

[SS 14] biodiesel and transesterif+ and supercrit+ and (alcohol or methanol or ethanol) and (triglycerid+ or mol or ratio or temperature or pressure or cool+ or heat+)

Results in EPODOC 7

[SS 15] ..li



1/7 © EPODOC / EPO

PN - [CN105505590](#) A 20160420

PR - CN2016119518 20160113

AP - CN2016119518 20160113

DT - I

CNOI - [C11B3/12](#) ; [C10L1/02](#) ; [C11C3/10](#)

CCA - [Y02E50/13](#)

PA - SHANDONG LIANXING ENERGY GROUP CO LTD

TI - Method for preparing **biodiesel** through **supercritical** extraction method

AB - The invention discloses a method for preparing **biodiesel** through a **supercritical** extraction method. The method for preparing the biodiesel comprises the following steps: 1, mixing methyl **alcohol** with CO₂ expansion liquid, so that methyl **alcohol** expansion mixed liquid is obtained; 2, adding oil and the methyl **alcohol** expansion mixed liquid into a static mixer, and conducting preheating and mixing; 3, lowering oleyl **alcohol** mixed liquid obtained in step 2 into a tubular reactor, adding sodium hydrogen sulfate with the concentration being 5%, conducting a **transesterification** reaction of grease when the methyl **alcohol** is made in the **supercritical** state, and generating **biodiesel** and glycerin; 4, conducting reduced **pressure** separation on the obtained **biodiesel**, and conducting rectification once again, so that the **biodiesel** higher in purity is obtained; 5, conducting rectification on the methyl **alcohol** which is subjected to reduced **pressure** separation in step 4, so that methyl **alcohol** higher in purity is obtained, and the methyl **alcohol** can be applied to step 1 repeatedly. By means of the method, reaction efficiency is improved, reaction operation conditions are lowered, production cost is saved, and the method make production of **biodiesel** conducted through the **supercritical** method possible.

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PN - [CN102108319](#) A 20110629

PNFP - CN102108319B B 20140219

PR - CN20091262781 20091228

AP - CN20091262781 20091228

DT - I

CCA - [Y02E50/13](#)

PA - (A B)
METAL IND RES DEVELOPMENT CT

TI - (A B)

Continuous system and method for preparing **biodiesel**

- AB - (A)
 The invention discloses a continuous system and a continuous method for preparing **biodiesel**. The continuous method for preparing **biodiesel** comprises the following steps: (a) pressurizing and **heating** liquid **alcohol** till the liquid **alcohol** changes into a subcritical state or high-**pressure** liquid state; (b) performing continuous extraction by using a continuous extraction module which has a plurality of extraction tanks for receiving the subcritical or high-**pressure** liquid **alcohol**, extracting a grease raw material in the extraction tanks, and obtaining an extract product; (c) performing the **transesterification** of the extract product to obtain a product of the **transesterification**; and (d) separating the product of the **transesterification** to obtain the **biodiesel**. In the continuous system and the continuous method for preparing **biodiesel**, the **biodiesel** is prepared by extracting the grease with the subcritical or high- **pressure** liquid **alcohol** and the **transesterification** of **supercritical alcohol**, the continuous extraction module and the continuous extraction method are used for extraction, the extraction and **transesterification** process procedures are performed by using the same **alcohol**, the process is simplified, and labor force and energy are saved.

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- PN - [KR20100020872](#) A 20100223
- PNFP - KR100959417B B1 20100524
- PR - KR20080079677 20080813
- AP - KR20080079677 20080813
- DT - I
- CNOI - (A)
[C10L1/19](#) ; [C10G3/00](#) ; [C12P7/00](#)
- CCA - [Y02E50/13](#) ; [Y02P20/544](#) ; [Y02P30/20](#)
- CNOA - (A)
[Y02E50/13](#)
- PA - (A)
 KOREA IND TECH INST [KR]
- TI - (A)
 METHOD FOR PRODUCING **BIODIESEL** USING POROUS MATERIAL BASED CONTROLLED RELEASE-ABSORPTION SYSTEM FOR **METHANOL** AND GLYCEROL
- (B1)
 Method for producing **biodiesel** using porous material based controlled release-absorption system for **methanol** and glycerol
- AB - (A)
 PURPOSE: A method of manufacturing **biodiesel** by a discharge and absorption controlling system of **methanol** and glycerol is provided to minimize the inhibition of an enzyme inhibition material including **methanol** and glycerol, to produce **biodiesel** steadily, and to simplify a manufacturing device for **biodiesel**. CONSTITUTION: A method of manufacturing **biodiesel** comprises the following steps of: producing **biodiesel** by a **transesterification** of oil and **methanol** using enzymatic catalyst; inserting a porous material consisting **methanol** instead of inserting the **methanol** itself to the reactor;

and separating glycerol from the porous material after a completion of the reaction. The porous material is a silica gel. The separation of the glycerol from the porous material is done by **methanol** and **supercritical** carbon dioxide. The reaction **temperature** for the **transesterification** is 40 deg C, and the stirring speed of the reactor is 300rpm.

