is alkyl polysaccharides. Such surfactants are disclosed in U.S. Patent Nos. 4,565,647, 5,776,872, 5,883,062, and 5,906,973. Among alkyl polysaccharides, alkyl polyglycosides comprising five and/or six carbon sugar rings are preferred, those comprising six carbon sugar rings are more preferred, and those wherein the six carbon sugar ring is derived from glucose, i.e., alkyl polyglycosides ("APG"), are most preferred. The alkyl substituent in the APG chain length is preferably a saturated or unsaturated alkyl moiety containing from 8 to 16 carbon atoms, with an average chain length of 10 carbon atoms. C_{8-C16} alkyl polyglycosides are commercially available from several suppliers (e.g., Simusol® surfactants from Seppic Corporation, 75 Quai d'Orsay, 75321 Paris, Cedex 7, France, and Glucopon 220®, Glucopon 225®, Glucopon 425®, Plantaren 2000 N®, and Plantaren 2000 N UP®, from Cognis Corporation, Postfach 13 01 64, D 40551, Dusseldorf, Germany). Also suitable are alkylglycerol ethers and sorbitan esters.

Another class of non-ionic surfactant suitable for the present invention is fatty acid amide surfactants comprising an alkyl group containing from 7 to 21, preferably from 9 to 17, carbon
atoms. Preferred amides are $C_8-C_{20}$ ammonia amides, monoethanolamides, diethanolamides, and isopropanolamides.

Other non-ionic surfactants that can be used include those derived from natural sources such as sugars and include $C_6-C_{16}$ N-alkyl glucose amide surfactants.

Alternative non-ionic detergent surfactants for use herein are alkoxylated alcohols generally comprising from 8 to 16 carbon atoms in the hydrophobic alkyl chain of the alcohol. Typical alkoxylation groups are propoxy groups or ethoxy groups in combination with propoxy groups, yielding alkyl ethoxy propoxylates. Such compounds are commercially available under the tradename Antarox® available from Rhodia (40 Rue de la Haie-Coq F-93306, Aubervilliers Cedex, France) and under the tradename Nonidet® available from Shell Chemical.

The condensation products of ethylene oxide with a hydrophobic base formed by the condensation of propylene oxide with propylene glycol are also suitable for use herein. The hydrophobic portion of these compounds will preferably have a molecular weight of from 1500 to 1800 and will exhibit water insolubility. The addition of polyoxyethylene moieties to this hydrophobic portion tends to increase the water solubility of the molecule as a whole, and the liquid character of the product is retained up to the point where the polyoxyethylene content is about 50% of the total weight of the condensation product, which corresponds to condensation with up to 40 moles of ethylene oxide. Examples of compounds of this type include certain of the commercially available Pluronic® surfactants, marketed by BASF. Chemically, such surfactants have the structure $(EO)_x(PO)_y(EO)_z$ or $(PO)_x(EO)_y(PO)_z$ wherein x, y, and z are from 1 to 100, preferably 3 to 50. Pluronic® surfactants known to be good wetting surfactants are more preferred. A description of the Pluronic® surfactants, and properties thereof, including wetting properties, can be found in the brochure entitled "BASF Performance Chemicals Plutonic® & Tetronic® Surfactants", available from BASF.

Other suitable though not preferred non-ionic surfactants include the polyethylene oxide condensates of alkyl phenols, e.g., the condensation products of alkyl phenols having an alkyl group containing from 6 to 12 carbon atoms in either a straight chain or branched chain configuration, with ethylene oxide, the said ethylene oxide being present in amounts equal to 5 to 25 moles of ethylene oxide per mole of alkyl phenol. The alkyl substituent in such compounds
can be derived from oligomerized propylene, diisobutylene, or from other sources of iso-octane, n-octane, w-o-nonane or n-nonane.

Suitable anionic surfactants for use herein are all those commonly known by those skilled in the art. The anionic surfactants for use herein include alkyl sulphonates, alkyl aryl sulphonates, alkyl sulphates, alkyl alkoxylated sulphate surfactants, C₆-C₂₀ alkyl alkoxylated linear or branched diphenyl oxide disulphonates, or mixtures thereof.

When present in the composition anionic surfactant can be incorporated in the compositions herein in amounts ranging from 0.01% to 50%, preferably 0.5% to 40%, more preferably 2% to 35%.

Suitable sulphate surfactants for use in the compositions herein include water-soluble salts or acids of C₄-C₁₄ alkyl or hydroxyalkyl, sulphate and/or ether sulfate. Suitable counter ions include hydrogen, alkali metal cation or ammonium or substituted ammonium, but preferably sodium. Where the hydrocarbyl chain is branched, it preferably comprises C₃₋₄ alkyl branching units. The average percentage branching of the sulphate surfactant is preferably greater than 30%, more preferably from 35% to 80% and most preferably from 40% to 60% of the total hydrocarbyl chains.

The sulphate surfactants may be selected from C₈-C₂₀ primary, branched-chain and random alkyl sulphates (AS); C₁₀-C₁₈ secondary (2,3) alkyl sulphates; C₁₀-C₁₈ alkyl alkoxy sulphates (AEₓS) wherein preferably x is from 1-30; C₁₀-C₁₈ alkyl alkoxy carboxylates preferably comprising 1-5 ethoxy units; mid-chain branched alkyl sulphates as discussed in US 6,020,303 and US 6,060,443; mid-chain branched alkyl alkoxy sulphates as discussed in US 6,008,181 and US 6,020,303.

