

INTISARI

Infeksi endodontik yang melibatkan *Enterococcus faecalis* berperan dalam terjadinya Periodontitis Apikal yang berpotensi menyebabkan resorpsi tulang periapikal. Teknik *Guided Tissue Regeneration* (GTR) dan *Guided Bone Regeneration* (GBR) diperlukan dalam hal ini dengan memanfaatkan membran *barrier* seperti *Poly Lactic Acid* (PLA) yang dilapisi *Polyvinyl Alcohol* (PVA) dan *Carbonate Hydroxyapatite* (CHA), namun risiko kontaminasi bakteri tetap menjadi kendala sehingga diperlukan bahan antibakteri dengan substitusi ion perak (Ag⁺) pada karbonat apatit untuk meningkatkan aktivitas antibakteri dari membran tersebut.

Penelitian eksperimental laboratoris ini bertujuan untuk mengetahui pengaruh substitusi Ag⁺ terhadap aktivitas antibakteri membran PLA/PVA/CHA terhadap *E. faecalis* menggunakan metode difusi Kirby-Bauer dengan lima kelompok perlakuan, yaitu kontrol negatif (PLA+PVA+CHA), perlakuan PLA+PVA+Ag-CHA dengan konsentrasi Ag⁺ 1%; 1,5%; dan 2%, serta kontrol positif berupa *vancomycin*. Data kemudian dianalisis menggunakan uji *Shapiro-Wilk*, *Levene Test*, *Welch ANOVA*, dan *Post Hoc Games-Howell*.

Hasil menunjukkan adanya kecenderungan peningkatan zona hambat berdasarkan nilai rerata pada kelompok dengan penambahan ion Ag⁺, akan tetapi secara statistik tidak terdapat perbedaan bermakna antara kelompok perlakuan dengan kelompok membran tanpa Ag⁺ ($p > 0,05$). Dapat disimpulkan bahwa substitusi ion Ag⁺ menunjukkan kecenderungan peningkatan aktivitas antibakteri, namun belum signifikan pada konsentrasi yang diuji.

Kata kunci: Periodontitis apikal, *Enterococcus faecalis*, PLA, PVA, CHA, ion Ag⁺.

ABSTRACT

*Endodontic infections involving *Enterococcus faecalis* play an important role in the development of Apical Periodontitis (AP), which may lead to periapical bone resorption. In such conditions, Guided Tissue Regeneration (GTR) and Guided Bone Regeneration (GBR) techniques are commonly used with barrier membranes such as Poly Lactic Acid (PLA) coated with Polyvinyl Alcohol (PVA) and Carbonated Hydroxyapatite (CHA). However, bacterial contamination remains a major concern. Therefore, the substitution of silver ions (Ag^+) into carbonate apatite was proposed to enhance the antibacterial properties of the membrane.*

*This laboratory experimental study aimed to evaluate the effect of Ag^+ substitution on the antibacterial activity of PLA/PVA/CHA membranes against *E. faecalis* using the Kirby-Bauer diffusion method. The study consisted of five groups, a negative control (PLA+PVA+CHA), treatment groups (PLA+PVA+Ag-CHA) with Ag^+ concentrations of 1%; 1.5%; 2%, and a positive control (vancomycin). Data were analyzed using the Shapiro-Wilk test, Levene's test, Welch's ANOVA, and the Games-Howell's Post Hoc test.*

The results showed a tendency for an increase in the inhibition zone diameter based on mean values in groups with the addition of Ag^+ ions. However, no statistically significant difference was found between the treatment groups and the membrane without Ag^+ ($p > 0.05$). In conclusion, Ag^+ substitution demonstrated a tendency to improve antibacterial activity, although the increase was not statistically significant at the tested concentrations.

Keywords: Apical periodontitis, *Enterococcus faecalis*, PLA, PVA, CHA, silver ion (Ag^+).