

Bioethanol production from galactose by immobilized wild-type *Saccharomyces cerevisiae*

Abstract

Bioethanol has been emerging from different types of renewable feedstocks as an alternative to reduce problems caused by the use of fossil fuels. Galactose is the major sugar obtained from the hydrolysis of seaweeds and can be fermented to ethanol by yeast. Wild-type *Saccharomyces cerevisiae* has been reported with good performance of galactose fermentation. The first part of the study focused on the isolation and characterization of wild-type *S. cerevisiae* with the ability to ferment galactose to ethanol. A wild-type *S. cerevisiae* strain with the ability to ferment galactose to ethanol was isolated from grape with ethanol tolerance of 15%. Immobilization of yeast cells has been performed to increase the ethanol production. The second part of the study involved the immobilization of the isolated wild-type *S. cerevisiae* in PVA-alginate beads. Batch fermentation of galactose by immobilized wild-type *S. cerevisiae* obtained ethanol concentration and yield efficiency of 9.57 g/L and 93.82%. The immobilized wild-type *S. cerevisiae* were used for four cycles of galactose fermentation and obtained ethanol concentration of 7.66 g/L with yeast relative activity of 79.07%. In short, bioethanol produced by galactose fermenting wild-type *S. cerevisiae* can be a future sustainable fuel.