

CLAIMS

1. A method for purifying a biological feedstock (70) comprising acylglycerols, free fatty acids and nitrogen containing compounds, the method comprising the steps:
- 5 a) subjecting the feedstock (70) to a first separation step (80) and separating from said feedstock a first fraction (90) comprising free fatty acids and nitrogen containing compounds, and collecting the residue (85) comprising acylglycerols,
- b) collecting the separated first fraction (90) and reacting said first
10 fraction in a reaction step (100) with glycerol (105) to obtain acylglycerols from the free fatty acid,
- c) feeding said first fraction (90) after said reaction step to a second separation step (120) and separating a second fraction (125) comprising nitrogen containing compounds, which is discharged as a waste-product,
- 15 d) collecting the remains (130) from said second separation step (120) containing formed acylglycerols,
- e) optionally combining the collected acylglycerols from steps a) and e),
- to obtain a purified biological feed containing the collected acylglycerols from step a) or e) or optionally both, containing reduced amount of free fatty acids and nitrogen containing compounds compared to the biological feedstock.
2. The method according to claim 1, wherein the purified biological feed is further subjected to a hydrotreatment process, optionally including an isomerisation step in the presence of a hydrotreating catalyst, where the acylglycerols are converted to paraffins.
- 25 3. The method according to claim 2, wherein the hydrotreatment process comprises at least a hydrodeoxygenation reaction, where the acylglycerols are reacted with hydrogen in the presence of a hydrodeoxygenation catalyst, and an isomerisation reaction in which the paraffins are at least partly converted to isoparaffins in the presence of an isomerisation catalyst.
- 30 4. The method according to claim 2 or 3, wherein the hydrotreatment process is performed under a continuous hydrogen flow with a hydrogen/feed ratio from 500 to 2000 n-L/L, preferably from 800 to 1400 n-L/L.
5. The method according to any one of the claims 2 to 4, wherein the
35 hydrotreatment process is performed at a temperature from 250 to 380°C, pref-

erably from 275 to 360°C, more preferably from 280 to 350°C, a pressure from 4 to 20 MPa and the hydrotreating catalyst comprises at least one component selected from IUPAC group 6, 8 or 10 of the Periodic Table.

6. The method according to any one of the claims 2 to 5, wherein the
5 hydrotreating catalyst is a supported Pd, Pt, Ni, NiW, NiMo or a CoMo catalyst and the support is zeolite, zeolite-alumina, alumina and/or silica, preferably selected from NiW/Al₂O₃, NiMo/Al₂O₃, CoMo/Al₂O₃ or a mixture thereof.

7. The method according to any one of the previous claims, wherein
10 the purification method is preceded by pre-treatment of said biological feedstock comprising separating volatiles from the feedstock, heat treatment, bleaching, degumming the feedstock or any possible combination thereof.

8. The method according to claim 7, wherein the heat treatment step is performed in a temperature of from 180 to 300°C under pressure to solidify at least part of phosphorous and/or metal containing impurities comprised in said
15 biological feedstock.

9. The method according to claim 7 or 8, wherein the pre-treatment includes a bleaching step comprising a filtering step of the biological feedstock.

10. The method according to claim 7, wherein the pre-treatment of the biological feedstock includes a heat treatment step and a bleaching step and said
20 biological feedstock is cooled before the bleaching step and the collected heat is used to heat the bleached biological feedstock prior to entering the first separation step of the purification method of claim 1.

11. The method according to any one of the previous claims, wherein the first separation step is performed by distilling or evaporating said biological
25 feedstock using a temperature which is higher than the boiling point of said free fatty acids and nitrogen containing compounds in the used pressure and below 300°C, preferably in a temperature from 250 to 280°C and a pressure of from 0.05 to 1 kPa.

12. The method according to any of the previous claims, wherein the
30 second separation step is performed by distilling or evaporating said biological feedstock using a temperature which is higher than the boiling point of said nitrogen containing compounds in the used pressure and below 300°C.

13. The method according to any of the previous claims, wherein the reaction of said first fraction with glycerol is performed in a temperature from
35 200 to 280°C, preferably in a temperature from 240 to 265°C and in the presence of a catalyst, preferably TBT (tetra butyl titanate).

14. The method according to any of the previous claims, wherein said biological feedstock is of low quality which cannot be directed directly into hydrotreatment processing, said low quality feedstock preferably containing up to 2000 ppm nitrogen, more particularly from 1500 to 1 ppm nitrogen, such as from 500 to 10 ppm nitrogen, by weight measured as total elemental nitrogen, wherein the nitrogen containing impurities in said biological feedstock preferably originate from oil or fat selected from animal fat, animal-based oils and fats, such as suet, tallow, blubber, recycled alimentary fats, oils originating from yeast, mould or algae, used cooking or frying oil and combination thereof.

15. The method according to any of the previous claims, wherein said nitrogen containing compounds include at least amides and amines.

16. The method according to any of the previous claims, wherein the amount of nitrogen containing compounds in the collected acylglycerol fractions from steps a) and e) is reduced by at least 50% compared to the amount in the biological feedstock provided in step a).

17. An apparatus for performing the purification method of any of the claims 1 to 15, wherein the apparatus comprises

- a first separation vessel for performing the separation in step a) to recover the first fraction
- a reaction vessel for reacting the separated first fraction of step a) with glycerol,
- a second separation vessel for performing said second separation step, and
- means for collecting the fractions formed in the purification method.