ABSTRACT

Medicinal plants have been used for the treatment of different ailments in human and animal health systems for many years. Approximately over 80% of rural and urban African populations use plant-based synthetic products for primary healthcare. However, the widespread and indiscriminate use of antibiotics has led to clinical resistance of previously sensitive microorganisms. Despite plants and associated endophytes being rich sources of secondary metabolites with antimicrobial potential, little is known about the antimicrobial potential of many medicinal plants including *Ocimum kilimandscharicum* and *Vernonia adoensis* in Kakamega Forest. This study investigated the antimicrobial activities of the secondary metabolites from the two plants and their associated endophytes, by specifically screening the secondary metabolites for phytoconstituents and determining their antimicrobial activities. An experimental design using a purposive sampling method was used in the study. The crude extracts from the plants and endophytes were obtained by standard extraction methods. The antimicrobial activities against selected bacteria (*Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Escherichia coli*) and fungi (*Candida albicans*) were determined using the agar well diffusion and micro dilution methods. The choice of the pathogens was on the basis of the diseases the plants treat in the traditional medicine. Kruskal-Wallis was utilized to determine the difference in the diameter of the inhibition zones of the extracts against the susceptible microorganisms. The qualitative phytochemical screening showed that the plants had alkaloids, terpenoids, tannins, steroids, saponins and phenols. Both plants also showed bacteria (*Bacillus* sp) and fungi (*Alternaria* sp and *Phomopsis* sp) as culturable endophytes. The endophytic metabolites from both plants showed the presence of terpenoids, flavonoids and alkalloids. The extracts from the plants significantly inhibited growth of susceptible bacteria (*Staphylococcus aureus*; $p = 0.0138$ and *Escherichia coli*, $p = 0.223$ and from endophytes (*Klebsiella pneumoniae*; $p = 0.0211$, *Escherichia coli*, $p = 0.0226$ and *Candida albicans*, $p = 0.001$). Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) results suggested that the metabolites can be potential antimicrobial agents against the pathogenic microorganisms. The study results showed that the plants and endophytes possess bioactive chemical compounds with antimicrobial potential. The findings are useful in understanding the antimicrobial potential of the medicinal plants in managing the emerging drug resistance in pathogenic microorganisms. From the study, there is need to conduct a detailed bioassay-guided phytochemical studies, profile the endophytes in the plants, characterize the secondary metabolites from these plants and endophytes and determine the antimicrobial potential of the purified compounds from the two medicinal plants.