Manual dishwashing detergent formulation made with sea water and biodegradable surfactants and method of production

A detergent manual dishwashing formulation and its production method where the formulation is made with seawater and two biodegradable anionic surfactants and by a combination of the following components:

a) Sea water in a quantity equal to 50-70% of the total weight;
b) Two biodegradable anionic surfactants, containing sulphur, which are in a total amount equal to 30-50% of the total weight, of which one at neutral pH;

c) A perfume compound formed from a mixture of natural and synthetic aromatic products in a quantity equal to 0.1-0.5% of the total weight;
d) Dyes based on mixtures of metal oxides in quantities equal to 0.001-0.005% of the total weight;
e) Preservative formed from a mixture of isothiazolin-3-one and 2-brom-2 nitropane-1,3-diol in an amount equal to 0.05-0.2% of the total weight.
Description

Technical Field of the invention

[0001] The present invention relates to a manual dishwashing detergent formulation made entirely with sea water and biodegradable surfactants and the process for its production. The present invention is the result of many years of experimentation on formulations designed to improve the quality of manual dishwashing detergents, to reduce formulation costs and environmental pollution which the surfactants normally may cause coming through urban sewer into the sea, since they are present in large quantities in these formulations.

State of the art

[0002] The formulations of manual dishwashing detergents are composed of a solvent commonly made of soft water, industrial water, drinking water or demineralized water, and by a solute consisting of cationic, anionic, non ionic and amphoteric surfactants that are admixed with waters, preservatives and perfumes, to which is added sodium in the form of sodium chloride in high concentrations, as a thickener to make sure that the detergent has the desired density and in the form of caustic soda, as a neutralizing agent.

[0003] The patent application EP-A1-1158040 describes a detergent containing anionic and cationic surfactants, its formulation is constituted by Dodecyl benzene sulfonic acid, Sodium laureth 2 sulphate, coconut starch propyl betaine, alkyl dimethyl hydroxyethyl ammonium chloride, caustic soda, soft water, perfume, dyes and preservatives. To produce detergents according to the formulations described in EP-A1-1158040 must use different types of surfactants, and large quantities of soft water and large amounts of caustic soda. Both the availability of fresh water, that the availability of large amounts of caustic soda imply significant costs and consumption of energy for their production involving a significant contribution to pollution of the environment. FR-A1-2731435 describes a liquid detergent composition for cleaning the skin and / or hair which comprises cationic surfactants, anionic and non-ionic surfactants, debacterized sea water and non-biodegradable substances such as tri-ethanol amine. DE-A1-4243702 describes a liquid detergent composition for rinsing contact lenses. This liquid solution has an ionic composition that is of the same quality as that of seawater. It is not foreseen the use of surfactants in its preparation in order to avoid that the absorption of these substances in contact lenses can create intolerance in the eye of the wearer.

Summary of the Invention

[0005] The purpose of the present invention is to provide a biodegradable manual dishwashing detergent whose formulation provides the use of only two biodegradable anionic surfactants having as solvent the sea water and a method that accomplishes such a formulation so that the components are perfectly dissolved in the solvent, and the perfume and the colour do not alter losing the original fragrance and colour.

[0006] In order to reduce in the formulation of a detergent the number of surfactant present, the consumption of soft water, the consumption of sodium chloride, the present invention has the purpose of using pure sea water. The levy of seawaters takes place in pristine areas of the sea under the supervision of an expert company in analytical checks.

[0007] In this way, the formula of the detergent is enriched with a considerable number of salts which give the detergent a high degreasing action.

[0008] In the sea there are the following salts:

\[
\begin{align*}
\text{Sodium chloride, magnesium chloride, potassium chloride, magnesium sulphate, calcium sulphate, potassium bromide, potassium iodide, potassium sulphate, } & \text{This mixture of natural salts combined with} \\
& \text{a limited number and a modest amount of suitable surfactants, produces a product with a balanced and synergistic detergent mixture and with a high degreasing action, which acts with reduced amount of product and with surprising results compared to traditional detergents.}
\end{align*}
\]

[0009] The aim of the present invention is to provide a manual dishwashing detergent made with sea water and biodegradable surfactants, provides that the detergent has to be at neutral pH. This result can not be achieved if Dodecyl benzene sulfonic acid is added to sea water since it is not possible to neutralize pH with sodium hydroxide, in presence of sea water. The present invention achieves the overcoming of this difficulty in the following way, in a second tank Dodecyl benzene sulfonic acid is neutralized with sodium hydroxide until neutral pH and titrated up to 25% and dodecyl benzene sulphonate 25% is stored waiting to be mixed.

