

# Engineering of a Microbial Host for the Sustainable Production of Ecofriendly Solvents

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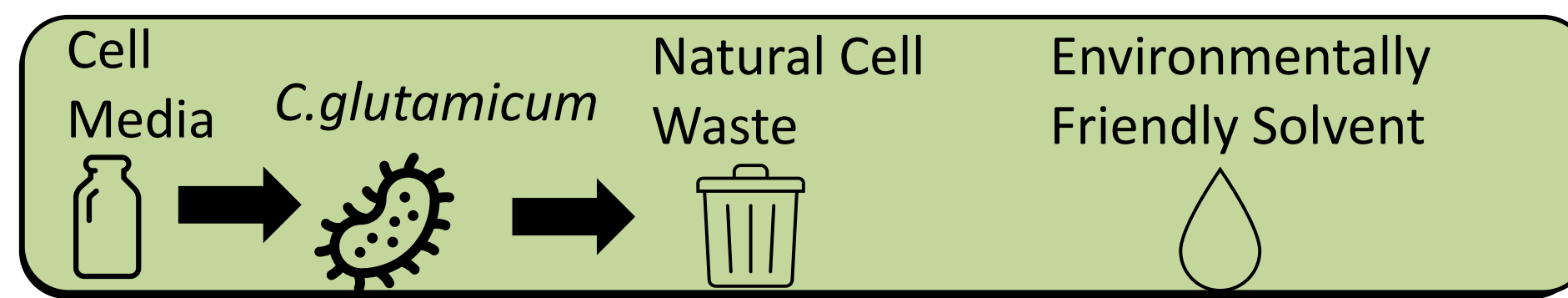


## Purpose

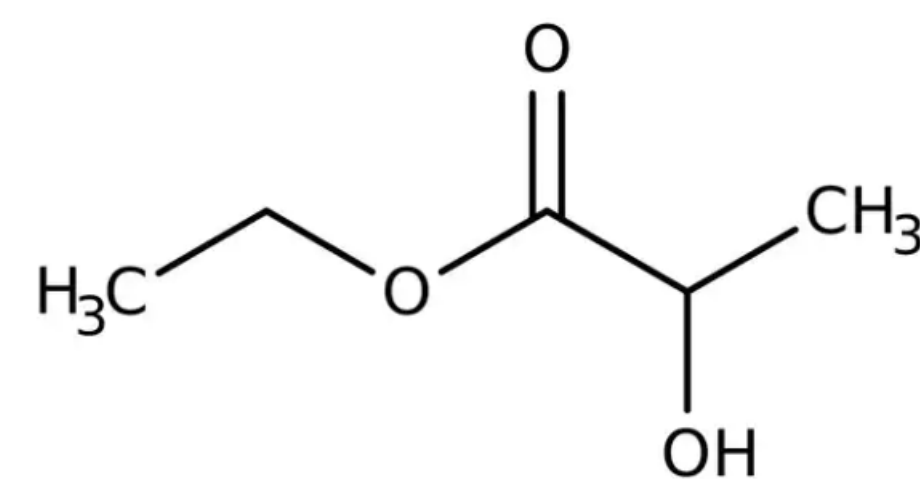
- Industrially used solvents are sourced from petroleum
- This project seeks to engineer a sustainable method to produce environmentally friendly solvents
  - Strays away from petroleum reliance



