

**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF AGRICULTURE AND ANIMAL SCIENCES

DEPARTMENT OF ANIMAL PRODUCTION AND MANAGEMENT

**QUANTITATIVE PHYTOCHEMICAL ANALYSIS OF ETHANOLIC EXTRACTS OF
CAPSICUM ANNUUM LEAVES AND ROOTS**

BY

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BU/UP/2020/1528

**THE RESEARCH SUBMITTED TO THE DEPARTMENT OF ANIMAL PRODUCTION
AND MANAGEMENT IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR
THE AWARD OF THE DEGREE OF BACHELOR**

OF ANIMAL PRODUCTION AND MANAGEMENT OF BUSITEMA

UNIVERSITY.

FEBRUARY 2024

ABSTRACT

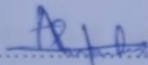
The research was conducted at Busitema University for a period of one month, plant materials were collected in Soroti City. The bioactive components in *Capsicum annum* leaves and roots were extracted by Soxhlet reaction method where the extraction was done in Busitema University laboratory. The phytochemical screening in leaves revealed the presence of alkaloids, flavonoids, tannins, saponins. However glycosides and steroids were found. The phytochemical screening of *Capsicum annum* roots was conducted to determine the presence of alkaloids, tannins, glycosidalgesic, anti-inflammatory and anti-microbial properties. From the findings of the experiment, phytochemicals in the categories of Acetate, Diterpene alcohol and Fatty acid esters all had mean percentage concentration of greater than 3. Triterpene followed with mean percentage concentration of 2.42. However, only phytochemicals with match factor greater than 70% were considered, the rest of the phytochemicals with less than 70% match factor were not considered in this experiment. The results are summarized in figure 1 and the phytochemicals are listed in the table 1 at the appendix with their corresponding mean percentage concentration. 132 compounds were selected by sorting them using their match factor and those with match factor above 70% were then categorized. 54 different categories of phytochemicals were generated from the initial list and these included categories with one member which represented the majority while some had more than one member in the category. Five categories had mean percentage concentration of more than 0.50 but less than 1 and they included Steroid (0.9), Blank (0.78), Analgesic (0.70), Paraben (0.55), and Amide (0.54). The results of the experiment indicate that for categories of phytochemicals above 1.00 mean percentage concentration, for roots was 2.40 ± 1.00 compared to leaves which was much lower at 1.52 ± 0.22 . This finding suggests that the roots possess a greater potential for therapeutic and medicinal applications due to their richer phytochemical profile.

DECLARATION

I hereby declare that this research is mine and I personally did it towards the award of a bachelor's degree in animal production and management. It contains work published by other individuals and also work that has been accepted in other universities towards the award of degrees and due acknowledgement has been made towards those individuals.

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APPROVALS

The entire work relating to the research development and writing has been by **MENDWE AMANYA PATRICK** under the supervision of **Dr. ZIRINTUNDA GERALD.**

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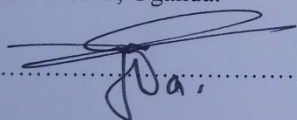
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DEDICATION

I majorly dedicate this research to my mom Mrs. **MENDWE NYAKAISIKI SALOME** who has been there for me throughout the course of my academic journey, my siblings and my own family that has supported me always.

ACKNOWLEDGEMENT

I thank the Almighty God for this far He has brought me. I extend my sincere gratitude to my family, my parents, friends and classmates for the continuous support they have given me and the encouragement always that they have given me. Also, to my dear supervisor, am really grateful for everything he has done for me throughout the period of my research.

LIST OF ABBREVIATIONS

PL- paprika leaves

RP- red paprika leaves

GP-green paprika

WHO- world health organisation

SFE- superficial fluid extraction

MAE- microwave assisted extraction

PCA- principle component analysis

MS Mass spectrometer

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CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND

Capsicum annuum is an annual shrub that belongs to the family of *Solanaceae* and it has many angular branches, leaves are simple, flowers white or violet in clusters. It is cultivated throughout the year in both tropical and temperate regions (Vijayalakshmi *et al.*, 2010). It is cultivated in almost all the tropical countries and capsicum is native to tropical America. They are grown commercially in Africa (mainly Zimbabwe and Malawi). They are sold as chillies in England and the variety grown in Bombay and Natal is less pungent and is known as Capsicum. The larger variety which are totally non pungent are grown in Europe. In the USA, capsicum is also known as bell peppers (Muthuswamy *et al.*, 2021).

It is an extremely valuable medicinal herb, distributed throughout India hence used in traditional medicine, due to presence of phytochemicals it has been used for the treatment of cough, toothache, sore throat, parasitic infections, rheumatism, wound healing etc (Muthuswamy *et al.*, 2021). *Capsicum annuum* is experiencing a rediscovery among health care practitioners, who have only just begun to uncover its marvelous therapeutic actions. It has been referred to as the purest and most effective natural stimulating botanical in the herbal medicine chest. It is commonly known as Red pepper in English and Mirchi in Hindi. Access(2016) highlights on the ethanolic extract of *Capsicum annuum* from leaves as a phytochemical constituent.

Kouassi et al (2010) points out that medicinal plants are considered as a rich resources of ingredients which can be used in drug development either pharmacopoeia, non- pharmacopoeia or synthetic drugs. A part from that, these plants play a critical role in the development of human cultures around the whole world. According to Muthuswamy et al (2021), some plants are considered as an important source of nutrition and as a result of that they are recommended for their therapeutic values. World Health Organization (WHO) provided numerous quality control parameters for herbs. The indication of phytochemicals and standardization of plants will provide a basis to identify and safety of an herbal remedy. The pharmacognostical evaluation, preliminary phytochemical screening, physicochemical studies of plant will aid in the conformation of plant resources. According to Authur, (2013), Other effects such as antibacterial and anticancer are

Efforts should be made to promote the cultivation of *Capsicum annum* for its roots, in addition to its commonly cultivated fruits. Farmers and agricultural practitioners can be encouraged to explore the cultivation of *Capsicum annum* varieties with high phytochemical content in their roots. Furthermore, industries involved in herbal medicine, pharmaceuticals, and functional foods can explore the utilization of *Capsicum annum* roots as a valuable raw material for product development.

Conservation measures should be implemented to ensure the sustainable harvesting of *Capsicum annum* roots without depleting natural populations. Practices such as proper cultivation techniques, crop rotation, and habitat preservation can help maintain biodiversity and ecosystem integrity while meeting the demand for *Capsicum annum* root-derived products.

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APPENDIX

i) BUDGET

SN	ITEMS	TOTAL(Uganda shillings)
1	Regents	200,000/=