Claims

1. A method for combined production of aviation fuel and diesel fuel both of biological origin, the method comprising

providing feedstock of biological origin containing fatty acids and/or esters of fatty acids, and

subjecting the feedstock to hydrotreatment for removal of oxygen, and to isomerization for branching of hydrocarbon chain of hydrotreated feedstock to obtain a paraffinic hydrocarbon intermediate having a carbon number distribution in the range of C10 to C20, and wherein the hydrotreatment is performed is performed in the presence of one or more catalyst(s) selected from hydrogenation metal on a support, such as a catalyst selected from a group consisting of Pd, Pt, Ni, Co, Mo, Ru, Rh, W or any combination thereof, under hydrogen pressure from 10 to 150 bar, and at a temperature from 200-400 °C, and wherein the isomerization is performed in the presence of one or more catalyst(s) comprising a Group VIII metal on a support, and the support is selected from silica, alumina, clays, titanium oxide, boron oxide, zirconia, which can be used alone or as a mixture, preferably silica and/or alumina, at a temperature from 200-500 °C, and at a pressure of 10-150 bar, and

fractionating said paraffinic hydrocarbon intermediate into at least two fractions,

a lighter fraction fulfilling the specification ASTM D7566-20 Annex A2 for aviation fuel, and

a heavier fraction fulfilling the requirements of EN 15940-18 standard for paraffinic diesel specification; and

wherein the production capacity of the lighter fraction and the production capacity of the heavier fraction are adjusted by selection of process conditions, preferably the isomerization process conditions, wherein yield of the lighter fraction is from 20 to 90 wt-% of the total weight of the formed fractions, and yield of the heavier fraction is from 10 to 80 wt-% of the total weight of the formed fractions, and

wherein a combined yield of the two fractions is at least 98 wt-% of the paraffinic hydrocarbon intermediate of biological origin.

2. The method according to claim 1, wherein the hydrotreatment, preferably hydrodeoxygenation, is performed under a hydrogen pressure from 20-120 bar, such as 30-100 bar, and at a temperature from 250-380 °C, such as 280-360 °C.

3. The method according to claim 1 or 2, wherein the hydrotreatment is performed in the presence of a catalyst comprising one or more catalyst(s) selected from CoMo, NiMo, NiW, CoNiMo on a support, for example an alumina support.

4. The method according to any one of the claims 1-3, wherein the isomerization, preferably hydroisomerization, is performed at a temperature of 280-370 °C, and at a pressure of 20-50 bar.

5. The method according to any one of claims 1 to 4, wherein the feedstock is subjected, after hydrotreatment and isomerization, to stabilization at a pressure lower than the isomerization pressure.

6. The method according to claim 5, wherein during stabilization an overhead fraction comprising hydrocarbons in the naphtha range (C4-C8) is formed, and preferably an amount of 60 wt-% or more, such as 90 wt-% or more, such as from 90 to 95 wt-%, of the formed hydrocarbons in the naphtha range at the stabilization column overhead, is recycled back to the stabilization.

7. A diesel fuel component of biological origin obtained by the method according to any one of claims 1-6, comprising 0-5 wt-% of n-paraffins in C16-C20 range and 90-97 wt-% isoparaffins in C16-C20 range, from 21 wt-% to 45 wt-% of C17 paraffins and from 50 wt-% to 75 wt-% of C18 paraffins.

8. The diesel fuel component of biological origin according to claim 7, wherein the diesel fuel component comprises 0-8 wt-% of n-paraffins in C17-C19 range, preferably 0-5 wt-%.

9. The diesel fuel component of biological origin according to claim 7 or 8, wherein the diesel fuel component comprises 85-95 wt-% isoparaffins in C17-C20 range, preferably 88-95 wt-%.

10. The diesel fuel component of biological origin according to any one of claims 7-9, wherein the diesel fuel component comprises from 21 wt-% to 43 wt-% of C17 paraffins.

11. The diesel fuel component of biological origin according to any one of claims 7 - 10, wherein the diesel fuel component comprises from 45 wt-% to 75 wt-% of C18 paraffins, preferably from 53 wt% to 75 wt-%.

12. The diesel fuel component of biological origin according to any one of claims 7-11, wherein the diesel fuel component comprises 0-4 wt-% of n-paraffins in C17-C18 range and 85-90 wt% isoparaffins in C17-C18 range.

13. The diesel fuel component of biological origin according to any one of claims 7-12, wherein the diesel fuel component has one or more of the following properties

- oxidation stability EN 16091 is at least 60 min, such as at least 75 min, such as at least 100 min;
- density at 15 °C EN ISO 12185 is between 765-800 kg/m^3, such as at least 786 kg/m^3, such as at least 788 kg/m^3;
- cetane number EN 15195 is at least 75, such as at least 80, or such as at least 82;
- total aromatics EN 12916 is less than 1.1 wt-%, such as less than 0.7 wt-%, or such as less than 0.6 wt-%;
- kinematic viscosity at 40 °C EN ISO 3104 is below 4.5 mm^2/s, such as below 4.0 mm^2/s, or such as below 3.8 mm^2/s;
- flash point EN ISO 2719 is at least 100 °C, such as at least 130 °C, such as at least 145 °C;
- cloud point ASTM D7689 is less than -20 °C, such as less than -25 °C, such as less than -30 °C, or -32 °C or less;
- net heat of combustion ASTM D4809 is within the range of 33 to 36 MJ/l;
- modern carbon content (pMC, ASTM D6866) is about 100%.

14. Use of the diesel fuel component of biological origin of any one of the claims 7-13 as diesel fuel or for a diesel fuel blend fulfilling the requirement of EN 15940-18 or EN 590-14.

15. Use of the diesel fuel component of any one of claims 7-13 for manufacturing a diesel fuel blend comprising from 25 wt-% to 50 wt-% of said diesel fuel component the remainder being fossil diesel fuel; or the remainder being renewable diesel fuel; or the remainder being renewable diesel fuel and fossil diesel fuel; or the reaminder being biodiesel and fossil diesel fuel.

16. Use of the diesel fuel component of any one of claims 7-13 for manufacturing a diesel fuel blend comprising from 25 wt-% to 50 wt-% of said diesel fuel component the remainder comprising a mixture of fossil diesel fuel, renewable diesel fuel and biodiesel.

17. Use of the diesel fuel component of any one of claims 7-13 for manufacturing a diesel fuel blend comprising from 10 wt-% to 25 wt-% of said diesel fuel component the remainder being a mixture of renewable diesel fuel and fossil diesel fuel.