

5 Claims/PCT/FI2009/050584/ Amended 2.12.2009

10 1. A process for producing hydrocarbons, said process comprising the stages, wherein in the first stage an oil feed of biological origin and hydrogen gas are subjected to hydrodeoxygenation at a pressure between 10 and 150 bar, a temperature between 200 and 400 °C, in the presence of a hydrogenation catalyst comprising a metal selected from Group VIII and/or VIB of the Periodic System of Elements to yield n-paraffins;

15 in the second stage the n-paraffins and hydrogen gas are subjected to conditions sufficient to effect isomerisation in the presence of an isomerisation catalyst to yield isoparaffins and separating fractions; and

recycling the fraction boiling at or above 200°C temperature under atmospheric pressure obtained from the second stage to reisomerization, where isomerization is effected in the presence of an isomerization catalyst.

20 2. The process according to claim 1, **characterized** in that the fraction boiling at or above 200°C temperature is combined with the fraction boiling in the diesel fuel range from 160 to 360 °C, or part of it.

25 3. The process according to claim 1 or 2, **characterized** in that the hydrodeoxygenation is carried out at a pressure between 30 and 70 bar, a temperature between 250 and 350 °C.

30 4. The process according to any one of claims 1 - 3, **characterized** in that in the second stage the isomerisation is carried out at a pressure between 10 and 150 bar, a temperature between 200 and 500 °C, in the presence of an isomerisation catalyst comprising a molecular sieve and/or a metal selected from Group VIII of the Periodic Table of Elements.

35 5. The process according to any one of claims 1 - 4, **characterized** in that the oil feed of biological origin is selected from plant-based fats and oils, fats contained in plants bred by means of gene manipulation, animal-based fats, recycled fats of the food industry and fats and oils originating from processes utilizing microbes.

- 5 6. The process according to any one of claims 1- 5, **characterized** in that the fraction boiling at or above 200°C temperature is recycled and combined with the feed to the second stage and reisolomerized.
- 10 7. The process according to any one of claims 1- 5, **characterized** in that the second stage comprises at least two sections and the n-paraffins obtained from the first stage are passed to the second section of the second stage and isomerised and the fraction boiling at or above 200°C temperature is recycled and passed to the first section of the second stage and reisolomerised.
- 15 8. The process according to any one of claims 1- 5, **characterized** in that the fraction boiling at or above 200°C temperature is recycled and reisolomerised in a third stage in the presence of an isomerisation catalyst.
- 20 9. The process according to claim 8, **characterized** in that in the third stage the isomerisation is carried out at a pressure between 10 and 150 bar, a temperature between 200 and 500 °C, in the presence of an isomerisation catalyst comprising a molecular sieve and/or a metal selected from Group VIII of the Periodic Table of Elements.

Claims

1. A process for producing aviation fuel or blending stocks for aviation fuel, wherein said process comprises

a first stage subjecting an oil feed comprising fatty acids and/or fatty acid esters of biological origin and hydrogen gas to hydrodeoxygenation at a pressure between 10 and 150 bar, a temperature between 200 and 400 °C, in the presence of a hydrogenation catalyst comprising a metal selected from Group VIII and/or VIB of the Periodic System of Elements to yield n-paraffins; and

a second stage subjecting the n-paraffins obtained from the first stage and hydrogen gas to effect isomerisation in the presence of an isomerisation catalyst to yield isoparaffins, and

separating by distillation the fractions obtained at the second stage into a fraction boiling in the gas range, into a fraction boiling in the gasoline range, into a fraction boiling in the aviation fuel range, into a fraction boiling in the diesel range and into the a heavy recycle stream boiling at a temperature from 290°C to 650°C under atmospheric pressure, and

recycling the heavy recycle stream fraction to second isomerisation, namely reisomerisation, where isomerisation is effected in the presence of an isomerisation catalyst.

2. The process according to claim 1, **characterized** in that the second stage comprises at least two sections and the n-paraffins obtained from the first stage are passed to the second section of the second stage and isomerised and the fraction boiling at a temperature of 290 – 650 °C is recycled and passed to the first section of the second stage and reisomerised.

3. The process according to any of the claims 1 - 2, **characterized** in that the hydrodeoxygenation is carried out at a pressure between 30 and 70 bar, a temperature between 250 and 350 °C.
4. The process according to any one of claims 1 - 3, **characterized** in that in the second stage the isomerisation is carried out at a pressure between 10 and 150 bar, a temperature between 200 and 500 °C, in the presence of an isomerisation catalyst comprising a molecular sieve and/or a metal selected from Group VIII of the Periodic Table of Elements.
5. The process according to any one of claims 1 - 4, **characterized** in that the fatty acids and fatty acid esters originate from biological and renewable sources selected from plant-based fats and oils, fats contained in plants bred by means of gene manipulation, animal-based fats, recycled fats of the food industry and fats and oils originating from processes utilizing microbes.