METHOD FOR PRETREATMENT OF BIOMASS USING AMMONIACAL GLYCEROL

IITM Technology Available for Licensing

Problem Statement

- Glycerol formation accounts for about 10% of the biodiesel produced. Successful utilization of the crude glycerol for **pre-treatment of biomass** can help in solving a major problem of biodiesel industry and at the same time help to release sugars from biomass for bioethanol production.
- However, glycerol pre-treatment is an **energy intensive process**, for effective pre-treatment requires high temperature (>190°C)
- **Glycerol pre-treatment partially removes lignin and xylan** from the biomass resulting in pre-treated solids with low polysaccharide content.
- Therefore, a need exists for an improved method for pre-treatment of biomass at **relatively low temperatures with high sugar recovery**.
- The improved method of pre-treatment of biomass **using glycerol should facilitate efficient enzymatic hydrolysis**.

Technology Category/ Market

Category - Green Technology, Biofuels
Applications - Cellulosic Ethanol Production, Energy, Biofuels, Waste Management
Industry - Biofuels, Agriculture Waste Management

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. **1749**
- **IN 428548 - Patent Granted**

TRL (Technology Readiness Level)

TRL - 3 , Technology concept formulated.

Technology

1. **A method for pre-treatment of biomass using ammoniacal glycerol for high sugar recovery and efficient saccharification.**
2. **The proposed method uses a mixture of ammonia (5%) and glycerol (50%) (ammoniacal glycerol) for organosolv pre-treatment at lower temperature (120°C).**
3. **The proposed method selectively removes lignin and significantly improves the digestibility of cellulose and xylan.**

Key Features / Value Proposition

1. **The new method selectively removed lignin and significantly improved the digestibility of cellulose and xylan.**
2. **Yields of glucose, xylose and total sugars released in enzymatic hydrolysis of biomass pretreated with ammoniacal glycerol (glycerol + ammonia) are higher by 2.8, 7.4 and 3.5 folds respectively when compared with the pretreatment using only glycerol.**
3. **Pretreated biomass of bagasse, rice straw and wheat straw were digested with cellulase loading of 10 FPU/g.**

Research Lab

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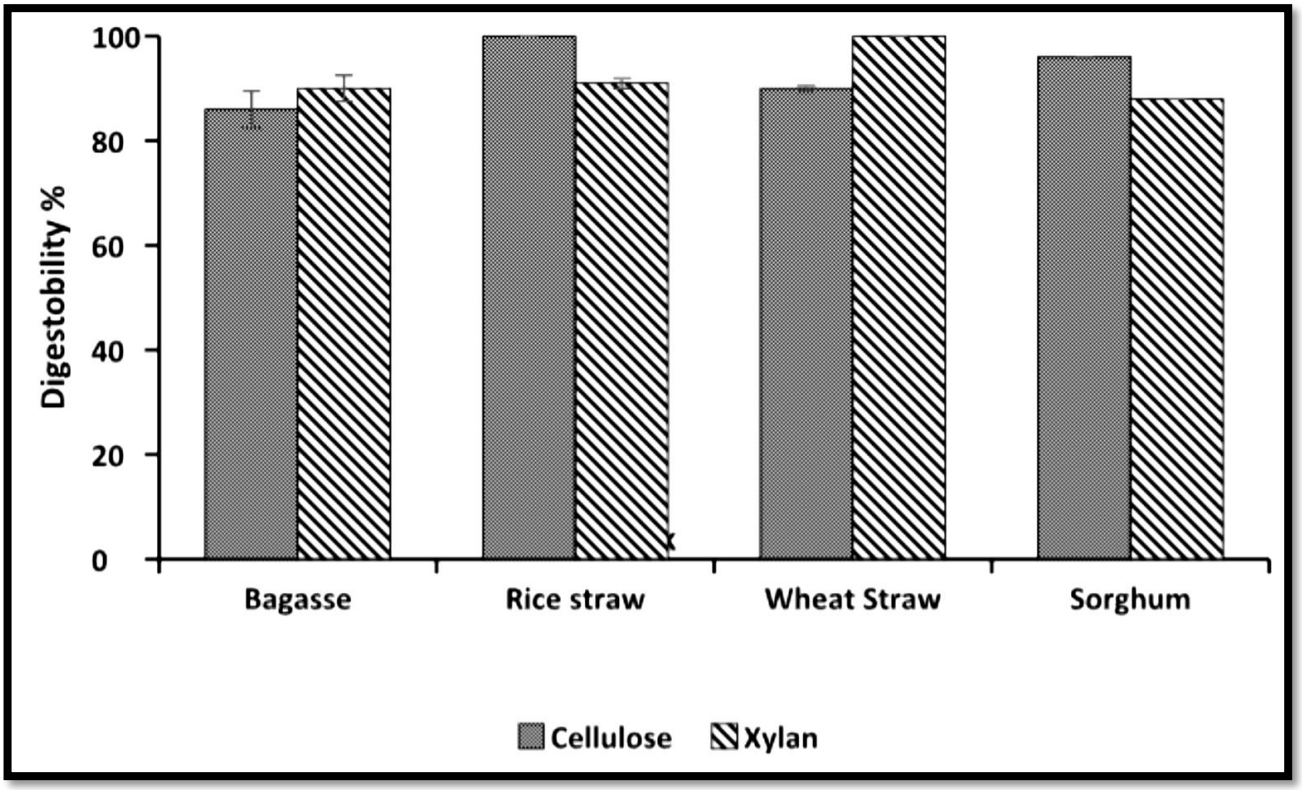
FIG. 1 illustrates a graphical representation of enzymatic digestibility of different biomasses pretreated using ammoniacal glycerol



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