the pre-treatment of a non-marine fatty acid oil mixture while improving oil yield and quality. Additionally, the process may be used for making a concentrate comprising at least one natural component.

[014] In a first aspect, the present disclosure generally relates to a process for reducing at least one impurity and/or for producing a concentrate comprising anat least one impurity, which in this case is a natural component, from a non-marine fatty acid oil mixture, the process comprising: (a) mixing (i) a crudethe non-marine fatty acid oil mixture comprising an impurity that has not been subjected to solvent extraction with (ii) an a miscible organic solvent to form a solution; (b) passing the solution across at least one selective membrane, wherein a retentate forms comprising oil content, and a permeate forms comprising at least onethe impurity component; and (c) removing the miscible organic solvent from the retentate to form a purified non-marine oil, wherein the at least one impurity in the purified non-marine oil is reduced compared to the non-marine fatty acid oil mixture, wherein the non-marine fatty acid oil mixture comprises at least one non-marine oil selected from the group consisting ofchosen from a triglyceride oilsoil and a , phospholipid oils, and any combination thereof; and wherein the impurity is at least one component of the crude fatty acid oil mixture that is different from di-, triglycerides and phospholipids, wherein the selective membrane used is a nanofiltration membrane having: characterized by a molecular weight cut-off ranging from about 150 g/mol to about 1,500 g/mol; and a rejection R_{TG} of the at least one non-marine oil selected from the group consisting of a target compounds triglyceride oils, and a phospholipid oils and/or mixtures thereof, which is greater than the membrane rejection of the impurities $R_{Imp.}$. Thus, the major amounts of triglyceride oils and phospholipid oils are retained by the membrane.

[015] For example, the present disclosure relates to a process for reducing at least one impurity from a non-marine triglyceride oil comprising: (a) mixing the non-marine triglyceride oil with an organic solvent to form a solution, wherein the organic solvent is chosen from ethyl acetate, isopropanol, and acetone; (b) passing the solution across at least one selective membrane, wherein the at least one selective membrane has a molecular weight cut-off ranging from about 200 g/mol to about 800 g/mol, wherein a retentate forms comprising oil content, and a permeate forms comprising the at least one impurity; and (c) removing the organic solvent from the retentate to form a purified oil, wherein the triglyceride oil comprises di- and triglycerides and the process is performed at a temperature ranging from 30 °C to 50 °C

[016] The present disclosure further relates to a process for making a concentrate comprising at least one natural component from a non-marine fatty acid oil mixture, comprising: (a) mixing the non-marine fatty acid oil mixture with an organic solvent to form a solution; (b) passing the solution across at least one selective membrane, wherein a retentate forms comprising oil content and a permeate forms comprising the at least one natural component; and (c) removing the organic solvent from the permeate to form a concentrate comprising the at least one natural component, wherein the at least one natural component is chosen from fat soluble vitamins A, D or E, cholesterol, phytosterols, other sterols, lipophilic hormones, astaxanthin, cantaxanthin, beta-carotene, xanthophylls, other

Claims:

1. A process for reducing at least one impurity and/or for producing a concentrate comprising ~~at least one~~an impurity, which in this case is a natural component, from a non-marine fatty acid oil mixture, the process comprising:

(a) mixing (i) a crude ~~the~~ non-marine fatty acid oil mixture comprising an impurity that has not been subjected to solvent extraction with (ii) a~~n~~ miscible organic solvent to form a solution;
(b) passing the solution across at least one selective membrane, wherein a retentate forms comprising oil ~~content~~, and a permeate forms comprising ~~at least one~~the impurity ~~component~~; and
(c) removing the miscible organic solvent from the retentate to form a purified non-marine oil,

wherein the ~~at least one~~ impurity in the purified non-marine oil is reduced compared to the non-marine fatty acid oil mixture,
wherein the non-marine fatty acid oil mixture comprises at least one non-marine oil selected from the group consisting of ~~chosen from~~ a triglyceride ~~oils~~oil and a~~,~~ phospholipid oil~~s, and any combination thereof~~; and
wherein the impurity is at least one component of the crude fatty acid oil mixture that is different from di-, triglycerides and phospholipids,
wherein the selective membrane ~~used~~ is a nanofiltration membrane having ~~characterized by~~
- a molecular weight cut-off ranging from about 150 g/mol to about 1,500 g/mol, and
- a rejection R_{TG} of the at least one non-marine oil selected from the group consisting of a ~~target compounds~~ triglyceride oil~~s~~, and a phospholipid oil~~s and/or mixtures thereof~~, which is greater than the membrane rejection of the impurities $R_{Imp.}$

2. The process according to claim 1,
wherein the passing of the solution across the at least one selective membrane comprises diafiltration or cross-flow /tangential-flow filtration, preferably with a linear velocity ranging from about 0.1 m/s to about 5 m/s, particular preferred with about 0.5 m/s to about 3 m/s , or a combination of dia- and cross-flow filtration and/or
wherein the process is performed at a temperature ranging from about -10 °C to about 60 °C, preferably from about 25 °C to about 50 °C,
and/or
wherein the solution is passed across the at least one selective membrane at a filtration pressure ranging from about 5 bar to about 70 bar, preferably from about 15 bar to about 60 bar.

