C L A I M S

1. A process for hydroprocessing a renewable feedstock comprising the steps of:

introducing the renewable feedstock and hydrogen in a downward flow into a top portion of the fixed-bed reactor, wherein the downward flow is introduced by a plurality of nozzles;

distributing the downward flow to a top surface of a first catalyst bed in a manner such that the area contacted by the downward flow from each of the plurality of nozzles overlaps the area contacted by the downward flow from at least another of the plurality of nozzles so that the top surface is uniformly wetted across the reactor cross section;

allowing the renewable feedstock to flow downwardly through the first catalyst bed;

reacting the renewable feedstock in the catalyst bed under hydroprocessing conditions sufficient to cause a reaction selected from the group consisting of hydrogenation, hydrodeoxygenation, hydrodenitrogenation, hydrodesulphurization, hydrodemetallization, hydrocracking, hydroisomerization, and combinations thereof to produce a hydrocarbon effluent;

separating a hydrocarbon liquid stream from the hydrocarbon effluent; and

recycling the hydrocarbon liquid to the renewable feedstock in a ratio of 0.4:1 to 1.8:1, based on the volume of the renewable feedstock.

2. The process according to claim 1, wherein the top surface of the first catalyst bed is uniformly wetted when at least 90% of the top surface is contacted by the downflow at a liquid velocity having a distribution range between highest and lowest local liquid velocities of at most 10 %.

3. The process of claim 1, further comprising the step of directing the downward flow to a distribution tray having a plurality of nozzles, and wherein the downward flow is distrusted through the plurality of nozzles to the top surface in a manner such that the area contacted by the downward flow from each of the plurality of nozzles overlaps the area contacted by the downward flow from at least another of the plurality of nozzles.

4. The process of claim 1, wherein the fixed bed reactor further comprises a second catalyst bed and an effluent from the first catalyst bed is quenched and subsequently directed to an interbed distribution tray.

5. The process of claim 4, wherein the interbed distribution tray comprises a plurality of nozzles for distributing the quenched effluent through the plurality of nozzles to a top surface of the second catalyst bed in a manner such that the area contacted by the downward flow from each of the plurality of nozzles overlaps the area contacted by the quenched effluent from at least another of the plurality of nozzles, thereby uniformly wetting a top surface of the second catalyst bed across the reactor cross section.

6. A process according to any claim 4 or 5, wherein quenching the effluent from the first catalyst bed is provided by adding a quench selected from quench gas, quench liquid and combinations thereof to the effluent before it passes through the interbed distribution tray.

7. A process according to any one of claims 4 to 6, wherein the effluent is quenched by passing at least a portion of the effluent through an internal heat exchanger.

8. A process according to any one of claims 4 to 7, wherein the effluent is quenched by passing at least a portion of the effluent through an external heat exchanger, optionally with a gas/liquid separator between the reactor and the external heat exchanger.

9. A process according to any one of claims 4 to 8, wherein the quench is directed to a quench mixing device to provide a homogeneous quenched effluent.

10. A process according to any one of claims 4 to 9, wherein after quenching, the difference between the highest and lowest temperature of the quenched effluent over the reactor cross section is less than 25% of the average temperature drop caused by the quenching.

11. A process according to any one of claims 1 to 10, wherein the renewable feedstock is selected from the group consisting of one or more bio-renewable fats and oils, liquid derived from a biomass liquefaction process, liquid derived from a waste liquefaction process, and combinations thereof.