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Production of polyhydroxybutyrate (PHB) from wheat bran through enzymatic hydrolysis and fermentation

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The increasing global demand for sustainable resources necessitates the complete utilization of feedstock. Wheat is a major global commodity and the milled wheat generating huge quantity of wheat bran as a waste which is underutilized. As wheat bran consists of 45% cellulose and hemicellulose, 15% starch, 6% lignin and 6% β -(1,3)/ β -(1, 4) glucan, it has the potential to serve as low-cost feedstock for renewable energy. Keep this in mind, present study was aimed to convert the wheat bran into fermentable sugars for further production of polyhydroxybutyrate. The destarched wheat bran was pretreated with 1% NaOH and then subjected to enzymatic hydrolysis by cellulase of *Trichoderma reesei* (37 FPU/g) and β -glucosidase of *Aspergillus niger* (15 CBU/g). After hydrolysis for 96 h, 42.6 g/L glucose and 21.8 g/L xylose were produced. The overall sugar concentration was 60.3 g/L with a sugar yield of 0.620 mg/g of pretreated wheat bran. Further, the PHB producer, *Ralstonia eutropha* grown in this hydrolysate supplemented with mineral salt medium (C:N - 20) for 48 h, produced PHB and cell density of 71.5% and 25.6 g/L respectively, with a productivity of 0.381 g/L/h.

Biography

Nallusamy Sivakumar has completed his PhD from Bharathidasan University. He is working as an Assistant Professor in the Department of Biology, Sultan Qaboos University, Oman. His research areas are microbial fermentation, bioprocessing and bioactive compounds. He has published more than 25 papers in reputed journals.

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