

## ABSTRACT

The present study deals with the effective biotransformation of benzaldehyde to a stable L-PAC using calcium alginate entrapped pyruvate decarboxylase of an auxotrophic *Saccharomyces cerevisiae* via submerged fermentation. The wild-type of *Saccharomyces cerevisiae* ISL-7 was mutagenised using UV radiations. Significant increase in L-PAC production was found as compared to wild-type. Out of 29 mutants, UV-t6 was selected for maximum L-PAC production after primary and secondary screening. The auxotrophic mutant UV-t6 resulted in 1.25fold increase in L-PAC activity than wild-type ISL-7 when exposed to UV radiations. The effect of different benzaldehyde concentrations and incubation time on production of L-PAC was also studied. The maximum PDC activity  $95.99 \pm 5.7$  U/ml and L-PAC activity  $22.46 \pm 1.34$  g/l was observed after 4 h of incubation at 28°C for 60  $\mu$ l benzaldehyde concentration. The selected mutant strain UV-t6 also showed maximum L-PAC production with better L-PAC fermentation kinetics as compared to wild-type ISL-7. The PDC of auxotrophic mutant strain of *Saccharomyces cerevisiae* UV-t6 was immobilized using calcium alginate beads. The effect of enzyme concentration, bead size and cell holding time on L-PAC activity was also studied. The immobilized enzyme exhibited maximum PDC and L-PAC activity i.e.  $116.22 \pm 8.13$  U/ml and  $13.72 \pm 0.96$  g/l at enzyme concentration 1.5 ml as compared to free enzyme (PDC activity  $115.20 \pm 8.06$  U/ml and L-PAC activity  $12.97 \pm 0.91$  g/l). The maximum L-PAC activity was observed for bead size 3 mm i.e.  $14.56 \pm 1.16$  g/l along with cell holding time 10 min. This study revealed that auxotrophic mutant strain of *Saccharomyces cerevisiae* along with immobilized PDC exhibited 1.68fold increase in L-PAC production than wild-type.