

Herbal medicine is practiced by many countries of the world including Kenya, but scientific data to support the efficacy of herbal preparations has been lacking. Sixteen indigenous plants used by herbal doctors in Kenya were chosen from seven provinces and screened for antimicrobial activities using the disc diffusion method for preliminary selection. The most active plants, *Entada abyssinica* (Stem bark), *Terminalia spinosa* (Stem bark), *Harrizonia abyssinica* (roots), *Ximenia caffra* (roots), *Azadirachta indica* (stem bark and laves), and *Spilanthes mauritiana* (flowers and roots), were chosen for subsequent analysis, to determine efficacy and to identify a source of new possible antimicrobial agents.

These plants were soxhlet extracted with methanol and tested for bioactivity. In the bioassay, the microtitre broth dilution method and the agar dilution method were compared to determine suitability for use. The microtitre method was found superior with a mean of 0.856 mg/ml compared to 2.958 mg/ml for the agar dilution method. Subsequently 110 strains of pathogenic bacteria from six genera were tested for activity using the microtitre broth dilution method. Their minimum inhibitory concentration (MICs) in mg/ml and minimum bactericidal concentrations (MBC's) in mg/ml were determined as a measure of their efficacy. The extracts had a bacteriostatic effect on Gram-negative bacteria and bactericidal effect on Gram-positive bacteria.

Bacteria with special significance and some protozoa were examined separately. Mycobacteria species which were tested because of tuberculosis upsurgence in Human Immunodeficiency virus victims were found to be resistant to the extracts. *Helicobacter pylori* no known cure was killed by *T. spinosa* extracts (MIC range 62.5 - 500 µg/ml). A protozoa, *Acanthamoeba castellanii* which causes granulomatous brain lesions has no known cure but responded to extracts of *E. abyssinica*, *T. spinosa*, *X. caffra*, *A. indica* and *S. mauritiana* when tested *in vitro*. Strains of pathogenic fungi from 2 genera *Candida* and *Aspergillus* were tested and found to be sensitive to more than 60% of the extracts used.

As a result of this evaluation, four plant extracts *E. abyssinica* (stem bark), *T. spinosa* (stem bark), *X. caffra* (roots), and *A. indica* (stem bark) were found substantially bioactive. *Candida albicans* (ATCC 90873), *E. coli* (ATCC 29213) and a potent  $\beta$ -lactamase producing organism, *Pseudomonas aeruginosa* (ATCC 27853), were used to perform time kill kinetics studies, in an effort to assess the rate and extent of the destruction of the said microorganisms by the above plant extracts.

The mode of action was investigated by the kill kinetics experiments using an electron microscope. By this technique, any morphological changes in the microbial cell structure with continued exposure to the extracts would be detected. Results showed cell wall malfunction leading to failure to form septa and lysis of several microbial cells.

Finally, the plant extracts were screened for the presence of coumarins, tannins saponins and other classes of compounds, which were considered active plant constituents. *T. spinosa* contained 75% of the classes of compounds screened, *S. mauritiana* 60%, *H. abyssinica* 56.3% and *A. indica* 56.3%.