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AREVIEWONINVESTIGATIONOFANTIMALARIALPRINCIPLESOFZANTHOXYLUMCHALYBEUM

BY

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AREVIEWREPORTSUBMITTEDTOTHEDEPARTMENTOFCHEMISTRYINPARTIALFULFILMENTOFHEREQUIREMENTFOR
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DECLARATION

I, ApioMaryValentine, declare that the work has been collected by myself and in addition the work has not been submitted for any other degree or professional qualification. I confirm that the work submitted is my own. My contribution and those of the other author to this work have been explicitly indicated below. I confirm that appropriate credit has been given where reference has been made to the work of others.

Signature.....Date.....

ApioMaryValentine

APPROVAL

This is to certify that the review report has been carried out under my supervision and this report is ready for submission with my approval.

Supervisor:

Dr. Richard Oriko Owor

Signature:.....Date:...../...../.....

DEDICATION

I dedicate my work to my loving parents, Okitoi Jimmy Michael and Asio Christine, my husband Emilu Emmanuel, and my children Arionget Canah and Akol Daniella whose words of encouragement and push for tenacity ring in my years.

I also dedicate this work to my supervisor DR. Richard Oriko Owor who has supported me throughout the process, especially his guidance that helped me develop my technological skills, thinking and creativity.

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ACRONYMSUSEDINTHETEXT

ZC

ACTs–ArtemisininCombinationTherapy.

CQ –Chloroquine.

LARMAT-LandResourceandManagement

WHO–WorldHealthOrganization.

Abstract

Zanthoxylum commonly referred as 'yellowwood' oreusuk (Ateso), Luganda (ntale yedungu), Lugwere (Musuku), Luo A (Kichuk, roki). Zanthoxylum chalybeum has been reported as an important medicinal plant for malaria treatment, fever, cough, headaches, chest pain, digestive illnesses (e.g. ulcers), diabetes and toothache. The effectiveness of Z. chalybeum as a herbal medicine has been associated with the presence of bioactive compounds alkaloids (tembetarine; nitidine and skimmianine) which have been known as anti-malaria secondary metabolite. Benzophenanthridine alkaloids; chelerythrine and nitidine within root barks of Z. chalybeum have been effectively used as anti-inflammatory activities. Other bioactive compounds reported to be found in Z. chalybeum are flavonoids, terpenoids, saponins, tannins, phenols and glycosides. The major purpose of this review is to investigate the antiplasmodial activity of the crude ether and methanol leaf extracts of ZC with chloroquine diphosphate as a positive control of malaria.

KEYWORDS: Plasmodium falciparum, Z. chalybeum, antioxidant, photochemistry,

CHAPTER ONE: Introduction

Medicinal plants are important in ethnomedical practices with malaria ranking as the most important disease treated with herbal remedies. Due to either limited availability or affordability of conventional medicines in tropical countries, about 80% of the rural population depends on traditional herbal remedies (Zirihietal., 2005). *Zanthoxylum chalybeum* is a wild plant which belongs to family Rutaceae and used as a folk medicine for treating many diseases. Although there is widespread use of traditional herbal remedies in the management of malaria (Gessler et al., 1995), scientific understanding of the plants is however largely unexplored (WHO, 2002) and therefore, there is a need to collect ethnobotanical information on antimalarial plants as a first step prior to evaluation of their efficacy and safety.

Historically, majority of conventional antimalarial drugs have been derived from plants or from structures modeled on plant derived compounds (Klayman, 1985). Quinine and artemisinin were obtained directly from plants. Research on medicinal plants used in folk medicine represents a suitable approach for the development of new drugs (Calixto, 1996). To meet the criteria of efficacy, safety and quality control like synthetic drug products, the pharmacological, toxicological and phytochemical profiles of the plant extracts have to be scientifically evaluated (Wagner, 1997). However, the World Health Organization (WHO) recognizes that the centuries-old use of certain plants as therapeutic resources should be taken into account of their efficacy (Gilbert et al., 1997). Thus, it considers phytotherapy in its healthcare programs and suggests basic procedures for the validation of drugs from plant origin in developing countries (Vulto and Smet, 1998).

Malaria is endemic in Bukedea district in Uganda and prevalent in many other parts of the country. The disease prevalence, morbidity and mortality have increased with increasing drug resistance by the malaria parasite, *Plasmodium falciparum* (WHO, 2001). This has necessitated countries like Uganda to revise their treatment policy and adopt artemisinin combination therapy (ACTs) as first line drug for the treatment of uncomplicated malaria. ACTs are expensive and majority of Ugandans cannot afford them. This underscores the extent of the disease burden and economic loss for the country. However, the practice of traditional medicine continues unabated

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