INTISARI

Streptococcus sanguinis adalah bakteri Gram positif yang berperan penting dalam pembentukan awal biofilm, sedangkan *Streptococcus mutans* adalah bakteri Gram positif utama yang berperan dalam pembentukan karies. Kedua bakteri ini dapat berkoagregasi membentuk *dual-species* biofilm. Daun sirih merah mengandung flavonoid, alkaloid, saponin, tanin, minyak atsiri, dan steroid yang memiliki efek antibakteri dan antibiofilm. Penelitian ini bertujuan untuk mengetahui pengaruh ekstrak daun sirih merah terhadap destruksi *dual-species* biofilm *S. sanguinis* ATCC 10556 dan *S. mutans* ATCC 25175.

Uji destruksi *dual-species* biofilm menggunakan metode *microtiter plate*. Biofilm dibuat dengan menginkubasi suspensi bakteri *S. sanguinis* dan *S. mutans* di dalam media BHI-B yang telah ditambah dengan 2% sukrosa selama 24 jam. Setelah biofilm terbentuk, variasi konsentrasi ekstrak (10,42%, 5,21%, 2,61%), klorheksidin glukonat 0,2% (kontrol positif), dan salin (kontrol negatif) ditambahkan ke dalam *well microplate*. Setelah 24 jam inkubasi, biofilm diwarnai menggunakan kristal violet 0,1%. *Optical density* dibaca menggunakan *microplate reader* ($\lambda = 450$ nm).

Uji *one-way ANOVA* menunjukkan perbedaan persentase destruksi *dual-species* biofilm yang signifikan ($p<0,05$) antar kelompok. Hal ini menunjukkan bahwa ekstrak daun sirih merah dapat mendestruksi *dual-species* biofilm *S. sanguinis* dan *S. mutans*. Uji Post-hoc *Least Significant Difference* menunjukkan bahwa terdapat perbedaan bermakna ($p<0,05$) pada kelompok ekstrak 10,42% jika dibandingkan dengan ekstrak daun sirih merah konsentrasi 2,61%. Disimpulkan bahwa ekstrak daun sirih merah memiliki kemampuan mendestruksi *dual-species* biofilm *S. sanguinis* ATCC 10556 dan *S. mutans* ATCC 25175, dan konsentrasi 10,42% merupakan konsentrasi ekstrak daun sirih merah yang paling efektif dalam mendestruksi *dual-species* biofilm *S. sanguinis* ATCC 10556 dan *S. mutans* ATCC 25175.

Kata kunci: Ekstrak daun sirih merah, destruksi *dual-species* biofilm, *Streptococcus sanguinis, Streptococcus mutans*.

ABSTRACT

Streptococcus sanguinis is a Gram positive bacteria that plays an important role in the initial formation of biofilms, while *Streptococcus mutans* is the Gram positive bacteria that plays a main role in caries formation. These two bacteria can coaggregate to form a dual-species biofilms. Red betel leaves contain flavonoids, alkaloids, saponins, tannins, essential oils, and steroids which have antibacterial and anti-biofilm effects. This study aimed to determine the effect of red betel leaf extract on the destruction of dual-species biofilms of *S. sanguinis* ATCC 10556 and *S. mutans* ATCC 25175.

The biofilm destruction test used the microtiter plate method. Biofilms were prepared by incubating the bacterial suspensions of *S. sanguinis* and *S. mutans* in BHI-B supplemented with 2% sucrose for 24 hours. After the biofilm was formed, various extract concentrations (10.42%, 5.21%, 2.61%), 0.2% chlorhexidine gluconate (positive control), and saline (negative control) were added to the well microplates. After 24 hours of incubation, biofilms were stained using 0.1% crystal violet. Optical density was read using a microplate reader (λ= 450 nm).

The one-way ANOVA test showed a significant ($p<0.05$) difference in the percentage of biofilm destruction among groups. This showed that red betel leaf extract can destroy the dual-species biofilms of *S. sanguinis* and *S. mutans*. The Post-hoc Least Significant Difference test showed that there was a significant difference ($p<0.05$) in the 10.42% extract group when compared to the red betel leaf extract concentration of 2.61%. It was concluded that red betel leaf extract had the ability to destroy the dual-species biofilms of *S. sanguinis* ATCC 10556 and *S. mutans* ATCC 25175 and extract concentration of 10.42% was the most effective concentration of red betel leaf extract in destroying the dual-species biofilm of *S. sanguinis* ATCC 10556 and *S. mutans* ATCC 25175.

Keywords: Red betel leaf extract, dual-species biofilm destruction, *Streptococcus sanguinis*, *Streptococcus mutans*.