Production of cellulases by thermophilic *Bacillus* sp in different carbon and nitrogen sources

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Bacillus sp SMIA-2 is a thermophilic, aerobic, sporeforming bacterium which can utilize cellulose, xylan, pectin, and several other carbon sources and produces numbers of extracellular polysaccharide hydrolyzing enzymes which include cellulases. It is apparent from literature that cellulase production depends on nature of carbon sources. Different ferment-able sugars have been shown to either induce or inhibit cellulase production depending on individual species. In addition, the enzyme production is also affected significantly by the organic and inorganic nitrogen sources. In this work was studied the influence of the carbon and nitrogen source on production of cellulose degrading enzymes from a thermophilic *Bacillus* sp SMIA-2. Such information may be useful in gaining better understanding of the lignocellulose biodegradation in relation to the enzyme system produced by *Bacillus* sp SMIA-2. Different organic and inorganic nitrogen sources were used for cellulase production and it was found that maximum avicelase and carboxymethylcellulase production was achieved when corn steep liquor (CSL) (0.3%, w/v) was used as a nitrogen source. The advantage of using CSL as nitrogen source in culture media for cellulase production is that this residue is capable to provide an additional nitrogen source by providing peptides and amino acids made readily available for cell metabolism and also it is an inexpensive substrate available in large scale. The highest activity encountered for avicelase was obtained using sugarcane bagasse followed by insoluble cellulose (avicel) and soluble cellulose (carboxymethylcellulose) as inducers after 120 h of fermentation. Therefore, avicel was not superior in inducing avicelase production by *Bacillus* sp SMIA-2 than sugarcane bagasse. The culture filtrates also showed ability to hydrolyse carboxymethylcellulose, which is generally considered a substrate for measurements of CMCase activity. The highest activity was found using carboxymethylcellulose (soluble cellulose) followed by sugarcane bagasse after 120 h of fermentation. It has been reported that untreated bagasse is a good substrate for cellulases and biomass production. It induces cellulase production as it contains about 50% cellulose, 25% hemicellulose and 25% lignin.

Key-words: Avicelase, *Bacillus,* carboxymethylcellulase, sugarcane bagasse

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