

ABSTRACT

The present study deals with the pre-treatment of sugar cane molasses for the enhanced production of citric acid by *Aspergillus niger* NG-4. For this purpose, different acids such as H_2SO_4 , HNO_3 and HCl were used. Their level varied from 0.5-2.0 N and added in the production medium during the time of clarification. Among all the acids, the maximum amount of citric acid (40.0 g/l) was produced when 1.0N H_2SO_4 pre-treated cane molasses was used as a substrate, which is about 2.5, fold higher than the control (15.8 g/l citric acid). Different metal complexing agents such as potassium ferrocyanide [$K_4Fe(CN)_6$] and ethylene diamine tetra acetic acid (EDTA) were also employed for molasses pre-treatment and the concentrations varied from 50-350 ppm. The maximum production of citric acid (36.4 g/l) was achieved in the medium pre-treated with 250 ppm potassium ferrocyanide.

In a parallel study, the acids and metal complexing agents were added in the molasses medium, alternatively prior to heating at $90^\circ C$ for 1 h. Among them, the maximum amount of citric acid (53.2 g/l) was produced when the ratio between $H_2SO_4+K_4Fe(CN)_6$ was maintained at 1.0:250 for the pre-treatment of cane molasses which is approximately 3.1 fold higher than the control (17.0 g/l citric acid). Therefore, this pre-treatment of molasses was optimized for further study in shake flask. Sugar concentration (150 g/l), initial pH (6.0) and incubation period (168 h) were also optimized. The kinetic parameters such as growth yield coefficients ($Y_{p/s}$, $Y_{p/x}$, $Y_{x/s}$ in g/g), volumetric rates (Q_p , Q_s , Q_x in g/l/h) and specific substrate rates (q_p , q_s in g/g cells/h) of the research work were also undertaken. The value of Q_p (0.134 g/l/h) is highly encouraging ($p \leq 0.05$).