

## Isolation and improvement of a thermotolerant *Saccharomyces cerevisiae* strain

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### Summary

The ambient temperature is a drawback in industrial ethanol production in Jaffna due to heat killing of yeast during fermentation. Thus a search was initiated for thermotolerant organisms suitable for fermentation in hot climates. The screening of the best wild-type organisms was undertaken as the first step. Thermotolerant strains were selected from environments where there are chances of organisms being exposed to high temperature. The samples were enriched and screened for thermotolerant organisms which survived at 45 °C for 15 h. Among the yeast strains selected from different sources, thermotolerant strains with the capacity to withstand 45 °C for 15 h were found in samples collected from the compost heap and distillery environments. Three colonies from the distillery environment were selected for further studies and named p1, p2 and p3. Exponential phase (18 h) cultures of p1, p2 and p3 were subjected to 15 temperature treatment cycles (at 50 °C each for 3 h) and thermally adapted strains pt1, pt2 and pt3 were obtained, showing 100, 30 and 20% viability at 50 °C for 30 min respectively. The initial round of thermal adaptation cycles increased the duration of 100% viability from 20 h (p1) to 68 h (pt1) when incubated at 40 °C. Very little benefit was obtained when pt1 was treated with u.v. and ethyl methanesulphonate. The selected strain was identified and designated as *Saccharomyces cerevisiae* S1. The ethanol produced from 100 g glucose l<sup>-1</sup> by *S. cerevisiae* S1 was 46 g l<sup>-1</sup> (36 h), 38 g l<sup>-1</sup> (48 h) and 26 g l<sup>-1</sup> (48 h) at 40, 43 and 45 °C respectively in rich nutrient medium.