Group B (HYPO) – 2.5% Sodium hypochlorite (Kasturba Hospital Pharmacy, Manipal, India)

Group C (DOXY) – 5% Doxycycline (Kasturba Hospital Pharmacy, Manipal, India)

Group D (DOXY + HYPO) – Combination of 5% Doxycycline and 2.5% Sodium hypochlorite

Group E (DOXY + CHX) – Combination of 5% Doxycycline and 0.2% Chlorhexidine gluconate

The agar plates were then carefully placed in a CO₂ incubator (NuAire Inc, Plymouth, MN) at 37°C for 48 hours. The zones of inhibition were measured using a millimeter scale, passing through its diameter to the point of complete inhibition of growth on either side and the average was calculated. ANOVA test and Tukeys HSD were used to evaluate the mean and the intergroup comparison between the various groups (p < 0.05).

RESULTS

Figure 1 shows measurement of mean zones of inhibition with standard deviation and Table 1 shows inter-group comparison. Group E (DOXY + CHX) produced the largest zone and Group B (HYPO) produced the smallest zone of inhibition.

DISCUSSION

The successful culmination of endodontic therapy lies in delivering to the patient efficacious treatment which renders complete resolution of pulpal or periapical pathosis. Although obligate anaerobic bacteria dominate the root canal microbiota, some facultative strains such as *E. faecalis* have been involved in persistent infections, influencing the prognosis of pulp space therapy. This organism is capable of surviving even under unusual environmental stresses. It displays innate resistance to a variety of antibiotics such as beta-lactams, aminoglycosides, vancomycin and trimethoprim-sulfa methoxazole combinations. Peciuliene et al.¹⁹ and Rôças et al.¹⁹ have reported high recovery rates in failed pulp space therapy. Considering the nature of the organism and its capability to populate and survive in unsuccessful cases of therapy, this organism assumes importance and is an imperative choice for this study.

In order to successfully eliminate this species, a thorough debridement of the root canal system is very essential. As part of the debridement procedures besides instrumentation of the root canal, irrigation with an appropriate agent has been the norm. In spite of these various bactericidal irrigants available, residual microorganisms such as *E. faecalis* still survive and have created a dilemma increasing the rate of root canal failures. Therefore, this study was confined to elucidating the antimicrobial property of various test irrigants when used alone or in combinations and comparing them with each other when tested against *E. faecalis*.

Sodium hypochlorite is a most popular irrigating solution. Hypochloric acid disrupts several vital functions in the microbial cell resulting in cell death.²⁰ Chlorhexidine gluconate is a broad spectrum antibacterial agent and is a choice of irrigant against *E. faecalis*.² This is because of its adsorption to dental hard tissues with gradual and prolonged release at therapeutic levels called residual effect or substantivity.¹¹ It acts by adsorbing onto the cell wall of the microorganism and causing leakage of intracellular components. At low concentrations of chlorhexidine, small molecular weight substances leach out, resulting in a