

## Mutation of Galp Improved Fermentation of Mixed Sugars to Succinate Using Engineered Escherichia coli AS1600a

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**Abstract :** Escherichia coli KJ122 was engineered to produce succinate from glucose using the wild type GalP for glucose uptake instead of the native phosphotransferase system (ptsI mutation). This strain ferments 10% (w/v) xylose poorly. Mutants were selected by serial transfers in AM1 mineral salts medium with 10% (w/v) xylose. Evolved mutants exhibited a similar improvement, co-fermentation of an equal mixture of xylose and glucose. One of these, AS1600a, produced  $84.26 \pm 1.37$  g/L succinate, equivalent to that produced by the parent (KJ122) strain from 10% glucose ( $85.46 \pm 1.78$  g/L). AS1600a was sequenced and found to contain a mutation in galactose permease (GalP, G236D). Expressing the galP\* mutation gene in KJ122 $\Delta$ galP resembled the xylose utilization phenotype of the mutant AS1600a. The strain AS1600a and KJ122 $\Delta$ galP (pLOI5746; galP\*) also co-fermented a mixture of glucose, xylose, arabinose, and galactose in sugarcane bagasse hydrolysate for succinate production.

**Keywords :** xylose, furfural, succinat, sugarcane bagasse, E. coli

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