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PN - [US2009277077](#) A1 20091112

PR - US20090432203
20090429; US20080074441
20080304; US20070904946P
20070305

AP - US20090432203 20090429

DT - *; Rep

CT - || R141 (A1)
[US6812359](#) B2 [];
[US6979426](#) B2 [];
[US3953298](#) A [];
[US3987021](#) A []

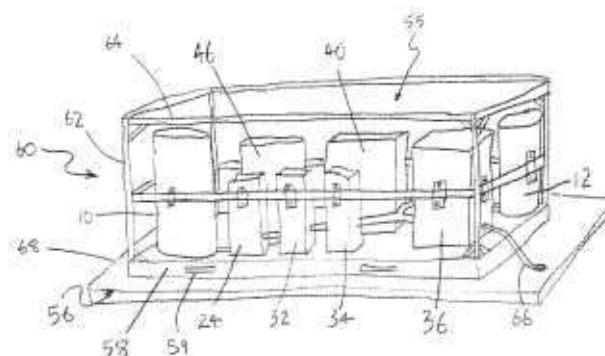
CCI - [C07C67/03](#) ; [C11C3/003](#)

CLC - [C07C67/03](#) , [C07C69/52](#) , INV

CCA - [Y02E50/13](#) ; [Y02P20/544](#) ;
[Y02P20/582](#)

TI - **BIODIESEL FUEL AND METHOD OF MANUFACTURE THEREFOR**

AB - A method for producing biofuel by a **transesterification** reaction of an **alcohol** and a **triglyceride** such as an oil or fat is carried out at **supercritical** conditions in a reactor using a stoichiometric excess of **alcohol**. The reaction products of biofuel and gaseous mixture of glycerin and **alcohol** are re-cycled through a series of **heat** exchangers which transfer **heat** to respective pre-**heaters** to sequentially raise the **temperature** and **pressure** of the reaction mixture prior to delivery to the reactor. Any excess **alcohol** after separating and recovering gaseous glycerin therefrom is recycled and mixed with "fresh" **alcohol**. Preferably, the process is a non-catalytic continuous process.



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- PN - [CN101362958](#) A 20090211
- PR - CN2008113296 20080917
- AP - CN2008113296 20080917
- DT - I
- CCA - [Y02E50/13](#) ; [Y02P30/20](#)
- PA - UNIV DALIAN TECH [CN]
- TI - Method for quickly preparing **biodiesel** at low **pressure** by alkali catalyst-enhanced **supercritical methanol** method
- AB - The invention provides a method which is used for quickly preparing biological diesel under a condition of low **pressure** by an alkali catalyst reinforced ultra-critical **methanol** method, belonging to the field of clean energy technique. The method is characterized in that the biological diesel is prepared by using a trace alkali catalyst reinforced ultra-critical **methanol** method, thus achieving the object of quickly preparing the biological diesel under the condition of low **pressure**. **Transesterification** is carried out for 10-30 minutes under the conditions of 160-260 DEG C of **temperature**, 1-6MPa of **pressure**, 0.01-0.25wt% of dosage of catalyst and 8:1-24:1 of molar **ratio** of **methanol** to oil; the conversion rate of methyl ester ranges from 90.1-99.8%. The method has the effects and benefits of retaining the outstanding advantages that the ultra-critical **methanol** method has short reaction time and high efficiency, the product requires no neutralization and water washing and the post-processing is simple, and overcoming the shortages that the ultra-critical **methanol** method has high reaction **temperature** and **pressure**, large dosage of **methanol**, etc. The dosage of the catalyst is only 1-25% of an alkali catalyst method, the reaction time can be greatly shortened, and the energy dissipation of production and requirement on the equipment are reduced.

