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(54) **ACID CLEANING FORMULATION**

(57) The present invention relates to an acid cleaning formulation characterised in that it comprises by weight with respect to the total weight of the formulation: 0.75 % - 4 % of at least one surfactant,  $\leq 3$  % of at least one solvent,  $< 5$  % of citric acid, 0.1 % - 0.3 % of 99 % triethanolamine, 0.1 % - 0.3 % of at least one perfume, 0.0005 % to 0.001 % by weight of at least one colourant, and a

sufficient quantity of osmotic water, wherein the sum of the quantity of all the components is less than or equal to 100 %, and wherein the formulation has a pH comprised between 2.5 and 6.5. The formulation of the invention is hypoallergenic, dermatologically safe, and biodegradable, therefore, it does not present a risk to the health of users or to the environment.

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## Description

### Object of the Invention

[0001] The present invention relates to a cleaning formulation, more particularly, an acid cleaning formulation comprising natural extracts which do not present a risk to the health of users or to the environment. The present invention therefore pertains to the sector of the chemical industry and, particularly, to the cleaning and disinfection product industry.

[0002] Said formulation comprises non-ionic or amphoteric surfactants and a series of additives conferring an acid nature to said formulation.

### Technical problem to be solved and background of the invention

[0003] Many of the cleaner compositions used in various industrial and domestic fields comprise chemical substances that are toxic to the health of the user, causing eye lesions and skin irritations. This combined with society's growing interest in respecting the environment and sustainability has led to industries manufacturing compositions for cleaning different types of materials face the need to develop biodegradable chemical products in order to eliminate any generation of chemical waste so as to have zero impact on the ecosystem.

[0004] In this manner, various cleaner compositions described in the patent literature have been developed.

[0005] One example is found in patent CN103608445A, which describes a biodegradable cleaning composition comprising biodegradable abrasive particles.

[0006] Another example is found in patent US2014352722A1, which describes a cleaning composition comprising abrasive particles, wherein said particles are abrasive foam particles and comprise a biodegradable thermoplastic material.

[0007] Lastly, patent application WO2010147485A1 relates to an acid cleaning composition using at least three organic acids which, when combined, act to provide a strong cleaning activity and require less acid concentration to achieve the same degree of cleaning effect as existing cleaning compositions.

[0008] Nevertheless, none of these patent documents relates to a formulation such as the one described herein or shows the advantages of the invention indicated herein.

[0009] While it is true that the compositions of the 3 mentioned patent documents are biodegradable, the first two documents describe compositions comprising abrasive nanoparticles or particles. Furthermore, the last document mentioned describes a composition which must comprise a minimum of 3 acids in its composition.

[0010] There is, therefore, a need to find compositions that have a more ecological profile, in other words, that use more ecological ingredients, reduce the number of

ingredients, reduce the application quantity necessary to achieve proper cleaning and are more effective than the current compositions. In addition, said compositions must be free of hazards for users and show proven efficacies that are equal to or better than other products currently existing on the market.

[0011] Therefore, the present document describes an improved cleaner formulation with respect to the cleaning compositions used at present in the detergent and cleaning product industry having very advantageous characteristics. Said formulation comprises natural extracts which do not present risks to health or to the environment and are biodegradable.

### 15 Description of the invention

[0012] The present invention proposes an acid cleaning formulation characterised in that it comprises by weight with respect to the total weight of the formulation:

0.75 % - 4 % of at least one surfactant,  
 $\leq 3$  % of at least one solvent,  
 $< 5$  % of citric acid,  
0.1 % - 0.3 % of 99 % triethanolamine,  
0.1 % - 0.3 % of at least one perfume,  
0.0005 % - 0.001 % of at least one colourant, and  
a sufficient quantity (qs) of osmotic water,  
and wherein the sum of the quantity of all the components is less than or equal to 100 %.

[0013] The present document refers to the object of the present invention as an acid cleaning formulation or acid cleaner formulation interchangeably.

[0014] At the formulation level, the cleaning capacity of the products is mainly achieved by an optimal mixture of surfactants, solvents, citric acid, perfumes and colourants, all in an aqueous base.

### Detailed description of the invention

[0015] The present invention proposes an acid cleaning formulation characterised in that it comprises by weight with respect to the total weight of the formulation:

0.75 % - 4 % of at least one surfactant,  
 $\leq 3$  % of at least one solvent,  
 $< 5$  % of citric acid,  
0.1 % - 0.3 % of 99 % triethanolamine,  
0.1 % - 0.3 % of at least one perfume,  
0.0005 % to 0.001 % by weight of at least one colourant, and a sufficient quantity (qs) of osmotic water,  
and wherein the sum of the quantity of all the components is less than or equal to 100 %.

