Conversion of two agrowastes; wheat straw and corn stover into bioethanol using simultaneous saccharification and fermentation process

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There is an increasing interest in alternative source of energy due to fast depletion of the world's energy supply. Bioethanol production through fermentation provides an economical competitive source of energy. Agrowastes like wheat straw and corn stover leave a large amount of residues rich in carbohydrates and sugar. The present investigation deals with the production and optimization of bioethanol from two agrowastes; wheat straw and corn stover using cellulase enzyme and co-cultures of *Saccharomyces cerevisiae* and *Aspergillus niger* through simultaneous saccharification and fermentation (SSF) process. Pulverized wheat straw and corn stover (ratio 4:6) after steam treatment were used as substrate for bioethanol production. Temperature of 30°C, inoculum size of *S. cerevisiae* and *A. niger* 6% (v/v), 4% (v/v), agitation for the first 24 h with incubation period of 48 h were found to be the best conditions for bioethanol production. The pretreated biomass after enzymatic saccharification containing reducing sugars (60 gL⁻¹) was fermented under optimized conditions resulting in bioethanol production, yield and fermentation efficiency of 23.64 gL⁻¹, 0.394 ggl⁻¹ and 77.25%, respectively. This research work may establish that both wheat straw and corn stover, which have been very little exploited commercially for industrial applications and are poorly disposed off, can be effectively used for bioethanol production. Moreover, due to minimal usage of resources/energy for pretreatment gives an edge to it. The results in this paper are very encouraging and can be utilized for scaling up of the process to a pilot scale or commercial fermenter level, thereby, making the process more cost effective along with contribution in solid waste management, henceforth, in green technology.

Biography

Nidhee Chaudhary is working as a Professor at Amity Institute of Biotechnology, Amity University Uttar Pradesh, Noida, India. She has completed her PhD from CCS University, Meerut and MPhil from IIT Roorkee, India. She has been in academia for over 17 years in various positions. She has supervised several PhD (theses), MPhil, MSc, MTech and BTech dissertations. She has many international and national publications in journals and books of repute. Her main research interest is in industrially and therapeutically important enzymes along with bioprocessing. Recently, she has been granted to Finn Wold Travel Award by The Protein Society, USA. She has been Member of various scientific groups like: The Protein Society, USA, American Society of Microbiology, USA, OMICS Group, USA, Biotech Research Society (BRSI), India, Global Science and Technology Forum (GSTF), Singapore, Biotech Society of India (BSI), World Academy of Science, Engineering and Technology (WASET), USA, Asian Federation of Biotechnology (AFOB). She has served as reviewer for several reputed Journals like; Journal of Biotechnology and Applied Biochemistry, Journal of Preparative Biochemistry and Biotechnology, Advances in Bioscience and Biotechnology, Journal of Biotechnology, published by Elsevier, Taylor & Francis, Wiley-Blackwell and other established groups.

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