

## **Synergistic effect of glucose and cellobiose with sugarcane bagasse on cellulase production by *Bacillus* sp.**

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Cellulase production is subject to induction by the presence of plant biomass components and to repression by the availability of easily metabolized sugars, such as glucose. In this work, the effect of glucose and cellobiose on cellulase synthesis by thermophilic *Bacillus* sp SMIA-2 in the presence of sugarcane bagasse was studied. The organism was cultivated in a medium with glucose (0.5%, w/v), cellobiose (0.5%, w/v) or sugarcane bagasse (SCB) (0.5%, w/v) individually and the results were compared to those obtained with SCB (0.5%, w/v) plus glucose (0.5%, w/v) and SCB plus cellobiose (0.5%, w/v) as carbon sources. The highest levels of avicelase and carboxymethylcellulase (CMCase) occurred during cultivation of *Bacillus* sp SMIA-2 on SCB incorporate with glucose. On the other hand, the growth of *Bacillus* sp SMIA-2 on SCB incorporate with cellobiose (0.5%, w/v) caused a reduction in avicelase and CMCase activity when compared to those obtained with SCB (0.5%, w /v) alone. It has been reported that high glucose concentration suppressed the induction of cellulase, whereas low glucose stimulate enzyme production. Thus, to test the effect of glucose concentration on cellulase activity *Bacillus* sp SMIA-2 was cultured on SCB which was mixed with a gradient of glucose (0.1-2.0%, w/v). The culture under SCB-alone was used as control. It was observed that increasing glucose concentration in the medium to 0.5 % (w/v), improved the avicelase and CMCase activities. At higher glucose concentrations (1-2%, w/v) enzymes production were suppressed. Thus, at lower glucose concentration this sugar did not induce catabolic repression and synergistically enhanced the cellulase synthesis in *Bacillus* sp SMIA-2. *Bacillus* sp SMIA-2 was also cultured on SCB mixed with different concentrations of cellobiose (0.1-2.0%, w/v). The activity of both enzymes avicelase and CMCase decreased under incremental concentrations of the cellobiose supplement, been more pronounced to CMCase.

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

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