ABSTRACT

Enzymatic depolymerization of sodium alginate to synthesize specific alginate oligosaccharides has driven great attention. The current study increased the production of alginate lyase from a mutant strain of *Bacillus licheniformis*. Different fermentation parameters such as time of incubation (72 h), initial pH of medium (6.5), size of inoculum (1 ml) and medium volume (75 ml) were optimized and the strain exhibited an enzyme activity of 31.36±0.81 U/ml. The alginate lyase was partially purified from crude extracts through ammonium sulphate partial purification method. At 40 % saturated solution of ammonium sulphate specific activity of alginate lyase was1000±0.58 U/mg. The optimum working conditions of enzyme were pH 7.5, incubation period (30 min) and temperature for optimal working was 40◦C. Alginate lyase was physically immobilized on silica gel matrices for improved stability and catalytic efficiency. The optimum parameters for the immobilization of enzyme were 100 mg silica gel, 0.15 ml of partially purified and crude enzyme and 30 min as procurement period. It was found that AOS production by immobilized enzyme was significantly improved (1.3-fold) as compared to free enzyme. Different parameters of AOS production ethanol treatment (2.5 volumes), agitation intensity (80 rpm) and level of sodium alginate (5 mg/ml) were also optimized. Catalytic efficiency, stability and reusability of enzyme were also significantly enhanced by immobilization of enzyme on silica gel matrices. However, the scaling up the process may lead to further increase in the substrate catalyzing efficiency and its industrial based applications.