

**Formulation of Herbal-Based Soap from *Rhoicissus tridentata* Root Extracts for
Management of Bacterial Skin Diseases**

By

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A research project report submitted to the Department of Chemistry for the partial fulfillment of the requirement for the award of Bachelors of Science Education degree at Busitema University

MAY 2023

DECLARATION

I WABWIIRE JACOB declare that this research dissertation is my original work and has not been submitted elsewhere for the award of a degree. Where other people’s work has been used, this has perhaps been recognized and cited according to the university policy.

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APPROVAL

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

Dr. Owor Richard Oriko

Signature ...... Date ......./MAY/2023

DEDICATION

I dedicate my work to my loving parents, Mr. Katebule Joseph and Mrs. Nabwire Jane for their infinite support. My brother Musana Joseph Katebule always held my hand when I lost hope to move forward.

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ABSTRACT

Bacterial skin infections are a major health issue worldwide. The major bacterial skin infections are cellulitis, folliculitis, impetigo, erysipelas, Staphylococcal scalded skin syndrome, and many others. These are majorly caused by gram-positive bacterial strains mainly *Staphylococcus aureus*. Recent literature shows that various forms of treatment have been developed to curb bacterial skin infections. Among these is the use of medicinal plants majorly in traditional African Societies. In this report, the major objective was to carry out phytochemical screening of root extracts of *R. tridentata* and to formulate a herbal soap product based on *Rhoicissus tridentata* root extracts for management of bacterial skin infections. The method of analysis described by Harbone, 1998 was employed during phytochemical screening and this showed the presence of flavonoids, alkaloids, and phenols as main phytochemicals. The formulated herbal soap was named Rhoitriderm and was found to have good physical-chemical properties such as lemon smell, pH, color, cleansing, and lathering power. Anti-bacterial assay of this herbal soap needs to be done to evaluate its pharmacological uses.

Keywords

Rhoicissus tridentata, *Staphylococcus aureus*, phytochemicals, Rhoitriderm, *Pentas decora*, anti-bacterial.

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ACRONYMS AND ABBREVIATION

SA	<i>Staphylococcus aureus</i>
WHO	World Health Organisation
DALYs	Disability-Adjusted Life Years
HIV	Human Immunodeficiency Virus
AIDS	Acquired Immune Deficiency Syndrome
NTDs	Neglected Tropical Diseases
GDB	Global Disease Burden

UV	Ultra Violet
SSSS	Staphylococcal Scalded Skin Syndrome
TSS	Toxic Shock Syndrome
GABHS	Group A Beta-Hemolytic Streptococcus pyogenes
ETOAc	Ethyl Acetate
ETOAcE	Ethyl Acetate Extract
<i>P. decora</i>	<i>Pentas decora</i>

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CHAPTER ONE: INTRODUCTION

1.1 Background

There is widespread skin disease in rural areas in Sub-Saharan Africa. This is attributed to hot humid climates, overcrowding, poverty, and poor infrastructure (Bissek et al., 2012).

Skin conditions are usually the mirror of more severe illnesses such as HIV/AIDS (Njoroge & Bussmann, 2007) and neglected tropical diseases (NTDs), such as elephantiasis (R. J. Hay et al., 2014). Statistics indicate that 92% of individuals suffering from HIV have cutaneous and mucosal complications (Njoroge & Bussmann, 2007). As a result, skin diseases are among the most common infections seen in primary healthcare settings in tropical areas.

Of the new attendances at outpatient departments in developing countries, 11% of the patients have skin problems. Astonishingly, skin and subcutaneous conditions were the 18th global disease burden in the global Disability-Adjusted Life Years (DALYs) disease burden ranking in 2013 (GDB2013) and were the 4th leading cause of disability worldwide between 2010 and 2013 (Xue, Zhou, Xu, Li, Bao, Cheng, He, Xu, Ren, Zheng, et al., 2022).

The highest rates in the general population in the whole world are due to pyoderma, scabies, and superficial mycoses (Mahé et al., 2005). In Uganda, the most reported skin conditions are allergies, autoimmune reactions, bacteria, viruses, cancers, hemangioma, pellagra, and fungus. Bacterial skin infections rank the 28th diagnosis among hospitalized patients (Stulberg, Penrod, & Blatny, 2002). The most common bacterial skin infections include impetigo, boils and carbuncles, folliculitis, cellulitis, and erysipelas.

Bacterial skin diseases appear to lack much attention globally despite their intense effect on the global disease burden (Xue, Zhou, Xu, Li, Bao, Cheng, He, Xu, Ren, & rong Zheng, 2022). The burden caused by bacterial skin diseases is due to skin bacterial pathogens developing strong resistance to multiple drugs. These multi-drug resistant bacterial strains include; the gram-positive *Staphylococcus aureus* and Group A *Streptococcus pyogenes* and the gram-negative *Pseudomonas*, *Escherichia*, and *Klebsiella* (R. Hay et al., 2006)

Methicillin-resistant *Staphylococcus aureus* accounts for 50% of skin and soft tissue infections (Pfalzgraff, Brandenburg, & Weindl, 2018). However, *Streptococcus pyogenes* have been found to cause a worthy number of skin infections. Various antibiotics such as erythromycin,

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