Pengaruh Cell-Free Spent Medium Actinomyces Naeslundii Terhadap Biofilm Koagregasi Candida Albicans dan Streptococcus Mutans = Effects of Actinomyces Naeslundii Derived Cell-Free Spent Medium on the Biofilm of Coaggregated Candida Albicans and Streptococcus Mutans

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Abstrak

Latar Belakang: Streptococcus mutans dan Candida albicans merupakan dua mikroba rongga mulut yang mengalami koagregasi dan membuat biofilm dual-spesies, menjadi suatu mekanisme untuk membantu keselamatan mereka. Actinomyces naeslundii juga dapat dijumpai dalam lingkungan oral dan telah dibuktikan dapat menjadi inhibitor biofilm tersebut. Spent medium mengandung metabolit sel, sehingga filtrasi medium tersebut dapat menuju pada perolehan protein tanpa adanya sel mikroba.
Tujuan: Mengevaluasi efek protein yang disekresikan Actinomyces naeslundii terhadap biofilm koagregasi Streptococcus mutans dan Candida albicans.
Metode: Analisa kualitatif dengan observasi inverted microscope dan observasi koloni mikroba dalam agar BHI, serta SDA. Analisa kuantitatif melalui uji statistik dan observasi data uji biomassa dengan Crystal Violet Assay dan viabilitas dengan Total Plate Count, yang dilakukan dalam agar BHI dan SDA. Eksperimen dilakukan dengan variabel independen waktu inkubasi 3 jam (fase inisial), 24 jam (fase pre-maturasi), dan 48 jam (fase maturasi), serta konsentrasi protein 1%, 10%, dan 100%.
Hasil: Perbedaan bermakna secara statistik hanya ditemukan pada komparasi biomassa berdasarkan waktu inkubasi 3 jam-48 jam pada konsentrasi protein 1% dan 3 jam-48 jam, serta 34 jam-48 jam dengan konsentrasi protein 10%. Tidak ada perbedaan bermakna secara statistik pada biomassa berdasarkan konsentrasi protein, maupun viabilitas berdasarkan waktu inkubasi atau konsentrasi protein.
Kesimpulan: Protein Actinomyces naeslundii dapat reduksi biomassa biofilm koagregasi Streptococcus mutans dan Candida Albicans pada fase inisial pembentukan biofilm, tanpa reduksi jumlah koloni mikroba. Diasumsikan terjadi reduksi komponen matriks EPS, tanpa reduksi sel mikroba.
.....Background: Streptococcus mutans and Candida albicans are oral microbes that can coaggregate into a dual-species biofilm, creating a mechanism to help their survival. Actinomyces naeslundii can also be discovered in the oral microflora, and proven to act as an inhibitor towards said biofilm. Spent medium contains cell metabolites, so that if filtered, said medium can lead to protein acquisition without the presence of microbes.
Purpose: To examine the effect of proteins secreted from Actinomyces naeslundii towards the coaggregated biofilm of Streptococcus mutans and Candida albicans.
Methods: Qualitative analysis through inverted microscope and direct observation of microbial colonies on BHI and SDA agar mediums. Quantitative analysis was done statistically and by observing data discovered from biomass evaluation with Crystal Violet assay and viability testing with Total Plate Count on BHI and SDA agar. The experiment was carried out with the independent variables being the incubation period of 3 hours (initial phase), 24 hours (pre-maturation phase), and 48 hours (maturation phase), along with protein concentrations of 1%, 10%, and 100%.

Results: Statistically significant difference during biomass comparison of 3 and 48 hours with 1% protein concentration, as well as 3 and 48 hours, 24 and 48 hours with 10% protein concentration. No other statistical differences were found.
Conclusion: Actinomyces naeslundii protein can reduce the biomass of coaggregated Streptococcus mutans and Candida albicans biofilm during the initial stage of biofilm formation, without reducing microbial colonies. It is assumed that there is reduction in EPS matrix components, without microbial cell reduction.