

## ABSTRACT

*Aspergillus niger* P<sub>1</sub> isolated from decaying lime fruit was a good citric acid producer (productivity 0.27gl<sup>-1</sup>d<sup>-1</sup>) among the different *Aspergillus* strains isolated from environment. By culturing *Aspergillus niger* P<sub>1</sub>, a natural mutant *Aspergillus niger* P<sub>2</sub> (productivity 0.49gl<sup>-1</sup>d<sup>-1</sup>) was selected. By UV-irradiation (254nm,20min), *Aspergillus niger* P<sub>2</sub> was mutated and the *Aspergillus niger* UV<sub>1</sub> (productivity 1.21gl<sup>-1</sup>d<sup>-1</sup>) was isolated. In second cycle of UV-irradiation, *Aspergillus niger* UV<sub>2</sub> was obtained (productivity 2.27gl<sup>-1</sup>d<sup>-1</sup>). Chemical mutagenesis of *Aspergillus niger* UV<sub>2</sub> using ethyl methane sulphonate (EMS) gave *Aspergillus niger* CM<sub>1</sub> as the best citric acid producer (productivity 3.17gl<sup>-1</sup>d<sup>-1</sup>).

Supplementation of basal medium with methanol (30ml<sup>-1</sup>) and gingilly oil (2ml<sup>-1</sup>) increased the extracellular citric acid production by *Aspergillus niger* UV<sub>1</sub> from 4.6gl<sup>-1</sup> to 12.4gl<sup>-1</sup> (productivity from 1.25 to 3.37gl<sup>-1</sup>d<sup>-1</sup>). At glucose concentration of 50, 100 and 150gl<sup>-1</sup>, citric acid production by *Aspergillus niger* UV<sub>2</sub> was highest (46.2gl<sup>-1</sup>) with 150gl<sup>-1</sup> glucose when the glucose concentrations of all were maintained in the range of 10-30gl<sup>-1</sup> by the addition of solid glucose as and when required. Increased citric acid production (47.8gl<sup>-1</sup>) in reduced time (17days) was observed when the production medium was inoculated with 65h old mycelium instead of spores. The possibility of replacing peptone organic nitrogen with soy organic nitrogen was tried out with *A.niger* CM<sub>1</sub>. In this experiment the media containing peptone and no peptone were supplemented with soy bean flour (20gl<sup>-1</sup>) and soy meat powder (20gl<sup>-1</sup>). Both soy bean and soy meat increased the growth of the fungus in the presence and absence of peptone (1.5 and 3.0 fold) but decreased the citric acid production (0.56 fold). As the soy bean organic nitrogen did not improve the citric acid production, the concentration of NH<sub>4</sub>NO<sub>3</sub> was increased from 0.5 to 0.75gl<sup>-1</sup> in the production medium and citric acid production was raised from 47.1gl<sup>-1</sup> to 53.5gl<sup>-1</sup> (at 17d, productivity 3.15gl<sup>-1</sup>d<sup>-1</sup>) while the growth of the fungus remaining constant. Further when the concentration of peptone was doubled to 14.0gl<sup>-1</sup> (at 8d, productivity 7.25gl<sup>-1</sup>d<sup>-1</sup>).

Citric acid was purified as calcium citrate (at pH7, 95<sup>0</sup> C) from spent medium using CaCO<sub>3</sub>. Of the total acid produced (58gl<sup>-1</sup>) by *A.niger* CM<sub>1</sub>, 80.5% and 7.94% were citric and oxalic acid respectively.