

## Department of Pharmacy and Complementary/Alternative medicine

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### PHENOTYPIC AND GENOTYPIC CHARACTERIZATION OF PATHOGENIC BACTERIA ISOLATED FROM HERBAL MEDICINES IN KENYA

#### Abstract

**Background:** The widespread use of use of herbal medicine has led to its approval by WHO has a factor in the attainment of universal health care coverage together with conventional medicine. However, unlike conventional medicine, herbal medicine has many challenges yet to be addressed. Pathogenic Microbial contamination has been cited as a serious quality issue in previous studies done in Kenya and other countries with no regulation of herbal medicines. Despite newer techniques of microbial analysis taking shape in routine microbial identification and characterization, quality control laboratories use pharmacopoeia techniques address same microorganisms without due regard to possible newer contaminants which may not be detected by the recommended techniques.

**Objective:** This study was therefore designed to use genotypic techniques not utilized before in quality control laboratories for microbial contaminant determination in herbal and nonsterile pharmaceuticals

**Materials and methods;** 16SrRNA a unique conserved gene to bacteria was used to identify bacteria that failed to be determined by routine methods. Bacterial contaminants were isolated from thirty samples of registered and nonregistered herbal products collected by random purposive sampling from five Kenyan provinces. Identification of the unknown isolates was done first by use of selective and differential media with the procedure in the BP 2007, followed by biochemical identification by API 20E commercial kit with the procedure given by the manufacturer. Genotypic characterization was finally carried out for the remaining unknowns. This was done by DNA extraction using DNA mini kits with procedures as given by manufacturer; PCR based fingerprinting, DNA sequencing and phylogenetic analysis of the sequences respectively.

**Results:** The total bacteria characterized from all samples were nineteen (19). Thirteen isolates were identified by the phenotypic methods e.g. six by differential and selective media, and seven by biochemical API 20 E kit. The remaining six were characterized genotypically despite the other technique failing to identify them.

**Conclusion:** Though the use of routine pharmacopoeia recommended techniques should be encouraged, practitioner, manufacturers and quality control laboratory analysts should be aware of more contaminants not included in the pharmacopoeia lists. The study further shows that appropriate use of genotypic techniques can enhance the accurate and robust

testing of herbal products. Further use of the techniques should be explored in routine microbial contamination analysis.