LACTOBACILLUS BUCHNERI: A NOVEL BIOCATALYST FOR ETHANOL PRODUCTION

S. Liu

Bioproducts and Biocatalysis Research, National Center for Agricultural Utilization Research, ARS-USDA, 1815 N. University Street, Peoria, IL 61604, USA

Conventional *Saccharomyces* for starch to ethanol fermentation are no longer applicable for lignocellulose-based ethanol production since a mixture of sugars instead of glucose alone is present in biomass hydrolysates. In addition, various inhibitory compounds are released or formed during the pretreatment and hydrolysis steps of biomass feedstocks. Furthermore, pretreatment and hydrolysis of recalcitrant lignocellulosic biomass under more aggressive mechanical and physical conditions often result in shifting of temperatures, pHs and osmotic pressures. Thus, robust and improved biocatalysts are needed to convert lignocellulosic biomass hydrolysates into fuels and valuable chemicals. A novel strain of *Lactobacillus buchneri* NRRL B-30929 was isolated as a contaminant of a fuel ethanol production facility. Unlike conventional *Saccharomyces*, this organism uses a mixture of five-carbon and six-carbon sugars commonly found in agricultural residues and other lignocellulosic biomass for production of ethanol and other chemicals. Currently, DOE and JGI is sequencing the genome of this strain. With the above mentioned unique characteristics, plus the genome sequence data, this strain can be used by researchers for developing new biocatalysts that convert biomass derived sugars into ethanol and other value-added products. In addition, this microbe exhibited high tolerance to environmental ethanol contents. The identification of ethanol stress related proteins can facilitate understanding of the molecular mechanisms as how the microbe works to tolerate high ethanol concentrations. These specific ethanol tolerance related traits/proteins/genes/ can be used by researchers for developing more ethanol tolerant biocatalysts for biomass to biofuel conversion.

Contact: Siqing Liu, Bioproducts and Biocatalysis Research, NCAUR-ARS-USDA, 1815 N. University Street, Peoria, IL 61604, USA. Tel: 309-681-6566. E-mail: Siqing.Liu@ars.usda.gov.