

Research Article

Antibacterial and Antifungal Properties of Citronella oil Against Streptococcus mutans and Candida albicans by In Vitro Study

Sifat Antibakteri dan Anti-fungal Minyak Sereh terhadap *Streptococcus mutans* dan *Candida albicans* Secara In Vitro

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ABSTRACT

Streptococcus mutans (*S. mutans*) and *Candida albicans* (*C. albicans*) are the main microorganisms that cause cavities. This could lead to infection, tissue damage around the teeth, abscesses, and focal infection to other organs. Natural compounds with anti-bacterial and anti-fungal activities are currently widely used as products or as additives in the prevention of dental caries, since the wide spread of antibiotic resistance. Citronella (*Cymbopogon citratus*) is abundant and easy to grow in tropical countries, such as Indonesia. This study aims to determine the effectiveness of citronella oil (*Cymbopogon citratus*) against the growth of microorganisms *S. mutans* and *C. albicans* based on Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC). The broth dilution method was performed with Citronella oil concentrations of 100%, 50%, 25%, 12.5%, 6.25%, and 3.125%, and 0.2% chlorhexidine as control. MIC values were determined based on absorbance spectrophotometry and MBC values were determined from agar plates using the scatter method. Biofilm eradication test was performed by crystal-violet staining and the absorbance was measured. MIC and MBC values of citronella oil against *S. mutans* were at concentrations of 25% and 100%, respectively, and MIC and MBC values on *C. albicans* were obtained at concentrations of 50% and 100%, respectively. It is concluded that citronella oil has antibacterial and antifungal activity.

Keywords: Antimicrobial, *Candida albicans*, Minimum Bactericidal Concentration, Minimum Inhibitory Concentration, *Streptococcus mutans*

ABSTRAK

Streptococcus mutans (*S. mutans*) dan *Candida albicans* (*C. albicans*) merupakan mikroorganisme utama penyebab gigi berlubang. Hal ini dapat menyebabkan infeksi, kerusakan jaringan di sekitar gigi, abses dan infeksi fokal ke organ tubuh lainnya. Bahan alam yang memiliki aktivitas anti bakteri dan anti jamur saat ini banyak digunakan sebagai produk atau bahan tambahan dalam pencegahan karies gigi, karena tingginya sebaran resistensi antibiotik. Citronella (*Cymbopogon citratus*) melimpah dan mudah tumbuh di negara tropis, seperti Indonesia. Penelitian ini bertujuan untuk mengetahui efektivitas minyak serai wangi (*Cymbopogon citratus*) terhadap pertumbuhan mikroorganisme *S. mutans* dan *C. albicans* berdasarkan Minimum Inhibitory Concentration (MIC) dan Minimum Bactericidal Concentration (MBC). Metode dilusi kaldu dilakukan dengan konsentrasi Citronella oil 100%, 50%, 25%, 12,5%, 6,25%, dan 3,125%, serta klorheksidin 0,2% sebagai kontrol. Nilai MIC ditentukan berdasarkan penghambatan organisme dari konsentrasi terendah berdasarkan visualisasi, sementara nilai MBC ditentukan dari pertumbuhan koloni bakteri pada media. MIC dan MBC minyak serai wangi terhadap *S. mutans* yaitu pada konsentrasi masing-masing 25% dan 100%, serta nilai MIC dan MBC pada *C. albicans* diperoleh pada masing-masing konsentrasi 50% dan 100%. Disimpulkan, minyak serai memiliki aktivitas antibakteri dan antijamur.

Kata Kunci: Antimikroba, *Candida albicans*, Minimum Bactericidal Concentration, Minimum Inhibitory Concentration, *Streptococcus mutans*

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