BUSITEMA UNIVERSITY
*Pursuing Excellence*

**FACULTY OF ENGINEERING**

**DEPARTMENT OF CHEMICAL AND PROCESS ENGINEERING**

**FINAL YEAR PROJECT**

# EXTRACTION AND CHARACTERIZATION OF ESSENTIAL OILS FROM AFRICAN BASIL (OCIMUM GRATISSIMUM) LEAVES OF UGANDA


BY

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**Final year project report submitted to the Faculty of Engineering, Department of Chemical and Processing Engineering in partial fulfillment for the award of a Bachelor's Degree of Sciences in Chemical and Process Engineering of Busitema University**

**MAY, 2018**

**ABSTRACT**

African basil (ocimum gratissimum) is a perennial small herb plant of the lamiaceae family having a strong aromatic smell and a height of 1 to 3 meters.This plant is a native to tropical countries of Africa and Asia where it has traditionally been used as a flavoring agent in soup and meat as while as a traditional medicine in the treatment of cough, yellow fever and headache. The aromatic smell of this African basil plant is due to the essential oils in the stem and Leaves

Essential oil is a concentrated hydrophobic liquid containing volatile aroma compounds from plants and also known as volatile oil, Essential oil in the sense contains the essence of plant's fragrance. And can be extracted from plant leaves, barks, flowers, stem, and seeds. Essential oil bring a wide range of health benefits, unlike modern drugs they have no side effects. Mostly, essential oil are obtained by distillation although other methods are used other methods include expression, solvent extraction, absolute oil extraction, resin tapping and cold pressing

In this project, N- hexane solvent extraction was used to extract oil and the yield was 0.57% with extraction time of 4hrs and the oil was found to contain chemicals like aliphatic fluoro compounds, alcohols, ethers, phenols using FTIR analysis

## DECLARATION

I **Muwanika Rogers** hereby declare to the best of my knowledge, that this final year project report is an outcome of my original work and that it has not been presented to any institution of learning for any an academic award.

Signature.....

Date.....23/05/2028.....





MUWANIKA ROGERS

## APPROVAL

This final year project report has been submitted to the Faculty of Engineering, Department of chemical and process engineering for examination with approval from the following supervisors

**MR.SSERUMAGA PAUL**

Signature……..

Date……..

**MR. SSEMUKASA EDWARD**

Signature……..

Date……

## DEDICATION

This report is dedicated to my beloved parents Mr.Ngobwoita George and Mrs.Wonaira Scoviah in appreciation for their selfless care and unflinching support provided to me since childhood, and for the spirit of hard work, courage and determination instilled into me, which attributes I have cherished with firmness and which have indeed made me what I am today. To my dear love Nabiryo Mariah Gorret for the time and finances invested in me during this period and I also dedicate this report to my friends;kiwanuka(muko),kunya,muzeeyi,roommates(Onoriah luke,musungu jasper,kungu lazaro) for their guidance, help and love showed to me during this period. May the Almighty God reward you abundantly for that nice work



MUWANIKA ROGERS

## ACKNOWLEDGEMENT

First and foremost, I thank the Almighty God who has enabled me to do this research and granted me a healthy life. In a special way I thank my parents, brothers and sisters for their continued support and encouragement

I want to extend my sincere gratitude to my supervisors for the guidance, advice and encouragement. I would not have made it this far without them. May God abundantly bless them

I also thank the staff of UIRI Chemistry Department especially Mr. Robert for their support throughout the research period.

Lastly I would like to extend my appreciation to my friends especially Harriet, Ibra, Muzeeyi and the APE class 2014 for their continued support and encouragement

MUWANIKA ROGERS

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## ACRONYMS/ABBREVIATIONS

O. gratissimum-ocimum gratissimum

FTIR-Fourier Transform Infrared Spectroscopy

SFE-Supercritical Fluid Extraction method

UIRI-Uganda Industrial Research Institute

KI-potassium iodide

NaOH-Sodium hydroxide

$Na_2SO_37H_2O$-hydrated sodium sulphate

KOH-potassium hydroxide

ANOVA-Analysis of Variance

C.F-Correction factor

TSS-Treatment Sum of Squares

Total SS-Total Sum of Squares

ESS-Error Sum of Squa

# CHAPTER ONE

## 1.0 Introduction

This chapter presents the general information about the research design giving its background, problem statement, significance, objectives, justification and scope of the study

## 1.2. Background

African basil (Ocimum gratissimum) is an erect small herb plant with many branches which usually grows not more 1m in height and with a strong aromatic smell. This plant is commonly known as African basil(English), "mujaja"[Uganda(soga,kiga& ganda)]( (Tabuti, Lye and Dhillion, 2003)) and distributed indigenous to tropical regions of India, west Africa, and some parts of Uganda like kanungu,mukono,nakapiripiriti (Ekmekci and Aasim, 2014). (Ekwenchi, Oluigbo and Akpuaka, 2014). Its well-known as a flavor put in hot drinks like milk tea, dry tea (Sulistiarini, 1999) and also as traditional medicine in the treatment of fever, headache, skin infections, Antidiarrheal ,influenza and respiratory tract infections(Ssegawa and Kasenene, 2007) The aromatic smell of this African basil plant is due to essential oils in the stem and Leaves (lemos et al 2005)

Essential oils, also called volatile odoriferous oil, are referred to any concentrated ,hydrophobic(immiscible with water ,typically (oil or fat soluble)) liquids of plants that contains highly volatile aroma compounds and carries a distinctive scent ,flavor, or essence of the plant.**(zuzarte & ligia, 2015)** Essential oils are found in diverse parts of the plants including leaves ,peels,barks,flowers,buds,seeds,roots and they can be extracted using several methods like steam distillation,expression,solvent,extraction,hydodistillation method ,water and steam distillation, carbon dioxide extraction ,Cohobation method **(Journal and Basic, 2016)**

Essential oils are used in a wide variety of consumer goods such as detergents, soaps, toilet products, cosmetics, pharmaceuticals, perfumes, confectionery food products, soft drinks, distilled alcoholic beverages (hard drinks) and insecticides therefore the world production and consumption of essential oils and perfumes are increasing very fast(**Finance and Development, 2012)**

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