

Daya Antibakteri Ekstrak Daun Sirih Merah (*Piper crocatum Ruiz & Pav.*) terhadap Biofilm *Streptococcus mutans* ATCC 25175

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ABSTRAK

Streptococcus mutans merupakan bakteri utama penyebab karies. Salah satu pencegahannya adalah dengan menghilangkan biofilm oral menggunakan agen antibakteri. Daun sirih merah (*Piper crocatum Ruiz & Pav.*) mengandung senyawa aktif yang memiliki aktivitas antibakteri sehingga dapat menghambat pertumbuhan *Streptococcus mutans*. Tujuan penelitian adalah untuk mengetahui nilai *Minimum Inhibitory Concentration* (MIC), *Minimum Bactericidal Concentration* (MBC), *Minimum Biofilm Inhibitory Concentration* (MBIC), dan *Minimum Biofilm Eradication Concentration* (MBEC) ekstrak daun sirih merah terhadap *Streptococcus mutans* ATCC 25175, menganalisis perbedaan perubahan massa biofilm antara pemberian ekstrak daun sirih merah dan klorheksidin serta menganalisis pengaruh lamanya induksi/pemberian ekstrak daun sirih merah terhadap massa biofilm.

Penelitian ini merupakan penelitian eksperimental murni, dilakukan di Laboratorium Sentral Universitas Padjadjaran. Uji MIC, MBC, MBIC, dan MBEC ekstrak daun sirih merah menggunakan metode mikrodilusi. Uji fitokimia dilakukan dengan menambahkan pereaksi. Data hasil penelitian dilakukan uji normalitas data dengan uji *chi-square*. Analisis data menggunakan uji ANAVA untuk melihat perbedaan massa biofilm. Analisis korelasi *Pearson* untuk melihat pengaruh lamanya induksi/pemberian ekstrak daun sirih merah terhadap perubahan massa biofilm.

Hasil uji fitokimia ekstrak daun sirih merah mengandung senyawa fenolik, tanin, flavonoid, saponin, triterpenoid, dan steroid yang memiliki aktivitas antibakteri. Nilai MIC ekstrak daun sirih merah (*Piper crocatum Ruiz & Pav.*) adalah 70%, nilai MBC adalah 100%, nilai MBIC terdapat pada konsentrasi 80% dan nilai MBEC adalah 90%. Hasil penelitian menunjukkan terdapat perbedaan yang signifikan perubahan massa biofilm *Streptococcus mutans* ATCC 25175 antara pemberian ekstrak daun sirih merah dan klorheksidin dalam waktu 30 menit dengan *p-value* $0,0011 < 0,05$. Tidak terdapat korelasi yang signifikan secara statistik antara waktu pemberian ekstrak daun sirih merah dan perubahan massa biofilm pada dengan *p-value* $0,4875 > 0,05$.

Simpulan penelitian adalah ekstrak daun sirih merah (*Piper crocatum Ruiz & Pav.*) memiliki daya antibakteri terhadap biofilm *Streptococcus mutans* ATCC 25175.

Kata kunci: *Streptococcus mutans*, biofilm, ekstrak daun sirih merah, antibakteri

Antibacterial Activity of Red Betel Leaf Extract (Piper crocatum Ruiz & Pav.) against Biofilm Streptococcus mutans ATCC 25175

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ABSTRACT

Streptococcus mutans is the main bacteria that cause caries. One way to prevent it is by removing the oral biofilm using antibacterial agents. Red betel leaf (*Piper crocatum* Ruiz & Pav.) contains active compounds that have an antibacterial activity which can inhibit the growth of *Streptococcus mutans*. The study is aimed to determine the value of Minimum Inhibitory Concentration (MIC), Minimum Bactericidal Concentration (MBC), Minimum Biofilm Inhibitory Concentration (MBIC), and Minimum Biofilm Eradication Concentration (MBEC) of red betel leaf extract against *Streptococcus mutans* ATCC 25175 and to analyze differences in mass changes biofilm between administration of red betel leaf extract and chlorhexidine and the effect of length of induction/administration of red betel leaf extract on the mass of biofilm.

This research is a true experimental research conducted at the Central Laboratory of Padjadjaran University. MIC, MBC, MBIC, and MBEC tests of red betel leaf extract were carried out by using the microdilution method. A phytochemical test was carried out by adding reagents. The research data were tested for data normality with the chi-square test. Data analysis used the ANOVA test to see differences in biofilm mass. Pearson correlation analysis test was carried out to see the effect of the length of induction/administration of red betel leaf extract on changes in biofilm mass.

The results of the phytochemical test of red betel leaf extract contain phenolic compounds, tannins, flavonoids, saponins, triterpenoids, and steroids which have antibacterial activity. The MIC value of red betel leaf extract (*Piper crocatum* Ruiz & Pav.) was 70%, the MBC value was 100%, the MBIC value was present at a concentration of 80% and the MBEC value was 90%. The results showed that there was a significant difference in the mass change of *Streptococcus mutans* ATCC 25175 biofilm between the administration of red betel leaf extract and chlorhexidine within 30 minutes with a p -value of $0.0011 < 0.05$. There was no statistically significant correlation between the time of administration of red betel leaf extract and changes in the mass of the biofilm with a p -value of $0.4875 > 0.05$.

The conclusion of the research was red betel leaf extract (*Piper crocatum* Ruiz & Pav.) has antibacterial activity against *Streptococcus mutans* ATCC 25175 biofilm.

Keywords: *Streptococcus mutans*, biofilm, red betel leaf extract, antibacterial