Name(s)

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Project Number

S1516

Project Title

Engineering Pseudomonas putida KT2440 for Biodegradation of Ethylene Glycol

Abstract

Objectives

Maximize consumption of ethylene glycol by engineering a bacteria Pseudomonas putida (P. putida) KT2440.

Methods

Designed a plasmid with the genes involved in converting ethylene glycol into biomass and transformed P. putida. Measured the optical density (OD) of the engineered bacteria in various concentrations of ethylene glycol, and will measure the concentration of ethylene glycol before and after its presence with the engineered bacteria using high-performance liquid chromatography (HPLC).

Results

There was significantly more growth of the wildtype P. putida in ethylene glycol than of the engineered P. putida, and there was insignificantly more growth of the P. putida with the control plasmid (backbone with no genomic insert) than with the expression plasmid. An effective HPLC protocol for ethylene glycol is being devised.

Conclusions

The toxicity assays of ethylene glycol on P. putida with the expression plasmid and with the control plasmid demonstrated no statistical difference in the optical density of the bacteria. The genes that were inserted into the backbone plasmid might not be effective in facilitating the growth of P. putida in ethylene glycol, which is a significant factor in maximizing the consumption of ethylene glycol.

Summary Statement

I designed a plasmid to maximize the consumption of ethylene glycol in the bacteria Pseudomonas putida KT2440.

Help Received

I did my research, developed my research question and hypothesis, and organized the data independently at home. I conducted the experiments at the University of California Riverside in Dr. Wheeldon's lab in the Department of Chemical Engineering under the supervision and guidance of a graduate student who