

INTISARI

Periodontitis merupakan penyakit kompleks yang paling banyak dijumpai pada rongga mulut karena dapat menyebabkan inflamasi gingiva, kehilangan tulang alveolar dan mobilitas gigi. Penambahan metronidazole sebagai agen antimikroba membran karbonat apatit mengarah pada resistensi bakteri serta terabsorbsinya antibiotik secara cepat oleh cairan tubuh. Optimalisasi agen pembawa ion logam diharapkan mampu berperan sebagai antimikroba pada membran karbonat apatit. Ion silver (Ag⁺) dikenal efektif dalam membunuh bakteri pada spektrum luas dengan resistensi mikroorganisme yang minimal. Penelitian ini memiliki tujuan untuk mengetahui pengaruh penambahan ion silver terhadap daya antibakteri membran karbonat apatit.

Penelitian ini dilakukan menggunakan tujuh kelompok sampel, yaitu kelompok perlakuan (AG-CHA 5:5, AG-CHA 6:4 dan AG-CHA 7:3), kelompok kontrol negatif (CHA 5:5, CHA 6:4 dan CHA 7:3) dan kelompok kontrol positif (CHA-Metronidazole). Pembuatan sampel membran melalui proses *freezer*, *freeze dryer*, *dehydrothermal treatment* dan sterilisasi untuk selanjutnya dilakukan pengujian mikrobiologi. Uji antibakteri menggunakan metode *kirby bauer* dengan mengukur diameter zona hambat yang terbentuk pada tiap-tiap membran. Penelitian ini menggunakan tiga macam bakteri uji yaitu *Staphylococcus aureus* ATCC 25923, *Pseudomonas aeruginosa* ATCC 10145, dan *Enterococcus faecalis* ATCC 29212. Data yang diperoleh berupa nilai diameter zona hambat yang kemudian diproses analisis menggunakan uji parametrik *One-way ANOVA* dan *post hoc LSD*.

Hasil analisis data mengindikasikan adanya perbedaan bermakna rerata diameter zona hambat pada setiap kelompok membran uji dibandingkan dengan kelompok kontrol negatif dan kontrol positif. Hal ini mengarah pada kesimpulan dari penelitian ini yaitu adanya pengaruh penambahan ion silver (Ag⁺) terhadap daya antibakteri membran karbonat apatit.

Kata Kunci : *Periodontitis, agen antibakteri, ion silver, gelatin, karbonat apatit, zona hambat*

ABSTRACT

Periodontal disease is a complex disease that mostly found in the oral cavity and it can caused gingival inflammation, loss of alveolar bone and tooth mobility. The addition of metronidazole as an antimicrobial agents for carbonate apatite membranes leads to microorganisms resistance and rapid absorption of antibiotics by body fluids. Optimization of metal ion carrier agents is expected to act as an antimicrobial on carbonate apatite (CHA)membranes. Silver ion (Ag⁺) in particular shows effectiveness in killing bacteria over a broad spectrum with a minimal development of microorganism's resistance. The aim of this study was to determine the effect of adding silver ions to the antibacterial power of CHA membranes.

This study was conducted in 7(seven) groups. Those were tested groups (AG-CHA 5:5, AG-CHA 6:4 and AG-CHA 7:3), negative control groups (CHA 5:5, CHA 6:4 and CHA 7 :3), and positive control group (CHA-Metronidazole). The membrane samples were prepared through the freezing, freeze drying, dehydrothermal treatment, and sterilization processes for microbiological testing.

Antibacterial test was conducted based on the Kirby Bauer method by measuring the diameter of the inhibition zone formed on each membrane. Three bacteria specieses were used in the study, i.e., Staphylococcus aureus (ATCC 25923), Pseudomonas aeruginosa (ATCC 10145), and Enterococcus faecalis (ATCC 29212). Data were obtained in the form of inhibition zone diameter and were analyzed using parametric One-way ANOVA and post hoc LSD tests.

The results indicated that there was a significant difference in the mean diameter of the inhibition zone in each test membrane group compared to the negative control group and the positive control group. This leads to the conclusion of this studythat there is an effect of the addition of silver ions (Ag⁺) on the antibacterial activities of the CHA membranes.

Keywords : *Periodontitis, antibacterial agents, silver ion, gelatin, carbonate apatite (CHA), ihibition zone*