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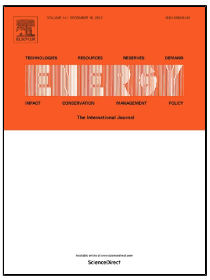

Investigating Continuous Biodiesel Production from Linseed Oil in the Presence of a Co-solvent and a Heterogeneous Based Catalyst in a Packed Bed Reactor

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Investigating Continuous Biodiesel Production from Linseed Oil in the Presence of a Co-solvent and a Heterogeneous Based Catalyst in a Packed Bed Reactor

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Abstract

Continuous transesterification of linseed oil was examined in order to maximize the fatty acid methyl esters (FAMEs) yield. The continuous process was conducted in a packed bed reactor using calcium oxide as a heterogeneous catalyst. In addition, the impact of three variables, namely the molar ratio of diethyl ether (DEE) to methanol, the molar ratio of methanol to oil and the flow rate (ml/min), on the FAMEs yield were studied. The effectiveness of DEE will reveal after comparing transesterification yield in the presence and absence of the co-solvent. The optimum conditions for in continuous method were reported as follows: a molar ratio of DEE to methanol of 1.19:1, a molar ratio of methanol to oil of 9.48:1, a flow rate of 1.37 ml/min, and temperature of 30°C. Under the optimum conditions, a FAMEs yield of 98.08% was achieved. All the properties such as flash point, pour point, cloud point, and viscosity of the biodiesel from linseed oil were measured by the related specific standards.

Key words: *Biodiesel, Transesterification, FAME, Linseed Oil, Continuous, Heterogeneous catalyst, co-solvent, diethyl ether (DEE).*

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1. Introduction

Although the largest share of energy consumption today stems from fossil fuels, the increasing price, non-renewability, and environmental drawbacks of fossil fuels have caused the researchers to seek for the suitable alternative renewable fuels [1-3]. Offering a number of