Poster

Development of novel strains for the production of biofuels

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Abstract

The growing global demand for new energy sources combined with environmental concerns had motivated the search for alternative fuels, produced from renewable raw materials. In this sense, n-butanol (also designed as 1-butanol) is considered the next generation of biofuels due to its superior fuel characteristics when compared with ethanol, including higher energy density, lower hygroscopicity and volatility. Besides its application as fuel, n-butanol has an important role in the manufacturing of pharmaceuticals, polymers, herbicide esters and butyl xanthate, and is also used as solvent for paints, coatings, natural resins, gums, synthetic resins, dyes, and alkaloids.

n-Butanol is naturally produced by solventogenic bacteria through Acetone-Butanol-Ethanol (ABE) fermentation, usually with low productivities. Thus, most of n-butanol is currently chemical synthesised via petrochemical routes and its price is extremely sensitive to crude oil's price, becoming imperative to seek for alternative ways to produce it. One possible approach is to express novel biosynthetic pathways in more user-friendly hosts as *Escherichia coli* or *Saccharomyces cerevisiae*. In this sense, this work aims at evaluating and implementing *in vivo* novel pathways to produce n-butanol. These heterologous pathways, previously generated using a (hyper)graph-based algorithm, will be evaluated according to diverse criteria such as size of the solution, yield and novelty. Then, the pathways identified as the most promising ones will be implemented *in vivo* either in *E. coli* or *S. cerevisiae*.