

Rio Pratama Rizq Nuswandana. NIM 220341100064. ANALISIS FISIKOKIMIA DAN ANTIBAKTERI *Staphylococcus epidermidis* DARI DETERGEN CAIR BERBAHAN LIMBAH BITTERN, *Sapindus rarak* DAN EKSTRAK KASAR DAUN *Avicennia marina*. Dibawa Bimbingan Eka Nurrahema Ning Asih, S.Kel., M.Si

ABSTRAK

Detergen cair berbahan surfaktan sintesis berpotensi mencemari lingkungan serta menimbulkan dampak terhadap kesehatan sehingga diperlukan alternatif berbahan alami yang lebih ramah lingkungan. Penelitian ini bertujuan menganalisis karakteristik fisikokimia dan aktivitas antibakteri detergen cair berbahan limbah bittern, ekstrak kasar daun *Avicennia marina*, dan *Sapindus rarak* dengan formula berbeda terhadap bakteri *Staphylococcus epidermidis*. Penelitian menggunakan metode eksperimental dengan empat formulasi ekstrak kasar daun *Avicennia marina*, yaitu 0%, 5%, 10%, dan 15%. Pengujian meliputi pH, bobot jenis, viskositas, stabilitas busa, daya detergensi, dan aktivitas antibakteri menggunakan metode difusi cakram (*disc diffusion*). Data dianalisis menggunakan uji *One Way ANOVA*, *Kruskal–Wallis*, dan *Mann–Whitney*. Hasil penelitian menunjukkan bahwa peningkatan konsentrasi ekstrak kasar daun *Avicennia marina* memberikan hasil yang berbeda terhadap karakteristik fisikokimia dan aktivitas antibakteri detergen cair. Nilai pH berkisar antara 5,12–5,39 dan masih berada dalam rentang yang aman menurut SNI, viskositas meningkat seiring bertambahnya konsentrasi ekstrak, stabilitas busa mencapai 100%, serta daya detergensi menunjukkan kemampuan membersihkan yang baik. Namun, nilai bobot jenis seluruh formula belum memenuhi persyaratan Standar Nasional Indonesia (SNI) detergen cair. Aktivitas antibakteri juga meningkat seiring peningkatan konsentrasi ekstrak, dengan diameter zona hambat berturut-turut sebesar $5,2 \pm 0,1$ mm; $10,30 \pm 0,26$ mm; $10,57 \pm 0,06$ mm; dan $14,07 \pm 5,48$ mm terhadap *Staphylococcus epidermidis*. Formula dengan penambahan ekstrak kasar daun *Avicennia marina* sebesar 15% menghasilkan aktivitas antibakteri tertinggi sehingga berpotensi menjadi formula terbaik, meskipun masih diperlukan optimasi formulasi untuk meningkatkan karakteristik fisikokimia, terutama bobot jenis agar memenuhi standar yang ditetapkan.

Kata Kunci : Detergen cair, *Avicennia marina*, bittern, *Sapindus rarak*, *Staphylococcus epidermidis*

Rio Pratama Rizq Nuswandana. Student ID 220341100064. *Physicochemical and Antibacterial Analysis of Staphylococcus epidermidis from Liquid Detergent Made from Bitter Waste, Sapindus rarak, and Crude Extract of Avicennia marina Leaves.* Supervised by Eka Nurrahema Ning Asih, S.Kel., M.Si.

ABSTRACT

Liquid detergents based on synthetic surfactants have the potential to pollute the environment and impact health; therefore, eco-friendly, natural alternatives are needed. This study aimed to analyze the physicochemical characteristics and antibacterial activity against Staphylococcus epidermidis of liquid detergents formulated from bitter waste, Avicennia marina leaf crude extract, and Sapindus rarak using various concentrations of Avicennia marina extract (0%, 5%, 10%, and 15%). Tests included pH, specific gravity, viscosity, foam stability, detergency, and antibacterial activity (via the disc diffusion method). Data were analyzed using One Way ANOVA, Kruskal Wallis, and Mann Whitney tests. The results showed that increasing the concentration of Avicennia marina leaf crude extract resulted in variations in the liquid detergent's physicochemical characteristics and antibacterial activity. pH values ranged from 5.12 to 5.39 (within the safe range according to SNI standards), viscosity increased with extract concentration, foam stability reached 100%, and detergency demonstrated good cleaning capability. However, the specific gravity values for all formulas did not yet meet the Indonesian National Standard (SNI) requirements for liquid detergents. Antibacterial activity also increased with extract concentration, yielding inhibition zone diameters of 5.2 ± 0.1 mm, 10.30 ± 0.26 mm, 10.57 ± 0.06 mm, and 14.07 ± 5.48 mm against Staphylococcus epidermidis, respectively. The formula containing 15% Avicennia marina leaf crude extract exhibited the highest antibacterial activity, making it a promising candidate for the optimal formula; however, further formulation optimization is required to improve physicochemical characteristics specifically specific gravity to meet established standards.

Keywords : *Liquid detergent, Avicennia marina, bitter, Sapindus rarak, Staphylococcus epidermidis*