



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



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التوثيق الإلكتروني والميكرو فيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكرو فيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
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MONA MAGHRABY



UPGRADING OF METHYL ESTER FOR PRODUCTION OF HIGHER VALUE PRODUCTS BY FRACTIONAL DISTILLATION

By

Zeinab Ibrahim Tawfik Ahmed

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
Chemical Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Prof. Fatma Ashour

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Former Chairman of the Board Directors of the Egyptian Abu Al Houl Company for Oils and Detergents

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Title of Thesis:

UPGRADING OF METHYL ESTER FOR PRODUCTION OF HIGHER VALUE
PRODUCTS BY FRACTIONAL DISTILLATION

Key Words:

Fatty acids methyl esters; winter grade fuel; biosurfactant, MES.

Summary:

The main source of the rising problem of Greenhouse Gas emissions and its impact on climate change is caused mainly by fossil fuels, which directed the focus of many researchers towards alternative biofuels.

The aim of this research is to produce specialized cuts from the fatty acid methyl ester, namely: fatty acid methyl ester sulfonate (MES) and a winter fuel additive as replacements to the crude oil based linear alkyl benzene and the current cold weather diesel additives.

The work done, first investigated the production of MES through a set of lab experiments starting with the production of the fatty acid methyl ester as an intermediate product using the sulfonation reaction of used cooking oil and oleic acid in the presence of sodium bisulfite. This was followed by the separation of the reaction products, for which the surface tension was tested and compared to its equivalent commercial surfactants and found below standard.

As a complementary part, an alternative method of separation was tested using Hysys 8.8 simulation program. The simulation involved utilizing a distillation tower to separate the required MES and winter fuel additive from the fatty acid methyl ester inlet. The tower design and operating conditions were optimized until the maximum separation efficiency was achieved.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name: Zeinab Ibrahim Tawfik Ahmed

Date: / /2021

Signature:

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