

ABSTRAK

Uji Antibakteri dan Antibiofilm Ekstrak Etil Asetat *Streptomyces* InaCC A758 Terhadap Mono-Spesies Dan Dual-Spesies *Streptococcus Mutans* ATCC 25175 Dan *Candida Albicans* ATCC 10231

Latar Belakang: *Streptococcus mutans* dan *Candida albicans* merupakan mikroorganisme utama yang berkontribusi dalam pembentukan biofilm rongga mulut dan patogenesis karies gigi. Biofilm dual-spesies keduanya diketahui lebih resisten terhadap terapi konvensional sehingga diperlukan agen antibiofilm alternatif. Penelitian ini bertujuan untuk mengevaluasi aktivitas antibakteri dan antibiofilm ekstrak etil asetat *Streptomyces* InaCC A758 terhadap biofilm mono-spesies dan dual-spesies *S. mutans* ATCC 25175 dan *C. albicans* ATCC 10231

Metode: Penelitian ini menggunakan metode *Microtiter Plate Assay* dengan *crystal violet*. Ekstraksi *Streptomyces* menggunakan metode maserasi cai-cair dengan pelarut etil asetat. Penentuan aktivitas antibakteri dan antibiofilm menggunakan metode *microbroth dilution*, dan analisis morfologi sel dengan menggunakan *Scanning Electron Microscopy* (SEM). **Hasil:** Ekstrak etil asetat *Streptomyces* InaCC A758 memiliki aktivitas antibakteri dengan nilai *Minimum Inhibitory Concentration* (MIC) menunjukkan konsentrasi 50 µg/mL untuk seluruh kelompok mono dan dual-spesies. Nilai *Minimum Bactericidal Concentration* (MBC) hanya tercapai untuk *S. mutans* konsentrasi 800 µg/mL, sementara MBC/MFC untuk *C. albicans* dan dual-spesies tidak dapat tercapai sampai konsentrasi uji tertinggi. Ekstrak etil asetat *Streptomyces* InaCC A758 memiliki aktivitas hambat biofilm dengan nilai *Minimum Biofilm Inhibition Concentration* (MBIC₅₀) menunjukkan konsentrasi 50 µg/mL pada seluruh kelompok mono dan dual-spesies. Ekstrak etil asetat *Streptomyces* InaCC A758 memiliki aktivitas reduksi biofilm dengan nilai *Minimum Biofilm Reduction Concentration* (MBRC₅₀) untuk *S. mutans* dapat dicapai pada konsentrasi 50 µg/mL, kelompok dual-spesies menunjukkan konsentrasi 800 µg/mL, namun pada *C. albicans* tidak dapat tercapai sampai konsentrasi uji tertinggi. Analisis SEM mendukung temuan tersebut dengan menunjukkan disrupti struktur biofilm serta penurunan kepadatan sel pada kelompok perlakuan. **Kesimpulan:** Ekstrak etil asetat *Streptomyces* InaCC A758 memiliki potensi kuat sebagai agen antibiofilm, terutama terhadap *S. mutans* dan biofilm dual-spesies, meskipun efektivitas terhadap *C. albicans* masih terbatas.

Kata Kunci: Dental biofilm; *Streptomyces*; antibiofilm; *Streptococcus mutans*; *Candida albicans*.

ABSTRACT

Antibacterial and Antibiofilm Activities of Ethyl Acetate Extract of *Streptomyces* InaCC A758 Against Mono-Species and Dual-Species *Streptococcus mutans* ATCC 25175 and *Candida albicans* ATCC 10231

Background: *Streptococcus mutans* and *Candida albicans* are major microorganisms involved in oral biofilm formation and the pathogenesis of dental caries. Dual-species biofilms of these microorganisms are known to exhibit higher resistance to conventional therapies, highlighting the need for alternative antibiofilm agents. This study aimed to evaluate the antibacterial and antibiofilm activities of the ethyl acetate extract of *Streptomyces* InaCC A758 against mono-species and dual-species biofilms of *S. mutans* ATCC 25175 and *C. albicans* ATCC 10231. **Methods:** This study employed the microtiter plate assay using crystal violet staining. *Streptomyces* extraction was performed using a liquid–liquid maceration method with ethyl acetate as the solvent. Antibacterial and antibiofilm activities were determined using the microbroth dilution method, while cellular morphological analysis was conducted using Scanning Electron Microscopy (SEM). **Results:** The ethyl acetate extract of *Streptomyces* InaCC A758 demonstrated antibacterial activity, with the Minimum Inhibitory Concentration (MIC) observed at 50 µg/mL for all mono-species and dual-species groups. The Minimum Bactericidal Concentration (MBC) was achieved only for *S. mutans* at a concentration of 800 µg/mL, whereas MBC/MFC values for *C. albicans* and dual-species biofilms were not achieved up to the highest tested concentration. The extract exhibited antibiofilm inhibitory activity, with the Minimum Biofilm Inhibition Concentration (MBIC₅₀) of 50 µg/mL observed in all mono-species and dual-species groups. Biofilm reduction activity showed that the Minimum Biofilm Reduction Concentration (MBRC₅₀) for *S. mutans* was achieved at 50 µg/mL, while the dual-species biofilm required a concentration of 800 µg/mL; however, MBRC₅₀ for *C. albicans* was not achieved at the highest tested concentration. SEM analysis supported these findings by demonstrating disruption of biofilm structure and reduced cell density in the treated groups. **Conclusion:** The ethyl acetate extract of *Streptomyces* InaCC A758 shows strong potential as an antibiofilm agent, particularly against *S. mutans* and dual-species biofilms, although its effectiveness against *C. albicans* remains limited.

Keywords: Dental biofilm; *Streptomyces*; antibiofilm; *Streptococcus mutans*; *Candida albicans*.