ABSTRACT

The present study is intended to improve the production of L-Phenylacetylcarbinol by yeast, which is a precursor for the production of many pharmaceutical compounds such as ephedrine and pseudoephedrine. The strategy opted to increase the L-PAC production through the improvement of strain *S. cerevisiae* Y-567 by chemical mutagenesis. Nitrous acid, a potent mutant, was used with varying concentrations and exposure time to isolate a mutant with efficient productivity. Twenty four mutants that showed tolerance to minimal inhibitory concentration of acetaldehyde were screened by submerged fermentation in shake flasks. *S. cerevisiae* mutant NA-67 showed better production of L-PAC (4.19 g/l) as compared with the other isolates.

The rate of growth of mutant was higher (0.41 h^{-1}) as compared to the wild strain. The strain *S. cerevisiae* NA-67 was optimized to attain higher yield through different parameters. The cultures were subjected to varying pH and temperature ranges to get a yield of 4.65 g/l. Inoculum size 15% (v/v) and 130 g/l of initial sugar concentration also gave a higher yield of L-PAC. The yeast mutant gave a higher yield of product when subjected to 372 µl of benzaldehyde concentration with descending dosage pattern having 6 doses and an interval of 30 min. Supplementation with acetaldehyde increased the biotransformation activity of mutant to form L-PAC. The scale up studies of mutant was also carried out in a stirred fermentor. The rates of aeration (0.7 vvm) and agitation (200 rpm) gave maximum production of L-PAC in the fermentor. Moreover, the addition of 8% silicone oil in the medium before benzaldehyde dosing reduced foam formation and improved L-PAC production.