

In-Vitro Dextran Synthesis and Characterization of an Intracellular Glucosyltransferase from *Leuconostoc Mesenteroides* AA1

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Abstract : Dextranase [EC 2.4.1.5] is a glucosyltransferase that catalyzes the biosynthesis of a natural biopolymer called dextran. It can catalyze the transfer of D-glucopyranosyl residues from sucrose to the main chain of dextran. This unique biopolymer has multiple applications in several industries and the key utilization of dextran lies on its molecular weight and the type of branching. Extracellular dextranase from *Leuconostoc mesenteroides* is most extensively studied and characterized. Limited data is available regarding cell-bound or intracellular dextranase and on the characterization of dextran produced by in-vitro reaction of intracellular dextranase. *L. mesenteroides* AA1 is reported to produce extracellular dextranase that catalyzes biosynthesis of a high molecular weight dextran with only α -(1 \rightarrow 6) linkage. Current study deals with the characterization of an intracellular dextranase and in vitro biosynthesis of low molecular weight dextran from *L. mesenteroides* AA1. Intracellular dextranase was extracted from cytoplasm and purified to homogeneity for characterization. Kinetic constants, molecular weight and N-terminal sequence analysis of intracellular dextranase reveal unique variation with previously reported extracellular dextranase from the same strain. In vitro synthesized biopolymer was characterized using NMR spectroscopic techniques. Intracellular dextranase exhibited V_{max} and K_m values of 130.8 DSU ml⁻¹ hr⁻¹ and 221.3 mM, respectively. Optimum catalytic activity was detected at 35°C in 0.15 M citrate phosphate buffer (pH-5.5) in 05 minutes. Molecular mass of purified intracellular dextranase is approximately 220.0 kDa on SDS-PAGE. N-terminal sequence of the intracellular enzyme is: GLPGYFGVN that showed no homology with previously reported sequence for the extracellular dextranase. This intracellular dextranase is capable of in vitro synthesis of dextran under specific conditions. This intracellular dextranase is capable of in vitro synthesis of dextran under specific conditions and this biopolymer can be hydrolyzed into different molecular weight fractions for various applications.

Keywords : characterization, dextran, dextranase, *leuconostoc mesenteroides*

Conference Title : ICBESE 2015 : International Conference on Biological, Ecological and Environmental Sciences, and Engineering

Conference Location : London, United Kingdom

Conference Dates : June 28-29, 2015