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Evaluation of cetane values of glycerolipids extracted from algae Scenedesmus dimorphus grown in various salinity concentrations using gas chromatography and mass spectrometry (GC-MS)

Paul Lin
Cleveland State University

Chandana Mannem
Cleveland State University

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College of Sciences and Health Professions and
Washkewicz College of Engineering

Student Researchers: Paul Lin and Chandana Mannem

Faculty Advisors: Joanne Belovich and Yan Xu

Abstract

Algae's ability to store lipids, renewability, and potentially safer for the environment has made it a promising alternative fuel source. An industry rating for a biofuel's potential is the cetane value, which is a measure of a fuel's quality related to various glycerolipid concentrations. Growing conditions will affect lipid profile in algae, thereby affecting the cetane value. This project will attempt to identify changes in the centane value of the algae Scenedesmus dimorphus grown in various salinity concentrations. Scenedesmus dimorphus is the algae chosen for this experiment because of its ability to rapidly grow under harsh conditions. In this experiment the growth conditions were controlled in bioreactors and shaker baths.

Total lipids were extracted from dry mass algae with the Bligh-Dyer method, which allows for the extraction of the glycerolipids with the solid phase extraction method. Upon the final extraction, a transesterification reaction is carried out in order to convert the glycerolipids into FAME (fatty acid methyl esters), which allows the GC-MS (gas chromatography and mass spectrometry) instrument to better quantify the lipid concentration.