

RECENT DEVELOPMENTS IN OPTIMIZATION OF CITRIC ACID FERMENTATION PROCESS-A REVIEW

K. ANAND KISHORE & G. VENKAT REDDY

Department of Chemical Engineering, National Institute of Technology, Warangal-506004, A.P, India

ABSTRACT

Citric acid is produced mainly by submerged fermentation using *Aspergillus Niger*. The present review reports the study on Optimization of process parameters using one factor at a time (OFAT) method and Response surface methodology (RSM). Regression equations were used to model the fermentation in order to determine optimum fermentation conditions. Maximum citric acid production was obtained at pH: 5.35, temperature: 30-32°C, fermentation days of 5.7 days with 221.66 g of substrate/L, 0.479 g of ammonium nitrate/L and 2.33 g of potassium ferrocyanide/L. A maximum citric acid production of 82 g kg⁻¹ dry peat moss (DPM) was reached after 72 h with the following optimized nutrient solution, in terms of g kg⁻¹ DPM: 967.9 glucose, 15.4 (NH₄)₂SO₄, 43.9 KH₂PO₄ and 4.0 NaCl. The maximum citric acid production of 354.8 g/kg DPM was resulted from the combination of 19 g phytate/kg DPM, 49 g olive oil/kg DPM and 37 g methanol/kg DPM at 120 h. The optimum experimental condition was found using 7.0 mg/L of Fe⁺³ and 6.5 mg/L of Zn⁺² in absence of Mn⁺².

KEYWORDS: *Aspergillus Niger*, Citric acid, factorial design, operating variables, Plackett-Burman design and Response Surface methodology.