[0016] The present formulation is characterised by having an acid pH comprised between 2.5 and 6.5.

[0017] In embodiments of the present invention, the

acid cleaner formulation object of the invention is characterised in that it comprises citric acid in a quantity of less than 5 %. Citric acid is a natural antioxidant that is present in most fruits and primarily in orange and lemon. In addition, citric acid is a very good preservative and has an excellent ecological and toxicological profile.

**[0018]** The acid cleaner formulation object of the invention is characterised in that it comprises 0.1 % - 0.3 % of 99 % triethanolamine, which is a weak base acting as a pH regulator with an excellent toxicological profile, which allows the pH to be kept slightly above 2.5. In an even more preferred embodiment, the quantity of 99 % triethanolamine is comprised between 0.15 % and 0.3 % by weight with respect to the total weight of the formulation.

**[0019]** Based on the aforementioned points, the acid comprised in the formulation object of the present invention is controlled and stabilised by 99 % triethanolamine. In this manner, the pH of the acid cleaner formulation cannot reach values below 2.5, preventing said acid cleaner formulation from being corrosive.

**[0020]** In embodiments of the present invention, the cleaner formulation can comprise non-ionic or amphoteric surfactants. In preferred embodiments of the present invention, the non-ionic surfactant can be fatty alcohol ethoxylate. In other preferred embodiments, the amphoteric surfactant can be betaine. In a more preferred embodiment, the quantity of betaine is comprised between 1.2 % and 1.8 % by weight with respect to the total weight of the formulation. In addition, the surfactants comprised in the formulation object of the invention can comprise preservatives, enhancers and foam stabilisers.

**[0021]** In preferred embodiments of the present invention, the quantity of citric acid and the quantity of surfactant present in the formulation object of the invention can be at a 5:1 ratio. In addition, in more preferred embodiments of the present invention, the quantity of acid that can be comprised in the formulation object of the invention is 4.5 %, and the quantity of surfactant is 0.935 %.

**[0022]** In other preferred embodiments of the present invention, when the formulation object of the invention comprises fatty alcohol ethoxylate, said surfactant cannot be comprised in a quantity greater than 0.99 % by weight with respect to the total weight of the cleaner formulation. In a more preferred embodiment, the quantity of fatty alcohol ethoxylate is comprised between 0.75 % and 0.99 % by weight with respect to the total weight of the formulation. In an even more preferred embodiment, the quantity of fatty alcohol ethoxylate is comprised between 0.8 % and 0.95 % by weight with respect to the total weight of the formulation.

**[0023]** In embodiments of the present invention, the acid cleaner formulation comprises at least one solvent which, in a preferred embodiment, can be butyl glycol, which is biodegradable, safe and even used in the food industry as an additive. In preferred embodiments of the present invention, the quantity of solvent is comprised

between 1.5 % and 3 % by weight with respect to the total weight of the formulation.

**[0024]** In embodiments of the present invention, the acid cleaner formulation comprises at least one perfume. In preferred embodiments of the present invention, the quantity of perfume is comprised between 0.1 % and 0.3 % by weight with respect to the total weight of the formulation. In an even more preferred embodiment, the quantity of perfume is comprised between 0.1 % and 0.2 % by weight with respect to the total weight of the formulation.

**[0025]** In the scope of the present invention, the perfumes which can be comprised in the formulation object of the invention are of a natural origin and their origin is mainly from plants, flowers, fruits, wood, etc. In embodiments of the present invention, the perfumes which can be comprised in the formulation object of the invention, if they are classified according to olfactory families, are perfumes selected from the group consisting of floral, fruit, balsamic, citrus, green, aromatic, marine and any combination thereof. In a preferred embodiment of the present invention, the perfume which can be comprised in the formulation object of the invention is from the balsamic olfactory family. In another preferred embodiment, the perfume which can be comprised in the formulation object of the invention is from the marine olfactory family.

**[0026]** In embodiments of the present invention, the acid cleaner formulation comprises at least one colourant. In preferred embodiments of the present invention, the quantity of colourant is comprised between 0.0005 % and 0.001 % by weight with respect to the total weight of the formulation. In the scope of the present invention, the colourants are classified according to an international index known as Colour Index International, which is used as a reference for colourant manufacturers. Based on the foregoing points, in embodiments of the present invention, the formulation object of the invention can comprise colourant CI14720 or CI 42051.

**[0027]** In preferred embodiments of the present invention, two types of acid cleaner formulations can be obtained, which are referred to herein as acid cleaner formulation type A and acid cleaner formulation type B. Both types of acid cleaner formulations have in common surfactants, citric acid and triethanolamine in the quantities described herein. Nevertheless, formulations type A and type B contain a different perfume and a different colourant.

