

Title-Algae Lipid Analysis Using Plastic Centrifuge Tubes

Program of Study-Chemistry

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Abstract: Microalgae may be a solution to the fuel crisis. Triacylglycerides serve as energy storage in algae, and, when extracted, can be converted into fatty acid methyl esters (FAMES) through a transesterification reaction. Algae samples are usually analyzed for their potential biofuel content (i.e., total lipid content as FAMES) using gas chromatography-mass spectrometry. The transesterification reaction of algae samples was carried out with acidified methanol in a 15-mL glass centrifuge tube and heated at 99 degrees Celsius for 30 minutes. Reaction vessels were centrifuged to separate the aqueous layer from the hexane layer containing the FAMES. Unpredictably, some glass centrifuge tubes would shatter while being centrifuged, resulting in a complete loss of a sample. The loss of sample also led to an inability to measure the biofuel content. Polypropylene and polyethylene terephthalate centrifuge tubes were evaluated over repeated trials for their thermal and chemical stability during the transesterification reaction and subsequent sample preparation steps. The polypropylene centrifuge tube was found to be a suitable alternative to the glass centrifuge tubes. However, additional modifications (such as the transesterification reaction temperature) to the method were required. The impact of these modifications on the determination of the total lipid content in

algae samples will be presented. Using plastic tubes reduces cost and eliminates or decreases sample loss.