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An evaluation of fermentation approaches for ethanol production from enzymatically pretreated sugarcane tops

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Second generation bioethanol has been advocated as a promising substitute of petroleum based fuels for mitigating GHG emissions and lessening our dependency on fossil based fuels. Bioethanol has emerged as one of the advantageous sustainable biofuel that aids in being an effective factor in the transportation sector for reducing emission of pollutants from tailpipe that are the reason for smog and ground-level ozone. Bioethanol due to its high octane number of 108 has high anti-knock value and can be used in bioethanol-diesel blend to decrease exhaust gas emission. In addition, bioethanol is less noxious producing less air-borne pollutants in comparison to petroleum fuel. Typical process for the biological conversion of carbohydrates to ethanol comprises of pretreatment, saccharification and fermentation. Development in fermentation technology plays a significant role in making the process viable. Fermentation being a key element in the bioethanol production process, the present study investigates different strategies viz. separate hydrolysis and fermentation (SSF) to produce ethanol from sugarcane tops enzymatically pretreated with laccase. Sugarcane tops, an agricultural residue was used as the substrate since it is rich in carbohydrates that are usually burnt in the field or used as low quality roughage. The focus of the study was to check the efficiency of various approaches among which SSF and SSSF were able to enhance ethanol titre in the range of 6-7 % (v/v) with shortened biological processing time (24-36 h).

Recent Publications

1. Azhar S H M et al. (2017) Yeasts in sustainable bioethanol production: a review. Biochemistry and Biophysics Reports. 10:52-61.

Biography

Knawang Chhunji Sherpa is currently pursuing her PhD at PK Sinha Centre for Bioenergy at the Indian Institute of Technology, Kharagpur, India. Her research work is focused on second generation bioethanol using sugarcane tops as lignocellulosic biomass.

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