CLAIMS

1. Process for the production of high value bio-chemicals, preferably including paraffins, LPG, jet fuel, diesel and naphtha, from natural occurring oil(s) containing acyl-containing compounds having 10 to 24 carbons including fatty acid esters and free fatty acids, and other components including impurities, comprising the steps of:

(a) refining the natural occurring oil(s) to remove at least a part of the impurities and to obtain a refined oil,

(b) optionally pre-treating the refined oil to further remove impurities and to obtain a pre-treated oil,

(c) hydroprocessing the refined oil or the pre-treated oil in presence of dihydrogen and of at least one catalyst to transform fatty acid esters and free fatty acids contained in said refined oil or pre-treated oil into linear or substantially linear paraffins, where the hydroprocessing is chosen among hydrodeoxygenation, decarboxylation and decarbonylation, and

the hydrodeoxygenation is carried out at a temperature from 200 to 500 °C, under a pressure from 1 MPa to 10 MPa and with a dihydrogen to oil feed ratio from 100 to 2000,

the decarboxylation/decarbonylation is carried out at 100 to 550 °C in presence of dihydrogen at pressures ranging from 0.01 up to 10 MPa, the dihydrogen to feedstock ratio being from 100 to 2000 Nl/l

characterized in that the refining step (a) includes

a hydrodynamic cavitation processing of the natural occurring oil(s) in presence of water under conditions efficient to generate cavitation features and to transfer at

least a part of impurities contained in the natural occurring oil(s) into an aqueous phase, and

separating the aqueous phase from an oil phase and recovering the oil phase as a refined oil.

2. Process according to claim 1 wherein the natural occurring oil(s) contain(s)one or several oils chosen among vegetable oil, animal fat, waste oils, by-products of the refining of vegetable oil(s) or of animal oil(s) containing free fatty acids, tall oils, and oil produced by bacteria, yeast, algae, prokaryotes or eukaryotes.

3. Process according to claim 1 or 2, characterised in that at least one degumming agent is added to the natural occurring oil(s) in the hydrodynamic cavitation processing step.

4. Process according to claim 3, characterized in that the degumming agent is chosen among steam, acids and complexing agents.

5. Process according to any one of claims 1 to 4, characterised in that the pre-treatment performed at step b) is chosen among a bleaching process in which the refined oil is contacted with an absorbent, a process in which the refined oil is contacted with an ion-exchange resin, a mild acid wash of the refined oil, a process using guard-beds, filtration, solvent extraction.

6. Process according to any one of claims 1 to 5, characterised in that it further comprises

hydrolysing the refined oil or pre-treated oil to transform fatty acid esters contained into the refined oil or pre-treated oil into alcohols and free fatty acids,

sending to the hydroprocessing step, in particular directly, the free fatty acids after alcohols removal.

7. Process according to any one of claims 1 to 6, characterised in that said at least one catalyst of the hydroprocessing step is chosen among a hydrogeoxygenation catalyst, a decarbonylation catalyst and a decarboxylation catalyst.

8. Process according to any one of claims 1 to 7, characterised in that it further comprises:

(d) submitting at least a part of the linear or substantially linear paraffins from step c) to a hydrocracking – hydroisomerisation reaction in presence of dihydrogen and of at least one catalyst to obtain an effluent and fractionating said effluent into dihydrogen, LPG, naphtha, Jet fuel and diesel fractions.

9. Process according to any one of claims 1 to 8, characterised in that a light fraction comprising C4-C15 hydrocarbons, preferably C5-C10 hydrocarbons, is added to the natural occurring oil(s) in the hydrodynamic cavitation processing step.

10. Process according to claim 9, characterised in that the light fraction is a naphtha fraction, optionally recovered from the fractionation of the effluent from the hydrocracking – hydroisomerisation step (d).

11. Process according to any one of claims 1 to 8, characterised in that a gas stream comprising dihydrogen, carbon dioxide, dihydrogen sulfide, methane, ethane, propane or mixtures thereof, is added to the natural occurring oil(s) in the hydrodynamic cavitation processing step.

12. Process according to any one of claims 1 to 11, characterised in that it further comprises:

(e) submitting at least a part of the linear or substantially linear paraffins from step c) to a steamcracking reaction.