

Perturbation of membrane compositions in *Clostridium acetobutylicum* ATCC 824 for a higher solvent tolerance

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Fermentative butanol as an alternative fuel has recently gained more attention due to the environmental and economical reasons. *Clostridium acetobutylicum*, a gram-positive, spore-forming anaerobe, is one of the butanol producers utilizing wide spectrum of carbohydrates. However, one of the problems in alcohol fermentation processes is tolerance against metabolites and inhibitors present in hydrolysates. Factors associated with cell resistance have been studied and known to be complicated. Along with the production of toxic products such as ethanol, butyrate, acetate etc., the compositions of lipids and terpenoids present in the cell membrane are known to be changed as a response to the environment. In order to examine function of membrane lipids and terpenoid in *C. acetobutylicum*, fatty acid composition and hopanoids, a class of terpanoid were analyzed using GC and LC-MS prior to perform metabolic pathway engineering. Four different genes (*fabF1-3* and *fabZ*) responsible for unsaturated fatty acid biosynthesis in *C. acetobutylicum* were cloned and overexpressed in *E.coli* and *C. acetobutylicum* will be further transformed and examined.