

Screening of High-Alcohol Producing Yeasts for Manufacturing Process of Whisky

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Abstract : This study aimed to develop yeast starters for scientific alcohol production and systematic quality control of whisky. A total of 389 yeast strains were isolated from traditional Korean fermentation starter (nuruk) and rice wine (makgeolli), and ten strains were finally selected for their high alcohol productivities, in which their alcohol productions were above 17.3% (v/v) during 10 days under two steps of glucose feeding condition (30% and then 15%, w/v). By 18s rDNA sequence analysis, all strains were identified as *Saccharomyces cerevisiae* (SC), and they can grow well under 50% (w/v) glucose and 10% (v/v) ethanol conditions. Furthermore, the capability of ten different SC strains to ferment rice wine for whisky was studied. Rice wine was fermented with only steamed rice, water, and two types of enzymes (glucoamylase and α -amylase) during 14 days at 25 °C, and then their oenological properties have been determined. As the results, the fermented rice wines indicated the final pH range of 4.24-4.38 and acidity range of 0.12-0.18. The highest ethanol production of 20.2% (v/v) was found in the fermentation with a SC-156 strain, whereas SC-92 (16.8%) and SC-119 (16.4%) showed significantly lowest ethanol productions. In addition, the residual sugar contents showed negative correlation with alcohol contents. Moreover, this study focused on nucleotide polymorphisms in the MSN2 and MSN4 genes to investigate the cause of the defective stress responses in yeast. Consequently, it was also confirmed that the deletion of the N termini of Msn4p from identified point mutations in SC-63, SC-95, SC-156, SC-158, and SC-160 strains.

Keywords : yeast, high-alcohol, whisky, rice wine

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