

INTISARI

Periodontitis apikalis sering kali disebabkan oleh kegagalan perawatan saluran akar karena persistensi bakteri di dalam saluran akar akibat irigasi yang kurang adekuat. *Enterococcus faecalis* merupakan bakteri utama penyebab kegagalan perawatan saluran akar yang disertai periodontitis apikalis. *Enterococcus faecalis* memiliki faktor virulensi *lipoteichoic acid* (LTA) dan *enterococcal surface protein* (ESP) yang berperan dalam adhesi dan pembentukan biofilm *E. faecalis* di dalam saluran akar. *Eco enzyme* kulit nanas mengandung zat aktif yang berfungsi sebagai agen antiadhesi maupun antibakteri. Tujuan dari penelitian ini adalah untuk mengetahui pengaruh *eco enzyme* kulit nanas terhadap penghambatan pembentukan biofilm *E. faecalis*.

Uji penghambatan pembentukan biofilm bakteri *E. faecalis* ATCC 29212 dilakukan menggunakan *96-well microplate*. Kelompok uji pada penelitian ini yaitu kontrol positif (NaOCl 2,5%), kontrol negatif (*Phosphate Buffer Saline*), serta variasi konsentrasi *eco enzyme* kulit nanas 41,67%, 20,83%, 10,42%, dan 5,21%. Setelah inkubasi selama 24 jam, biofilm diberi pewarnaan *crystal violet* 0,1%. *Optical Density* diukur menggunakan spektrofotometer dengan panjang gelombang 450 nm.

Uji *One-Way ANOVA* menunjukkan perbedaan bermakna antar seluruh kelompok uji penghambatan pembentukan biofilm *E. faecalis*. Uji LSD menunjukkan *eco enzyme* kulit nanas dengan konsentrasi 41,67%, 20,83%, dan 10,42% mempunyai efektivitas yang setara dengan NaOCl 2,5% terhadap penghambatan pembentukan biofilm *E. faecalis*. Kesimpulan penelitian ini adalah *eco enzyme* kulit nanas mampu menghambat pembentukan biofilm bakteri *E. faecalis* ATCC 29212. *Eco enzyme* kulit nanas 10,42% direkomendasikan untuk diteliti lebih lanjut sebagai alternatif bahan larutan irigasi saluran akar.

Kata kunci : *Enterococcus faecalis*, *eco enzyme* kulit nanas, penghambatan pembentukan biofilm

ABSTRACT

Apical periodontitis is related to the failure of endodontic treatment due to the bacterial persistence in the root canal from inadequate irrigation. *Enterococcus faecalis* has been isolated from many cases of failed endodontic treatment with persistent apical periodontitis. Lipoteichoic acid (LTA) and enterococcal surface protein (ESP) play a key role in *E. faecalis* adhesion and biofilm formation in the root canal. Pineapple peel eco enzyme contains active substances that may act as anti-adhesion and antibacterial substances. This study aimed to determine the effect of pineapple peel eco enzyme on the inhibition of *E. faecalis* biofilm formation.

A biofilm formation inhibition test was carried out using a 96-well microplate. *Enterococcus faecalis* ATCC 29212 was incubated with various concentrations of pineapple peel eco enzyme (41.67%, 20.83%, 10.42%, and 5.21%), 2.5% sodium hypochlorite as a positive control as well as Phosphate Buffer Saline as a negative control. After incubation for 24 hours, the biofilm was stained with 0.1% crystal violet. The optical density was then measured using a spectrophotometer at a wavelength of 450 nm.

One-way ANOVA test showed significant differences on the inhibition of *E. faecalis* biofilm formation among the groups. The result of the LSD test showed that 41.67%, 20.83%, and 10.42% pineapple peel eco enzyme had similar effectiveness in inhibiting *E. faecalis* biofilm formation compared to 2.5% sodium hypochlorite. In conclusion, pineapple peel eco enzyme has the effect of inhibiting *E. faecalis* ATCC 29212 biofilm formation. Pineapple peel eco enzyme with 10.42% concentration is recommended for further research as an alternative material for root canal irrigation solution.

Key words : *Enterococcus faecalis*, pineapple peel eco enzyme, biofilm formation inhibition