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BA ME(30) Priority: **14.12.2011 ES 201132005**(71) Applicant: **SORO INTERNACIONAL S.A.****50171 La Puebla de Alfindén Zaragoza (ES)**(72) Inventor: **Soro, Lefebvre, Elisa****50171 La Puebla de Alfindén****Zaragoza (ES)**(74) Representative: **Schäfer, Matthias W.****Patentanwalt****Schwannseestrasse 43****81549 München (DE)**(54) **Detergent for dishwashing machine**

(57) Detergent for dishwashing machines, of the type used both in industrial and household dishwashing machines, characterized in that it contains a mixture of alkaline compounds, salts and phosphonates used as sequestrants instead of the conventionally used phosphates, the phosphonates being a combination of hexamethylene diamine tetra (methylene phosphonate), hydroxyethyl amine di (methylene phosphonate), and citrates.

This detergent for dishwashing machines that is presented provides numerous advantages over the currently available systems, the most important being that phosphates/tripolyphosphates are eliminated from the detergent composition, obtaining a very low environmental impact, especially on aquatic ecosystems, enabling the regulatory parameters to be fulfilled and hence achieving the EcoLabel ecological detergent designation.

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Description

[0001] The present description relates, as its title indicates, to a detergent for dishwashing machines, **characterized in that** it comprises a mixture of alkaline compounds, salts and phosphonates used as sequestrants instead of the conventionally used phosphates, the phosphonates being a combination of hexamethylene diamine tetra (methylene phosphonate), hydroxyethyl amine di (methylene phosphonate) and citrates.

[0002] At present, many and diverse types of detergents for dishwashing machines are widely known and used. They traditionally incorporate phosphates as an integral part of their composition, as seen, for example, in European Patents 2264160 "*Detergent composition*" and 22174401 "*Detergent composition*". These detergents present the major drawback of having a high environmental impact, especially on aquatic ecosystems, due to their toxicity for aquatic animal and plant species and to the length of time that the pollutants remain in the water

[0003] Some attempts have been made to improve this situation, as described in Patents ES 2079858 "*Washing agent*" and ES 2086236 "*Adjuvants for washing agents*" which employ zeolites and/or silicates instead of phosphates, which, although they improve their environmental impact, do not comply with the parameters laid down by the regulations in order for them to be considered ecological detergents.

[0004] Phosphonates have also been used in detergents, as claimed for example, in European Patent 2228468 "Detergent compositions for dish washing that contain phosphonates that stabilize colour", but their use is complementary as a colour stabilizer and they never totally replace phosphates, which means that they still do not achieve compliance with the parameters laid down by the regulations, for them to be considered ecological detergents.

[0005] To solve the currently existing problems in regard to the use of phosphates and their contaminating effects, the dishwashing detergent that is the subject of the present invention has been devised, which uses a mixture of alkaline compounds, salts and phosphonates, said phosphonates being a combination of hexamethylene diamine tetra (methylene phosphonate), hydroxyethyl amine di (methylene phosphonate) and citrates. The phosphonates are used as sequestrants instead of the conventionally used phosphates.

[0006] This detergent for dishwashing machines that is presented provides numerous advantages over the currently available systems, the most important being that the phosphates/tripolyphosphates are eliminated from the detergent composition, obtaining a very low environmental impact, especially on aquatic ecosystems.

[0007] Another important advantage is that the composition of the detergent enables compliance with the regulated parameters for total chemicals, forbidden or restricted substances or mixtures, toxicity for aquatic or-

ganisms, critical dilution volume, biodegradability of organic compounds and washing efficacy, and thus achieves the EcoLabel ecological detergent designation.

[0008] To gain a better understanding of the object of the invention, the attached drawing shows a preferred practical embodiment of the manufacture of the detergent for dishwashing machines. In said drawing figure -1- shows a simplified block diagram of the procedure for manufacturing the detergent for dishwashing machines.

[0009] Figure -2- shows an example of a container that can be used for said detergent.

[0010] The detergent for dishwashing machines that is the object of the present invention comprises, as can be seen on the attached drawing, the following elements:

- alkaline compounds (1): between 15% and 60% by weight
- salts (2): between 10% and 40% by weight
- phosphonates (3): between 1% and 15 % by weight.

[0011] The phosphonates (3) are used as sequestrants and can be:

- hexamethylene diamine tetra (methylene phosphonate),
- hydroxyethyl amine di (methylene phosphonate),
- citrates,
- or a combination of the aforementioned.

[0012] The phosphonates (3) replace the phosphonates that are conventionally used as sequestrants, they prevent limescale and are rust inhibitors. The mixture enhances the synergic power.

[0013] The alkaline compounds (1) can be:

- sodium hydroxide,
- potassium hydroxide,
- meta sodium silicate,
- sodium carbonate,
- or a combination of the aforementioned.

[0014] Sodium hydroxide or potassium hydroxide is used to maximize the degreasing effect of certain detergent formulations.

[0015] Sodium silicate is used as an iron inhibitor and its different salts or oxides have a synergic effect with surfactants, keeping the pH of solutions stable.

[0016] Sodium carbonate is used as an adjuvant in detergency and to control pH.

[0017] The salts (2) can be

- sodium sulphate,
- sodium hydrogen carbonate,
- sodium chloride,
- or a combination of the aforementioned.

