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ABSTRACT

A lipopeptide biosurfactant is produced by *Bacillus licheniformis* JF-2. The biosurfactant has found application in *in-situ* microbial enhanced crude petroleum recovery whereby the bacteria is able to grow facultatively and anaerobically under extreme conditions of temperature, pH and salinity (Javaheri *et al.*, 1985). An attempt was made in this thesis to formulate a cultivation medium which would enhance the growth of the microorganism in order to achieve high yields of biomass. Process optimization was achieved in Nutrient broth whereby the initial pH was recorded at 7.0, temperature of 40°C and at an agitation speed of 250 rpm in shake flask cultures. The maximum absorbance achieved was 1.14 at the end of the log phase (8 hours) which was similar to the maximum absorbance achieved by Jenneman *et al.* (1983) between 1.0 to 1.2 obtained after 20 hours of growth in Medium E. The log phase lasted 5 hours in our study, approximately 14 hours was reported in Medium E conducted by Jenneman *et al.* (1983) to achieve maximum absorbance.

Media optimization in shake flask studies resulted in the formulation of the Optimized Medium which consisted of 0.3% (w/v) yeast extract, 3% (w/v) sodium chloride and 5% (w/v) glucose added with nutrient broth. *Bacillus licheniformis* JF-2 grown in the Optimized Medium at an initial pH of 7.0, temperature of 40°C and shaken at 250 rpm achieved a maximum biomass yield averaging 1.61 g/L and crude lipopeptide yield of 1.82 g/L whereas the maximum absorbance read at 480 nm achieved a maximum of 1.58 at the 8th hour of fermentation.