A hybrid of particle swarm optimization and minimization of metabolic adjustment for ethanol production of escherichia coli

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ABSTRACT

Ethanol is a chemical-colourless compound that widely used in pharmaceutical, medicines, food products, and industrial applications. As the demand for ethanol is rising recently, attention has been given on metabolic engineering of Escherichia coli (*E.coli*) to enhance its production through alteration of its genetic content. This research mainly aimed to optimize ethanol production in *E.coli* using a gene knockout strategy. Several gene knockout strategies like OptKnock and OptGene have been proposed previously. However, most of them suffer from premature convergence. Hence, a hybrid of Particle Swarm Optimization (PSO) and Minimization of Metabolic Adjustment (MOMA) algorithm is proposed to identify the list of gene knockouts in maximizing the ethanol production and growth rate of *E.coli*. Experiment results show that the hybrid method is comparable with two state-of-the-art methods in term of growth rate and production.

KEYWORDS

Particle swarm optimization; Minimization of metabolic adjustment; Metabolic engineering; Bioinformatics; Artificial intelligence

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