[0018] Sodium sulphate is used as a pH regulator and dispersant.

[0019] Sodium hydrogen carbonate increases the degreasing effect of detergents and generates a buffer effect on pH as well as contributing to the softening of water.

[0020] Sodium chloride is used in the process as an ionic conductor.

[0021] The procedure for the manufacture of a detergent for dishwashing machines according to this invention comprises two differentiated phases:

- mixing phase (4): carried out by adding, in a mixer, the alkaline compounds (1), the salts (2), and the phosphonates (3), until a homogenous finish with suitable viscosity is obtained. Preferably a stainless steel mixer is used, with blades at an angle of 35°, one rotation direction and a speed governor.
- filling phase (5): performed by gravity, in the containers through a filling device.

carbonate, sodium chloride and amines.

5. Procedure for the manufacture of a detergent for dishwashing machines as described in the previous claims, wherein it comprises a mixing phase (4) and a filling phase (5).
6. Procedure for the manufacture of a detergent for dishwashing machines, according to claim 5, wherein the mixing phase (4) is carried out by adding in a mixer the alkaline compounds (1), the salts (2) and the phosphonates (3), until a homogenous finish with suitable viscosity is obtained.
7. Procedure for the manufacture of a detergent for dishwashing machines, according to claim 6, wherein the mixing phase (4) is performed in a stainless steel mixer with blades at an angle of 35°, one rotation direction and a speed governor.
8. Procedure for the manufacture of a detergent for dishwashing machines, according to claim 5, wherein the filling phase (5) is performed by gravity, in the containers, through a filling device.

Claims

1. Detergent for dishwashing machines, of the type used both in industrial and household dishwashing machines, **characterised in that** it comprises between 15% and 60% by weight of alkaline compounds (1), between 10% and 40% by weight of salts (2), and between 1% and 15 % by weight of phosphonates (3) used as sequestrants.
2. Detergent for dishwashing machines, according to claim 1, wherein the sequestrants used are chosen from the phosphonate group (3), formed by hexamethylene diamine tetra (methylene phosphonate), hydroxyethyl amine di (methylene phosphonate) and citrates, or a combination of the aforementioned.
3. Detergent for dishwashing machines, according to claim 1, wherein the alkaline compounds (1) are chosen from the group formed by sodium hydroxide, potassium hydroxide, metal sodium silicate and sodium carbonate.
4. Detergent for dishwashing machines, according to claim 1, wherein the salts (2) are chosen from the group formed by sodium sulphate, sodium hydrogen

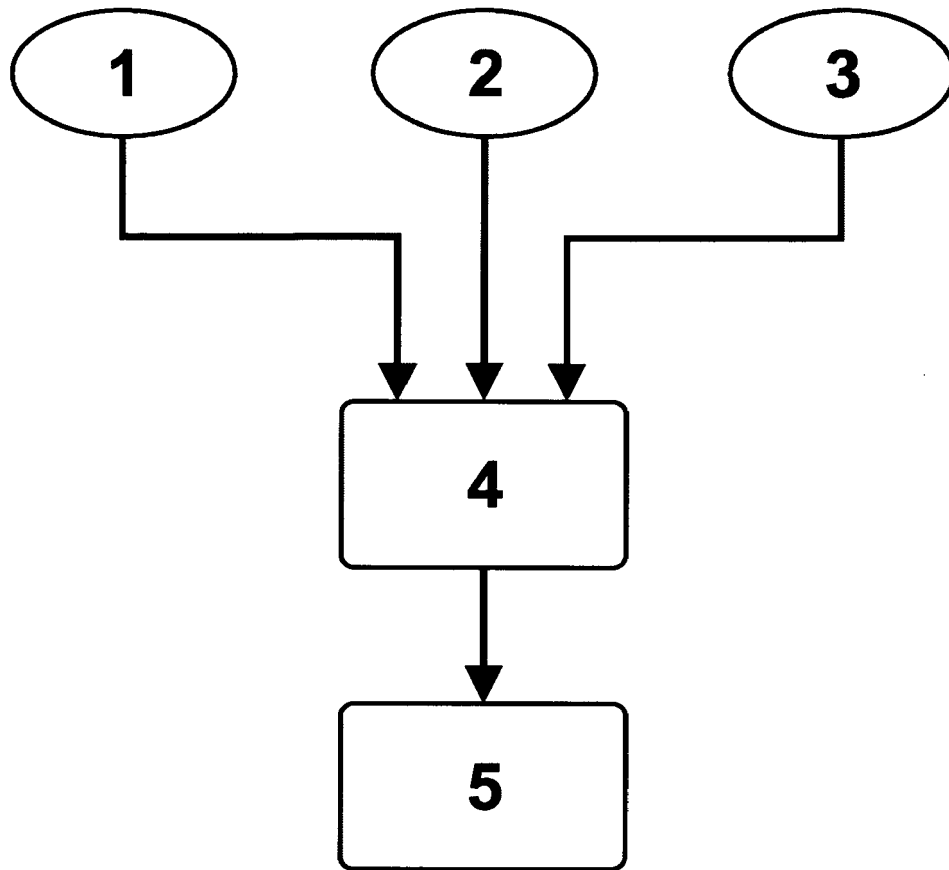


Fig. 1



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Application Number
EP 12 00 1324

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Munich		29 August 2012	Pfannenstein, Heide
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