Fourier Transform Infrared Analysis of Algae Lipid Content

Biomedical Studies

Power Point Presentation

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Basic

Abstract: This paper examines the efficacy of FT-IR in assessing the Triglyceride (TAG) content found within various types of algae. As a concern about the harmful effects of fossil fuels on the environment, the scientific community has sought to find new and alternative sources of energy to fuel the economy and lifestyles of today's average consumer. In this effort, algae have risen to the forefront as the fuel of the future. Hailed for its "greenness" in utilizing carbon dioxide even as it produces fuel resources, algae show much promise in its ability to produce large amounts of fuel cheaply and without a detrimental effect to the environment. Currently, algae's potential as a commercial biofuel is determined by its triglyceride content using Gas Chromatography Mass Spectroscopy (GC/MS). Although GC/MS is robust and reliable technique for measuring the biofuel content, it is time-consuming and expensive. As an alternative, the Fourier Transform Infrared (FT-IR) spectroscopy was examined as a new rapid, screening technique for determining triglyceride content in commercially grown algae cultures. The value of the FTIR technique in distinguishing between algae samples that contained

triglycerides and those that did not contain triglycerides was apparent. Major differences in the FTIR spectra were observed at 3300 cm^{-1} , 2900 cm^{-1}, 1700 cm^{-1},and 1200 cm^{-1} and were indicative of the presence (or absence) of triglycerides between these two types of samples. The unique difference(s) in the FTIR spectra is due to the alcohol, alkane carbon- hydrogen stretch, carbonyl, and ester functional groups on triglycerides, which occur at 3300-3600 cm^{-1}, 2900 cm^{-1}**,** 1650-1700 cm^{-1}, 1200 cm^{-1} respectively.