بسم الله الرحمن الرحيم

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شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY

Faculty of Women's for Arts,
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Ain Shams University

"Eco - friendly Multifunction Petroleum Additives : Preparation, Characterization and Evaluation"

A Thesis Submitted for Degree of M.Sc. in
Organic Chemistry

By

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Author

[Hesham F. Abo Hatab]

DEDICATION

To My Parents

I have to thank Allah for choosing both of you to be my parents.

Thank you for supporting me.

To My Grand-Father

To My Wife And My Son

To My Brother And My Sister

Thank you for your supporting and helping me.

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RESEARCH

Eco-friendly Multifunction Petroleum Additives: Preparation, Characterization and Evaluation

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A B S T R A C T

ZDDP (zinc dialkyldithiophosphate) is one of the most commonly used petroleum additives as anti-wear, anti-rust and anti-oxidant but it has some environmental problems, so there is a must to find alternative eco-friendly compounds which can replace some of these conventional used petroleum additives. In this study, new compatible mixtures from different natural sources using phospholipids were prepared and their solubility in mineral base oils was evaluated to achieve complete solubility. Some of the prepared mixtures were characterized by FT-IR and then evaluated as anti-rust and anti-oxidant additives for lubricating oils according to standard test methods such as rust preventing characteristics and RPVOT (Rotary Pressure Vessel Oxidation test) for oxidation stability evaluation. The results of evaluation showed an excellent opportunity of widely usage of the vegetable oils derivatives specially Soy Lecithin (SL) in petroleum industry as multifunctional petroleum additives.

1. INTRODUCTION

The Modern equipment must be lubricated in order to prolong its lifetime. A lubricant performs a number of critical functions. The main importance of lubricating oils is lubrication and cooling of metal parts in addition to cleaning and protecting metal surfaces against corrosive damage. Lubricant comprises a base fluid and an additives package. The primary function of the base fluid is to lubricate and act as a carrier of additives. The function of additives is either to enhance an already existing property of the base fluid or to add a new property. The already existing properties include viscosity, viscosity index, pour point, and oxidation stability. The examples of new properties include cleaning and suspending ability, anti-wear performance, and corrosion control. Additives for lubricating oils were used first during the 1920s, and their use has since increased tremendously. Today, practically all types of lubricating oil contain at least one additive and some oils contain several different types of additives [1-3]. During the 1930s and 1940s with the discovery of zinc dialkyldithiophosphates (ZDDP), the most important advance in anti-wear chemistry was made [4]. ZDDP was initially used to prevent bearing corrosion but it was later found to have exceptional antioxidant and anti-wear properties.

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