

UNIVERSITI TEKNOLOGI MARA

**PALM FATTY ACID DERIVED
FABRIC SOFTENER**

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Thesis submitted in fulfillment
of the requirement for the degree of
Master of Science

Faculty of Chemical Engineering

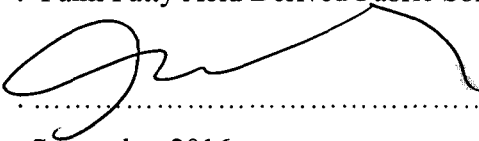
September 2016

AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledge as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Esterquat produced from tallow based fatty acid is one of the main ingredients of fabric softener used currently over the common distearyl dimethyl ammonium compounds. This esterquat is also excellent in softening and neutralizing the fabric's surface static cling. However, there are three problems can be encountered which include the limitation of feedstock production, use of expensive catalyst, and use reactor system with high vacuum condition. The usage of distearyl dimethyl ammonium chloride gives excellent softening performance but have poor biodegradability. The purpose of this study is to produce palm fatty acid esterquat as an alternative to tallow based esterquat with substitution of chloride compounds in the esterquat structure to methosulphate compounds to become more environmental friendly fabric softener. The study involves the production of palm based esterquats and formulation of fabric softener. Esterquat synthesis is a two-step process; firstly, the distillate hydrogenated palm fatty acid is esterified with triethanolamine (TEA) to produce esteramine, and secondly, the esteramine is quaternized with dimethyl sulphate (DMS) to produce quaternized ester salt, which is termed as esterquat. In the reaction of esterification of palm fatty acid and TEA, the effectiveness of the catalyst is evaluated. The reaction was also carried out under slightly vacuum, nitrogen and argon blanket instead of high vacuum condition since catalyst is deactivated by the by-product water. The products are analysed by using FT-IR, acid value, cationic matter of the active content. This synthesized esterquat are used for fabric softener formulation and tested using fabric softness evaluation by test panel scoring.

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TABLE OF CONTENTS

	Page
CONFIRMATION BY PANEL OF EXAMINERS	ii
AUTHOR'S DECLARATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	ix
LIST OF FIGURES	xi
LIST OF ABBREVIATIONS	xiii
CHAPTER ONE: INTRODUCTION	
1.1 Research Background	1
1.2 Problem Statement	3
1.3 Objectives	4
1.4 Scope of Study	5
CHAPTER TWO: LITERATURE REVIEW	
2.1 Introduction	6
2.2 Surfactants	10
2.2.1 Definition Of Surfactant	10
2.2.2 Types Of Surfactant	12
2.2.2.1 Anionic Surfactant	12
2.2.2.2 Cationic Surfactant	13
2.2.2.3 Nonionic Surfactant	14
2.3 Raw Materials	15
2.3.1 Palm Oil	15
2.4 Processing Routes For Basic Oleochemicals	17
2.5 Quaternary Ammonium Salts	20
2.5.1 Production Data	20
2.6 Synthesis of Cationic Surfactants	21