

INTISARI

Karies gigi merupakan penyakit infeksi kronis dengan prevalensi tinggi di Indonesia yang berkaitan erat dengan pembentukan biofilm oleh bakteri kariogenik, terutama *Streptococcus mutans* dan *Streptococcus sanguinis*. *Dual-species* biofilm dari kedua bakteri ini bersifat lebih resisten terhadap agen antimikroba dibandingkan biofilm mono-species. Salah satu pendekatan pencegahan karies adalah dengan penggunaan agen antibiofilm berbasis bahan alam. Buah jambu biji merah (*Psidium guajava L.*) diketahui mengandung senyawa aktif seperti flavonoid, tanin, dan alkaloid yang berpotensi menghambat pembentukan biofilm.

Penelitian ini bertujuan untuk mengetahui pengaruh ekstrak buah jambu biji merah terhadap pembentukan massa dan struktur *dual-species* biofilm *S. mutans* dan *S. sanguinis*. Pengujian massa biofilm dilakukan dengan metode pewarnaan *crystal violet* pada *96-microwell plate*, sedangkan struktur biofilm diamati menggunakan *Scanning Electron Microscope* (SEM). Konsentrasi ekstrak yang diuji meliputi 1,562%, 3,125%, 6,25%, dan 12,5% dengan kontrol negatif (PBS) dan kontrol positif (*chlorhexidine gluconate* 0,1%).

Hasil penelitian menunjukkan bahwa ekstrak buah jambu biji merah konsentrasi 3,125%; 6,25% dan 12,5% tidak berbeda signifikan dengan kontrol positif ($p > 0,05$) artinya setara menghambat pembentukan massa *dual-species* biofilm *S. mutans* dan *S. sanguinis*. Pengamatan menggunakan SEM menunjukkan penurunan kepadatan dan perubahan struktur biofilm yang menyerupai kontrol positif pada konsentrasi tersebut.

Kesimpulannya, ekstrak buah jambu biji merah dapat menghambat pembentukan massa *dual-species* biofilm *S. mutans* dan *S. sanguinis* mulai konsentrasi 3,125%. Ekstrak buah jambu biji merah berpengaruh terhadap struktur *dual-species* biofilm *S. mutans* dan *S. sanguinis* ditunjukkan melalui perubahan morfologi koloni, distribusi sel yang tidak merata, serta penurunan kepadatan biofilm pada hasil pengamatan SEM dibandingkan kelompok kontrol

Kata kunci: *Psidium guajava L.*, *Streptococcus mutans*, *Streptococcus sanguinis*, biofilm, antibiofilm, karies gigi.

ABSTRACT

Dental caries is a chronic infectious disease with a high prevalence in Indonesia, closely associated with biofilm formation by cariogenic bacteria, particularly *Streptococcus mutans* and *Streptococcus sanguinis*. Dual-species biofilms formed by these bacteria exhibit greater resistance to antimicrobial agents compared to mono-species biofilms. One approach to caries prevention involves the use of natural-based antibiofilm agents. Red guava (*Psidium guajava* L.) fruit is known to contain active compounds such as flavonoids, tannins, and alkaloids, which have the potential to inhibit biofilm formation.

This study aimed to investigate the effect of red guava fruit extract on the formation of mass and structure of dual-species biofilms of *S. mutans* and *S. sanguinis*. Biofilm mass was quantified using the crystal violet staining method on 96-microwell plates, while biofilm structure was observed using a Scanning Electron Microscope (SEM). The extract concentrations tested were 1,562%, 3.125%, 6.25%, and 12.5% with phosphate-buffered saline (PBS) as the negative control and 0.1% chlorhexidine gluconate as the positive control.

The results of the study indicate that red guava fruit extract at concentrations of 3.125%, 6.25%, and 12.5% did not differ significantly from the positive control ($p > 0.05$), suggesting an equivalent inhibitory effect on the formation of dual-species biofilm mass of *S. mutans* and *S. sanguinis*. Observations using SEM revealed a reduction in biofilm density and structural alterations resembling those of the positive control at these concentrations.

In conclusion, red guava fruit extract can inhibit the formation of dual-species biofilm mass of *S. mutans* and *S. sanguinis* starting from a concentration of 3.125%. The red guava fruit extract affects the structure of the dual-species biofilm of *S. mutans* and *S. sanguinis*, as evidenced by changes in colony morphology, uneven cell distribution, and a decrease in biofilm density observed in SEM images compared to the control group.

Keywords: *Psidium guajava* L., *Streptococcus mutans*, *Streptococcus sanguinis*, biofilm, antibiofilm, dental caries.