[0010] The surprising results of the detergent object of the present invention are due to the presence of sea water in the detergent formulation. In fact, just think how in a short time the sea alone deletes the huge amount of waste of any kind that flows in it, protecting thanks to its balanced mixture of salts of which it is composed.

[0011] A further advantage of the detergent realized with sea water is that it is more durable than regular detergent products with industrial soft water.

[0012] Moreover another advantage, is that the detergent with sea water, should not be admixed of crystallizing, as for example sodium chloride, nor of thickeners of any kind, as the sea water alone realizes the densification
necessary to obtain the characteristic density of this type of product. With the detergent object of the present invention the following advantages: are obtained:

a) Reduced consumption of drinking water as seawater that is taken then returns to the sea;

b) It avoids the consumption of sodium chloride, as already present in the marine waters;

c) It has a lower consumption of detergent as the formula made with sea water is more effective than other cleaning products formulated with soft water.

d) The result is a reduction in earth pollution because less detergent is used to wash dishes by hand which is carried out without the addition of additives to increase the degreasing and thickeners that lower biodegradability.

e) The use of sea water in the detergent, rich in salts, contributes to sanitize the sewer ducts during the flow to the sea of the washing water.

f) Furthermore, since the surfactants are already mixed in the formulation with seawater during the way back to the sea begin to biodegrade and then to pour into the sea producing less pollution.

[0013] Further scope of the present invention is to provide a method of production which allows to obtain the detergent object of the present invention.

[0014] The method of production of a manual dishwashing detergent made entirely with sea water and biodegradable surfactants consists of the following phases:

a) water is taken from the bottom of the sea and is stored in a first tank;

b) sodium hydroxide is added to dodecylbenzenesulfonic acid until neutral pH and is titrated until obtaining sodium dodecyl benzene sulfonate 25% at neutral pH, sodium dodecyl benzene sulfonate 25% is cooled and stored in the second tank;

c) An amount of seawater of 50-70% is taken and sent in a mixer, with a mixing speed of between 60 and 70 revolutions per minute to avoid an excessive formation of foam;

d) an amount of 15-25% of sodium dodecyl benzene sulfonate 25% at neutral pH is added to sea water in the mixer while mixing;

e) an amount of 20 - 30% of sodium lauryl ether sulphate 27% is sent inside the mixer;

f) the dye is dissolved in water in a heating magnetic mixer at a temperature of 120 °C, mixing for 60 minutes, pouring a quantity equal to 0.1-0.5% of dye in the mixer;

g) an amount of 0.1-0.5% of perfume compound is prepared and is sent inside the mixer;

h) an amount of 0.05-0.2% of the preservative isothiazolin-3-one and 2-brom-2-nitropane-1,3-diol is inserted and is sent inside the mixer;

i) agitation is doubled by inserting a pump which draws the composition from the bottom of the mixer and sends it back in the upper part of the mixer for about 120 minutes; the double agitation is necessary to make the mixture homogeneous. j) The detergent is allowed to rest for 24 hours.

Example of embodiment

[0015]

a) 10,000 liters of water are taken from the sea bottom and stored in a first tank;

b) in a second tank sodium hydroxide is added until neutral pH to dodecylbenzenesulfonic acid that is titrated until obtaining sodium dodecylbenzenesulfonate 25% at neutral pH, sodium dodecylbenzenesulfonate 25% is cooled and stored in the second tank;

c) 5560 liters of sea water equal to 55.60% of the total mixture weight are taken and sent in a blade mixer, with a mixing speed of between 60 and 70 revolutions per minute to avoid an excessive formation of foam;

d) 2000 Kg, equal to 20% of the total mixture weight, of sodium dodecylbenzenesulfonate 25% at neutral pH are added to sea water in the mixer while mixing;

e) 2400 kg of sodium lauryl ether sulphate 27%, equivalent to 24% of the total mixture weight, are send in the mixer;

f) dye is dissolved in water in a heating magnetic mixer at a temperature of 120 °C, mixing for 60 minutes, pouring 0.350 Kg of dye in the mixer, equal to 0.0035% of the total mixture weight;

g) 30 Kg of perfume compound, equal to 0.3% of the total mixture weight, and they are prepared and sent inside the mixer;

h) 10Kg of preservative isothiazolin-3-one and 2-brom-2-nitropane-1,3-diol equal to 0.1% of the total...
mixture weight are inserted and is sent inside the mixer;

i) agitation is doubled by inserting a pump which draws the mixture from the bottom of the mixer and sends it back in the upper part of the mixer for about 120 minutes; the double agitation is necessary to make the mixture homogeneous. j) The detergent is allowed to rest for 24 hours.

