

# Analisis Pengaruh Cell Free Spent Media Streptococcus salivarius Terhadap Pertumbuhan Biofilm Kombinasi Candida Albicans dan Streptococcus Mutans = Analysis of the Effect of Streptococcus Salivarius Cell Free Spent Media on Growth of Candida Albicans and Streptococcus Mutans Biofilm

Vincent Gerald Junior, author

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## Abstrak

Latar Belakang: Hubungan sinergistik antara bakteri etiologi karies Streptococcus mutans dan jamur patogen Candida albicans merupakan salah satu faktor yang berperan dalam memperparah penyakit karies. Selain itu, bakteri komensal Streptococcus salivarius telah dilaporkan dapat mempengaruhi pembentukan biofilm Streptococcus mutans dan Candida albicans ketika dikultur bersama-sama. Streptococcus salivarius telah diobservasi mampu mengganggu sistem quorum sensing dari Streptococcus mutans dan mencegah perubahan morfologi Candida albicans dari ragi menjadi hifa.

Tujuan: Menganalisis pengaruh keberadaan whole protein Streptococcus salivarius terhadap pertumbuhan biofilm Streptococcus mutans dan Candida albicans dalam berbagai konsentrasi dan waktu.

Metode: Dilakukan uji pembentukan biofilm Streptococcus mutans ATCC 25175 dan Candida albicans ATCC 10231 yang dipaparkan whole protein hasil metabolit Streptococcus salivarius ATCC 9222 dalam konsentrasi yang bervariasi (1%, 10%, 100%). Kemudian biofilm diinkubasi dengan durasi 3 jam, 24 jam, dan 48 jam untuk melihat efek keberadaan protein terhadap fase pembentukan biofilm. Uji massa biofilm dilakukan dengan menggunakan crystal violet assay. Pengamatan dengan mikroskop cahaya dilakukan untuk mengobservasi morfologi biofilm. Perbandingan jumlah sel viabel Streptococcus mutans dan Candida albicans diuji dengan metode total plate count.

Kesimpulan: Terdapat indikasi jika whole protein hasil metabolit Streptococcus salivarius menghambat pertumbuhan biofilm Streptococcus mutans dan Candida albicans bergantung pada konsentrasi protein dan waktu inkubasi biofilm.

.....Background: Commensal bacteria Streptococcus salivarius has been reported to influence Streptococcus mutans or Candida albicans when cultured together.

Objective: To analyze the effect of the presence of Streptococcus salivarius whole protein on the growth of Streptococcus mutans and Candida albicans dual-species biofilms in various concentrations and at various times representing the stage of biofilm formation.

Method: Biofilm formation assay was conducted for biofilm consisting of Streptococcus mutans ATCC 25175 and Candida albicans ATCC 10231. The exposure to whole protein from the metabolite of Streptococcus salivarius ATCC 9222 was done by infusing the spent medium in varying protein concentrations. Then the biofilm was incubated with varying duration to see the effect of the protein on different phase of biofilm formation. Biofilm mass measurement was carried out using crystal violet assay. Microscope observations were done to observe the morphology of the biofilm. Comparison of the number of viable cells between Streptococcus mutans and Candida albicans was done with total plate count method.

Conclusion: There is an indication that the whole protein metabolite of Streptococcus salivarius inhibits the growth of Streptococcus mutans and Candida albicans dual species biofilms depending on protein

concentration and biofilm phase.