

Enhanced production of thermophilic xylanase by recombinant *Escherichia coli* DH5 α through optimization of medium and dissolved oxygen level.

ABSTRACT

Enhancement of thermophilic xylanase production by recombinant *Escherichia coli* DH5 α through suitable medium formulation was initially investigated using shake flask cultures. Thereafter the effect of dissolved oxygen tension (DOT) level on the performance of xylanase fermentation by *E. coli* DH5 α was investigated in 2 L stirred tank bioreactor using the optimal medium. Among the two basal medium tested (complex medium of Luria Bertani & defined mineral medium), defined mineral medium gave the highest growth and xylanase production. The optimal glucose and (NH₄)₂SO₄ for xylanase production was obtained at 10 g L⁻¹ and 2 g L⁻¹, respectively. Growth of *E. coli* DH5 α and xylanase production was inhibited in oxygen limited fermentation, where dissolved oxygen tension level was controlled at 0% saturation. On the other hand, xylanase production was enhanced at DOT level controlled at 20% saturation, though growth was not significantly improved. Substantially high xylanase production (1784.57 U mL⁻¹) was obtained in fermentation using optimal medium composition and DOT level. These results indicate that efficient process control strategy is important for the mass production of xylanase enzyme by *E. coli* DH5 α .

Keyword: Thermophilic xylanase; Xylan-degrading enzymes; Batch fermentation; *E. coli* DH5 α ; Kinetic; Modeling.