Effect of Selected Polyols And Salts on Stability of Xylanase Produced By Bacillus pumilus

Subajini Mahilrajan, Sandrasegarampillai Balakumar and Vasanthy Arasaratnam

Department of Biochemistry, Faculty of Medicine, University of Jaffna, Sri Lanka

jsubajini@gmail.com

ABSTRACT

The objective of this study is to improve the stability of an alkaline xylanase with selected polyols and salts, which was produced by a locally isolated alkalo-thermophilic Bacillus pumilus. Xylanases with higher stability are used for the application in paper and pulp industry for bio bleaching. In the absence of additives at 55°C, the xylanase retained 38(±1.0)% of its initial activity at 30min and retained 45.6 (±0.76) and 20.6(±0.84)% of its initial activity at pH 8.0 and 9.0 respectively. Xylanase which contained polyols such as 10mM Poly Ethylene Glycol (PEG)-8000, 1M glycerol and 2M sorbitol the enzyme retained 24.0(±0.34), 19.0(±0.84) and 53.8(±0.57)% of its initial activity respectively at 60min. Addition of 10mM NaCl lost all of its activity while the enzyme retained 88.4(±0.18)% of its initial activity in the presence of 10mM CaCl₂. Sorbitol and CaCl₂ were the best additives among the polyols and salts respectively. CaCl₂ and sorbitol of different concentrations were studied and the halflives of the xylanase in presences of 10mM CaCl₂ and 2M sorbitol were 302 and 63min respectively. When both 10mM CaCl₂ and 2M sorbitol were used together, the enzyme retained more (95%) of its initial activity at 60min than that in presence of 10mM CaCl₂ (88%) and 2M sorbitol (53%) individually. At 55°C half-life of the xylanase in presence of CaCl₂, sorbitol and CaCl₂ & sorbitol were 18, 47 and 552min respectively. The enzyme contained both CaCl₂ & sorbitol helped to retain 95, 88 and 18% of the initial activity at 55, 60 and 65°C respectively; while at 70°C it lost all of its activity at 120min. Xylanase from B. pumilus was stable at 60°C for 2h with both CaCl₂ & sorbitol.

Key words: Half-life, Polyols, Stability, Salts, Xylanase