CLAIMS

1. A method for preparing (a) at least one cetylated fatty acid or a mixture of cetylated fatty acids comprising the steps of:

(I) placing at contact at least one fatty acid, cetyl alcohol and a metal catalyst in a chamber (3) of a reactor (2) in absence of solvent, to obtain a reaction mixture (15); followed by

(II) saturating the container (3) using an inert gas bringing the container (3) to a pressure P1 of about 1 atmosphere, applying a flow of said inert gas through said chamber (3); followed by

(III) applying a first heating ramp to said reaction mixture (15) up to reaching a temperature T1 comprised from 120°C to 200°C at a pressure P1 of about 1 atmosphere and in the presence of the inert gas flow to initiate an esterification reaction with initial formation of said cetylated fatty acid or mixture of cetylated fatty acids and esterification water; followed by

(IV) keeping said reaction mixture (15) under stirring at said temperature T1 and pressure P1 for a period of time comprised from 10 minutes to 2 hours; followed by

(V) applying a second heating ramp to said reaction mixture (15) up to reaching a temperature T2 comprised from 201°C to 260°C at a pressure P1 of about 1 atmosphere and in the presence of the inert gas flow to continue the esterification reaction with further formation of said cetylated fatty acid or mixture of cetylated fatty acids and esterification water; followed by

(VI) keeping said reaction mixture (15) under stirring at said temperature T2 and pressure P1 and in the presence of the inert gas flow for a period of time comprised from 4 hours to 12 hours;

(VII) applying a vacuum program in the chamber (3) which reduces the reaction pressure up to reaching a reduced pressure P2 comprised from 100 mbar to 10 mbar;

(VIII) keeping said reaction mixture (15) under stirring at said reduced pressure P2 and in the presence of the inert gas flow for a period of time comprised from 30 minutes and 4 hours to obtain complete formation of said at least one unrefined cetylated fatty acid or mixture of unrefined cetylated fatty acids (MI).

2. Method according to claim 1, wherein

said step (VI) of keeping said reaction mixture (15) under stirring at said temperature T2 and pressure P1 and in the presence of the inert gas flow for a period of time comprised between 6 hours and 12 hours is carried out up to reaching an acidity value of the reaction mixture (15) measured using the *AOCS Official Method Cd 3d-63* stable over time and comprised between 5 mgKOH/g and 8 mgKOH/g; and

said step (VIII) of keeping said reaction mixture (15) under stirring at said reduced pressure P2 and in the presence of the inert gas flow for a period of time comprised between 30 minutes and 4 hours up to obtaining an acidity value of the reaction mixture (15) measured using measured using the AOCS Official

Method Cd 3d-63 comprised between 4.5 mgKOH/g and 3.5 mgKOH/g to obtain complete formation of said at least one unrefined cetylated fatty acid or mixture of unrefined cetylated fatty acids (MI).

3. The method according to claim 1 or 2, wherein said at least one fatty acid is selected from among the group comprising or, alternatively, consisting of lauric acid, myristic acid, palmitic acid, palmitoleic acid, stearic acid, oleic acid, linoleic acid, eicosanoic acid, and the mixtures thereof;
preferably selected from among myristic acid, oleic acid and a mixture of myristic acid and oleic acid.

4. The method according to any one of the preceding claims, wherein said flow of inert gas is applied using blowing means (7) positioned in the volume portion of the chamber (3) overlying the reaction mixture (15).

5. The method according to any one of the preceding claims, wherein the esterification water, drawn out of the chamber (3) during the esterification reaction by applying the inert gas flow and the vacuum program, is condensed in a horizontal condenser (11) and collected in a container (13) after flowing through the vertical condenser (16).

6. The method according to any one of the preceding claims, wherein said method further comprises the step (IX) (filtering step) of filtering said at least one unrefined cetylated fatty acid (MI) obtained from step (VIII) on bleaching earth and/or filtering earth in a filter press (23), to obtain at least one filtered cetylated fatty acid (Mf) wherein the metal catalyst is absent or present at an amount smaller than 2% by weight with respect to the weight of said filtered cetylated fatty acid or mixture of filtered cetylated fatty acids (Mf).

7. The method according to any one of claims 1 to 6, wherein said method further comprises, subsequently to step (IX), the step (X) (deodorisation step) of treating said at least one filtered cetylated fatty acid (Mf) in a reactor (27) at a temperature T3 comprised from 150°C to 200°C and a reduced pressure P3 comprised from 1 mbar to 20 mbar in the presence of a water vapour flow for a period of time comprised from 1 hour to 5 hours to obtain a refined cetylated fatty acid (MF).

8. A method for preparing a composition comprising (a) at least one cetylated fatty acid, wherein the method comprises preparing at least one filtered cetylated fatty acid (Mf) by the method according to claim 6, or, alternatively, preparing at least one refined cetylated fatty acid (MF) by the method according to claim 7, and the step of mixing said at least one filtered cetylated fatty acid (Mf), or, alternatively, said at least one refined cetylated fatty acid (MF) with at least one antioxidant, wherein said at least one antioxidant is mixed at a total oxidant percentage by weight comprised from 0.001% to 0.5% with respect to the total weight of the composition, preferably between 0.005% to 0.1%, more preferably from 0.01% to 0.08%.

9. The method for preparing a composition according to claim 8, wherein said at least one filtered cetylated fatty acid (Mf) or at least one refined cetylated fatty acid (MF) comprises or, alternatively, consists of a mixture of cetylated myristic acid and cetylated oleic acid, and wherein said at least one antioxidant is tert-butyl-hydroquinone (TBHQ).

10. The method for preparing a composition according to claim 8 or 9, wherein before step (X), said at least one filtered cetylated fatty acid (Mf) obtained from step (IX), preferably a mixture of filtered cetylated myristic acid and cetylated oleic acid, is subjected to a step (XII) of adding said at least one filtered cetylated fatty acid (Mf) with a vegetable oil, preferably olive oil, to form a mixture comprising (Mf) and vegetable oil which is subsequently subjected to step (X).