

Microbial Synthesis of Biodiesel
1st year Progress Report
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The overall goal of our efforts is to develop a microbial process for biodiesel synthesis. *E. coli* has been selected as a target bacterium for this project. Our specific aims are as follows:

1. Overproduce fatty acids in *Escherichia coli*. We are harnessing both genetic and fermentation strategies to do so. Genetic strategies include manipulation of fatty acid metabolism. Fermentation strategies include developing analytical methods to measure carbon flux into the fatty acid biosynthetic pathway under fed-batch fermentation conditions. These methods will facilitate optimization of fermentation conditions for biodiesel production.

2. Produce biodiesel in *Escherichia coli*. We are evaluating the ability of a variety of microbial enzymes to directly produce fatty acid methyl esters in *E. coli*.

3. Produce fatty aldehydes, alcohols and esters in *Escherichia coli* as precursors to novel biofuels. We are introducing new enzymatic systems into *E. coli* that synthesize aldehyde, alcohol and ester derivatives of fatty acids for potential use as new biodiesel components.