

Accepted Manuscript

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PII: S0960-8524(18)30269-4
DOI: <https://doi.org/10.1016/j.biortech.2018.01.153>
Reference: BITE 19582

To appear in: *Bioresource Technology*

Received Date: 26 October 2017
Revised Date: 8 January 2018
Accepted Date: 10 January 2018



Please cite this article as: Lage, S., Gentili, F.G., Quantification and characterisation of fatty acid methyl esters in microalgae: comparison of pretreatment and purification methods, *Bioresource Technology* (2018), doi: <https://doi.org/10.1016/j.biortech.2018.01.153>

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**Quantification and characterisation of fatty acid methyl esters in microalgae:
comparison of pretreatment and purification methods**

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Abstract

A systematic qualitative and quantitative analysis of fatty acid methyl esters (FAMES) is crucial for microalgae species selection for biodiesel production. The aim of this study is to identify the best method to assess microalgae FAMES composition and content. A single-step method, was tested with and without purification steps—that is, separation of lipid classes by thin-layer chromatography (TLC) or solid-phase extraction (SPE). The efficiency of a direct transesterification method was also evaluated. Additionally, the yield of the FAMES and the profiles of the microalgae samples with different pretreatments (boiled in isopropanol, freezing, oven-dried and freeze-dried) were compared. The application of a purification step after lipid extraction proved to be essential for an accurate FAMES characterisation. The purification methods, which included TLC and SPE, provided superior results compared to not purifying the samples. Freeze-dried microalgae produced the lowest FAMES yield. However, FAMES profiles were generally equivalent among the pretreatments.

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