9. The process according to any one of claims 1 to 8,
wherein the process produces a reduction in the level of at least one impurity in the purified non-marine oil ranging from 50% to about 100%, preferably of about 70% to 100% and especially 80% to 100%, in particular preferred is a reduction of about 70% to about 99% compared to the non-marine fatty acid oil mixture.

10. The process according to any one of claims 1 to 9,
wherein the organic solvent is chosen from aliphatic hydrocarbons, aromatic hydrocarbons, ketones, esters, and alcohols, preferably from pentane, hexane, heptane, toluene, acetone, methyl ethyl ketone, methyl acetate, ethyl acetate, propyl acetate, butyl acetate, iso-propanol, butanol, pentanol, particular preferred from hexane, acetone, ethyl acetate and isopropanol and especially preferred from acetone, ethyl acetate and isopropanol.

11. The process according to any one of claims 1 to 10,
wherein the at least one selective membrane comprises a material chosen from polyethylene, polypropylene, polytetrafluoroethylene (PTFE), polyvinylidene difluoride (PVDF), polysulfone, polyethersulfone, polyacrylonitrile, polyamide, polyimide, polyamideimide, polyetherimide, cellulose acetate, polyaniline, polypyrrole, polyetheretherketone (PEEK), polybenzimidazole, and mixtures thereof.

12. The process according to claim 11
wherein the at least one selective membrane has a molecular weight cut-off ranging from ~~about 150 g/mol to about 1,500 g/mol, preferably from~~ about 200 g/mol to about 700 g/mol and preferably~~particular preferred~~ 300-600 g/mol
and/or
wherein the at least one selective membrane provide a contact angle for water of more than 70° at 25°C, as measured using the static sessile drop method preferably of more than 75° at 25°C and especially preferred more than 95° at 25°C and/or
wherein particularly preferred hydrophobic membranes of the present invention are polyimide membranes, particularly preferred made of P84, whose CAS registry number is 9046-51-9, and/or P84HT whose CAS registry number is 134119-41-8,

and/or mixtures thereof, that optionally may be crosslinked and/or organic coated, especially with silicone acrylates as coating agents.

13. The process according to any one of claims 1 to 12, wherein the permeate comprises at least one of free cholesterol, esterified cholesterol, sterols, esterified sterols, phenolic compounds, oxidation products, components that create unwanted smell and/or taste in the oil mixture, Vitamin A, Vitamin D, Vitamin E, astaxanthin, canthaxanthin, and other carotenoids with an increased concentration compared to the non-marine fatty acid oil mixture.

14. A process according to any one of claims 1 to 8, and 9 to 13 comprising:

(a) mixing the non-marine fatty acid oil mixture with an organic solvent to form a solution;

(b) passing the solution across at least one selective membrane, wherein a retentate forms comprising oil content and a permeate forms comprising the at least one natural component; and

(c) removing the organic solvent from the permeate to form a non-marine concentrate comprising the at least one natural component,

wherein the at least one natural component is chosen from free cholesterol, esterified cholesterol, sterols, esterified sterols, phenolic compounds, oxidation products, components that create unwanted smell and/or taste in the oil mixture, Vitamin A, Vitamin D, Vitamin E, astaxanthin, canthaxanthin, and other carotenoids, and

wherein the fatty acid oil mixture comprises non-marine oil comprising triglyceride oils, phospholipid oils, and any combination thereof.

15. The process according to claim 14, further comprising purifying the non-marine concentrate using a method chosen from HPLC, supercritical fluid chromatography, distillation, molecular distillation, short path evaporation, thin film evaporation, extraction, absorption, and any combination thereof.

~~16. The process according to any one of the preceding claims, wherein the non-marine fatty acid oil mixture is crude non-marine fatty acid oil mixture.~~

~~17. The process according to any one of the preceding claims, wherein the organic solvent is miscible with the non-marine fatty acid oil mixture.~~

16~~18~~. The process according to ~~claim 17~~any one of the preceding claims, wherein the non-marine fatty acid oil mixture dissolved in the miscible solvent forms a homogeneous solution.