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E. Coli Fermentation of Glycerol from Biodiesel Waste into Ethanol

The E. coli both grows on the glycerol and produces ethanol from the glycerol. Under oxygen limiting conditions, the E. coli strain grows slowly on the glycerin while producing large quantities of ethanol during fermentation. Alternatively, the strain grows quickly on the biodiesel waste when oxygen is in abundance while the

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E. Coli Fermentation of Glycerol from Biodiesel Waste into Ethanol

ESCHERICHIA COLI FERMENTATION OF GLYCEROL WASTE TO ETHANOL

An E. coli strain has been genetically engineered that can convert unrefined glycerol to ethanol in a fast and high yield E. coli fermentation process. Glycerol waste (also called glycerin or glycerine) is the major waste product in biodiesel manufacturing processes, and this E. coli strain can efficiently convert this biodiesel waste into ethanol, a type of biofuel. Existing processes utilize E. coli for bacterial fermentation to convert glycerol to ethanol, but at much lower yields and much slower rates.

BACTERIAL FERMENTATION OF BIODIESEL WASTE: CELLULAR ETHANOL PRODUCTION

The E. coli grows on the glycerol and produces ethanol from the glycerol. Under oxygen limiting conditions, the E. coli strain grows slowly on the glycerin while producing large quantities of ethanol during fermentation. Alternatively, the strain grows quickly on the biodiesel waste when oxygen is in abundance while the Escherichia coli fermentation process is slowed. Beneficially, the E. coli strains that grow quickest in the oxygen abundant conditions also convert the most glycerol to ethanol under oxygen limiting conditions. This allows for the evolution of the designed e. coli strain to maximize cellular ethanol production by growing the culture under oxygen abundant conditions.

BENEFITS OF E. COLI FERMENTATION OF ETHANOL FROM BIODIESEL WASTE:

- Efficient: high yields (~90%) and fast rate of conversion of glycerol to ethanol
- Cellular ethanol production utilizes toxic biodiesel waste (glycerol waste by-products)
- Escherichia coli fermentation converts glycerol (or glycerin or glycerine) into another biofuel (ethanol)
- Beneficial evolution of the designed strain results from bacterial growth resulting in improved microbial fermentation by e. coli batches

More information

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