ABSTRACT

In this study, we use B. subtilis DYU1 as γ-Polyglutamic acid (γ-PGA) producer to investigate the effect of medium compositions and incubated conditions on γ-PGA production in flask. The maximum γ-PGA production (32.1 g/L) was obtained when it was grown in the medium containing 30 g/L L-glutamic acid. The applicable temperatures for producing γ-PGA were between 35 – 38 ℃. The addition of amino acid solution to the medium could not enhance the γ-PGA production. On the other hand, we also investigate the effect of agitation speed and aeration rate on the γ-PGA production in a 5-L fermentor. Furthermore, in order to reduce the production costs, the molasses was used as basic production medium, at the same time the waste could be reused. The results suggest that the molasses has high potential for producing γ-PGA. The rheological properties of γ-PGA fermentation broth were studied using a rotational viscometer at several pHs and temperatures. The mathematical models were developed for determining the apparent viscosity of γ-PGA fermentation broth as affected by temperature and γ-PGA concentration. Potential applications of γ-PGA as humectant and flocculant was also study in this research and, the results show that γ-PGA has high moisture-absorption and moisture-retention capacities. Furthermore, the γ-PGA solution also has high moisture-retention capacity. Three kinds of γ-PGA (as flocculant) and the polyaluminum chloride (PAC) (as coagulant) were use to perform the flocculation test of E. coli. The γ-PGA produced from B. subtilis DYU1 was found to have excellent flocculating ability for E. coli suspension. Moreover, mechanisms describing the flocculation process with γ-PGA were proposed based on the experimental observations.
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