

INTISARI

Streptococcus mutans dan *C. albicans* merupakan mikroorganisme yang berperan penting menyebabkan karies gigi karena memiliki kemampuan asidogenik dan asidurik. Di dalam rongga mulut, kedua mikroorganisme ini dapat berinteraksi membentuk biofilm kariogenik. Daun sirih merah mengandung flavonoid, alkaloid, tanin, saponin, dan minyak atsiri yang memiliki aktivitas antibiofilm. Penelitian ini bertujuan untuk mengetahui pengaruh ekstrak daun sirih merah terhadap destruksi dual-spesies biofilm *S. mutans* dan *C. albicans*.

Uji destruksi biofilm dilakukan menggunakan *microplate round-bottom 96 wells*. Model biofilm dibuat dengan menginkubasi suspensi *S. mutans* dan *C. albicans* pada BHI-B yang mengandung 2% sukrosa pada suhu 37°C selama 24 jam. Setelah inkubasi, biofilm diberi perlakuan ekstrak daun sirih merah konsentrasi 5%, 10%, 20%, klorheksidin glukonat 0,2% (kontrol positif), dan NaCl steril (kontrol negatif). *Microplate* diinkubasi pada suhu 37°C selama 24 jam, kemudian dibilas dengan NaCl, dan dilanjutkan pewarnaan dengan *crystal violet* 0,1%. *Optical density* (OD) diukur menggunakan *microplate reader* ($\lambda = 450\text{nm}$). Data dianalisis menggunakan *One-Way ANOVA*, dilanjutkan uji *Post-Hoc* metode *Least Significant Difference* (LSD).

Uji *One-Way ANOVA* menunjukkan adanya pengaruh signifikan antar kelompok uji ($p < 0,05$) terhadap destruksi dual-spesies biofilm *S. mutans* dan *C. albicans*. Uji LSD menunjukkan terdapat perbedaan signifikan ekstrak daun sirih merah konsentrasi 5%, 10%, dan 20% terhadap klorheksidin glukonat 0,2%. Kesimpulan penelitian ini adalah ekstrak daun sirih merah memiliki kemampuan destruksi terhadap dual-spesies biofilm *S. mutans* ATCC 25175 dan *C. albicans* ATCC 10231. Ekstrak sirih merah konsentrasi 20% memiliki kemampuan mendestruksi dual-spesies biofilm *S. mutans* ATCC 25175 dan *C. albicans* ATCC 10231 yang paling tinggi, tetapi efektivitasnya masih lebih rendah dibandingkan klorheksidin glukonat 0,2%.

Kata kunci: *Candida albicans*, daun sirih merah, destruksi biofilm, dual spesies biofilm, *Streptococcus mutans*

ABSTRACT

Streptococcus mutans and *C. albicans* are microorganisms play an important role in dental caries since they have acidogenic and aciduric abilities. In the oral cavity, these two microorganisms can interact with each other to form a cariogenic biofilm. Red betel leaves contain flavonoids, alkaloids, tannins, saponins, and essential oils that have anti-biofilm activities. This study aimed to determine the effect of red betel leaf extract on the destruction of dual-species biofilm of *S. mutans* and *C. albicans*.

The biofilm destruction was performed using a 96-well round bottom microplate. The biofilm model was made by incubating *S. mutans* and *C. albicans* suspension in BHI-B containing 2% sucrose at 37°C for 24 hours. After the incubation, the biofilm was exposed to various concentrations of red betel leaf extract (5%, 10%, 20%), 0.2% chlorhexidine gluconate (positive control), and NaCl (negative control). The microplate was then incubated at 37°C for 24 hours, rinsed with NaCl, and followed by staining with 0.1% crystal violet. Optical density was measured using a microplate reader ($\lambda = 450$ nm). The data were analyzed using One-way ANOVA, then continued with the Post-Hoc Least Significant Difference method.

One-way ANOVA showed that there was a significant effect among test groups ($p < 0.05$) on the destruction of dual-species biofilm *S. mutans* and *C. albicans*. The LSD test showed that there was a significant difference in red betel leaf extract concentrations of 5%, 10%, and 20% against 0.2% chlorhexidine gluconate. The study concluded that red betel leaf extract has the ability to destruct dual-species biofilm *S. mutans* ATCC 25175 and *C. albicans* ATCC 10231. Red betel leaf extract concentration 20% has the highest ability to destruct dual-species biofilm *S. mutans* ATCC 25175 and *C. albicans* ATCC 10231, but the effectivity is lower than 0.2% chlorhexidine gluconate.

Keywords: Biofilm destruction, *Candida albicans*, dual-species biofilm, red betel leaves, *Streptococcus mutans*