Suitable alkyl alkoxylated sulphate surfactants for use herein are according to the formula RO(A)ₘ₃C₇₋₃M wherein R is an unsubstituted C₆-C₂₀ alkyl or hydroxyalkyl group having a C₆-C₂₀ alkyl component, preferably a C₈-C₂₀ alkyl or hydroxyalkyl, more preferably C₁₀-C₁₈ alkyl or hydroxyalkyl, A is an ethoxy or propoxy unit, m is greater than zero, typically between 0.5 and 6, more preferably between 0.5 and 5, and M is H or a cation which can be, for example, a metal cation (e.g., sodium, potassium, lithium, calcium, magnesium, etc.), ammonium or substituted-ammonium cation. Alkyl ethoxylated sulfates as well as alkyl propoxylated sulfates are
contemplated herein. Specific examples of substituted ammonium cations include methyl-, dimethyl-, trimethyl-ammonium and quaternary ammonium cations, such as tetramethyl-ammonium, dimethyl piperidinium and cations derived from alkanolamines such as ethylamine, diethylamine, triethylamine, mixtures thereof, and the like. Exemplary surfactants are C_{12}-C_{18} alkyl polyethoxylate (1.0) sulfate (C_{12}-C_{18}E(1.0)SM), C_{12}-C_{18} alkyl polyethoxylate (2.25) sulfate (C_{12}-C_{18}E(2.25)SM), C_{12}-C_{18} alkyl polyethoxylate (3.0) sulfate (C_{12}-C_{2}E(3.0)SM), C_{12}-C_{18} alkyl polyethoxylate (4.0) sulfate (C_{12}-C_{18}E(4.0)SM), wherein M is conveniently selected from sodium and potassium.

Suitable alkyl sulphonates for use herein include water-soluble salts or acids of the formula RSO_{3}M wherein R is a C_{6}-C_{2} linear or branched, saturated or unsaturated alkyl group, preferably a C_{6}-C_{18} alkyl group and more preferably a C_{10}-C_{16} alkyl group, and M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium), or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperidinium cations and quaternary ammonium cations derived from alkanolamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like). Particularly suitable liner alkyl sulphonates include C_{12}-C_{16} paraffin sulphonate like Hostapur® SAS commercially available from Hoechst.

Suitable alkyl aryl sulphonates for use herein include water-soluble salts or acids of the formula RSO_{3}M wherein R is an aryl, preferably a benzyl, substituted by a C_{6}-C_{2} linear or branched saturated or unsaturated alkyl group, preferably a C_{6}-C_{18} alkyl group and more preferably a C_{10}-C_{16} alkyl group, and M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium, calcium, magnesium and the like) or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperidinium cations and quaternary ammonium cations derived from alkanolamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like). An example of commercially available alkyl aryl sulphonate is Lauryl aryl sulphonate from Su.Ma.. Particularly preferred alkyl aryl sulphonates are alkyl benzene sulphonates commercially available under trade name Nansa® available from Albright&Wilson.
Suitable C6-C20 alkyl alkoxylated linear or branched diphenyl oxide disulphonate surfactants for use herein are according to the following formula:

![Formula Image]

wherein R is a C6-C20 linear or branched, saturated or unsaturated alkyl group, preferably a C12-C18 alkyl group and more preferably a C14-C16 alkyl group, and X+ is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium, calcium, magnesium and the like). Particularly suitable C6-C20 alkyl alkoxylated linear or branched diphenyloxide disulphonate surfactants to be used herein are the C12 branched diphenyloxide disulphonic acid and C16 linear diphenyloxide disulphonate sodium salt respectively commercially available by DOW under the trade name Dowfax 2A1® and Dowfax 8390®.

Other anionic surfactants useful herein include salts (including, for example, sodium, potassium, ammonium, and substituted ammonium salts such as mono-, di- and triethanolamine salts) of olefinsulfonates, sulphonated polycarboxylic acids prepared by sulphonation of the pyrolyzed product of alkaline earth metal citrates, e.g., as described in British patent specification No. 1,082,179, C8-C24 alkylpolyglycolethersulfates (containing up to 10 moles of ethylene oxide); alkyl ester sulfonates such as C14-C16 methyl ester sulfonates; acyl glycerol sulfonates, fatty oleyl glycerol sulfates, alkyl phenol ethylene oxide ether sulfates, alkyl phosphates, isethionates such as the acyl isethionates, N-acyl taurates, alkyl succinamates and sulfosuccinates, monoesters of sulfosuccinate (especially saturated and unsaturated C12-C18 monoesters) diesters of sulfosuccinate (especially saturated and unsaturated C6-C14 diesters), acyl sarcosinates, sulfates of alkylpolysaccharides such as the sulfates of alkylpolyglucoside (the nonionic nonsulfated compounds being described below), alkyl polyethoxy carboxylates such as those of the formula RO(CH2CH20)kCH2COO·M+ wherein R is a C8-C12 alkyl, k is an integer from 0 to 10, and M is a soluble salt-forming cation. Resin acids and hydrogenated resin acids are also suitable, such as resin, hydrogenated rosin, and resin acids and hydrogenated resin acids present in or derived from tall oil. Further examples are given in "Surface Active Agents and Detergents" (Vol. I and II by Schwartz, Perry and Berch). A variety of such surfactants are also

Zwitterionic surfactants represent another class of preferred surfactants within the context of the present invention. When present in the composition, zwitterionic surfactants may be comprised at levels from 0.01% to 20%, preferably from 0.2% to 15%, more preferably 0.5% to 12%.

Zwitterionic surfactants contain both cationic and anionic groups on the same molecule over a wide pH range. The typical cationic group is a quaternary ammonium group, although other positively charged groups like sulfonium and phosphonium groups can also be used. The typical anionic groups are carboxylates and sulfonates, preferably sulfonates, although other groups like sulfates, phosphates and the like can be used. Some common examples of these detergents are described in the patent literature: U.S. Patent Nos. 2,082,275, 2,702,279 and 2,255,082.