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- PN - [CN101225323](#) A 20080723
- PNFP - CN101225323B B 20110914
- PR - CN2008110373 20080203
- AP - CN2008110373 20080203
- DT - I
- CCA - [Y02E50/13](#) ; [Y02P30/20](#)
- PA - (A)
UNIV DALIAN TECH [CN]
- (B)
UNIV DALIAN TECH
- TI - (A B)
Method for preparing **biodiesel** from raw material by overcritical extraction-**transesterification** coupling process
- AB - (A)
The invention relates to a preparation method of **biodiesel**. 10 to 1000g material with seed fat is mechanically crushed into 10 to 60 mesh grains, and then added into

a **supercritical** extraction apparatus at packed bed mode to react after adding high **pressure** CO₂ in 10 to 30 MPa and 30 to 70 degrees C and a certain amount of higher **alcohol** with. The contact reacting time of the solvent and materials is controlled and then the mixed solution extracted from the **supercritical** extraction apparatus is sent to a high **pressure** fixed bed reactor with catalyst to carry on the ester exchange reaction. The **pressure** is controlled in 10 to 30 MPa, the **temperature** is at 40 to 80 degrees and reaction time is for 0.5 to 20 hours. The product from the ester exchange reaction is sent to a separator to separate and then recycled after measuring by gas phase CO₂. The liquid phase (sterol, **biodiesel** and glycerin) is decompressed and distilled to recover the sterol and at last the **biodiesel** and the glycerin are separated by water washing method. The preparation method can obtain the **biodiesel** from the material by one-step in gentle condition, and also has the advantages of convenient craft and low cost.

- (B)

The present invention relates to a preparation method of **biodiesel**. 10 to 1000g material with seed fat is mechanically crushed into 10 to 60 mesh grains, and then added into a **supercritical** extraction apparatus at packed bed mode to react after adding high **pressure** CO₂ in 10 to 30 MPa and 30 to 70 degrees C and a certain amount of higher **alcohol** with. The contact reacting time of the solvent and materials is controlled and then the mixed solution extracted from the **supercritical** extraction apparatus is sent to a high **pressure** fixed bed reactor with catalyst to carry on the ester exchange reaction. The **pressure** is controlled in 10 to 30 MPa, the **temperature** is at 40 to 80 degrees and reaction time is for 0.5 to 20 hours. The product from the ester exchange reaction is sent to a separator to separate and then recycled after measuring by gas phase CO₂. The liquid phase (sterol, **biodiesel** and glycerin) is decompressed and distilled to recover the sterol and at last the **biodiesel** and the glycerin are separated by water washing method. The preparation method can obtain the **biodiesel** from the material by one-step in gentle condition, and also has the advantages of convenient craft and low cost.

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PN - [US2008221344](#) A1 20080911

PR - US20080074441
20080304; US20070904946P
20070305

AP - US20080074441 20080304

DT - *; Rep

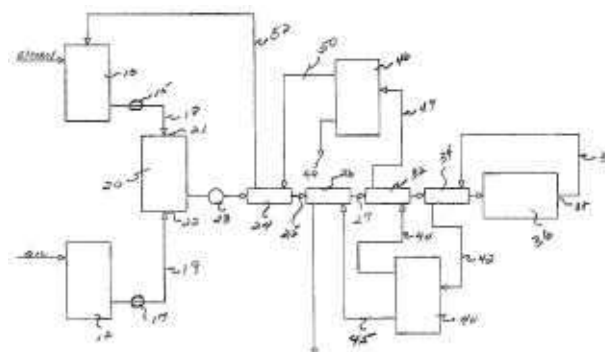
CCI - [C07C67/03](#) ; [C11C3/003](#)

CLC - [C07C67/03](#) , [C07C69/52](#) , INV

CCA - [Y02E50/13](#) ; [Y02P20/544](#) ;
[Y02P20/582](#)

TI - **Biodiesel** fuel and method of
manufacture therefor

AB - A method for producing biofuel
by a **transesterification** reaction
of an **alcohol** and a **triglyceride**
such as an oil or fat is carried



out at **supercritical** conditions in a reactor using a stoichiometric excess of **alcohol**. The reaction products of biofuel and gaseous mixture of glycerine and **alcohol** are re-cycled through a series of pre-**heaters** to sequentially raise the **temperature** and **pressure** of the reaction mixture prior to delivery to the reactor. Any excess **alcohol** after separating and recovering gaseous glycerin therefrom is recycled and mixed with "fresh" **alcohol**. Preferably, the process is a non-catalytic continuous process.

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