

2nd Euro Global Summit and Expo on

BIOMASS AND BIOENERGY

October 12-13, 2017 London, UK

Study of in situ transesterification from wet microalgae biomass

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Statement of the Problem: Microalgae are considered as alternative as biodiesel feedstock. These microorganisms can grow fast and accumulate high level of lipids. However, biodiesel production from microalgae is associated with high production cost. Traditional transesterification from microalgae includes: dry, cell disruption, oil extraction and finally trans/esterification, involving a long processing time. This process is complex and includes several steps; therefore, direct transesterification (in situ) can combine all these steps in a single step and in a single reactor. This process can be economically viable, once in situ transesterification eliminates the biomass drying, lipid extraction and separation steps. Bearing all this in mind, the aim of this work is to investigate in situ transesterification from wet biomass microalgae.

Methodology & Theoretical Orientation: Microalgae *Desmodesmus* sp. growth was carried out under light flux of 62 $\mu\text{E m}^{-2} \text{s}^{-1}$, shaker rate of 250 rpm and $26 \pm 4^\circ\text{C}$ during 14 days. Then, biomass was recuperated by centrifugation. The in situ transesterification was carried out with methanol and sulfuric acid at 60°C during 1, 3 and 6 hours of reaction. Figure 1 shown the experimental methodology.

Findings: The in situ transesterification was conducted and confirms that is very important to use excess of alcohol. The FAME (fatty methyl ester) production increase when the reaction time increases.

Conclusion & Significance: In this work, the in situ transesterification was carried out from *Desmodemus* sp. The importance of this study was to eliminate the drying and oil extraction steps. The results shown that is possible to convert wet microalgae biomass directly to FAME with high yield. This method is a cost-effective process from microalgae wet biomass. Acknowledgments: The authors are very thankful to São Paulo Research Foundation Process N.2014/10064-9.

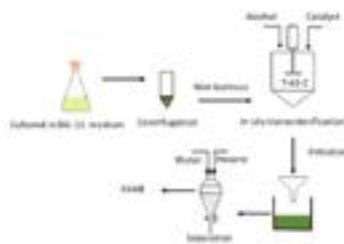


Figure1: Experimental methodology

Biography

Luisa F Rios Pinto, PhD is a Postdoctoral Researcher at University of Campinas, Brazil. Rios received Bachelor's from Industrial University of Santander in Chemical Engineering and her Master's and PhD degrees from University of Campinas in Chemical Engineering as well. Her particular interest is in a conventional and non-conventional separation processes, purification of products and chemical reactions. Her research has concentrated on biodiesel production from microalgae; her recent research activities include study of nitrogen starvation, influence of culture medium and comparison of growth regimes for lipid accumulation.

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