Suitable zwitterionic surfactants include betaines such alkyl betaines, alkylamidobetaine, amidazolinium betaine, sulfobetaine (INCI Sultaines) as well as the Phosphobetaine and preferably meets formula I:

\[
\text{R'}-\text{fCO-X (CH}_2\text{)}_n-\text{N}^+\text{(R}^3\text{)}-(\text{R}^3\text{)}-(\text{CH}_2\text{)}_m-\text{[CH(OH)-CH}_2\text{]}_y-\text{Y}^-. \text{(I)}
\]

wherein
- R\(^1\) is a saturated or unsaturated C\(6-22\) alkyl residue, preferably C\(8-16\) alkyl residue, in particular a saturated C\(10-16\) alkyl residue, for example a saturated C\(12-14\) alkyl residue;
- X is NH, NR\(^4\) with C\(1-4\) Alkyl residue R\(^4\), O or S,
- n a number from 1 to 10, preferably 2 to 5, in particular 3,
- x 0 or 1, preferably 1,
- R\(^2\), R\(^3\) are independently a C\(1-4\) alkyl residue, potentially hydroxy substituted such as a hydroxyethyl, preferably a methyl;
- m a number from 1 to 4, in particular 1, 2 or 3,
- y 0 or 1 and
- Y is COO, S\(03\), OPO(OR\(^5\))\(0\) or P(0)(OR\(^5\))\(0\), whereby R\(^5\) is a hydrogen atom H or a C\(1-4\) alkyl residue.

Preferred betaines are the alkyl betaines of the formula (Ia), the alkyl amido betaine of the formula (Ib), the sulfo betaines of the formula (Ic) and the amido sulfobetaine of the formula (Id):

\[
\text{R}^1\text{-N}^+\text{(CH}_3\text{)}_2\text{-CH}_2\text{COO}^-. \text{ (Ia)}
\]
R -CO-NH(CH$_2$)$_3$-N$^+$ (CH$_3$)$_2$-CH$_2$COO$^-$  

R$^1$-N$^+$ (CH$_3$)$_2$-CH$_2$CH(OH)CH$_2$S0$_3$$^-$  

R$^1$-CO-NH-(CH$_2$)$_3$-N$^+$ (CH$_3$)$_2$-CH$_2$CH(OH)CH$_2$S0$_3$$^-$

in which R$^1$ has the same meaning as in formula I. Particularly preferred betaines are the Carbobetaine [wherein Y$^-$=COO$^-$], in particular the carbobetaine of the formula (Ia) and (Ib), more preferred are the alkylamidobetaine of the formula (Ib).

Examples of suitable betaines and sulfobetaine are the following: almandamidopropyl betaine, apricotamidopropyl betaine, avocodoamidopropyl betaine, babassuamidopropyl betaine, behen amidopropyl betaine, behenyl betaine, canolamidopropyl betaine, capryl/capramidopropyl betaine, carnitine, cetyl betaine, cocamidoethyl betaine, cocamidopropyl betaine, cocamidopropyl hydroxysultaine, cocobetaine, cocohydroxysultaine, coco/oleamidopropyl betaine, coco sultaine, decyl betaine, dihydroxyethylloleylglycinate, dihydroxyethylstearylglucinate, dihydroxyethyl tallow glycinate, dimethiconepropyl pg-betaine, erucamidopropyl hydroxysultaine, hydrogenated tallow betaine, isostearamidopropyl betaine, lauramidopropyl betaine, lauryl betaine, lauryl hydroxysultaine, lauryl sultaine, milkamidopropyl betaine, minkamidopropyl betaine, myristamidopropyl betaine, myristyl betaine, oleamidopropyl betaine, oleamidopropyl hydroxysultaine, oleylbetaine, olivamidopropyl betaine, palmitamidopropyl betaine, palmitoyl carnitine, palmkernelamidopropyl betaine, polytetrafluoroethylene acetoxypropyl betaine, ricinole amidopropyl betaine, sesamidopropyl betaine, soyamidopropyl betaine, stearamidopropyl betaine, stearyl betaine, tallow amidopropyl betaine, tallowamidopropylhydroxysultaine, tallow betaine, tallowdihydroxyethyl betaine, undecylenamidopropyl betaine and wheat germ amidopropyl betaine. Preferred betaine is cocamidopropyl betaine.

A specific example of a zwitterionic surfactant is 3-(N-dodecyl-N,N-dimethyl)-2-hydroxypropone-1-sulfonate (Lauryl hydroxyl sultaine) available from the McIntryre Company (24601 Governors Highway, University Park, Illinois 60466, USA) under the tradename Mackam LHS®. Another specific zwitterionic surfactant is C$_{12,14}$ acylamidopropylene (hydroxypropylene) sulfobetaine that is available from McIntrye under the tradename Mackam 50-SB®. Other very useful zwitterionic surfactants include hydrocarbyl, e.g., fatty alkylene betaines. A highly preferred zwitterionic surfactant is Empigen BB®, a coco dimethyl betaine produced by Albright & Wilson. Another equally preferred zwitterionic surfactant is Mackam 35HP®, a coco amido propyl betaine produced by McIntrye.
Another class of preferred surfactants comprises the group consisting of amphoteric surfactants. One suitable amphoteric surfactant is a Cs-Ci6 amido alkylene glycinate surfactant ('ampho glycinate'). Another suitable amphoteric surfactant is a Cs-Ci6 amido alkylene propionate surfactant ('ampho propionate'). Other suitable, amphoteric surfactants are represented by surfactants such as dodecylbeta-alanine, N-alkyltaurines such as the one prepared by reacting dodecylamine with sodium isethionate according to the teaching of U.S. Patent No. 2,658,072, N-higher alkylaspartic acids such as those produced according to the teaching of U.S. Patent No. 2,438,091, and the products sold under the trade name "Miranol®", and described in U.S. Patent No. 2,528,378.

