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Valorization of wastes produced from processed Assam lemon

Debajyoti Kundu and **Rintu Banerjee**
Indian Institute of Technology Kharagpur, India

Rapid industrialization, modern civilization and heavy load in transport sector leads to the huge consumption of crude oil. In 2013, 89 million barrels crude oil was consumed in world basis and it is expected to rise to 115 million barrels/day in 2040, which represent about 63% increment of total liquid fuel consumption. It is predicted that only in the transport sector consumption of fuel will be increased by 57% in 2040. Inevitable depletion of fossil fuel and increment of oil price forced us to search alternative sources for the production of non-petroleum based fuel. Utilization of agro-residual substrate rather than any food substrate for liquid fuel (ethanol) production is a promising approach which can also nullify the food vs fuel controversy. Fruit wastes are good sources of fermentable soluble sugars, cellulose and hemicellulose. This suitable composition coupled with abundant supply makes fruit waste as an excellent source for ethanol production. Among all the fruits, citrus fruits hold top position in production and financial aspects. More than 115 million tonnes per annum citrus fruits are produced worldwide. After US and Brazil, India is the third largest producer of citrus. Approximately 30 million tons of citrus fruits are used for juice production from which 50% are generated as waste. North-east region in India is associated with large-scale production of citrus fruits, which leads to accumulation of their waste. Biotechnological conversion of these wastes not only facilitate ethanol production but also provide safe environmental practices. In this regard an attempt has been made to exploit the citrus fruit waste for the production of bioethanol. In this present work partial simultaneous saccharification and fermentation (pSSF) (with yeast as inoculum) was carried out for bioethanol production. Different factors viz. solid loading, incubation time, temperature, inoculum volume and inoculum's age were taken into consideration for bioethanol production, where 167.76 g/L bioethanol was obtained. After fermentation, residual solid also can be valorised as biomanure for application in farmyard practices.

Recent Publications:

1. Patil M B and Dhake A B (2014) Debittering of citrus fruit juice by naringinase of *Penicillium purpurogenum*. International Journal of Engineering Research and Science and Technology. 3(2).
2. Liu T S et al.(2014) Potential and impacts of renewable energy production from agricultural biomass in Canada. Applied Energy. 130:222-229.
3. Avanthi A and Banerjee R (2016) A strategic laccase mediated lignin degradation of lignocellulosic feedstocks for ethanol production. Industrial Crops and Products. 92:174-185.
4. Rajak R C and Banerjee R (2016) Enzyme mediated biomass pretreatment and hydrolysis: a biotechnological venture towards bioethanol production. RSC Advances. 6(66):61301-61311.
5. Choi I S et al. (2015) A low-energy, cost-effective approach to fruit and citrus peel waste processing for bioethanol production. Applied Energy 140:65-74.

Biography

Debajyoti Kundu is currently pursuing PhD from Indian Institute of Technology, Kharagpur, India. He is working in the area of food biotechnology and bioenergy production from food wastes.

debajyoti69@gmail.com