Intisari

Latar belakang: Kerusakan gigi desidui akibat karies yang meluas serta invasi bakteri ke jaringan periapikal memicu pelepasan sitokin pro-inflamasi yang merangsang osteoklastogenesis dan menyebabkan resorpsi tulang alveolar patologis. Gel ekstrak bawang putih (GEBP) mengandung senyawa organosulfur dan flavonoid yang diketahui memiliki sifat antibakteri, antiinflamasi, serta dapat menghambat osteoklastogenesis. **Tujuan:** Penelitian ini bertujuan untuk mengkaji pengaruh aplikasi GEBP 20% dan 40% terhadap ekspresi *Tartrate-resistant Acid Phosphatase* (TRAP) pada jaringan periapikal yang terinfeksi dengan durasi aplikasi selama 5, 7 dan 14 hari. **Metode**: Penelitian ini menggunakan desain eksperimental murni dengan *post-test only control group design*. Sebanyak 36 molar pertama maksila tikus dilakukan perforasi kamar pulpa dan injeksi LPS *E. coli* untuk menginduksi kelainan periapikal. Tikus dibagi menjadi 4 kelompok perlakuan: kontrol negatif (basis gel), kontrol positif (*Triple Antibiotik Paste*/ *TAP*), GEBP 20% dan GEBP 40%. Pengamatan dilakukan pada hari ke-5, 7, dan 14. Ekspresi TRAP dalam bentuk persentase area dianalisis menggunakan uji *two-way* ANOVA dengan tingkat kepercayaan 95%. **Hasil:** Persentase area dengan ekspresi TRAP positif terendah ditemukan pada kelompok GEBP 40% dengan paparan selama 14 hari (8,03±0,89), diikuti GEBP 20% paparan 14 hari (9,15±0,95) dan kontrol positif paparan 14 hari (10,08±1,19). Persentase tertinggi ditemukan pada kontrol negatif dengan paparan 14 hari (23,95±3,49). Pada uji two-way ANOVA terdapat perbedaan signifikan antar kelompok perlakuan (p=0,000) dan interaksi antara perlakuan dengan lama paparan (p=0,001). Perbedaan antar lama paparan tidak menunjukkan nilai yang signifikan (p=0,477). **Kesimpulan:** Gel ekstrak bawang putih 20% dan 40% dapat menekan ekspresi TRAP pada lesi periapikal, menunjukkan potensi menghambat resorpsi tulang alveolar patologis.

Kata kunci: gel ekstrak bawang putih, konsentrasi, lama paparan, ekspresi *Tartrate-resistant Acid Phosphatase* (TRAP), aktivitas osteoklas

Abstract

Background: *The deterioration of tooth structure due to the presence of caries and the invasion of periapical tissues by bacteria results in the release of pro-inflammatory cytokines, which stimulate osteoclastogenesis and cause pathological resorption of the alveolar bone. The garlic extract gel (GEG) contains organosulfur compounds dan flavonoids, which are known to possess antibacterial and anti-inflammatory properties, and to inhibit osteoclastogenesis.* ***Objective:*** *The objective of this study is to evaluate the effect of 20% and 40% GEG application on Tartrate-resistant Acid Phosphatase (TRAP) expression in infected periapical tissue over a period of 5, 7, and 14 days.* ***Methods:*** *This study employed a true experimental design with a post-test only group control design. A total of 36 maxillary first molars from rats were perforated and injected with E. coli LPS to induce periapical abnormalities. The rats were divided into four treatment groups: a negative control group (gel base), a positive control group (Triple Antibiotic Paste/ TAP), a 20% GEG group, and a 40% GEG group. Observations were conducted on day 5, 7, and 14. The expression of TRAP was analysed using a two-way ANOVA test with a 95% confidence level, expressed as a percentage area.* ***Results:*** *The lowest percentage of area with positive TRAP expression was observed in the GEG 40% group with 14 days of exposure (8.03 ± 0.89), followed by the GEG 20% group (9.15±0.95) and positive control with 14 days exposure (10.08±1.19). The highest percentage was observed in the negative control group, which was exposed for 14 days (23.95 ± 3.49). A significant difference was observed between the treatment groups (p=0.000) and the interaction between treatment and exposure duration (p=0.001). The difference between exposure durations did not show a significant value (p=0.477).* ***Conclusion:*** *The garlic extract gels of 20% and 40% can suppress TRAP expression in periapical tissue, indicating the potential to inhibit pathological alveolar bone resorption.*

Keywords: *garlic extract gel; concentration, duration of exposure, Tartrate-resistant Acid Phosphatase (TRAP), osteoclast activity*