

ABSTRAK

Joshua Leonard Damanik, NIM 4202520003 (2024). Isolasi dan Identifikasi Bakteri Endofit pada Daun Sirih (*Piper betle* L.) dan Potensinya Sebagai Antibakteri.

Daun sirih (*Piper betle* L.) diketahui mengandung berbagai metabolit sekunder yang memiliki sifat antibakteri, dan merupakan salah satu tanaman yang dapat dijadikan sumber bakteri endofit. Bakteri endofit diketahui menghasilkan metabolit sekunder yang sama dengan tanaman inang, sehingga mereka dapat melawan bakteri patogen. Dalam mengidentifikasi bakteri, digunakan gen 16S rRNA. Tujuan dari penelitian ini adalah untuk mengetahui keanekaragaman mikroskopis dan makroskopis bakteri endofit yang terdapat pada daun sirih, mengetahui potensi bakteri endofit pada daun sirih (*Piper betle* L.) sebagai antibakteri terhadap bakteri patogen *Escherichia coli* dan bakteri *Staphylococcus aureus*, serta mengetahui spesies bakteri endofit yang berhasil diisolasi dari daun sirih (*Piper betle* L.) yang memiliki potensi antibakteri. Daun sirih yang diambil adalah daun tua. Aktivitas antibakteri menggunakan metode difusi cakram. Hasil isolasi didapatkan 8 isolat bakteri endofit dengan beragam karakter makroskopik dan mikroskopik. Pengujian aktivitas antibakteri terhadap bakteri patogen *Escherichia coli* ATCC 25922 dan *Staphylococcus aureus* ATCC 25923 didapatkan 3 isolat bakteri endofit yang paling potensial menghambat bakteri uji, yaitu IE 6 (11,5 mm), IE 7 (20,5 mm), dan IE 8 (17,8). Ketiga bakteri yang diidentifikasi secara molekuler menggunakan 16S rRNA dan memiliki kemiripan 99,81% dengan *Lysinibacillus fusiformis* strain N169 (IE 6), kemiripan 100% dengan *Pseudomonas aeruginosa* strain PaLo22 (IE 7), dan kemiripan 100% terhadap *Bacillus cereus* strain Z2-R9 (IE 8). Dapat disimpulkan bahwa terdapat 8 isolat endofit yang berhasil diisolasi dengan berbagai keragaman makroskopik dan mikroskopiknya, Potensi daya hambat antibakteri terbesar dari 8 isolat terhadap bakteri patogen ada 3 isolat, yang masing-masing memiliki kemiripan dengan *Lysinibacillus fusiformis*, *Pseudomonas aeruginosa*, dan, *Bacillus cereus*.

Kata Kunci: Daun sirih, Bakteri endofit, Antibakteri, Gen 16S rRNA

ABSTRACT

Joshua Leonard Damanik, NIM 4202520003 (2024). Isolation and Identification of Endophyte Bacteria In Betel Leaves (*Piper Betle* L.) and Their Potential as Antibacterial

Betel leaves (*Piper betle* L.) are known to contain various secondary metabolites that have antibacterial properties, and are one of the plants that can be used as a source of endophytic bacteria. Endophytic bacteria themselves are known to produce the same secondary metabolites as the host plant, making them effective against pathogenic bacteria. Identification of bacteria was carried out using the 16S rRNA gene. The purpose of this study was to identify the microscopic and macroscopic diversity of endophytic bacteria found in betel leaves, to determine the potential of endophytic bacteria in betel leaves (*Piper betle* L.) as antibacterials against pathogenic bacteria *Escherichia coli* and *Staphylococcus aureus* bacteria, and to identify endophytic bacterial species that were successfully isolated from betel leaves (*Piper betle* L.) that have antibacterial properties. The betel leaves taken are old leaves. Antibacterial activity using the disc diffusion method. The isolation results showed that there were 8 isolates of endophytic bacteria with various macroscopic and microscopic characteristics. Testing of antibacterial activity against the pathogenic bacteria *Escherichia coli* ATCC 25922 and *Staphylococcus aureus* ATCC 25923 showed that 3 isolates of endophytic bacteria had the most potential to inhibit the test bacteria, namely IE 6 (11.5 mm), IE 7 (20.5 mm), and IE 8 (17.8). The three bacteria were identified molecularly using 16S rRNA and had 99.81% similarity to *Lysinibacillus fusiformis* strain N169 (IE 6), 100% similarity to *Pseudomonas aeruginosa* strain PaLo22 (IE 7), and 100% similarity to *Bacillus cereus* strain Z2-R9 (IE 8). It can be concluded that there were 8 endophyte isolates that were successfully isolated with various macroscopic and microscopic variations. The greatest potential antibacterial inhibitory power of the 8 isolates against pathogenic bacteria was 3 isolates, each of which had similarities to *Lysinibacillus fusiformis*, *Pseudomonas aeruginosa*, and *Bacillus cereus*.

Key words: Betel leaf, Endophytic bacteria, Antibacterial, Gen 16S rRNA

