

**PENGARUH EKSTRAK ROYAL JELLY TERHADAP
EKSPRESI mRNA NUCLEAR FACTOR KAPPA-B DAN IL-6
SEL HELA SETELAH PAPARAN *Pseudomonas aeruginosa* IN VITRO**

INTISARI

Pseudomonas aeruginosa merupakan salah satu bakteri penyebab infeksi nosokomial yang mampu berkoloni pada plak gigi sehingga menyebabkan pneumonia maupun infeksi di rongga mulut yang diperantarai prosedur dental. Bakteri ini dapat menginduksi peningkatan produksi interleukin-6 melalui jalur NF- κ B pada sel hospes. Sifatnya yang resisten terhadap berbagai antibiotik menyebabkan kesulitan untuk dieradikasi. Royal jelly memiliki efek antibakteri dan antiinflamasi. Tujuan penelitian ini mengkaji pengaruh pemberian ekstrak royal jelly terhadap ekspresi mRNA NF- κ B dan mRNA IL-6 pada sel HeLa setelah paparan *P. aeruginosa*.

Sel HeLa sebagai representatif epitelium oral dikultur pada 6-well microplate ($1,2 \times 10^6$ sel/well) dibagi ke dalam enam kelompok. Sel diberi perlakuan ekstrak royal jelly (25%; 12,5%; dan 6,25%) dan kontrol positif ibuprofen 400 μ g/ml selama 30 menit, kemudian dipapar bakteri *P. aeruginosa* $1,5 \times 10^7$ CFU/ml. Ekspresi mRNA NF- κ B dan mRNA IL-6 dari *real-time* PCR dihitung menggunakan metode kuantifikasi relatif dan dianalisis dengan *One-Way ANOVA*.

Hasil analisis statistik menunjukkan ekspresi mRNA IL-6 pada semua kelompok perlakuan royal jelly lebih rendah dibandingkan kontrol negatif ($p < 0,05$); sedangkan ekspresi mRNA NF- κ B pada royal jelly 25% dan 12,5% lebih rendah dibandingkan kontrol negatif ($p < 0,05$). Ekspresi mRNA NF- κ B pada kelompok royal jelly 25% dan 12,5% tidak berbeda signifikan dengan kelompok ibuprofen ($p > 0,05$). Level ekspresi mRNA IL-6 pada semua konsentrasi ekstrak royal jelly tidak berbeda signifikan dengan ibuprofen ($p > 0,05$). Selain itu, ekspresi mRNA IL-6 pada ekstrak royal jelly 25% lebih rendah dibandingkan kelompok sel tanpa perlakuan, begitu pula dengan kelompok ibuprofen ($p < 0,05$). Disimpulkan bahwa pemberian ekstrak royal jelly dapat menghambat ekspresi mRNA NF- κ B dan mRNA IL-6 pada sel HeLa setelah paparan *P. aeruginosa*. Ekspresi terendah mRNA NF- κ B dan IL-6 terdapat pada pemberian ekstrak royal jelly 25%, namun konsentrasi 12,5% direkomendasikan untuk efek antiinflamasi yang efektif dan aman.

Kata kunci : *Pseudomonas aeruginosa*, ekstrak royal jelly, sel HeLa, NF- κ B, IL-6

**THE EFFECT OF ROYAL JELLY EXTRACT ON *Pseudomonas aeruginosa*
- INDUCED EXPRESSION OF NUCLEAR FACTOR KAPPA-B AND IL-6
mRNA IN HELA CELL *IN VITRO***

ABSTRACT

Pseudomonas aeruginosa is one of the bacteria which causes nosocomial infections. It colonizes in dental plaque causing pneumonia or oral infection mediated by dental procedures. This bacterium able to induce interleukin-6 production through NF- κ B signal transduction pathway within host cells. Antibiotic resistance between *P. aeruginosa* strains causes difficulties in eradication of its infection. Royal jelly has antibacterial and anti-inflammatory effects. This study aimed to investigate the effect of royal jelly extract pretreatment on the expression of NF- κ B and IL-6 mRNA in HeLa cells after exposure to *P. aeruginosa*.

HeLa cells as oral epithelium representative model cultured in 6-well microplates (1.2×10^6 cells/well) were divided into six groups. Cells were treated using royal jelly extract (25%; 12.5%; and 6.25%) and 400 μ g/ml ibuprofen (positive control) then exposed to *P. aeruginosa* (1.5×10^7 CFU/ml). The expression of NF- κ B mRNA and IL-6 mRNA from real-time PCR was calculated using the relative quantification method and analyzed by One-Way ANOVA.

Interleukin-6 mRNA was significantly lower in all royal jelly group than the negative control ($p < 0.05$). Besides, the NF- κ B mRNA in 25% and 12.5% royal jelly groups were significantly lower than that of negative control ($p < 0.05$). The expression of NF- κ B mRNA in 25% and 12.5% royal jelly extract group were not significantly different with that of the ibuprofen group ($p > 0.05$). Meanwhile, the expression of IL-6 mRNA in royal jelly extract treated groups were not significantly different to that of the ibuprofen ($p > 0.05$). In addition, the expression of IL-6 mRNA in the cells treated with 25% royal jelly extract was lower than the untreated group and likewise ibuprofen ($p < 0.05$). It can be concluded that royal jelly extract is able to reduce the expression of NF- κ B and IL-6 mRNA in HeLa cells after exposure to *P. aeruginosa*. The lowest expression of NF- κ B and IL-6 mRNA was found in the administration of 25% royal jelly extract, however a 12.5% concentration is recommended for an effective and safe anti-inflammation effect.

Keywords : *Pseudomonas aeruginosa*, royal jelly extract, HeLa cell, NF- κ B, IL-6