PHYTOCHEMICAL INVESTIGATION OF SELECTED PLANTS FROM THE FAMILY ASPHODELACEAE FOR ANTI-INFECTIVE PRINCIPLES

Martha Khasiala Induli

Abstract

Worldwide, infectious diseases are the number one cause of death accounting for approximately one-half of all deaths in tropical countries. Resistance of the microbes to the existing anti-infective agents has rendered many of them ineffective thus contributing to the high mortality. The species belonging to the family Asphodelaceae have been used in traditional medicine practice for the treatment of various ailments including malaria, diarrhoea, and skin infections. To address the existing problem of resistance, selected species belonging to the family Asphodelaceae were studied with the aim of identifying bioactive compounds with different modes of action. The roots and leaves of Aloe secundiflora, rhizomes of Kniphofia foliosa and roots of Kniphofia thomsonii were dried and ground and extraction done using dichloromethane/ methanol 1:1 followed by 100% methanol. The extracts obtained were subjected to various chromatographic separation techniques and crystallisation. The isolated compounds were identified through the use of 1D and 2D Nuclear Magnetic Resonance Spectroscopy, Mass Spectroscopy and Ultra-violet Spectroscopy. The crude extracts and compounds isolated were tested for in-vitro anti-plasmodial activities against the chloroquine-sensitive (D6) and the chloroquine resistant (W2) strains of Plasmodium falciparum. Some of the isolated compounds were also tested for antimicrobial activity against Mycobacterium tuberculosis. A total of 33 compounds were isolated with 5 of them being novel. Joziknipholone A showed the highest activity with IC<sub>50</sub> values of 0.4±0.1 µg/mL (D6) and 0.3±0.1 µg/mL (W2). Aloesaponarin I showed moderate activity with MIC values of 22.8 and 21.1 µg/mL in the Microplate Alamar Blue Assay (MABA) and Low Oxygen Recovery Assay (LORA). The study has identified compounds with promising biological activities and different mode of action which with structural modification can serve as templates for good anti-infective drugs. Since the observed biological activities supports the traditional use of these plants for the treatment of various infections, the study recommends the formulation and standardization of herbal medicines given that we have identified compounds that can be used as markers.