Cationic surfactants, when present in the composition, are present in an effective amount, more preferably from 0.1% to 20%, by weight of the liquid detergent composition. Suitable cationic surfactants are quaternary ammonium surfactants. Suitable quaternary ammonium surfactants are selected from the group consisting of mono C_{6-10} N-alkyl or alkenyl ammonium surfactants, wherein the remaining N positions are substituted by methyl, hydroxyethyl or hydroxypropyl groups. Another preferred cationic surfactant is a C_{6-18} alkyl or alkenyl ester of a quaternary ammonium alcohol, such as quaternary chlorine esters. More preferably, the cationic surfactants have the formula (V):

\[ \text{CH}_3 \quad \text{CH}_3 \quad \text{CH}_3 \]

\[ \text{N}^+ \quad (\text{CH}_2\text{CH}_2\text{O})_{\text{n}}\text{H} \]

\[ \text{X}^- \]

(V)

wherein R^1 of formula (V) is Cs-Cis hydrocarbyl and mixtures thereof, preferably, C_{8-14} alkyl, more preferably, Cs, C_{10} or C_{12} alkyl, and X^- of formula (V) is an anion, preferably, chloride or bromide.

Chelating agents

One class of optional compounds for use herein includes chelating agents or mixtures thereof. Chelating agents can be incorporated in the compositions herein in amounts ranging from 0.0% to 10.0% by weight of the total composition, preferably 0.01% to 5.0%.
Suitable phosphonate chelating agents for use herein may include alkali metal ethane 1-hydroxy
diphosphonates (HEDP), alkylene poly (alkylene phosphonate), as well as amino phosphonate
compounds, including amino aminotri(methylene phosphonic acid) (ATMP), nitrilo trimethylene
phosphonates (NTP), ethylene diamine tetra methylene phosphonates, and diethylene triamine
penta methylene phosphonates (DTPMP). The phosphonate compounds may be present either in
their acid form or as salts of different cations on some or all of their acid functionalities.

Preferred phosphonate chelating agents to be used herein are diethylene triamine penta
methylenephosphonate (DTPMP) and ethane 1-hydroxy diposphonate (HEDP). Such
phosphonate chelating agents are commercially available from Monsanto under the trade name
DEQUEST®.

Polyfunctionally-substituted aromatic chelating agents may also be useful in the compositions
herein. See U.S. patent 3,812,044, issued May 21, 1974, to Connor et al. Preferred compounds of
this type in acid form are dihydroxydisulfobenzenes such as 1,2-dihydroxy-3,5-disulfobenzene.

A preferred biodegradable chelating agent for use herein is ethylene diamine N,N'- disuccinic
acid, or alkali metal, or alkaline earth, ammonium or substitutes ammonium salts thereof or
mixtures thereof. Ethylenediamine N,N'- disuccinic acids, especially the (S,S) isomer have been
Ethylenediamine N,N'- disuccinic acids is, for instance, commercially available under the
tradename ssEDDS® from Palmer Research Laboratories.

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

Polymers

The compositions herein may optionally further comprises one or more alkoxylated polyethyleneimine polymer. The composition may comprise from 0.01% to 10%, preferably from 0.01% to 2%, more preferably from 0.1% to 1.5%, even more preferable from 0.2% to 1.5% by weight of the total composition of an alkoxylated polyethyleneimine polymer as described on page 2, line 33 to page 5, line 5 and exemplified in examples 1 to 4 at pages 5 to 7 of WO2007/135645 The Procter & Gamble Company.

The alkoxylated polyethyleneimine polymer of the present composition has a polyethyleneimine backbone having from 400 to 10000 weight average molecular weight; preferably from 400 to 7000 weight average molecular weight, alternatively from 3000 to 7000 weight average molecular weight.

The alkoxylation of the polyethyleneimine backbone includes: (1) one or two alkoxylation modifications per nitrogen atom, dependent on whether the modification occurs at a internal nitrogen atom or at an terminal nitrogen atom, in the polyethyleneimine backbone, the alkoxylation modification consisting of the replacement of a hydrogen atom by a polyalkoxylene chain having an average of about 1 to about 40 alkoxo moieties per modification, wherein the terminal alkoxy moiety of the alkoxylation modification is capped with hydrogen, a C1-C4 alkyl or mixtures thereof; (2) a substitution of one C1-C4 alkyl moiety or benzyl moiety and one or two alkoxylation modifications per nitrogen atom, dependent on whether the substitution occurs at a internal nitrogen atom or at an terminal nitrogen atom, in the polyethyleneimine backbone, the alkoxylation modification consisting of the replacement of a hydrogen atom by a polyalkoxylene chain having an average of about 1 to about 40 alkoxy moieties per modification wherein the terminal alkoxy moiety is capped with hydrogen, a C1-C4 alkyl or mixtures thereof; or (3) a combination thereof.

The composition may further comprise the amphiphilic graft polymers based on water soluble polyalkylene oxides (A) as a graft base and sides chains formed by polymerization of a vinyl ester component (B), said polymers having an average of ≤1 graft site per 50 alkylene oxide
units and mean molar mass M<sub>w</sub> of from 3,000 to 100,000 described in BASF patent application WO2007/138053 on pages 2 to page 10, line 34 and exemplified on pages 15-18.

**Radical scavenger**

The compositions of the present invention may further comprise a radical scavenger or a mixture thereof.

Suitable radical scavengers for use herein include the well-known substituted mono and dihydroxy benzenes and their analogs, alkyl and aryl carboxylates and mixtures thereof. Preferred such radical scavengers for use herein include di-tert-butyl hydroxy toluene (BHT), hydroquinone, di-tert-butyl hydroquinone, mono-tert-butyl hydroquinone, tert-butyl-hydroxy anisole, benzoicacid, toluicacid, catechol, t-butylcatechol, benzylamine, 1,1,3-tris(2-methyl-4-hydroxy-5-t-butylphenyl) butane, n-propyl-gallate or mixtures thereof and highly preferred is di-tert-butyl hydroxy toluene. Such radical scavengers like N-propyl-gallate may be commercially available from Nipa Laboratories under the trade name Nipanox SI®.

