

**AIM OF THE STUDY** : To determine the optimum concentration of herbal extracts namely *Acacia nilotica* (Babool), *Azadirachta indica* (Neem), *Cinnamomum zeylanicum* (Cinnamon), and *Syzygium aromaticum* (Clove) for their antimicrobial activity and to test the efficacy of herbal irrigation against 3% Sodium Hypochlorite, together with instrumentation in the removal of multispecies endodontic biofilm.

**MATERIALS AND METHODS** : Ethanolic extract of *A.nilotica*, *A.indica*, *C.zeylanicum* and *S.aromaticum* was prepared and the susceptibility of mixed microbial strain to different antibiotics vs herbal extracts was tested using well diffusion method to determine the optimum concentration of the extract. Sixty single-rooted human mandibular premolars were decoronated, prepared and randomly grouped into five groups consisting of 12 teeth each. Two teeth in each group were selected and prepared for viewing under Scanning Electron Microscope (SEM) after the irrigation protocol.

Group I – conventional irrigation consisting 3% Sodium Hypochlorite (NaOCl)

Group II – irrigation with *Acacia nilotica* extract

Group III – irrigation with *Azadirachta indica* extract

Group IV – irrigation with *Cinnamomum zeylanicum* extract

Group V – irrigation with *Syzygium aromaticum* extract

All the prepared teeth were sterilized and the canals were inoculated with mixed human subgingival plaque bacteria and incubated at 37°C for 24 hours to allow the biofilm to form. The teeth specimens were treated with the various irrigants to be tested and the antibacterial efficacy of the herbal extracts compared to NaOCl was evaluated by Culture Study (Colony Counting) and Turbidity Testing (Optical Density at 600nm).

**RESULTS** : The results showed that complete elimination of bacteria was not achieved in any of the experimental groups. The best antibacterial activity through Optical Density was shown by Group I, followed by Group II and the least by Group III. The best antibacterial activity through Colony Counting was shown by Group I, followed by Group II and the least by Group V. Scanning Electron Microscopy analysis showed moss like depositions on the dentin surface in Group IV and V and mat like depositions in Group I and II, whereas dentin surface in Group I showed relatively clear dentinal surface with patent dentinal tubules.

**CONCLUSION** : Within the limitations of this study, 3% sodium hypochlorite showed maximum antibacterial activity, followed by *Acacia nilotica* which showed almost similar results. The use of herbal alternatives as a root canal irrigant might prove to be advantageous considering the several undesirable characteristics of Sodium Hypochlorite. Further research is needed to overcome the deposition of extracts on the dentin surface and conclusively recommend herbal solutions as root canal irrigants.

**KEYWORDS** : *Acacia nilotica*, *Azadirachta indica*, *Cinnamomum zeylanicum*, *Syzygium aromaticum*, Sodium Hypochlorite, Scanning Electron Microscope.