

INTISARI

Latar belakang: *Nano silver fluoride* ekstrak *Sargassum* sp. (NSF-ES) dikembangkan sebagai alternatif *Silver Diamine Fluoride* (SDF) dalam perawatan karies gigi anak tanpa pewarnaan lesi. Ekstrak *Sargassum* sp. berperan sebagai pereduksi dan penstabil nanopartikel *silver*. Penelitian ini mengkaji aktivitas antibakteri NSF-ES terhadap *Streptococcus mutans*, bakteri utama penyebab karies gigi. **Tujuan:** Meneliti pengaruh variasi konsentrasi *nano silver fluoride* (NSF) biosintesis alga cokelat (*Sargassum* sp.) terhadap pertumbuhan *Streptococcus mutans*. **Metode:** Penelitian *in vitro* dilakukan pada lima kelompok perlakuan: NSF-ES 45%, 50%, dan 55%, kontrol positif (SDF 30%), serta kontrol negatif (akuades). Pertumbuhan *S. mutans* diukur dengan menghitung jumlah koloni bakteri menggunakan metode *Total Plate Count* (CFU/ml). Analisis statistik dilakukan menggunakan uji *Kruskal-Wallis* dan dilanjutkan dengan uji *Mann-Whitney U* pada taraf signifikansi 95%. **Hasil:** Jumlah koloni *S. mutans* menurun seiring meningkatnya konsentrasi NSF-ES. Jumlah koloni pada NSF-ES dengan konsentrasi 45%, 50%, dan 55% masing-masing adalah $2,02 \times 10^5 \pm 0,59 \times 10^5$ CFU/ml, $1,22 \times 10^5 \pm 0,38 \times 10^5$ CFU/ml, dan $0,72 \times 10^5 \pm 0,13 \times 10^5$ CFU/ml. Hasil secara signifikan lebih rendah dibandingkan kontrol negatif ($16,6 \times 10^5 \pm 1,12 \times 10^5$ CFU/ml, $p=0,009$). Kontrol positif (SDF 30%) menunjukkan inhibisi total (0 ± 0 CFU/ml) dan secara signifikan lebih efektif dibandingkan semua kelompok NSF-ES ($p = 0,005$). **Kesimpulan:** Konsentrasi *nano silver fluoride* (NSF) biosintesis alga cokelat (*Sargassum* sp.) yang lebih tinggi memiliki kemampuan menghambat pertumbuhan bakteri *Streptococcus mutans* yang lebih tinggi. Konsentrasi 55% memiliki kemampuan menghambat pertumbuhan bakteri *Streptococcus mutans* paling besar dibandingkan kelompok konsentrasi 45% dan 50%.

Kata kunci: *nano silver fluoride*, *Sargassum* sp., *Streptococcus mutans*, antibakteri

ABSTRACT

Background: Nano silver fluoride synthesized using *Sargassum* sp. extract (NSF-ES) is a promising alternative to Silver Diamine Fluoride (SDF) for managing dental caries in children without causing lesion discoloration. The *Sargassum* sp. extract acts as a natural reducing and stabilizing agent for silver nanoparticles. This study investigates the antibacterial activity of NSF-ES against *Streptococcus mutans*, the primary bacterium responsible for dental caries. **Objective:** To evaluate the effect of varying concentrations of biosynthesized NSF-ES on *S. mutans* growth. **Methods** An *in vitro* study tested five groups: NSF-ES at 45%, 50%, and 55%, a positive control (SDF 30%), and a negative control (distilled water). *S. mutans* growth was quantified by counting colony-forming units (CFU/ml) using the Total Plate Count method. Statistical analyses were performed using the Kruskal-Wallis test followed by the Mann-Whitney U test with a 95% confidence level. **Results:** The number of *S. mutans* colonies decreased with increasing NSF-ES concentration. Colony counts for NSF-ES at 45%, 50%, and 55% were $2.02 \times 10^5 \pm 0.59 \times 10^5$, $1.22 \times 10^5 \pm 0.38 \times 10^5$, and $0.72 \times 10^5 \pm 0.13 \times 10^5$ CFU/ml, respectively, all significantly lower than the negative control ($16.6 \times 10^5 \pm 1.12 \times 10^5$ CFU/ml, $p=0.009$). The positive control (SDF 30%) showed complete inhibition (0 ± 0 CFU/ml), significantly outperforming all NSF-ES groups ($p=0.005$). **Conclusion:** Higher concentrations of biosynthesized nano silver fluoride (NSF) from brown algae (*Sargassum* sp.) exhibit greater inhibitory effects on the growth of *Streptococcus mutans*, with the 55% concentration showing the strongest antibacterial effect compared to 45% and 50% concentrations.

Key words: nano silver fluoride, *Sargassum* sp., *Streptococcus mutans*, antibacterial