



Phytochemical profiling and larvicidal activity of *Synadenium grantii* (Hook. F.) extracts on *Anopheles gambiae* mosquito larvaeM. P. Njeri¹, H. Matovu¹, I. Nakalembe¹, W. Olaho-Mukani²¹ Faculty of Veterinary Medicine Makerere University, P.O. Box 7062, Kampala, Uganda, ² Ministry of Agriculture Animal Industry and Fisheries, Directorate of Animal Resources, P.O. Box 513, Entebbe UgandaCorresponding author: Email: williamolahomukani@gmail.com

Abstract

A study was done to establish the phytochemical profile of *Synadenium grantii* (Hook. F.) extracts and determine their larvicidal activity on mosquito larvae. Three parts of *Synadenium grantii* (leaves, stem and roots) were extracted using ethanol and diethyl ether by soaking for 7 days. The phytochemical profiles of the different concentrations of the extracts were determined after filtration. *Synadenium grantii* was found to contain tannins, reducing sugars, alkaloid salts, anthracenosides, coumarins, flavonosides, steroid glycosides and anthocyanosides. However, the leaf extracts lacked steroid glycosides, while the stem and the root lacked both steroid glycosides and flavonosides. A larvicidal assay of each extract in varying concentrations was evaluated against 10 mosquito larvae *in vitro*. The larvae were then observed after an exposure period of 24 hours at an interval of 2 hours. The results of the larvicidal assay demonstrated that the ethanol extract from the stem had the strongest larvicidal activity at all the concentrations used of 20%, 8%, 2%, 1% and 0.5% causing a mean death of 86.7%, 90.8%, 85.8%, 85.8% and 84.1%, respectively. The diethyl ether extract from the stem showed the least larvicidal activity with a mean death of 35.8%, 29.2%, 30.0%, 21.7% and 33.3%, respectively. Generally, all the extracts from the different parts of the plant had larvicidal activity to a varying degree. It was further observed, that even for the larvae which did not die, had evidence of larval development inhibition. This study showed that extracts from this plant had phytochemicals which had larvicidal activity on mosquito larvae. The stem ethanol extracts had the most pronounced larvicidal effect on mosquito larvae with nearly 100% mortality at concentrations as low as 0.5% in 6 hrs. This study has showed that this plant has biopesticide effects and its application should be integrated with other mosquito control programmes. However, more work should be carried out on larvicidal efficacy of the active ingredients in the extracts of *Synadenium grantii*.

Key words: Phytochemical profiling, larvicidal activity, *Synadenium grantii*, *Anopheles gambiae*

Introduction

Ecologically, mosquitoes are important components of aquatic and terrestrial food chains as they serve as food for a number of aquatic and terrestrial animals including birds and other insects. With respect to the human and animal well-being, mosquitoes are of great economic importance because their bites are annoying and may cause skin allergies. They are also vectors for a number of diseases causing organisms such as *Plasmodium* species, yellow fever virus, Dengue fever virus, Rift Valley fever virus and viruses that cause certain types of encephalitis such as West Nile virus (1).

World Health Organisation (WHO), for example, estimates that globally malaria alone is responsible for 247 million human clinical cases and 800,000 deaths annually, the vast majority of cases being (86%) being in sub-Saharan Africa, followed by East Asia (9%) and Eastern Mediterranean regions (3%). It is estimated that more than 40 percent of global population (greater than 2.1 billion people) is at risk of malaria (2)

A number of methods have been used to control malaria transmitting mosquitoes. These methods include: physical, chemical or biological approaches. Some of these methods have environmental and toxicological effects and therefore their use has been contested.