Radical scavengers, when used, may be typically present herein in amounts up to 10% by weight of the total composition and preferably from 0.001% to 0.5% by weight. The presence of radical scavengers may contribute to the chemical stability of the compositions of the present invention.

**Hydrotrope**

The liquid detergent compositions of the invention may optionally comprise a hydrotrope in an effective amount so that the liquid detergent compositions are appropriately compatible in water. Suitable hydrotropes for use herein include anionic-type hydrotropes, particularly sodium, potassium, and ammonium xylene sulfonate, sodium, potassium and ammonium toluene sulfonate, sodium potassium and ammonium cumene sulfonate, and mixtures thereof, and related compounds, as disclosed in U.S. Patent 3,915,903. The liquid detergent compositions of the present invention typically comprise from 0% to 15% by weight of the total liquid detergent composition of a hydrotrope, or mixtures thereof, preferably from 1% to 10%, most preferably from 3% to 10% by weight of the total liquid composition.
Polymeric Suds Stabilizer

The compositions of the present invention may optionally contain a polymeric suds stabilizer. These polymeric suds stabilizers provide extended suds volume and suds duration of the liquid detergent compositions. These polymeric suds stabilizers may be selected from homopolymers of (N,N-dialkylamino) alkyl esters and (N,N-dialkylamino) alkyl acrylate esters. The weight average molecular weight of the polymeric suds boosters, determined via conventional gel permeation chromatography, is from 1,000 to 2,000,000, preferably from 5,000 to 1,000,000, more preferably from 10,000 to 750,000, more preferably from 20,000 to 500,000, even more preferably from 35,000 to 200,000. The polymeric suds stabilizer can optionally be present in the form of a salt, either an inorganic or organic salt.

One preferred polymeric suds stabilizer is (N,N-dimethylamino)alkyl acrylate esters. Other preferred suds boosting polymers are copolymers of hydroxypropylacrylate/dimethyl aminoethylmethacrylate (copolymer of HPA/DMAM).

When present in the compositions, the polymeric suds booster/stabilizer may be present from 0.01% to 15%, preferably from 0.05% to 10%, more preferably from 0.1% to 5%, by weight of the liquid detergent composition.

Another preferred class of polymeric suds booster polymers is hydrophobically modified cellulosic polymers having a number average molecular weight (Mw) below 45,000; preferably between 10,000 and 40,000; more preferably between 13,000 and 25,000. The hydrophobically modified cellulosic polymers include water soluble cellulose ether derivatives, such as nonionic and cationic cellulose derivatives. Preferred cellulose derivatives include methylcellulose, hydroxypropyl methylcellulose, hydroxyethyl methylcellulose, and mixtures thereof.

Enzymes

The composition of the present invention may comprise an enzyme. Enzymes may be incorporated at a level of typically from 0.00001% to 1%, preferably at a level of from 0.0001% to 0.5%, more preferably at a level of from 0.0001% to 0.1% of enzyme protein by weight of the total composition.
The aforementioned enzymes can be provided in the form of a stabilized liquid or as a protected liquid or encapsulated enzyme. Liquid enzyme preparations may, for instance, be stabilized by adding a polyol such as propylene glycol, a sugar or sugar alcohol, lactic acid or boric acid or a protease stabilizer such as 4-formyl phenyl boronic acid according to established methods. Protected liquid enzymes or encapsulated enzymes may be prepared according to the methods disclosed in US 4,906,396, US 6,221,829, US 6,359,031 and US 6,242,405.

Enzymes suitable for use in the present compositions can be obtained from Genencor International, Palo Alto, California, U.S.A.; Novozymes A/S, Bagsvaerd, Denmark; Amersham Pharmacia Biotech., Piscataway, New Jersey, U.S.A.; Sigma-Aldrich Company Ltd, Dorset, UK.

**Perfume**

Suitable perfume compounds and compositions for use herein are for example those described in EP-A-0 957 156 under the paragraph entitled "Perfume", on page 13. The compositions herein may comprise a perfume ingredient, or mixtures thereof, in amounts up to 5.0% by weight of the total composition, preferably in amounts of 0.1% to 1.5%.

**Dye**

The liquid compositions according to the present invention may be coloured. Accordingly, they may comprise a dye or a mixture thereof.

**Delivery form of the compositions**

The compositions herein may be packaged in a variety of suitable packaging known to those skilled in the art, such as plastic bottles for pouring liquid compositions, squeeze bottles or bottles equipped with a trigger sprayer for spraying liquid compositions. Alternatively, the paste-like compositions according to the present invention may be packaged in a tube.

In an alternative embodiment herein, the liquid composition herein is impregnated onto a substrate, preferably the substrate is in the form of a flexible, thin sheet or a block of material, such as a sponge.
Suitable substrates are woven or non-woven sheets, cellulosic material based sheets, sponge or foam with open cell structures e.g.: polyurethane foams, cellulosic foam, melamine foam, etc.

The process of cleaning a surface

The present invention encompasses a process of cleaning a surface with a liquid composition according to the present invention. Suitable surfaces herein are described herein above under the heading "The liquid cleaning composition".

In a preferred embodiment said surface is contacted with the composition according to the present invention, preferably wherein said composition is applied onto said surface.

In another preferred embodiment, the process herein comprises the steps of dispensing (e.g., by spraying, pouring, squeezing) the liquid composition according to the present invention from a container containing said liquid composition and thereafter cleaning said surface.

The composition herein may be in its neat form or in its diluted form.

By "in its neat form", it is to be understood that said liquid composition is applied directly onto the surface to be treated without undergoing any dilution, i.e., the liquid composition herein is applied onto the surface as described herein.

