ABSTRACT

The major requirements of industrial fuel ethanol production are high ethanol yield and low-cost production. The ability to tolerate osmotic stress and ethanol stress is considering to be a key factor in achieving high ethanol concentration. In this study, UV-mutagenesis and ethyl methane sulfonate (EMS)-induced mutagenesis were performed to improve osmotolerance, ethanol tolerance and ethanol production from high concentration of sugar. Among 114 osmotolerant and ethanol-tolerant yeasts, *Saccharomyces cerevisiae* OA33 showed the best ability to grow in the presence of 25% (w/v) glucose and 15% (v/v) ethanol and produced high concentration of ethanol (12.3% v/v) at 37 °C from 25% (w/v) glucose. This osmotolerant and ethanol-tolerant yeast was subjected to UV-mutagenesis and the selected mutants were then treated with EMS. One mutant, M43OA33, displayed a significantly improved growth tolerance in the presence of 25% (w/v) glucose and 15% (v/v) ethanol comparing to the wild-type. The maximum ethanol concentration and theoretical yield by *S. cerevisiae* M43OA33 mutant from 30% (w/v) glucose at 37 °C was 8.6% and 8.4% higher than the wild-type, respectively.

Key words: UV-mutagenesis, ethyl methane sulfonate-induced mutagenesis, osmotolerant yeast, ethanol-tolerant yeast, ethanol production