Petroleum-Based Method



Sustainable Microbial Method

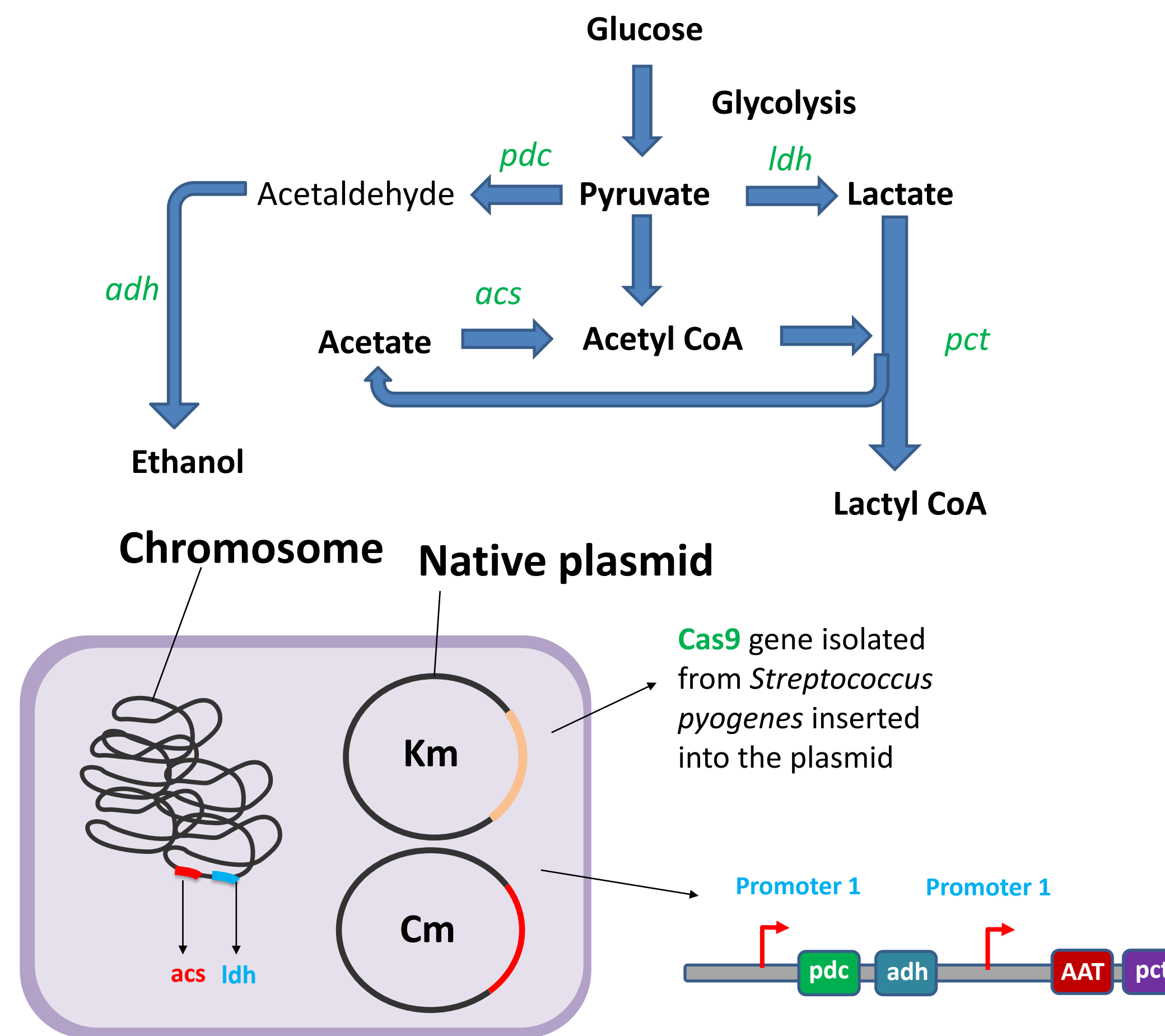


Ethyl lactate, an environmentally friendly solvent which is commonly used in pharmaceutical and cosmetic industry

## Why *C. glutamicum*

- Industry proven
- Used for production of many essential amino acids, like glutamic acid, and other value-added chemicals

## Metabolic Pathway & Strain Construction



**Cas9:** gene  
**acs:** Acetyl—CoA synthetase  
**ldh:** lactate dehydrogenase  
**pdc:** pyruvate decarboxylase  
**adh:** Alcohol dehydrogenase

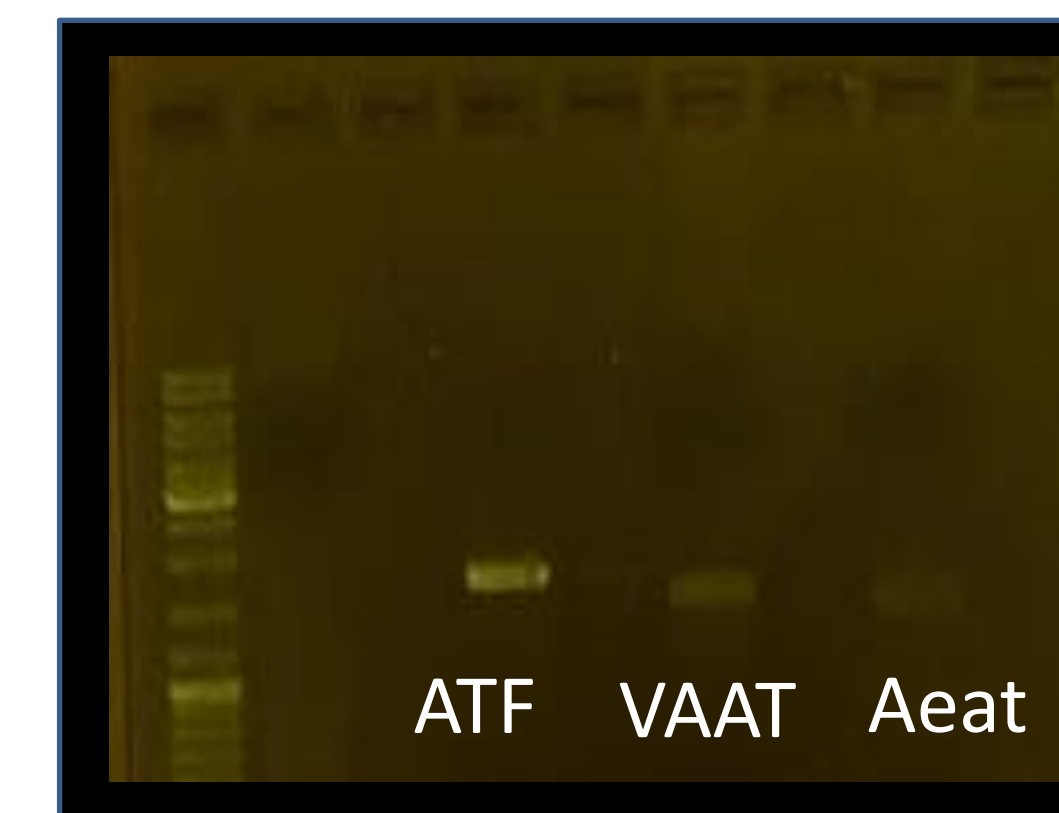
**pct:** propionyl coenzyme A transferase  
**AAT:** alcohol acyltransferase

## Methods

- From previous work, a plasmid containing acs and ldh genes has been made
  - Cas9 plasmid made as well
- To form the final necessary plasmid, restriction digestion and ligation processes were implemented
  - Restriction enzymes cut the gene fragments and plasmid vector
  - Ligase connects genes and vector

## Results

- Currently, all the genes needed for the formation of the second plasmid have undergone restriction digestion
- Next steps for this project are to perform ligations of the genes into the plasmid vector and transform the plasmids into the microbial host



## Acknowledgements

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