CLAIMS

1. A process for producing hydrocarbons from a biological feedstock, said process comprising:
    a. diluting the biological feedstock with a hydrocarbon oil to produce a diluted biological feedstock, wherein the biological feedstock includes unsaponifiable material at a concentration greater than 2 wt%;
    b. subjecting the diluted biological feedstock to a hydrodeoxygenation process by contacting the diluted biological feedstock with a hydrogen-rich gas and a catalyst at a temperature and pressure which are elevated above an ambient temperature and pressure to produce a reactor effluent; and
    c. recovering a hydrocarbons fraction from the reactor effluent.
2. The process of Claim 1 wherein the biological feedstock comprises free fatty acids and fatty acid glyceride esters.
3. The process of claim 1 wherein the temperature is between about 260 °C and 371 °C and the pressure is between about 500 and 2,500 psig.
4. The process of claim 1 wherein the biological feedstock comprises distillation bottoms recovered from a biodiesel distillation process.
5. The process of claim 1 wherein the biological feedstock comprises at least 20 wt% high molecular weight components.
6. The process of claim 5 wherein the high molecular weight components are indicated by 20 wt% boiling above about 400 °C according to at least one of ASTM D2887-18 or ASTM D7169-11 measured on the diluted biological feedstock.
7. The process of claim 1 wherein the hydrocarbon oil comprises C15, C16, C17, and C18 n-paraffins.
8. The process of claim 1 wherein the hydrocarbon oil is a petroleum fraction.
9. The process of claim 1 wherein the reactor effluent comprises less than 5 wt% hydrocarbons boiling above 380 °C according to ASTM D2887-18.
10. The process of claim 1, wherein the reactor effluent is a hydrocarbon with acid number below 0.05 mg KOH/g.
11. The process of claim 4 wherein the biodiesel distillation process purifies biodiesel made by at least one of transesterification and esterification of a lipid feedstock comprised of

greater than 10 wt% of an unconventional lipid wherein the unconventional lipid comprises at least 20 wt% C20+ fatty acids.

12. The process of claim 4 wherein the distillation bottoms comprises at least 15 wt% C20+ fatty acid alkyl esters.

13. A process for producing hydrocarbons from a biological feedstock, said process comprising:

    a. diluting the biological feedstock with a hydrocarbon oil to produce a diluted biological feedstock, wherein the biological feedstock includes a fatty acid alkyl ester fraction comprising greater than 40 wt% C16 and shorter carbon fatty acid chains, wherein the biological feedstock also includes unsaponifiable material at a concentration greater than 2 wt.%;

    b. subjecting the diluted biological feedstock to a hydrodeoxygenation process by contacting the diluted biological feedstock with a hydrogen-rich gas and a catalyst at a temperature and pressure which are elevated above an ambient temperature and pressure to produce a reactor effluent; and

    c. recovering a hydrocarbons fraction from the reactor effluent.

14. The process of claim 13 wherein the temperature is between about 260 °C and 371 °C and the pressure is between about 500 and 2,500 psig.

15. The process of claim 13 further comprising separating the reactor effluent into a hydrocarbon phase, a gas phase, and an aqueous phase and using a hydrocarbon stripper to separate the hydrocarbon phase into an overheads fraction and the hydrocarbons fraction.

16. The process of claim 13 further comprising adding the hydrocarbons fraction to a diesel fuel.

17. The process of claim 13 further comprising introducing the hydrocarbons fraction to at least one of a hydrocracking and hydroisomerization process to produce a renewable diesel fuel.

18. A process for producing a purified biodiesel from a feedstock containing unsaponifiable material, said method comprising:

    a. introducing the feedstock to a pre-treatment process to produce a pretreated feedstock;

b. introducing the pretreated feedstock to a FFA refining process to produce a refined feedstock;

c. reacting the refined feedstock in a transesterification reactor with an alcohol to produce a crude biodiesel;

d. purifying the crude biodiesel by distillation to produce a purified biodiesel and a distillation bottoms;

e. diluting the distillation bottoms with a hydrocarbon oil to produce a diluted biological feedstock;

f. subjecting the diluted biological feedstock to a hydrodeoxygenation process by contacting the diluted biological feedstock with a hydrogen-rich gas and a catalyst at a temperature and pressure which are elevated above an ambient temperature and pressure to produce a reactor effluent;

g. recovering a hydrocarbons fraction from the reactor effluent.

19. The process of claim 18 further comprising separating the reactor effluent into a hydrocarbon phase, a gas phase, and an aqueous phase and using a hydrocarbon stripper to separate the hydrocarbon phase into an overheads fraction and the hydrocarbons fraction.

20. The process of claim 18 further comprising adding the hydrocarbons fraction to a diesel fuel.

21. The process of claim 18 further comprising introducing the hydrocarbons fraction to at least one of a hydrocracking and hydroisomerization process to produce a renewable diesel fuel.

22. A process for producing stripped hydrocarbons from a biological feedstock, said process comprising:

a. diluting the biological feedstock with a hydrocarbon oil to provide a diluted biological feedstock, wherein the biological feedstock includes unsaponifiable material at a concentration greater than 2 wt.%;

b. subjecting the diluted biological feedstock to a hydrodeoxygenation process by contacting the diluted biological feedstock with a hydrogen-rich gas and a catalyst at a temperature and pressure which are elevated above an ambient temperature and pressure to produce a reactor effluent;

c. separating the reactor effluent into a hydrocarbon phase, a gas phase, and an aqueous phase;

d. using a hydrocarbon stripper to separate the hydrocarbon phase into a stripper overheads fraction and a stripped hydrocarbons fraction.

23. The process of claim 22 wherein the biological feedstock comprises free fatty acids and fatty acid glyceride esters.

24. The process of claim 22 wherein the temperature is between about 260 °C and 371 °C and the pressure is between about 500 and 2,500 psig.

25. The process of claim 22 further comprising adding the stripped hydrocarbons fraction to a diesel fuel.

26. The process of claim 22 further comprising introducing the stripped hydrocarbons fraction to at least one of a hydrocracking and hydroisomerization process to produce a renewable diesel fuel.

27. The process of claim 1 wherein the biological feedstock comprises unsaponifiable material at a concentration greater than 3 wt %.

28. The process of claim 13 wherein the biological feedstock comprises unsaponifiable material at a concentration greater than 3 wt %.

29. The process of claim 22 wherein the biological feedstock comprises unsaponifiable material at a concentration greater than 3 wt %.

30. The process of claim 1 wherein the biological feedstock comprises unsaponifiable material at a concentration greater than 4 wt %.

31. The process of claim 13 wherein the biological feedstock comprises unsaponifiable material at a concentration greater than 4 wt %.

32. The process of claim 22 wherein the biological feedstock comprises unsaponifiable material at a concentration greater than 4 wt %.

33. A product produced by the process of claim 1.

34. A product produced by the process of claim 13.

35. A product produced by the process of claim 18.