



Industrial Consultancy & Sponsored Research (IC&SR)

PROCESS FOR PRODUCING BIOETHANOL USING CHEESE WHEY AND **CELLULOSIC BIOMASS**

IITM Technology Available for Licensing

Problem Statement

Indian Institute of Technology Madras

- Biomass high in cellulose, hemicellulose and lignin are not readily digestible and are primarily utilized for wood and paper products, fuel, or are disposed of.
- Cheese whey is a common waste byproduct of dairy production which in surplus can endanger the physical and chemical structures of soil, decrease crop yields, and cause serious water pollution.
- Creating products from whey reduces whey disposal costs for the dairy industry, enabling their businesses to become more profitable.
- Thus, it is desirable to find inexpensive and environmentally-friendly alternatives for creating commercially desirable products from cheese whev.
- Also, a need exists for an improved process for producing bioethanol using cheese whey and cellulosic biomass.

Technology Category/ Market

Category - Green Technology, Biofuels

Applications - Bioethanol Production, Energy, Biofuels, Waste Management Industry - Biofuels, Agriculture & Dairy Waste Management, Energy

Market - Bioethanol market size is estimated to be USD 83.4 B in 2023, and it is projected to reach USD 114.7 B by 2028 at a CAGR of 6.6%

Intellectual Property

- IITM IDF Ref. 1306
- IN 432544 Patent Granted

TRL (Technology Readiness Level)

TRL – 3, Technology validated in lab.

CONTACT US

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IITM TTO Website: https://ipm.icsr.in/ipm/

Technology

• An improved process for producing bioethanol using cheese whey and cellulosic biomass.

Process

1	• Obtain lignocellulosic biomass from various agro-industrial waste and by- products and processed for using in the bioethanol production.
2	 Pretreat lignocellulosic biomass using alkali, acid solvents or steam explosion or combination.
3	• Enzymatically hydrolyze pretreated biomass by mixing with the cheese whey and a cocktail of cellulases and hemicellulases.
4	• Ferment hydrolysate using ethanologenic microorganism, such <i>Kluyveromyces marxianus</i> in order to produce bioethanol.

Fig. 1. Flowchart illustrates process for producing ethanol from cheese whey and lignocellulosic biomass.

Key Features / Value Proposition

- The primary industrial advantage is to utilize cheese whey, along with lignocellulosic substrates, which is a byproduct of agriculture industry for ethanol production.
- In addition whey acts as a buffering solution, and replace buffer which leads to low cost of enzymatic hydrolysis of lignocelluloses.
- This invention maximizes the use of low-cost, lignocellulosic biomass found in agriculture and dairy industry waste for effective production of ethanol at a low processing time.

Research Lab

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