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**PHYTOCHEMICAL ANALYSIS AND FORMULATION OF A HERBAL  
TOOTHPASTE FROM *SPARAGUS RACEMOSUS* ROOT EXTRACT FOR  
MANAGEMENT OF ANTIBACTERIAL ACTIVITIES IN THE TOOTH**

BY

MWAGALE FLAVIA

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**Declaration**

I, Mwangale Flavia, declare that this research is my own original work otherwise cited, and where such has been the case, references have been stated and that the same work has not been submitted for any award in any other university or other tertiary institute of higher education

Signature..... *Flavia* .....

Date..... *7th/06/2023* .....

Approval

This research review has been submitted for examination and has been approved by my supervisor.

Dr. Oriko Richard Owor

Signature..... *Oruko* .....

Date..... *7/06/2023* .....

### **Dedication**

This report is dedicated to my parents Mr. Mukular Gona Patrick and Ms. Nakagolo Rose, who have supported me in all aspects of life in my entire life journey of pursuing my career dream as a professional teacher. Special thanks to my siblings Mukular Faustine and Madam Baluka Fiona who have been supportive. This research is also dedicated to Mr. Kasadha David

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## ABSTRACT

Phytochemical screening of *Asparagus racemosus*, a medicinal plant belonging to-family, was conducted to identify and analyse the presence of various bioactive compounds its roots. *Asparagus racemosus* is known in the world for its traditional medicinal uses and it has been reported to possess antimicrobial, antioxidant and anti-inflammatory properties. The phytochemical analysis of *Asparagus racemosus* contained the extraction of the plant materials using suitable solvents followed by quantitative and qualitative analysis of the extracted compounds these include; flavonoids, steroids, terpenoids, tannins, glycosides, saponins, alkaloids and phenols. The compounds are known for their good potential health benefits and their contribution to the medicinal properties of *Asparagus racemosus*. The findings of the phytochemical screening of *Asparagus racemosus* providevaluable data about the chemical composition of the plant and its potential pharmacological activities. Therefore the phytochemical screening of *Asparagus racemosus* contributes more on the understanding of the plant`s chemical components and their health benefit potentials so further studies or research can be conducted to characterize and isolate the compounds individually, elucidate their mechanism of action and potential applications in health sectors.

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## CHAPTER ONE: INTRODUCTION

### 1.1 BACKGROUND:

Dental caries or tooth decay is a multifactorial, chronic bacterial disease that leads to demineralization and distortion of hard tissues, due to production of acid through bacterial fermentation of the food debris accumulated on the tooth surface. Today, caries remain one of the most common diseases affecting people's physical, environmental, psychological health status worldwide and therefore individuals are susceptible to this disease throughout their lifetime. Worldwide, approximately 36% of the population suffers from dental caries in their permanent teeth, in baby teeth it affects 9% of the population (Karpiński and Szkaradkiewicz 2013). Dental caries is also a pathological process involving localized destruction of complex, multifunctional etiology in which three interrelated factors coexist in order for caries to develop. Microorganisms with cariogenic potential are some of the factors favoring tooth decay (Smith 1988).

*Streptococcus mutans* and *streptococcus sobrinus* are the major bacteria that contribute to dental caries (Kubo, Muroi et al. 1992). *Streptococcus mutans* are intimately involved in the initiation of tooth decay in humans consists of at least seven and eight serotypes, gains attachment to the tooth surface, colonise the enamel by producing sticky tenacious polysaccharides polymers often termed as perspectives in Biology and Medicine. (Smith 1988)

Oral diseases represent a major public health challenge globally, and yet remain neglected. It was estimated that oral diseases affect over 3.5 billion people worldwide, with dental caries of permanent teeth being the most common condition (Dickson-Swift, Knevel et al. 2021). Globally, it is estimated that 2.3 billion people suffer from caries of permanent teeth and more than 530 million children suffer from caries of primary teeth (Bahar, Permana et al. 2021).

The burden of oral diseases is more severe in poor and disadvantaged population groups. A systematic review suggested a 20.8% increase in the global burden of oral conditions in the past decades, and this has attributed to population growth and aging (Dickson-Swift, Knevel et al. 2021).

In the recent years, people have been using drugs like penicillin, Amoxicillin, penicillin G, Chloramphenicol, Doxycycline, Ofloxacin and Tetracycline to manage tooth decay. Globally in

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