

# Limitations of Direct Microbial Transformation of Carbon Dioxide to Biofuels

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Fixation of carbon dioxide via direct biocatalytic conversion to liquid fuel presents a possible solution to reduce greenhouse gas emissions and produce a valuable product. Studies have been conducted on reducing carbon dioxide electrochemically and enzymatically; however, scale up of these methods is for the most part, nonexistent. Cultivation of microorganisms capable of fixing carbon dioxide is another point of interest. Using a continuous feedstock of syngas, microbes like *Clostridium ljungdahlii* and *Clostridium autoethanogenum* are capable of carbon dioxide reduction and production of acetate, ethanol, and other compounds via the Wood-Ljungdahl pathway. With this, many limitations arise namely the production of invaluable products that make the process economically unviable for long term success. Introduction of a dynamic co-culture could produce compounds of more value, but with-it different limitations exist. In this, we go into these limitations that arise with direct microbial transformation of carbon dioxide to biofuels currently keeping the movement at bay and possibly delaying further innovation and industrialization.

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