

Formulation of Herbal based Dentifrice from *Solanum Anguivi* Fruit extracts for Dental caries control.

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May 2023

DECLARATION PAGE

I LWAMUSAAYI JARED declare that this research Dissertation is my original work and has not been submitted elsewhere for the award of a degree in any other university. Where other people's work or my own has been used, this has been appropriately acknowledged and referenced following the Busitema university requirements.

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APPROVAL

This research Dissertation has been submitted for examination with my approval as his university supervisor.

Signature:  Date: 24 / May / 2023

Dr. OWOR ORIKO RICHARD

DEDICATION

I dedicate this work to my beloved parents, Mr. Tezikoma Samuel and Mrs. Mbawobye Oliver, who supported me both financially and emotionally throughout the course without forgetting all my siblings, Fred, Denis, Flavia, Doreen, Isaac, Gilbert, Babirye, Elvis, and Arnold who could always speak to me with words of encouragement and advice.

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Abstract

Dentifrices have been used since ancient times and are crucial, indispensable part of oral healthcare. During that time, crushed bone, crushed egg shells and clams were used when brushing teeth, shells were used as abrasive.

In order to prevent and or treat oral illnesses, attention has recently been resorted to the release of active substances from medicinal plants for formulation development.

The photochemical screening of *Solanum anguivi* involved the extraction of plant materials using suitable solvents followed by qualitative and quantitative analyses of the extract obtained. The phytochemical tests carried out were alkaloid tests, flavonoid tests, tannins tests, phenolic compound tests, and glycoside tests in order to determine the presence of specific phytochemicals in the fruits of the plant. The phytochemical tests revealed the presence of alkaloids, tannins, flavonoids, and terpenoids and these compounds are well-known for their potential health benefits and therefore contribute to the medicinal properties of *Solanum anguivi* lam.

The herbal dentifrice was formulated from three major plant species, *Solanum anguivi* Lam., *Asparagus racemosus*, and *Euclea Rasemosa* ssp *Schimperi* as active ingredients and other unfluoridated excipients and branded as SEAL.

The prepared dentifrice was evaluated for different tests like spread ability, foaming power, taste, PH, stability, colour, odour and abrasiveness. However further investigation should be made to determine the antibacterial activity of the formulated product especially on streptococcus matan since it is the main cause of tooth infections.

KEY WORDS

Phytochemical, *Solanum anguivi* Lam, antibacterial activity

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LIST OF ACRONYMS

Abbreviations	Definition
A.R	Asparagus racemosus
BC	Before Christ
BSCE	Bachelor of Science Education
CMC	Carboxymethyl Cellulose
CNS	Central Nervous System
Dr	Doctor
MIC	Minimum inhibitory concentration
E.R.S	Euclea Rasemosa ssp Schimperi
G	Grams
M	Metre
Micm	Micro centimeters
ml	Millitre
Mr	Mister
Mrs	Miss
NCD	Non-Communicable Disease
pH	Potential of Hydrogen
S.A	Solanum Anguivi Lam
SLS	Sodium Lauryl Sulfate
USEPA	United States Environmental Protection Agency
w/w	Weight per weight
WHO	World Health Organization

Chapter 1: INTRODUCTION

1.1 Background

In the mouth, bacteria exist freely without causing any harm to the person's health provided their concentration does not exceed the minimum limit, otherwise they significantly cause teeth infection and decay. And the most considered bacterial species responsible for tooth infection and decay is streptococcus mutans.(Rostinawati. T, 2018)

These bacteria metabolize the carbohydrates that remain on teeth after having a meal causing fermentation of carbohydrates, a process that produces acids which results in tooth decay.(Lea Sedghi, 2021)

Fluorides are Active ingredients in toothpaste playing a role of eradication of dental caries and control of gingivitis and most toothpastes and mouthwashes on market today contain fluoride as Anticaries, However, Fluoridated toothpaste is not recommended for children below 6 years of age(Levine, 2020), because it's diverse side effects such as irritation, oral cancer, pigmentation of teeth, intestinal changes, oral flora and vomiting, associated with ingestion or excessive use of these fluoridated toothpastes(Ammar Abdulrahman Jairoun, 2021).

Studies nowadays are focused towards developing natural products from medicinal plants, alternative to using synthetic Antibacterial agents because medicinal shrubs are cheaper, readily available, efficacious and have no adverse side effects(Lijie Chen, 2021). Thus, the initiative of formulating a herbal Dentifrice from herbs containing compounds with antibacterial properties is helpful in control of dental caries(Victoria Furquim dos santos Cardeso, 2021).

Solanum Anguivi Lam. (Solanaceae family) is a medicinal flowering and berry bearing plant as shown in figure 1 and can grow up to 2 to 3m in height. The berries have various pharmacology effects which include Antibacterial, analgesic, antioxidants, anthelmintic, anti-plasmodia, hepatoprotective, anticancer, laxative, cardiotoxic activity, CNS depressant and anti-hypertensive in addition to being nonpoisonous(Sharon Bright Amany, 2021).

And the berries have been used by local people of Uganda to clean, whiten their teeth and suppress bad breath from their oral environment. Its use to eradicate bad odor is an additive advantage over other plants that have been used in formulation of toothpaste.

Many Biochemical compounds have been identified from different medicinal plants and among them is S.A, that has been used to treat and clean teeth by the local people in Uganda especially

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