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Bioethanol production through simultaneous saccharification and fermentation from citrus fruit waste

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Citrus fruits have a great popularity throughout the world owing to its flavors, therapeutic value and health benefits. In India, citrus fruits are produced in large quantities. India holds third rank in respect of production of citrus fruits in the world. Despite being rich in nutrients, citrus fruit residues do not find any commercial importance and are largely disposed of in municipal dumps or as underutilized cattle feed. Fruit processing industries generates a huge amount of solid wastes which includes fruit peel and mash. The proper conversion of these solid wastes through biotechnological intervention not only led to biofuel production but, also resulting in less environmental pollution caused due to open waste disposal. In India, especially North-East belt is associated with the higher production of citrus fruits and subsequently generates a large amount of fruit wastes. Essential oil extracted from citrus peel is one of the valuable by-product. On the other hand the solid fruit waste has high cellulose content other than water soluble components such as glucose, fructose and sucrose that represents as a potential candidate for bioethanol production. The presence of low lignin levels makes such substrates ideal for fermentation-based products, such as ethanol production. In this regard, an attempt has been taken to utilize the solid fruit waste for the production of bioethanol. Solid residue produced after fermentation can also be used as a biomanure after proper processing. The present work deals with simultaneous saccharification and fermentation (SSF) (with yeast as inoculums) for bioethanol production. Several parameters like solid loading, incubation time, temperature, inoculum volume and inoculums age were studied to see the effect of these parameters for bioethanol production from citrus fruit wastes. The optimization studies are being continued. Preliminary study reveals that 13.08% (v/v) bioethanol was obtained when SSF was practiced.

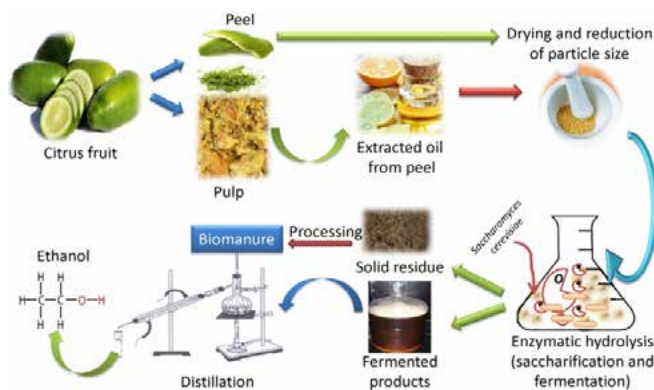


Fig 1: Schematic representation of bioethanol production from citrus fruit waste

Biography

Debajyoti Kundu is currently pursuing PhD under the guidance of Prof. Rintu Banerjee from Indian Institute of Technology, Kharagpur, India. He is working in the area of Food Biotechnology and Bioenergy Production from Food Wastes.

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