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Amino acids as a source of higher alcohols

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Biofuels are considered to be part of the solution to dwindling global fossil fuel reserves. Bioethanol offers commercial viability, but has substantial disadvantages in terms of its fuel properties. Higher alcohols, such as n-butanol, isobutanol, isoamyl alcohol (3-methyl-1-butanol) and active amyl alcohol (2-methyl-1-butanol) possess better fuel characteristics than bioethanol, but their production lags behind in terms of commercial viability. While much research has concentrated on using *Escherichia coli* and *Clostridium* species, here we use yeast as a vehicle for the production of these higher alcohols. In *Saccharomyces cerevisiae,* higher alcohol production is via amino acid catabolism through the Ehrlich pathway, but the yield is relatively low. Proof of principle that high amino acid concentrations will generate higher alcohol levels has been obtained by adding amino acids exogenously. An attempt has been made to increase production of higher alcohols by over-expressing the transcription factor gene, *GCN4* in prototrophic yeasts. Gcn4p is involved in the global regulation of nitrogen assimilation pathways. Results obtained show an increase in isobutanol production in the strain over-expressing the transcription factor relative to the wild type and delete strains. Future work will attempt to optimise this yield via genetic engineering.

Biography

Henry Oamen Patrick is a third year PhD student of Biotechnology at the University of Manchester. He completed his MSc degree in Biotechnology and Enterprise at the University of Exeter. He has won the Commonwealth Scholarship for both MSc and PhD degrees. He has keen interest in the biofuel and chemical industry.

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