

INTISARI

Periodontitis merupakan penyakit inflamasi kronis penyebab kerusakan tulang alveolar. Gel komposit perancah (*scaffold*) PVA-CHA dikembangkan untuk regenerasi tulang, namun optimalisasinya terhambat oleh keasaman area akibat infeksi *Pseudomonas aeruginosa*. Bakteri adaptif ini dapat berkoloni di dalam *Dental Unit Water Lines* (DUWLs) serta menjadi sumber infeksi potensial bagi pasien maupun klinisi. Serbuk putih telur (EW) berpotensi sebagai antibakteri alami bebas risiko resistensi. Penelitian ini bertujuan mengevaluasi pengaruh konsentrasi EW pada gel PVA-CHA dalam meningkatkan daya antibakteri terhadap *P. aeruginosa*.

Penelitian eksperimental laboratoris murni secara *in vitro* ini menggunakan 25 sampel yang dibagi ke dalam 5 kelompok ($n=5$): kontrol negatif (gel PVA-CHA), kontrol positif (ciprofloxacin), serta tiga kelompok perlakuan gel komposit PVA-CHA dengan variasi konsentrasi EW sebesar 3%, 5%, dan 7%. Uji daya antibakteri terhadap *Pseudomonas aeruginosa* ATCC 10145 dilakukan dengan metode difusi sumuran pada media *Mueller-Hinton Agar* (MHA) dengan inkubasi 24 jam pada suhu 37°C. Luas zona hambat diukur secara digital menggunakan perangkat lunak ImageJ. Analisis data dilakukan secara statistik menggunakan uji *One-Way ANOVA* dan *Post-Hoc Least Significant Difference* (LSD) pada tingkat kepercayaan 95%.

Hasil pengujian menunjukkan bahwa peningkatan konsentrasi serbuk putih telur pada gel PVA-CHA tidak memberikan pengaruh signifikan secara statistik dan tidak efektif meningkatkan daya antibakteri terhadap *Pseudomonas aeruginosa*.

Kata kunci: *Pseudomonas aeruginosa*, Serbuk Putih Telur, Polivinil Alkohol, Karbonat Hidroksiapatit, Daya Antibakteri

ABSTRACT

Alveolar bone destruction is caused by periodontitis, which is classified as a chronic inflammatory disease. Polyvinyl alcohol-carbonate hydroxyapatite (PVA-CHA) composite gel scaffolds are developed for bone regeneration; however, their optimization is hindered by local acidity resulting from *Pseudomonas aeruginosa* infection. This adaptive bacterium can be harbored within Dental Unit Water Lines (DUWLs), serving as a potential infection source for both patients and clinicians. Egg white (EW) powder is regarded as a potential natural antibacterial agent without the risk of antibiotic resistance. The effect of EW concentration in PVA-CHA gel on enhancing the antibacterial activity against *P. aeruginosa* was evaluated in this study.

In this *in vitro* pure laboratory experimental study, a total of 25 samples were utilized and divided into 5 groups (n=5): a negative control (PVA-CHA gel), a positive control (ciprofloxacin), and three treatment groups of PVA-CHA composite gel with varying EW concentrations of 3%, 5%, and 7%. The antibacterial activity test against *Pseudomonas aeruginosa* ATCC 10145 was conducted using the well diffusion method on Mueller-Hinton Agar (MHA) with a 24-hour incubation at 37°C. The measurement of the inhibition zone area was performed digitally using ImageJ software. Data analysis was executed statistically using One-Way ANOVA and Post-Hoc Least Significant Difference (LSD) tests at a 95% confidence level.

An enhancement of the antibacterial activity against *Pseudomonas aeruginosa* was not statistically significant and was not effectively achieved by increasing the concentration of egg white powder in the PVA-CHA gel.

Keywords: *Pseudomonas aeruginosa*, Egg White Powder, Polyvinyl Alcohol, Carbonate Hydroxyapatite, Antibacterial Activity