
# Gene Duplications For Crabtree-Warburg-Like Aerobic Xylose Fermentation

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## The Invention

UW-Madison researchers have developed an engineered Saccharomyces cerevisiae strain capable of efficient fermentation of xylose to ethanol. The engineered yeast they developed builds upon a previously disclosed and patented yeast strain out the GLBRC (US Patent 10,508,272). Through directed evolution, the researchers identified new strains that can produce more ethanol than previously possible from a given feedstock through xylose fermentation. They sequenced the best performing strains and used that information to genetically engineer a strain that proved very effective at fermenting xylose, conversion of xylose to ethanol at 55% of the theoretical maximum yield. The inventors determined that duplications of genes encoding engineered xylose metabolism enzymes, as well as TKL1, a gene encoding a transketolase in the pentose phosphate pathway, were the causative genetic changes for the evolved phenotype. Reengineered duplications of these enzymes, in combination with deletion mutations in HOG1, ISU1, GRE3, and IRA2, increased the rates of aerobic and anaerobic xylose fermentation. They validated the xylose fermentation activity of the engineered strain using an industrially relevant switchgrass hydrolysate (biomass processed to free sugars for fermentation).

## Additional Information

**For More Information About the Inventors**

- Christopher Hittinger

**Tech Fields**

- Clean Technology : Biobased & renewable chemicals & fuels

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854