

Effect of agitation & nitrogen source on *Beijerinckia indica* for the production of exopolysaccharide

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Summary

The polysaccharide, PS-7 or S-7, is a potential biopolymer with novel properties which is produced by *Beijerinckia indica*, a free-living, nitrogen-fixing, aerobic, gram negative bacterium. In this work, the effect of agitation and carbon/nitrogen ratio of media were studied on a 5-L fermentor and the optimal condition was established: 500 rpm of agitation speed and 20 g/l of glucose with 0.6 g/l ammonium nitrate were optimal for cell growth and polysaccharide production. Nitrogen-limited medium is commonly used in the industrial gum production. Here, we studied the effect of organic and inorganic nitrogen source on the exopolysaccharide synthesis. Ammonium was good nitrogen source for cell growth, but high concentration of ammonium inhibited the exopolysaccharide synthesis. Nitrogen fixation would be a high-energy wasting process. Absence of nitrogen source in the environment might stimulate the N₂-fixing. Addition of organic nitrogen source in the fermentation process would enhance the metabolism of the bacteria and the molecular masses of the polysaccharide were increased, which was shown by the increase of viscosity, though the amount of biopolymer production was not increased accordingly. Addition of ammonium nitrate would increase the final biomass production, but the polysaccharide production decreased. When using nitrate as inorganic nitrogen sources, it produced more biomass compared to that from ammonium source. Ammonium chloride or potassium nitrate in the media would result in less polysaccharide synthesis.

References

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