

Production and properties of *Irpex lacteus* cellulase and xylanase

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Abstract

This study aimed to characterize the cellulolytic system of *Irpex lacteus* BCC 104 isolated from the forest of Georgia. The results obtained showed that the expression of endoglucanase and xylanase synthesis in this fungus is inducible in the presence of cellulose-containing growth substrates. Among them, crystalline cellulose appeared to be the best carbon source providing the highest endoglucanase (48.0 U/mL), total cellulase (7.6 U/mL), and xylanase (68.4 U/mL) activities. Supplementation of the Avicel-induced culture with 0.5 or 1% glycerol caused catabolite repression of the cellulase and xylanase formation by *I. lacteus* BCC 104. The enzyme synthesis resumed only after the depletion of easily metabolizable carbon source from the medium. The crude enzyme obtained after the cultivation of *I. lacteus* in the fermenter and used for saccharification of pretreated wheat straw (40 mg/mL, FPA load 20 U/g substrate) yielded 10.7 mg reducing sugars/mL (32.2% from the theoretically possible). CMCase and xylanase were purified 31- and 34-fold and characterized. The optimum pH for both enzyme activities was found to be 5.0; at pH 5-6, they retained 60% of their initial activity after incubation at 30°C for 48 h. CMCase expressed maximum activity at 50°C while xylanase – at 55°C. Half-inactivation periods of endoglucanase and xylanase during incubation at 60°C were 60 min and 150 min, respectively.

Keywords: *Irpex lacteus*, Cellulase, Xylanase, Production, Purification, Properties

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Conflict of interests

The authors have no conflict of interests to declare.

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