ANTIBACTERIAL PROPERTIES OF *Nicotiana tabacum* EXTRACTS ON ORAL MICROBIOME

BY

SHISA TIMOTHY, BU/UP/2017/1420

A RESEARCH REPORT SUBMITTED TO THE DEPARTMENT OF BIOLOGY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE BACHELOR OF SCIENCE EDUCATION OF BUSITEMA UNIVERSITY.

2020

SUPERVISORS:

DR. BANSON BARUGAHARE

DR. MOSES ANDIMA

DECLARATION

I the under signed student do solemnly affirm that this project report is first and authentic as the outcome of my research at Busitema University Faculty of science and Education Biology and Chemistry Laboratories. It consists of activities I personally participated in and has never been published and submitted to any University or other institution for award of Bachelor's degree.

Signature: …… Date: ……

Shisa Timothy. BU/UP/2017/1420

APPROVAL

Signature: …….. Date: ……...

Dr. Moses Andima

Supervisor, Department of Chemistry

Signature: …….. Date: ……

Dr. Banson Barugahare

Supervisor, Departments of Biology

ACKNOWLEDGEMENT

I fervently thank the Administration of Busitema University for granting me the opportunity of conducting my research project from the Biology and Chemistry Laboratories at the faculty of science education of Busitema University. I will henceforth extend my heartily appreciation to the laboratory personnel who without doubt invested their effort in my success in this perspective most especially Mr. Olowo Moses and the Entire staff of the Department of Biology and Chemistry.

I with great pleasure show out my appreciation and gratitude to My Supervisors Dr. Banson Barugahare and Dr. Moses Andima for their relentless efforts, guidance, devotion and dedication towards the success of this research project, their concern was overly vital.

In another special way, am also obliged to appreciating my long time sponsors Karsten Wolpers and Maike Shunman who never got tired in supporting me financially throughout my Educational journey, God bless them indeed.

Besides, I can`t forget my family Members, my Mother Khaitsa Alice Beatrice, My Uncle Mr. Shiondo Deogratius, brothers and sisters Most especially Mr. Mangalya Ivan Denis for his enormous concern towards my educational advancements Including Mr. Wamono Felix , friends like Mr. Wanamama David, Mr. Ngotowa Emma, Mr. Mafabi Denis and course mates who all together played specific essential roles towards my success, my old teachers Mr. Odenyi Simon Peter, Mr. Magira Geoffrey, Mr. Musamali Fredrick and many other persons not mentioned here all need not forgetting. With their assistance, my own efforts alone wouldn`t have yielded anything dependable.

All in the loving memory of my late father the Late Vincent Makhonje. God bless you all.

Contents

List of Tables

List of Figures

LISTS OF ABREVIATIONS

FME: First Methanol Extract

NAEe: Non Alkaloidal Ethyl Acetate Extract

AEe: Alkaloidal Ethyl Acetate Extract

MeOH: Methanol

M.P: Melting point

ABSTRACT

The role of medicinal plants to society in drug formulation and discovery is an overly essential aspect. It`s evident that humans have used medicinal plants to cure several infections caused by pathogenic microorganisms and other disease causing agents. Medicinal plants also called medicinal herbs have been discovered and used in traditional medicine practices since prehistoric times. In ethno medical practices, it`s evident that the plant *Nicotiana tabacum* has severally been used by local communities as a traditional medicinal plant against stomach complications, against pains associated with the gum inflammation, skin rashes, boils and wounds, headaches, pneumonia, destroying worms in sores and many others. However all these ethno medical practices find opposition from the findings that the use of tobacco is overly associated with developments of cancers most especially oral and chest cancers mostly being caused by Nicotine and Nornicotine I in this research therefore focused on finding out whether Phytochemicals with Antimicrobial properties depend only on known the carcinogenic compounds Nicotine and Nornicotine or other extracts without these carcinogenic compounds also have Phytochemicals with dependable antimicrobial properties. This was done by ensuring extracting of Nicotine and Nornicotine into a separate solvent.

Extraction of the Phytochemicals was done using solvent extraction yielding three different extracts whose antibacterial properties were evaluated using the disc diffusion method streptococcus and steptobacilli bacteria obtained from the human mouth swab. Different concentrations of each extract were used since stock solutions were made with concentration expressed in µg/ml to enable analysis using graphical work, ANOVA Test and Calculation on Minimum Inhibitory Concentrations (MICs) of Each Extract.

It was found out that the Non Alkaloidal extract NAEe with the lowest MIC of *3.162µg/ml* exhibited the greatest Antibacterial abilities compared to the two other extracts FMe with MIC of *3.981µg/ml* and AEe with MIC of *15.85sµg/ml* that contained the Alkaloids- Nicotine and Nornicotine.

This hence yielded justification that besides the Alkaloids that are associated with cancers in tobacco, tobacco contains other Phytochemicals that have potential anti-bacterial properties and these may be those that the ethno medical practitioners gain from in treating diseases and other medical complications. With this therefore, Tobacco should not be under looked in the scientific such for new antibiotics, it should not only be reserved for smoking but also Bioprospection.