METABOLIC ENGINEERING OF *S. POMBE* VIA CRISPR-CAS9 GENOME EDITING FOR LACTIC ACID PRODUCTION FROM GLUCOSE AND CELLOBIOSE

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We constructed D-lactic acid (D-LA) producing *Schizosaccharomyces pombe* using CRISPR-Cas9 system. Two PDC genes, intact L-LDH, a minor gene of alcohol dehydrogenase (SPBC337.11) were disrupted to attenuate ethanol production pathway. To increase the cellular supply of acetyl-CoA, an important metabolite for growth, we introduced bacterial acetylating acetaldehyde dehydrogenase enzyme genes. Two kinds of acetaldehyde dehydrogenase genes from *Escherichia coli*, mhpF and eutE, were expressed. D-LA production was achieved by expressing D-lactate dehydrogenase gene from *Lactobacillus plantarum*. The engineered strains efficiently consumed glucose and produced 25.2 g/liter of D-LA from 35.5 g/liter of consumed glucose with the yield of 0.71 g-D-LA / g-glucose. Finally, we expressed beta-glucosidase by cell surface display techniques, and the resultant strain produced 24.4 g/L of D-LA from 30 g/L of cellobiose in minimal medium with the yield of 0.68 g-D-LA / g-glucose. This is the first report to generate metabolically engineered *S. pombe* strain using CRISPR-Cas9 system and we showed the possibility of *S. pombe* for the production host cell of value-added chemicals.