Xanthan Lyase Activity in Extracellular Secretion of a Native Strain Isolated From Soil

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Background & Objectives: Xanthan gum is an important natural polysaccharide that use in pharmaceutical and food industries and petroleum production because of its high viscosity. Xanthan is a linear polymer of β 1→4 glucose with negative charge sugars in side chain. Viscosity of xanthan solutions may be controlled via degrading of its backbone or side chains by using hydrolyzing enzymes, e.g xanthanase (hydrolyzing the backbone) and xanthan lyase (hydrolyzing the side chain).

Methods: In this study, bacteria isolated from soil was cultured in fluid culture media that containing xanthan solution. Supernatant was separated from mass of bacteria by centrifugation. Xanthan lyase activity in the supernatant was monitored by measuring the increase of A235 caused by the conjugation of the formed C=C bond with carboxylate group in the uronic acid residue (due to release D-mannose) after adding appropriate concentration of xanthan. To investigation of the existence of xanthan lyase activity in extracellular secretion of the bacterium, TLC was done using various concentrations of xanthan added to supernatant and incubated at 30^{o}C during time intervals.

Results: Increasing of A235 proved that the supernatant contained xanthan lyase activity. According to appropriate standard in TLC, release of D-mannose due to xanthan lyase activity was confirmed.

Conclusion: Regarding production of various xanthan-depolymerizing enzymes by xanthan degrading bacteria, determination of type of the enzyme(s) is required. In this study, it has been improved, using two different methods, that the bacterium shows extracellular xanthan lyase activity releasing mannose monomers by hydrolyzing end sugar of side chains.

Keywords: Xanthan Lyase; Xanthan; D-mannose; Biopolymer Degradation