

# Efek ekstrak etanol temulawak terhadap viabilitas dual species streptococcus mutans dan streptococcus sanguinis = The effect of curcuma xanthorrhiza ethanol extract to viability of dual species streptococcus mutans and streptococcus sanguinis

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## Abstrak

Temulawak (*Curcuma xanthorrhiza* Roxb.) telah terbukti memiliki efek antibakteri terhadap *Streptococcus mutans* (*S. mutans*) dan *Streptococcus sanguinis* (*S. sanguinis*) single species. *S. mutans* dan *S. sanguinis* saling berkompetisi dalam biofilm.

Tujuan: Menganalisis pengaruh ekstrak etanol temulawak terhadap viabilitas dual species *S. mutans* dan *S. sanguinis* pada fase pembentukan biofilm yang berbeda.

Metode: Model biofilm *S. mutans* dan *S. sanguinis* diinkubasi selama 20 jam (fase akumulasi aktif) dan 24 jam (fase maturasi) pada suhu 37°C. Kedua model biofilm dipaparkan ekstrak etanol temulawak dengan konsentrasi 0,2%-25%, klorheksidin 0,2% sebagai kontrol positif, dan kultur bakteri tanpa intervensi sebagai kontrol negatif. Viabilitas bakteri dianalisis menggunakan uji MTT.

Hasil: Ekstrak etanol temulawak menurunkan viabilitas *S. mutans* dan *S. sanguinis* secara signifikan ( $p < 0,05$ ) mulai konsentrasi 0,2%. Viabilitas bakteri pada biofilm dual species *Streptococcus* fase akumulasi aktif lebih rendah dibandingkan fase maturasi. Efek antibakteri ekstrak etanol temulawak setara dengan klorheksidin 0,2%.

Kesimpulan: Ekstrak etanol temulawak dapat menurunkan viabilitas *S. mutans* dan *S. sanguinis* pada biofilm. Efek ekstrak etanol temulawak efektif pada fase akumulasi aktif.

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*Curcuma xanthorrhiza* (*C. Xanthorrhiza*) Roxb. extract had been reported to have antibacterial effect against *Streptococcus mutans* (*S. mutans*) and *Streptococcus sanguinis* (*S. sanguinis*) single species. *S. mutans* and *S. sanguinis* are competing in the biofilm.

Objective: To analyze the effect of *C. xanthorrhiza* extract on the viability of dual species *S. mutans* and *S. sanguinis* in different stages of biofilm formation.

Methods: *S. mutans* and *S. sanguinis* in dual species model biofilm was incubated for 20 hours and 24 hours at 37°C and exposed by 0.2%-25% *C. xanthorrhiza* ethanol extract, 0.2% Chlorhexidine as a positive control, and bacterial culture only as a negative control. The viability of the bacteria was analyzed using the MTT assay.

Results: The java turmeric ethanol extract decreased the *S. mutans* and *S. sanguinis* viability significantly ( $p < 0.05$ ) started from concentrations 0.2%. The viability of bacteria in dual species biofilms *Streptococcus* in the active accumulation phase is lower than in the maturation phase. The antibacterial effect of *C. xanthorrhiza* ethanol extract is equivalent to 0.2% Chlorhexidine.

Conclusion: The *C. xanthorrhiza* ethanol extract can reduce the viability of *S. mutans* and *S. sanguinis* in the biofilm. The effectivity of *C. xanthorrhiza* ethanol extract is higher in the active accumulation phase.