By "diluted form", it is meant herein that said liquid composition is diluted by the user typically with water. The liquid composition is diluted prior to use to a typical dilution level of up to 10 times its weight of water. A usually recommended dilution level is a 10% dilution of the composition in water.

The composition herein may be applied using an appropriate implement, such as a mop, paper towel, brush or a cloth, soaked in the diluted or neat composition herein. Furthermore, once applied onto said surface said composition may be agitated over said surface using an appropriate implement. Indeed, said surface may be wiped using a mop, paper towel, brush or a cloth.
The process herein may additionally contain a rinsing step, preferably after the application of said composition. By "rinsing", it is meant herein contacting the surface cleaned/cleansed with the process according to the present invention with substantial quantities of appropriate solvent, typically water, directly after the step of applying the liquid composition herein onto said surface. By "substantial quantities", it is meant herein between 0.01 l.t. and 1 l.t. of water per m² of surface, more preferably between 0.1 l.t. and 1 l.t. of water per m² of surface.

Cleaning effectiveness

Cleaning Effectiveness test method:

Enamel tiles (typically glossy, white, 24cm x 7cm) are covered with typical home care soils such as white sauce, grease or greasy soap scum. Then the soiled tiles are cleaned using 5ml of the composition of the present invention poured directly on a Spontex® cellulose sponge pre-wetted with water. The sponge is then mounted on a Wet Abrasion Scrub Tester Instrument (such as made by Sheen Instruments Ltd. Kingston, England) with the particle composition coated side facing the tile. The abrasion tester can be configured to supply pressure (e.g.:600g), and move the sponge over the test surface with a set stroke length (e.g.:30cm), at set speed (e.g.:37 strokes per minute). The ability of the composition to remove white sauce, grease or greasy soap scum is measured through the number of strokes needed to perfectly clean the surface, as determined by visual assessment. The lower the number of strokes, the higher the white sauce, grease, or greasy soap scum cleaning ability of the composition.

Cleaning data below are achieved with 1-5% of abrasive particles -

<table>
<thead>
<tr>
<th>Product / Soil type</th>
<th>Greasy soap scum*</th>
</tr>
</thead>
<tbody>
<tr>
<td>All purpose cleaner (3.8% C9-C11 EO8 (Neodol 91-8®, pH adjusted to 9.5)</td>
<td>&gt;70 strokes to clean</td>
</tr>
<tr>
<td>+ 5% olive stone 150-250μm ECD 275microns, Circularity 0.54.</td>
<td>49 strokes to clean</td>
</tr>
</tbody>
</table>

*0.3g of typical greasy soap scum soils mainly based on calcium stearate and artificial body soils commercially available (applied to the tile via a sprayer). The soiled tiles are then dried in an oven at a temperature of 140°C for 10-45 minutes, preferably 40 minutes and then aged between 2 and 12 hours at room temperature (around 20°C) in a controlled environment humidity (60-85% RH, preferably 75% RH)
White Sauce*: 10 parts White sauce powder (Knorr White sauce is mixed with 90 part full cream milk and brought to ebullition for 5 minutes. 0.5g of the mix is distributed on 24cm x 7cm white, glossy, enamel tiles using a paint roller to obtain a uniform layer on top of the tile. Tiles are baked in an oven at 150° C for 30 minutes, then let to age 24 hours in a controlled temperature/humidity environment (25°C, 70%RH).

Neat Pure Grease**: 0.6 g neat pure grease (97.5% corn, sunflower and peanut oil at equal proportions + 2.5% Housewife Soil with Carbon Black) spread on 24cm x 7cm white, glossy, enamel tiles using a paint roller to obtain a uniform layer on top of the tile. Tiles are baked in an oven at 140° C for 2 hours and 10 minutes, then let to age 24 hours in a controlled temperature/humidity environment (25°C, 70%RH).

Examples
These following compositions were made comprising the listed ingredients in the listed proportions (weight %). Examples 1-24 herein are met to exemplify the present invention but are not necessarily used to limit or otherwise define the scope of the present invention.

Hard surface cleaner Bathroom composition:

<table>
<thead>
<tr>
<th>% Weight</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>C9-C11 E08 (Neodol 91-8®)</td>
<td>3</td>
<td>2.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Alkyl Benzene sulfonate</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C12-14-dimethyl Aminoxide</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n-Butoxy Propoxy Propanol</td>
<td>2</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Hydrogene Peroxide</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrophobic ethoxylated polyurethane (Acusol 882®)</td>
<td>1.5</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>Lactic Acid</td>
<td>3</td>
<td></td>
<td>3.5</td>
</tr>
<tr>
<td>Citric Acid</td>
<td>3</td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td>Polysaccharide (Xanthan Gum, Keltrol CG-SFT® Kelco)</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>Perfume</td>
<td>0.35</td>
<td>0.35</td>
<td>0.35</td>
</tr>
</tbody>
</table>
Olive pit particles (Particle sieved 150-250µη, circularity 0.43, 80 shore D hardness) | 6 | 6 | 6
---|---|---|---
Water | Balance | Balance | Balance

**Hard surface cleaner Bathroom composition (cont.):**

<table>
<thead>
<tr>
<th>% Weight</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloridric acid</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear C1O alkyl sulphate</td>
<td>1.3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>n-Butoxy Propoxy Propanol</td>
<td>2</td>
<td></td>
<td>1.75</td>
</tr>
<tr>
<td>Citric Acid</td>
<td></td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Polyvinylpyrrolidone (Luviskol K60®)</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>NaOH</td>
<td></td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Perfume</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Polysaccharide (Xanthan Gum Kelzan T®, Kelco)</td>
<td>0.3</td>
<td>0.35</td>
<td>0.35</td>
</tr>
<tr>
<td>Olive pit particles (Particle sieved 150-250µη, circularity 0.43, 80 shore D hardness)</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Water</td>
<td>Balance</td>
<td>Balance</td>
<td>Balance</td>
</tr>
</tbody>
</table>

