[Name of Document] Claims

1. A method for producing a biodiesel fuel, comprising:

a first separation step of mixing a raw material containing at least one of a free fatty acid and a fatty acid glycerin ester with an inorganic acid or enzyme to separate a first oil component and a first glycerin liquid; and

a catalytic cracking step of bringing the first oil component into contact with a catalyst to obtain a hydrocarbon.

2. The method according to claim 1, comprising:

a neutralization step of neutralizing, with an alkaline substance, the first glycerin liquid obtained by using the inorganic acid in the first separation step; and

a second separation step of separating a second oil component and a precipitated inorganic salt from the neutralized glycerin liquid,

wherein the catalytic cracking step includes bringing the second oil component into contact with the catalyst together with the first oil component.

3. The method according to claim 1 or 2, wherein the raw material in the first separation step contains at least one of a high acid value oil having an acid value of 10 mgKOH/g or more and waste glycerin produced as a by-product in a process of producing a fatty acid alkyl ester.

4. The method according to any one of claims 1 to 3, wherein the inorganic acid is used in the first separation step, and the inorganic acid is concentrated sulfuric acid.

5. The method according to any one of claims 1 to 4, wherein the inorganic acid is used in the first separation step, and a mixed liquid of the raw material and the inorganic acid has a pH of 3 or less.

6. The method according to any one of claims 1 to 5, wherein the catalyst in the catalytic cracking step contains magnesium oxide.

7. The method according to any one of claims 1 to 6, wherein the catalytic cracking step includes performing a reaction in a rotating drum that is arranged in a state in which its axis of rotation is inclined with respect to a horizontal plane.

8. The method according to any one of claims 1 to 7, wherein a reaction temperature in the catalytic cracking step is 200°C to 600°C.

9. The method according to claim 8, wherein the reaction temperature is adjusted by electromagnetic induction heating.