

Chemical Engineering Thesis Defense

Developing an Automated Sampling System for CO₂ Fixation
in Cultures of Bio-Engineering Cyanobacteria

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Abstract

Cyanobacteria and its complex photosynthetic systems have been a prime target for synthetic biologists and their molecular engineering tools for the last couple of decades. However, characterizing meaningful carbon dioxide (CO₂) removal performance has always been a struggle within the field. Measuring these changes in gas concentration within a dynamic system can be accomplished with a simple automated Arduino-powered system. The system employs solenoids in parallel and can be applied for n number of outlet streams, all are connected to one large manifold which feeds to a CO₂ concentration probe. The development of such a system allows for high fidelity growth experiments between different strains of cyanobacteria. These experiments provide continuous data collection over the entire life cycle of each individual culture and aim to quantify the differences in total CO₂ fixation between strains and overall growth. In the future, the system can be modified to fit other simple dynamic gas systems, as well as testing similar gas production capabilities within other organisms.



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Zoom Link: <https://asu.zoom.us/j/8026732975>