**General degreaser composition:**

<table>
<thead>
<tr>
<th>% Weight</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>C9-C11 E08 (Neodol 91-8®)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>N-Butoxy Propoxy Propanol</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Ethanol</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Isopropanol</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Polysaccharide (Xanthan Gum-glyoxal modified Optixan-T)</td>
<td>0.35</td>
<td>0.35</td>
</tr>
<tr>
<td>Olive pit particles (Equivalent Circle Diameter 465µη, circularity 0.5, 80 shore D hardness)</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Water (+ minor e.g.: pH adjusted to alkaline pH)</td>
<td>Balance</td>
<td>Balance</td>
</tr>
</tbody>
</table>

**Scouring composition:**

<table>
<thead>
<tr>
<th>% Weight</th>
<th>12</th>
<th>13</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium C13-16 prafin sulfonate</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>C12-14-E07 (Lutensol A07®)</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Coconut Fatty Acid</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Ingredient</td>
<td>sodium citrate</td>
<td>sodium carbonate</td>
<td>orange terpenes</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>----------------</td>
<td>------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Sodium Citrate</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Sodium Carbonate</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Orange terpenes</td>
<td>2.1</td>
<td>2.1</td>
<td>2.1</td>
</tr>
<tr>
<td>Benzyl Alcohol</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Polyacrylie acid 1.5Mw</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diatomaceous earth (Celite 499® median size 10 µη)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium Carbonate (Merk 2066® median size 10 µη)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olive pit particles (Equivalent Circle Diameter 465 µη, circularity 0.5, 80 shore D hardness)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>balance</td>
<td>balance</td>
<td>balance</td>
</tr>
</tbody>
</table>

**Liquid glass cleaner:**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>% Weight</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butoxypropanol</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Ethanol</td>
<td>3</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>C12-14 sodium sulphate</td>
<td>0.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NaOH/Citric acid</td>
<td>To pH 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citric Acid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olive pit particles (Particle sieved 150-250µm, circularity 0.65, 80 shore D hardness)</td>
<td>2 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water (+ minor)</td>
<td>balance</td>
<td>balance</td>
<td>balance</td>
</tr>
</tbody>
</table>

5 Hand dishwashing detergent composition

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>% Weight</th>
<th>17</th>
<th>17bis</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear Alkylbenzene Sulfonate</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alkyl Ethoxy Sulfate</td>
<td>24</td>
<td>24</td>
<td>15</td>
<td>9</td>
<td>11</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Paraffin Sulfonate</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Coco amido propyl Betaine</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Ethoxylated alkyl alcohol</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>0.6</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Amine Oxide (1)</td>
<td>5.3</td>
<td>5.3</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Alkylpolyglucoside</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Ethanol</strong></td>
<td>3.25</td>
<td>3.25</td>
<td>-</td>
<td>3</td>
<td>2</td>
<td>9</td>
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<td><strong>Polypropyleneglycol</strong></td>
<td>0.7</td>
<td>0.7</td>
<td>0.8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
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<tr>
<td><strong>Citrate</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.1</td>
<td>0.3</td>
<td>-</td>
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<tr>
<td><strong>NaCl</strong></td>
<td>1.25</td>
<td>1.25</td>
<td>1.0%</td>
<td>-</td>
<td>0.2</td>
<td>-</td>
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<tr>
<td><strong>Sodium cumene sulfonate</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.6</td>
<td>-</td>
<td>3</td>
<td></td>
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<tr>
<td><strong>Olive pit particles</strong> (Particle sieved 150-250µm, circularity 0.54, ECD 275µm, 80 shore D hardness)</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td></td>
<td></td>
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<tr>
<td><strong>Olive pit particles</strong> (Particle sieved 150-250µm, circularity 0.52, ECD 300µm, 80 shore D hardness)</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Hydrogenated castor oil</strong></td>
<td></td>
<td></td>
<td>0.28</td>
<td>0.18</td>
<td>-</td>
<td>0.2</td>
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<tr>
<td><strong>Minors</strong></td>
<td>Balance to 100% with water</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>pH</strong></td>
<td>9</td>
<td>9</td>
<td>8.5</td>
<td>7</td>
<td>6</td>
<td>7</td>
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</table>

*Minors: dyes, opacifier, perfumes, preservatives, hydrotropes, processing aids, stabilizers

**Cleaning wipe (surface cleaning wipe):**

<p>| % Weight | 22 | 23 | 24 |
| <strong>C1O Amine Oxide</strong> | - | 0.02 | - |
| <strong>C12.14 Amine Oxide</strong> | 0.4 | - | - |
| <strong>Betaine (Rewoteric AM CAS 15 U)</strong> | - | - | 0.2 |
| <strong>C9.11 A5EO (Neodol E 91.5®)</strong> | - | 0.1 | - |
| <strong>C9.11 A8EO (Neodol E 91.8®)</strong> | - | - | 0.8 |
| <strong>C12.14 A5EO</strong> | 0.125 | - | - |
| <strong>2-Ethyl Hexyl Sulphate</strong> | - | 0.05 | 0.6 |
| <strong>Silicone</strong> | 0.001 | 0.003 | 0.003 |
| <strong>EtOH</strong> | 9.4 | 8.0 | 9.5 |
| <strong>Propylene Glycol Butyl Ether</strong> | 0.55 | 1.2 | - |
| <strong>Geraniol</strong> | - | - | 0.1 |
| <strong>Citric acid</strong> | 1.5 | - | - |
| <strong>Lactic acid</strong> | - | - | 1.5 |
| <strong>Perfume</strong> | 0.25 | 0.15 | 0.15 |
| <strong>Olive pit particles</strong> (Particle sieved 150-250µm, circularity 0.43, 80 shore D hardness) | 5 | 3 | 3 |</p>
<table>
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<th>Nonwoven: Spunlace 100% viscose 50gsm (lotion loading fact)</th>
<th>(x3.5)</th>
</tr>
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<tbody>
<tr>
<td>Nonwoven: Airlaid walkisoft (70% cellulose, 12% Viscose, 18% binder) 80gsm (lotion loading factor)</td>
<td>(x3.5)</td>
</tr>
<tr>
<td>Carded thermobonded (70% polypropylene, 30% rayon), 70gsm (Lotion loading factor)</td>
<td>(x3.5)</td>
</tr>
</tbody>
</table>

