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Bioprospecting of Yeast Strains for Efficient Conversion of Lignocellulose to Bioethanol through Simultaneous Saccharification and Fermentation

Ajay Kumar Pandey* and **Naseem A. Gaur**
Yeast Biofuel Group, DBT-ICGEB Center for Advanced Bioenergy Research, India

Lignocellulosic hydrolysate is a mixer of C6/C5 sugars and inhibitors (Furans, weak acids and phenolics) generated during the pretreatment.Therefore, robust yeast isolates with characteristics of C6/C5 fermentation and pretreatment inhibitor tolerance are pre-requisite forlignocellulosic ethanol production. Moreover, use of thermotolerant yeast isolates will reduce cooling cost, contaminations during fermentation, and also required for developing SSF and SSCF processes. Therefore, we evaluated the growth and fermentation performances of yeast isolates isolated from diverge natural habitats. The growth and fermentation performances were evaluated at 30°C and 40°C along with tolerance towards pretreatment inhibitors (Furfural, HMF, Acetic acid and Ethanol). *K. marxianus* NGY8 and *O. thermophila* NGY11 were able to grow onwide range of C6/C5 sugars including arabinose and cellobiose. *S. cerevisiae* NGY10 isolate, isolated from sugarcane bagasse distillery waste, produced maximum ethanol yield of 47.59 ± 2.34 g/l and 46.8 ± 3.11 g/l with the efficiency of 94.11% and 93.73% at 30°C and 40°C respectively, in 24 hours with glucose as a carbon source. This isolate produced ethanol yield of 8.17 ± 0.14g/l with fermentation efficiency of 93.23% at 40°C, when rice straw enzymatic hydrolyzate was used as carbon source and displayed furfural (1.5 g/l), HMF (3.0 g/l), acetic acid (0.2% v/v) and ethanol (10.0% v/v) tolerant phenotypes. Together, NGY10 isolate could be potential yeast isolate for lignocellulosic ethanol production, C5 metabolic engineering and developing strategies for SSF and SSCF processes.