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**FACULTY OF ENGINEERING
DEPARTMENT OF CHEMICAL AND PROCESS
ENGINEERING
BACHELOR OF AGRO-PROCESSING ENGINEERING**

EXTRACTION AND CHARACTERISATION OF LEMON GRASS OIL

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**A final year project report submitted to the department of chemical and processing engineering
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ABSTRACT

Essential oils are present in several plants, including lemon myrtle, lemon grass leaves and stems, eucalyptus leaves, Cedar wood, bay leaf, cinnamon, eucalyptus leaves, rose wood. Pure essential oils are mixtures of more than 200 components, normally mixtures of terpenes or phenylpropanic derivatives, in which the chemical and structural differences between compounds are minimal. They can be essentially classified into two groups: volatile fraction: Essential oil constituting of 90–95% of the oil in weight, containing the monoterpene and sesquiterpene hydrocarbons, as well as their oxygenated derivatives along with aliphatic aldehydes, alcohols, and esters while nonvolatile residue comprises 1–10% of the oil, containing hydrocarbons, fatty acids, sterols, carotenoids, waxes, and flavonoids. Essential oils present in lemon grass is used for flavourings in cooking, used in the perfumery industry, pharmaceuticals since it has medicinal importances, preservative since it has anti microbial properties. This study involved isolation of essential oil from samples of lemon grass grown in wakiso, using hydro distillation and solvent extraction by hexane, determining the physiochemical properties of the oil which were pH, iodine value, peroxide value, acid value, density and saponification value, comparison with correlation charts, functional groups present determined using FT-IR in the fingerprint region, finding possible applications of lemon grass essential oil in Uganda. The results obtained from the analysis of the physiochemical properties were analysed using Microsoft excel and Anova two extraction methods indicated that the percentage yield of oil extracted is higher on solvent extraction than as compared to hydro distillation.

DECLARATION

I NAIGA HARRIET affirm that this report is a true accountability of what I have learnt about my project title, and it has been compiled out of my tremendous effort. It is the first of its kind because it has never been presented. No part of this publication may be reproduced in any form by any means, electronic or mechanical, including photocopying, or any information storage without permission in writing from the publisher.

.....NAIGA HARRIET.....

STUDENT'S NAME

.......... 23/05/2018

STUDENT'S SIGNATURE



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LIST OF ACRONYMS

DF	Degree of freedom.
SS	Sum of Squares
MS	Mean Squares
ANOVA	Analysis of Variance
C.V	Coefficient of Variance
FAO	Food and Agriculture Organization
GC	Gas Chromatography
FTIR	Fourier Transform Infrared

CHAPTER ONE

1.0 Introduction

This chapter describes the background information of the project, the problem statement, and justification of the study, purpose, objectives and the scope of the study. The problem statement describes the problem of the study and the solution. The justification describes the importance of the project and the specific objectives which helped to achieve the main objective.

1.1 Back Ground of the Study

Lemon grass (*Cymbopogon citratus*) is a tender perennial of the grass family and resembles (Obote, 2007) many of its members in the long, upright blades, but with leaves at the ends, and growing in clumps. These blades are sharp, denser than most grasses, with a thick solid, almost bulb-like base of a few inches, and has a height of three to six feet. Blades are deep nearly bluish-green in color, white near the thick, clumpy stems, and branch from this bulb in dense white growths. When cut they have the appearance of a scallion. Flowers are rare on lemon grass plants, but when they do bear, they are large heads with false reddish-brown spikes. Plants reach around five feet in height and four feet in breadth. The telltale fragrance of this lemon-scented plant is due to the presence of essential oils in the tube-like cells. (Varieties of *Cymbopogon Citratus*, 2008)

Lemongrass is native to tropical countries such as India, China, and Thailand where it has traditionally been used as a flavoring agent in foods, drinks, and desserts and for its ability to boost circulation and immunity. Due to its ability to reduce fever, Lemongrass earned the name "fever grass" in some cultures that made "fever teas" from Lemongrass leaves. (Leaf Group Ltd, 2007) Uganda is among those countries which are blessed with plants and grasses such as neem tree, eucalyptus, cinnamon ginger, lemon grass among others from which essential oils can be extracted. According to Uganda Investment Authority (UIA), this is one investment idea Ugandans can take advantage of if they want not only to get rich but also to create jobs

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