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TOPIC(s) : Biomass conversion / Homogenous, heterogenous and biocatalysis

## Physiochemical Analysis of Lignocellulosic Biomass; Cannabis indica, in the Context of Biorefinery

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### PURPOSE OF THE ABSTRACT

In this study, the biomass taken is one of the wild species of weeds grown in India. However, nowadays the species Cannabis indica i.e. Indian bhang is being cultivated in different regions of India for the medicinal applications. It is well known that the extracted constituents present in the cannabis oil also called as cannabinoids (Tetrahydrocannabinol, cannabiniol, and cannabidiol) and their oxidized derivatives are used as the medicinal components of chemotherapy. After the extraction of the medicinal molecules, the fibrous part of the biomass i.e. stem is characterized in the context of Biorefinery. During this study, the biomass is characterized by XRD, FTIR, TGA and SEM. The cellulose, hemicellulose and lignin contents are estimated using NFTA (National Forage Testing Association) methods. The dry powdered biomass is hydrothermally liquefied into the soluble reducing sugars and biofuel platform chemicals such as 5-Hydroxymethylfurfural (5-HMF), furfural and levulinic acid using subcritical water at a range of temperatures (120-240°C), pressures (10-40 bar) and time (20-40 mins) in a high pressure batch reactor and reducing sugar content is determined by the help of DNS (dinitrosalicylic acid) method and the conversion of pentose and hexose sugars is verified by the Gas chromatography. The total reducing sugar hydrolyzed out of the biomass by the hydrothermal treatment (Subcritical water) has been depicted in figure-2. In the next part of the project, after the optimization of liquefaction process, the liquid supernatant obtained from the each batch reaction, is dehydrated in presence of modified zeolites to form 5-HMF and furfural. Again yield of the product is quantified using chromatographic techniques. The aim of the whole studies is to use the biomass fully for the purpose of production of medicinal oil and utilize the waste biomass for the production of liquid fuels.

Keywords: Cannabinoids, 5-Hydroxymethylfurfural, furfural, levulinic acid, dinitrosalicylic acid

FIGURES

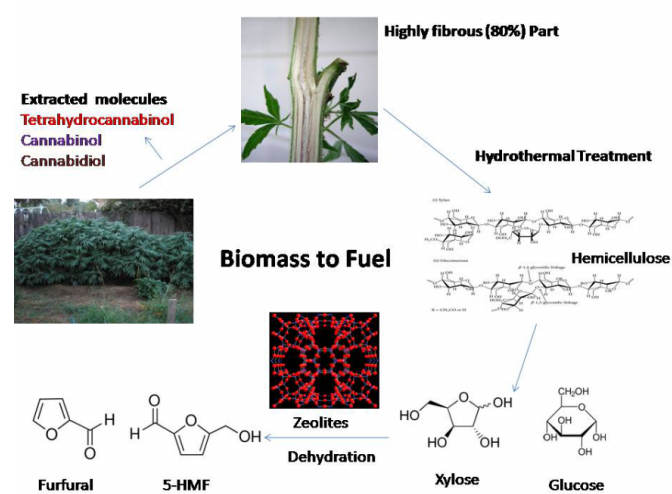


FIGURE 1

GRAPHICAL ABSTRACT

5-HMF- Hydroxymethylfurfural

zeolites- different types of modified zeolites as solid catalysts

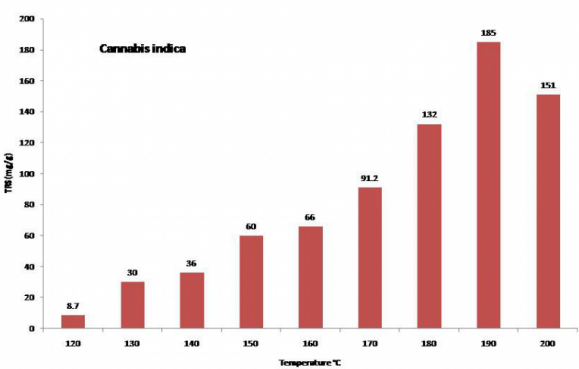


FIGURE 2

Reducing Sugar leached out of the biomass

X-Axis : Temperature

Y-Axis : Reducing Sugar hydrolyzed out of the biomass in mg per gram of biomass

KEYWORDS

Cannabinoids | 5-Hydroxymethylfurfural | furfural | Subcritical water

BIBLIOGRAPHY