

PROCESS FOR THE CONVERSION OF LIPID INTO BIODIESEL

KEYWORDS

- ☐ BIODIESEL
- ☐ FAME
- ☐ RENEWABLE RESOURCES
- ☐ BIOREFINERIES

AREA

- ☐ ENERGY & ENVIRONMENT

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Patent Type

Patent for invention

Ownership

Sapienza 100%

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Industrial & Commercial Reference

The invention is placed in the biofuel production field. It is aimed at the development of new models of integrated biorefineries.

Time to Market

The methodology has been developed on a laboratory scale (TRL 4 = Technology validated in the lab)

Availability

Assignment, Research, Development, Experimentation and collaboration.

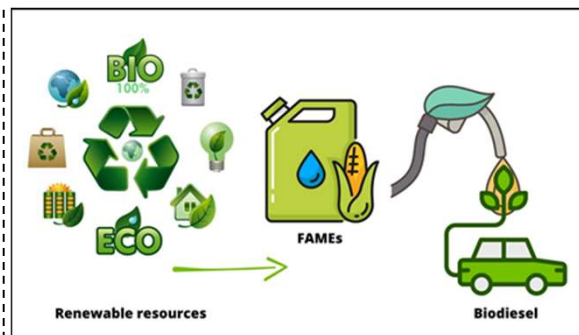


Fig. 1 Graphical abstract

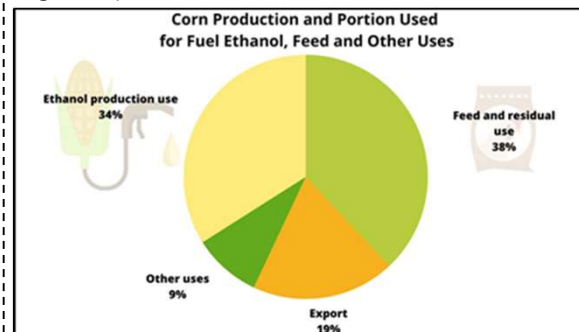
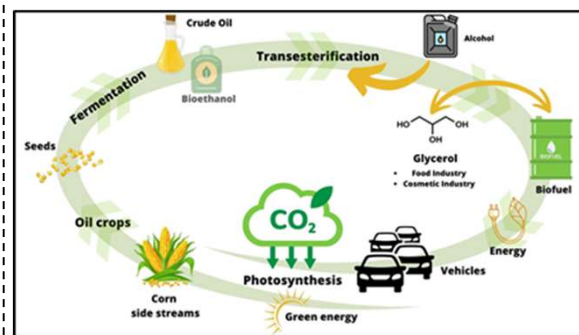


Fig. 2 Corn production and portion used for fuel ethanol, feed and other uses.



Abstract

The invention describes a process for the conversion of post-fermentation corn oil, and similar lipidic matrices, characterized by a high content of free fatty acids, in biodiesel. In particular, the developed methodology is based on a single reactive step and is characterized by a high yield and a high operational simplicity even during the purification phase.

Due to its characteristics, including the possibility of using renewable starting materials, the process is very interesting for industrial applications both in economic terms and environmental policies currently adopted by European states (Fig.1).

Fig. 3 Work-up



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Technical Description

The process represents an alternative to existing methods to produce biodiesel from lipid matrices. The starting material used is the post-fermentation corn oil (Fig. 2). This oil has a high content of free fatty acids and is generally converted into biodiesel through two-step processes. The inventors developed a process that leads to a simplification of existing methodologies by realizing the complete transformation of the oil into biodiesel through a single reactive step. The high performance of the process, the use of renewable sources, and the simple purification methodology make this strategy very interesting for industrial applications (Fig.3).

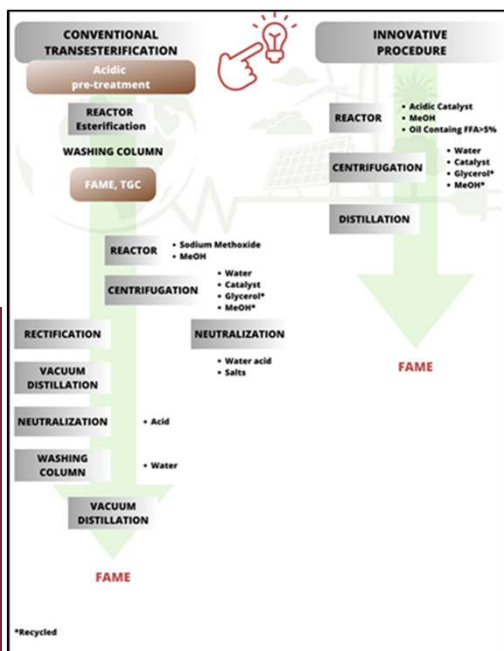


Fig. 4 Advantages of the new transesterification procedure

Technologies & Advantages

The proposed process is based on the direct transformation of post-fermentation corn oil (resulting as a side stream in the production of bioethanol) into fatty acid methyl esters (FAME), which are the components of biodiesel. In this invention, the conversion process is carried out in a single reactive step, is characterized by a high simplicity in operating, high yields, and short times, and is based on the use of a renewable starting material, which currently, according to the known procedure, could be employed for the same use only through multistep methodologies (Fig.4). These aspects make the process extremely interesting from the point of view of the circular economy and eco-sustainability and open to numerous advantages in terms of reduction of the biodiesel production costs by identifying new sources of income and destinations for the industries concerned.

Applications

Compared to the state of the art, the invention proposes a process in which, the production of biodiesel from oily waste is realized through a more easy and advantageous methodology. It can be of great interest in the industrial field with particular attention to the issues linked to the ecological transition that characterize the international political agenda. Currently, in fact, industries are strongly encouraged in the development of integrated production processes, which led to valorizing the "waste" by obtaining from them new products to be inserted in different markets. The proposed process is in line with the principles of the circular economy and could have a great impact on the creation of a sustainable market for biofuels by boosting the bio-refinery sector and increasing their competitiveness in national and international markets (Fig. 5-6).

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