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Continuous Degradation of Sodium Alginate in Bioreactor Using Immobilized Alginate Lyase

[Yasuhito MATSUBARA](#)¹⁾, [Masako INOUE](#)²⁾ and [Ken-ichi IWASAKI](#)²⁾

1) *Kagawa Prefectural Fermentation and Food Experimental Station*

2) *Food Research Institute, Kagawa Prefectural Government*

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The enzymatic degradation of sodium alginate was continuously carried out to effectively produce alginate oligosaccharides using immobilized alginate lyase in a CSTR (continuous stirred tank reactor) system. The alginate lyase was immobilized onto the chitosan beads and the reaction was operated at an initial alginate concentration of 10 g l^{-1} at 35°C and pH 7.0 under the dilution rate of 0.77 to 1.74 h^{-1} . The degradation products mainly consisted of di-, tri-, tetra-, penta-, and hexasaccharides with the highest conversion of 0.34, with the volumetric production rate of the total oligosaccharides dependent on the dilution rate. The production process was mathematically modeled from the basic material balance and the rate equation, and showed agreement between the simulated and experimental results. The present reactor system was found to be effective for obtaining alginate oligosaccharides with a high production rate.

Keywords: [sodium alginate](#), [enzymatic degradation](#), [alginate lyase](#), [CSTR system](#), [alginate oligosaccharide](#)



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