

Valorisation of rice straw by using it as a substrate for production of cellulolytic-hemicellulolytic enzyme cocktail and second generation ethanol

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A natural variant of *Aspergillus niger* P-19 has been used for the production of cellulolytic and hemicellulolytic enzyme cocktail on rice straw. Untreated rice straw was able to support the growth of *A. niger* P-19 and induced the co-production of CMCase, FPase, β -glucosidase, xylanase and mannanase with productivities of 88.28U/gds, 30.55U/gds, 46.59U/gds, 570.40U/gds and 54.47U/gds respectively under solid state fermentation. The yields were further augmented by optimizing various environmental and cultural conditions including a substrate to moisture ratio, pH of moistening agent, inoculum size, exogenous supplementation of carbon, nitrogen sources and surfactants. Characterization of the crude enzyme preparation revealed that all the enzymes had optimum activity at 60°C and pH 4.0. This enzyme preparation worked very well in the hydrolysis of 0.25N NaOH pre-treated rice straw and was able to produce 700mg of total reducing sugars and 500mg of glucose per gram of dried pre-treated straw. The sugars thus obtained in the hydrolysate were subjected to fermentation with *S. cerevisiae* which resulted in the ethanol yield of 15.8g/l with a productivity of 158g/kg of the pre-treated rice straw residue. The lignin obtained after alkali pre-treatment can be precipitated and used for multiple purposes and the residue left after enzymatic hydrolysis may be used as biofertilizer.

Biography

Jaspreet Kaur done her graduation in Biotechnology and postgraduation in Microbial Biotechnology. Currently, she is doing PhD under the supervision of Prof SK Soni and Dr Raman Soni in the Department of Microbiology, Panjab University Chandigarh (India). The title of Jaspreet Kaur research is Rice straw to fuel ethanol: Standardization of pre-treatment, enzymatic hydrolysis and fermentation strategies. She is working on value addition to rice straw for its better utilization for the production of multiple carbohydrase's and ethanol.

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