

### Intisari

**Latar belakang:** Migrasi bakteri ke periapikal menyebabkan terlepasnya sitokin pro-inflamasi yang menginduksi osteoklastogenesis dan menyebabkan resorpsi tulang alveolar. Osteoklas banyak ditemukan dalam waktu 5-14 hari setelah terjadi jejas pulpa. Infeksi periapikal gigi desidui dapat menginvasi jaringan ikat dan memengaruhi perkembangan benih gigi permanen. Gel ekstrak bawang putih (GEBP) memiliki kandungan organosulfur dengan kemampuan antibakteri, anti-inflamasi, dan menghambat osteoklastogenesis. **Tujuan:** Mengkaji perbedaan pengaruh GEBP 20% dan 40%, serta lama paparnya terhadap jumlah sel osteoklas. **Metode:** *True experimental* dengan *post test only group control design*. Sejumlah 32 molar pertama maksila tikus kiri dan kanan, dilakukan perforasi kamar pulpa dan injeksi LPS *E. coli* untuk menginduksi kelainan periapikal. Sampel dibagi menjadi 4 kelompok dengan bahan uji: basis gel (kontrol -), TAP (kontrol +), GEBP 20%, GEBP 40% yang kemudian dibagi lagi berdasarkan lama paparan 5, 7, dan 14 hari. **Hasil:** Rerata jumlah osteoklas paling sedikit ditemukan pada kelompok GEBP 40% dengan lama paparan 7 dan 14 hari, sedangkan jumlah osteoklas terbanyak pada kelompok basis gel dengan lama paparan 5 hari. Puncak penekanan osteoklas terlihat dengan lama paparan 7 hari pada seluruh kelompok. Perbedaan bermakna terlihat antara kelompok basis gel dengan GEBP 20% pada paparan 5 hari ( $p=0,022$ ) dan 7 hari ( $p=0,012$ ), serta GEBP 40% paparan 5 hari ( $p=0,042$ ), 7 hari ( $p=0,005$ ), dan 14 hari ( $p=0,045$ ). Perbedaan tidak bermakna didapatkan antara kelompok TAP, GEBP 20%, dan 40% pada seluruh kelompok hari lama paparan. **Kesimpulan:** Gel ekstrak bawang putih menghambat pembentukan osteoklas pada kelainan periapikal sehingga berpotensi mengurangi resorpsi tulang.

**Kata kunci:** Gel ekstrak bawang putih, jumlah osteoklas, konsentrasi, lama paparan

## Abstract

**Background:** Bacterial migration to the periapical area results in the release of pro-inflammatory cytokines, which induce osteoclastogenesis and cause alveolar bone resorption. Osteoclasts are typically present within 5-14 days after pulp injury. Periapical infection of deciduous teeth can invade connective tissue and affect the development of permanent tooth buds. Garlic extract gel (GEBP) contains organosulfur with antibacterial, anti-inflammatory, and osteoclastogenesis-inhibiting properties. **Objective:** The aim of this study was to investigate the effects of 20% and 40% GEBP, as well as the duration of exposure, on the osteoclast cell count. **Methods:** This was a true experimental with a post-test only group control design. The samples of 32 left and right rat maxillary first molars were used, with the pulp chamber perforated and *E. coli* LPS injected intrapulpally to induce periapical abnormalities. The samples were divided into four groups of samples: gel base (- control), TAP (+ control), GEBP 20%, and GEBP 40%, and further divided based on the length of exposure, which was either 5, 7, or 14 days. **Results:** The lowest mean number of osteoclasts was found in the GEBP 40% group with exposure durations of 7 and 14 days, while the highest was in the gel base group with exposure durations of 5 days. Peak osteoclast suppression was seen at 7 days in all groups. Significant differences were seen between the gel base group and GEBP 20% at 5 days ( $p = 0.022$ ) and 7 days ( $p = 0.012$ ), and GEBP 40% at 5 days ( $p = 0.042$ ), 7 days ( $p = 0.005$ ), and 14 days ( $p = 0.045$ ). There were no significant differences between the TAP, GEBP, and 40% groups on all exposure days. **Conclusion:** Garlic extract gel inhibits osteoclast formation in periapical disorders, potentially reducing bone resorption.

**Keywords:** garlic extract gel; osteoclast, concentration, duration of exposure.