The invention, it should be noted, is not limited to the description given but may be perfected and modified by those skilled in the art without, however, exceeding the limits of the patent.

The invention permits numerous advantages, and to overcome difficulties that could not otherwise have been overcome with the systems on sale at present.

Claims

1. A manual dishwashing detergent formulation made with seawater and two biodegradable anionic surfactants characterized in that it is further constituted by a combination of the following components:

   a) Sea water in a quantity equal to 50-70% of the total weight;
   b) Two biodegradable anionic surfactants, containing sulphur, which are in a total amount equal to 30-50% of the total weight, of which one at neutral pH;
   c) a perfume compound formed from a mixture of natural and synthetic aromatic products in a quantity equal to 0.1-0.5% of the total weight;
   d) Dyes based on mixtures of metal oxides in quantities equal to 0.0001-0.0005% of the total weight;
   e) Preservative formed from a mixture of isothiazolin-3-one and 2-brom-2-nitropane-1,3-diol in an amount equal to 0.05-0.2% of the total weight.

2. A manual dishwashing detergent formulation made with seawater and biodegradable surfactants according to claim 1 characterized in that it contains:

   a) water is taken from the bottom of the sea and is stored in a first tank;
   b) a sea water quantity between 50 and 70% of the total weight is sent in a blade mixer, with a mixing speed of between 60 and 70 revolutions per minute to avoid an excessive formation of foam;
   c) a quantity comprised between 15 and 25% of the total weight of sodium dodecyl benzene sulfonate 25% at neutral pH is added to sea water into the mixer while mixing;
   d) a quantity comprised between 20 and 30% of the total weight of sodium alkyl ether sulphate 27% is sent into the mixer;
   e) dye is dissolved in water in a heating magnetic mixer at a temperature of 120 °C, with agitation for 60 minutes, after that a quantity comprised between 0.003 and 0.005% of the total weight of colorant is poured in the mixer;
   f) a perfume compound in an amount equal to 0.1-0.5% of the total weight is prepared and is sent inside the mixer;
   g) preservative isothiazolin-3-one and 2-brom-2-nitropane-1,3-diol in an amount equal to 0.05-0.2% of the total weight is sent inside the mixer;
   h) agitation is doubled by inserting a pump which draws the composition from the bottom of the mixer and sends it back in the upper part of the mixer for about 120 minutes;
   i) The detergent is allowed to rest for 24 hours.

4. A method for producing a manual dishwashing detergent formulation according to the preceding claims characterized in that:

   a) water is taken from the bottom of the sea and is stored in a first tank;
   b) a sea water quantity between 50 and 70% of the total weight is sent in a blade mixer, with a mixing speed of between 60 and 70 revolutions per minute to avoid an excessive formation of foam;
   c) a quantity comprised between 15 and 25% of the total weight of sodium dodecyl benzene sulfonate 25% at neutral pH is added to sea water into the mixer while mixing;
   d) a quantity comprised between 20 and 30% of the total weight of sodium alkyl ether sulphate 27% is sent into the mixer;
   e) a perfume compound in an amount equal to 0.1-0.5% of the total weight is prepared and is sent inside the mixer;
   f) a perfume compound in an amount equal to 0.1-0.5% of the total weight is prepared and is sent inside the mixer;
   g) preservative isothiazolin-3-one and 2-brom-2-nitropane-1,3-diol in an amount equal to 0.05-0.2% of the total weight is sent inside the mixer;
   h) agitation is doubled by inserting a pump which draws the composition from the bottom of the mixer and sends it back in the upper part of the mixer for about 120 minutes;
   i) The detergent is allowed to rest for 24 hours.

5. A method for producing a detergent manual dishwashing formulation according to claim 4 characterized in that in a second tank the sodium dodecyl benzene sulphonate 25% is brought to neutral pH by adding sodium hydroxide to dodecylbenzenesulphonic acid, titrating to 25%, cooling and storing it.
### DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<th>Citation of document with indication, where appropriate, of relevant passages</th>
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<th>CLASSIFICATION OF THE APPLICATION (IPC)</th>
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</table>

**TECHNICAL FIELDS SEARCHED (IPC)**

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The present search report has been drawn up for all claims.

1 Munich 18 April 2013 Hillebrecht, Dieter

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