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Bioethanol Production by Optimizing Cellulase Production from Bacteria

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Abstract : *Cellulose is a major constituent of plant cell wall and is the most abundant biological polymer on earth. The use of various cellulolytic microorganisms for the bioconversion of cellulose into valuable products has attracted worldwide attention. Our present work was aimed to isolate, purify and optimize the cellulase producing bacteria for bioethanol production. Optimization of the fermentation medium was carried out for maximum cellulase production and enzyme assay. The culture conditions like pH, temperature, incubation time, carbon sources, and nitrogen sources were optimized. The optimum conditions found for cellulase production and then for bioethanol production were 45°C at pH 4.5 with incubation time of 216 hours with peptone as a good nitrogen source and different substrates (coconut husk, rice bran, and pineapple peel). The yeast Saccharomyces cerevisiae was used for simultaneous saccharification and fermentation because it tolerates a wide range of pH with acidic optimum, and it is the preferred strain for industrial production of bioethanol.*

Keywords: *Isolation; Exoglucanase; Endoglucanase; Cellulase; Cellulose.*

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Introduction:

Cellulose is a linear polysaccharide of glucose residue with β-1, 4-glycosidic linkages. Abundant availability of cellulose makes it an attractive raw material for producing many industrially important commodity products.

It is the most abundant biomass on the earth (Tomme et al. 1995). It is the primary product of photosynthesis in terrestrial environments and the most abundant renewable bioresource produced in the biosphere (Jarvis, 2003 and Zhang et al. 2004).

Cellulose, a polymer of glucose residues connected by beta 1, 4-linkages, being the primary structural material of plant cell wall, is the most abundant carbohydrate in nature (Saha et al. 2006). Therefore, there is considerable economic interest to