The above wipes lotion composition is loaded onto a water-insoluble substrate, being a patterned hydroentangled non-woven substrate having a basis weight of 56 gms comprising 70% polyester and 30% rayon approximately 6.5 inches wide by 7.5 inches long with a caliper of about 0.80 mm. Optionally, the substrate can be pre-coated with dimethicone (Dow Corning 200 Fluid 5cst) using conventional substrate coating techniques. Lotion to wipe weight ratio of about 2:1 using conventional substrate coating techniques.

The dimensions and values disclosed herein are not to be understood as being strictly limited to the exact numerical values recited. Instead, unless otherwise specified, each such dimension is intended to mean both the recited value and a functionally equivalent range surrounding that value. For example, a dimension disclosed as "40 mm" is intended to mean "about 40 mm".
What is claimed is:

1. A liquid cleaning composition comprising olive pit particles having an average degree of whiteness (L*) of greater than 65, measured under D 65 illumination and wherein said olive pit particles are derived from olive pit from olives collected from the olive tree Olea europaea tree species.

2. A liquid cleaning composition according to claim 1, wherein the olive pit particles are having degree of whiteness (L*) of preferably greater than 70, measured under D 65 illumination, and most preferably greater than 80.

3. A liquid cleaning composition according to any preceding claim, wherein olive cultivar is selected from the group consisting of Aglandau (Beruguette), Agrinion, Arauco, Ascolana, Ascolana del Piceno, Ascolana Tenera, Ascolano, Barnea, Cerignola, Coratina, Frantoio, Hojiblanca, Kura, Leccino, Lucques, Manzanilla, Manzanillo, Mission, Naphlion, Picholine, Picual, Salonenque, Sevillano, Sicilian and mixtures thereof.

4. A liquid cleaning composition according to any of the preceding claims, wherein said olive pit particles have a mean circularity from 0.1 to 0.7, preferably from 0.3 to 0.6 and more preferably from 0.4 to 0.5 measured according to ISO 9276-6:2008(E).

5. A liquid cleaning composition according to any of the preceding claims, wherein said abrasive particles have a mean particle size as expressed by the area-equivalent diameter from 50 to 550 μm and more preferably from 100 to 450 μm and most preferably from 200 to 300 μm according to ISO 9276-6.

6. A liquid cleaning composition according to any of the preceding claims, wherein said composition comprises olive pit particles from 0.1%, to 20%, preferably from 0.5% to 10%, more preferably from 1% to 8% and most preferably from 3% to 6% by weight of the composition.
7. A liquid cleaning composition according to any of the preceding claims, wherein the olive pit particles are produced from olives having the maturity index of the olive fruit population below 6, preferably below 5, more preferably below 4 and most preferably below 3.

8. A liquid cleaning composition according to any of the preceding claims further comprises a suspending aid, wherein said suspending aid is selected from the group consisting of polycarboxylate polymer thickeners; hydroxyl-containing fatty acid, fatty ester or fatty soap wax-like materials; micro fibril cellulose; carboxymethylcellulose, ethyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, hydroxymethyl cellulose, succinoglycan and naturally occurring polysaccharide polymers like Xanthan gum, gellan gum, guar gum, locust bean gum, tragacanth gum, succinoglu can gum, or derivatives thereof, or mixtures thereof.

9. A liquid cleaning composition according to any of the preceding claims, wherein said olive pit particles have a Shore D hardness from 60 to 90, more preferably from 70 to 90 and most preferably from 75 to 85 when immersed in the liquid cleaning composition, measured according to Shore D hardness scale by using a durometer type D according to a procedure described in ASTM D2240.

10. A liquid cleaning composition according to any of the preceding claims whereas the cleaning composition is loaded on a cleaning substrate whereas the substrate is a paper or nonwoven towel or wipe or a sponge.

11. A process of cleaning a surface with a liquid, cleaning composition according to any of the preceding claims, wherein said surface is contacted with said composition, preferably wherein said composition is applied onto said surface.

12. A process according to claim 11 wherein said surface is an inanimate surface, preferably selected from the group consisting of household hard surfaces; dish surfaces; surfaces like leather or synthetic leather; and automotive vehicles surfaces.
Fig. 1

Fig. 2
Olive Maturity index

Plain Olive →

0 1 2 3
Hard green Yellow-Green Color <1/2 surface Color >1/2 surface

Sliced Olive →

4 5 6 7
Hard green Yellow-Green Color <1/2 surface Color >1/2 surface

Fig. 5
**INTERNATIONAL SEARCH REPORT**

**International application No.**

PCT/US2013/027081

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**A. CLASSIFICATION OF SUBJECT MATTER**

INV. C11D3/14

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of database and, where practicable, search terms used)

EPO-Internal, WPI Data

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**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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<th>Category</th>
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Further documents are listed in the continuation of Box C.

See patent family annex.

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* Special categories of cited documents:

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

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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- "A" document member of the same patent family

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Date of the actual completion of the international search: 22 April 2013

Date of mailing of the international search report: 02/05/2013

Name and mailing address of the ISA:

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer:

Culmann, J
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