

Significant improvement of caproic acid production in *Megasphaera hexanoica* by optimizing composition of electron donors and electron acceptors

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Caproic acid is representative medium chain carboxylic acids (MCCAs) which have wide range of potential applications. Caproic acid itself can be used as antimicrobial agents and a corrosion inhibitor. Additional opportunities can be applied using MCCAs derivatives such as esterification of MCCAs for fragrance and flavor products, and alcohol or alkane form derivatives can be used as solvents and fuels. *Megasphaera hexanoica*, the strain well known for producing MCCAs especially caproic acid, can use fructose and lactate as carbon sources and electron donors, and acetate and butyrate as electron acceptors. In this study, using response surface methodology (RSM), various compositions of electron donors and electron acceptors were evaluated. By optimizing the concentration of the supplemented electron donors and electron acceptors, maximum titer and productivity of caproic acid were achieved to 20.17 g/L and 13.34 g/L/day respectively. These are highest caproic acid production level in single strain batch culture without product extraction as far as we know. Further processes such as fed-batch and extractive fermentation were also conducted.