**[0028]** In preferred embodiments of the present invention, when the acid formulation is type A, said formulation is characterised in that its perfume is from the marine olfactory family and the colourant is CI 42051. Said acid formulation type A presents a viscosity of 0.65 Pa·s at 20 °C. In another embodiment of the present invention, when the acid formulation is type B, said formulation is characterised in that its perfume is from the balsamic olfactory family and the colourant is CI14720.

**[0029]** Therefore, there is described an acid and biodegradable cleaner formulation, which is the first of its

kind in the scope of detergency, since it is a formulation that is not consolidated on the market today, having a cleaning capacity similar to products available on the market with the following advantages:

- It is hypoallergenic and dermatologically safe, therefore, it is highly advantageous for the end consumer;
- It is biodegradable, therefore, it does not cause environmental pollution.

#### Description of an exemplary embodiment of the invention

**[0030]** For the purpose of contributing to better understand the invention, and according to a practical embodiment thereof, a series of preferred exemplary embodiments of the present invention are attached as an integral part of this description.

#### Example 1: Composition 1 of the acid cleaning formulation

##### [0031]

COMPOSITION	%
FATTY ALCOHOL ETHOXYLATE	0.935
BUTYL GLYCOL	0.15
CITRIC ACID	4.50
PERFUME (Marine)	0.20
99 % TRIETHANOLAMINE	0.2
COLOURANT (CI42051)	0.001
WATER	qs

#### Example 2: Composition 2 of the acid cleaning formulation

##### [0032]

COMPOSITION	%
FATTY ALCOHOL ETHOXYLATE	0.935
BUTYL GLYCOL	3.00
CITRIC ACID	4.50
PERFUME (Balsamic)	0.20
99 % TRIETHANOLAMINE	0.30
COLOURANT (CI14720)	0.0005
WATER	qs

#### Claims

1. An acid cleaning formulation **characterised in that** it comprises by weight with respect to the total weight of the formulation:
  - 0.75 % - 4 % of at least one surfactant,
  - $\leq 3$  % of at least one solvent,
  - $< 5$  % of citric acid,
  - 0.1 % - 0.3 % of 99 % triethanolamine,
  - 0.1 % - 0.3 % of at least one perfume,
  - 0.0005 % to 0.001 % by weight of at least one colourant, and
  - a sufficient quantity of osmotic water,
  - and wherein the sum of the quantity of all the components is less than or equal to 100 %, and it has a pH comprised between 2.5 and 6.5.
2. The acid cleaning formulation according to claim 1, wherein the surfactant is non-ionic, amphoteric or a combination thereof.
3. The acid cleaning formulation according to claim 2, wherein the surfactant is non-ionic and is fatty alcohol ethoxylate and is comprised between 0.75 % and 0.99 % by weight with respect to the total weight of the formulation.
4. The acid cleaning formulation according to claim 2, wherein the surfactant is amphoteric and is betaine and is comprised between 1.2 % and 1.8 % by weight with respect to the total weight of the formulation.
5. The acid cleaning formulation according to any one of claims 1 to 4, wherein the ratio between the percentage of citric acid by weight and the percentage of the at least one surfactant by weight is 5:1.
6. The acid cleaning formulation according to any one of claims 1 to 5, wherein the perfume is selected from the group of olfactory families consisting of floral, fruit, balsamic, citrus, green, aromatic, marine and any combination thereof.
7. The acid cleaning formulation according to any one of claims 1 to 6, wherein the colourant is CI14720 or CI 42051.
8. The acid cleaning formulation according to any one of claims 1 to 7, wherein the perfume is from the marine olfactory family and the colourant is CI42051.
9. The acid cleaning formulation according to any one of claims 1 to 7, wherein the perfume is from the balsamic olfactory family and the colourant is CI14720.



## EUROPEAN SEARCH REPORT

Application Number

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A	* example 1: composition C * * column 11, lines 59-63 * * column 3, line 60 - column 4, line 15 * * column 5, line 53 * * column 7, lines 11-17 * * column 8, lines 19-67 * -----	4	C11D3/43 C11D3/40 C11D3/50 C11D3/30 C11D3/20
X	US 2014/017184 A1 (FUMAGALLI CHIARA [IT] ET AL) 16 January 2014 (2014-01-16) * example 12 * * paragraphs [0013] - [0020], [0063], [0083] * * the whole document * -----	1-9	
A	US 9 592 185 B2 (KLUG PETER [DE]; PILZ MAURICE FREDERIC [DE] ET AL.) 14 March 2017 (2017-03-14) * column 8 - column 11 * * the whole document * -----	1-9	
			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search <b>The Hague</b>		Date of completion of the search <b>31 January 2022</b>	Examiner <b>Yildirim, Zeynep</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

# ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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