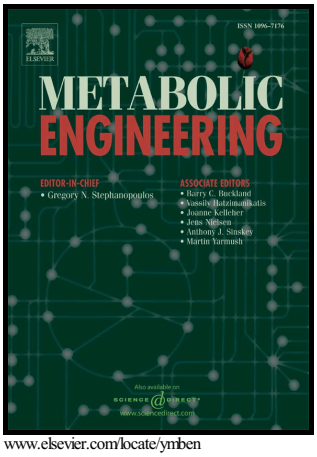

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Production of 2-methyl-1-butanol and 3-methyl-1-butanol in engineered *Corynebacterium glutamicum*

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Abstract

The pentanol isomers 2-methyl-1-butanol and 3-methyl-1-butanol represent commercially interesting alcohols due to their potential application as biofuels. For a sustainable microbial production of these compounds, *Corynebacterium glutamicum* was engineered for producing 2-methyl-1-butanol and 3-methyl-1-butanol via the Ehrlich pathway from 2-keto-3-methylvalerate and 2-ketoisocaproate, respectively. In addition to an already available 2-ketoisocaproate producer, a 2-keto-3-methylvalerate accumulating *C. glutamicum* strain was also constructed. For this purpose, we reduced the activity of the branched-chain amino acid transaminase in an available *C. glutamicum* L-isoleucine producer (K2P55) via a start codon exchange in the *ilvE* gene enabling accumulation of up to 3.67 g/l 2-keto-3-methylvalerate. Subsequently, nine strains expressing different gene combinations for three 2-keto acid decarboxylases and three alcohol dehydrogenases were constructed and characterized. The best strains accumulated 0.37 g/l 2-methyl-1-butanol and 2.76 g/l 3-methyl-1-butanol in defined medium within 48 h under oxygen deprivation conditions, making these strains ideal candidates for additional strain and process optimization.

Keywords: biofuels, *Corynebacterium glutamicum*, 2-keto acids, 2-methyl-1-butanol, 3-methyl-1-butanol, Ehrlich pathway