

KERAGAMAN BAKTERI ENDOFIT DAUN *Vetiveria zizanioides* (WILD TYPE) DAN POTENSINYA SEBAGAI ANTIBAKTERI

ABSTRAK

Telah dilakukan penelitian mengenai karakterisasi dan identifikasi molekuler bakteri endofit daun *Vetiveria zizanioides* (*wild type*). Tujuan dari penelitian ini adalah untuk mengkarakterisasi dan mengidentifikasi morfologi bakteri endofit daun *V. zizanioides* (*wild type*). Pengamatan karakteristik bakteri endofit *V. zizanioides* (*wild type*) dilakukan dari sisi morfologi, bentuk sel dan jenis Gram, uji aktivitas antibakteri, dan uji aktivitas biokimia yang meliputi uji hidrolisis pati, hidrolisis lipid, hidrolisis kasein, hidrolisis gelatin, fermentasi karbohidrat, uji katalase, uji produksi H₂S, uji motilitas, dan uji IMViC (uji indol, uji methyl red, uji Voges-Proskauer, dan uji sitrat). Penelitian dilanjutkan dengan melakukan identifikasi molekuler pada tiga isolat yang memiliki kemampuan menghambat pertumbuhan *Escherichia coli* dan *Pseudomonas aeruginosa* serta dua isolat yang menghambat pertumbuhan *Staphylococcus aureus*. Identifikasi dilakukan dengan menggunakan analisis sikuen parsial gen *16S rRNA* yang diamplifikasi menggunakan primer 63F dan 1387R. Analisis bioinformatik sikuen parsial gen *16S rRNA* dilakukan dengan menggunakan program BLASTN pada situs GeneBank. Hasil penelitian ini diperoleh 18 isolat yang memiliki karakteristik morfologi yang beragam. Hasil pewarnaan Gram menunjukkan seluruh isolat berbentuk basil dengan 16 isolat bakteri Gram positif dan dua isolat bakteri Gram negatif. Pengujian aktivitas biokimia memperlihatkan hasil yang berbeda dari setiap bakteri. Berdasarkan hasil uji aktivitas antibakteri, isolat VD3, VD4, dan VD8 memiliki kemampuan menghambat pertumbuhan *E. coli* dan *P. aeruginosa* serta isolat VD13 dan VD14 menghambat pertumbuhan *S. aureus*. Hasil analisis bioinformatik menunjukkan bahwa isolat VD3 merupakan spesies *Paenibacillus* sp. dengan identitas kemiripan 97%, isolat VD4 merupakan spesies *Bacillus methylotrophicus* dengan identitas kemiripan 97%, isolat VD8 merupakan spesies *Bacillus velezensis* dengan identitas kemiripan 99%, isolat VD13 merupakan spesies *Bacillus thuringiensis* dengan identitas kemiripan 99%, dan isolat VD14 merupakan spesies *Bacillus cereus* dengan identitas kemiripan 97% .

Kata kunci: *Vetiveria zizanioides*, bakteri endofit, antibakteri.

DIVERSITY OF *Vetiveria zizanioides* (WILD TYPE) LEAF ENDOPHYTIC BACTERIA AND THEIR POTENTIAL AS ANTIBACTERIAL

ABSTRACT

The study of characterization and molecular identification of *Vetiveria zizanioides* (wild type) leaf endophytic bacteria had been done. The purpose of this study was to characterize and identify the morphology of *V. zizanioides* (wild type) leaf endophytic bacteria. Observations characteristics of endophytic bacteria *V. zizanioides* (wild-type) was conducted in terms of morphology, cell shape and type of Gram, antibacterial activity test, and the test of biochemical activities that include starch hydrolysis test, lipid hydrolysis, casein hydrolysis, gelatin hydrolysis, fermentation of carbohydrates, catalase test, H₂S production test, motility test, and IMViC test (indole test, methyl red test, Voges-Proskauer test, and citrate test). Research was continued to perform molecular identification of the three isolates that have the ability to inhibit the growth of *Escherichia coli* and *Pseudomonas aeruginosa* and also two isolates that inhibit the growth of *Staphylococcus aureus*. Identification was done by using partial sequence analysis of 16S rRNA genes which were amplified using 63F and 1387R primers. Bioinformatics analysis 16S rRNA gene partial sequences was done by using program BLASTN on GeneBank site. This study obtained 18 isolates which have different morphological characteristics. Gram staining results showed that all isolates are bacilli-shaped bacteria with 16 Gram-positive isolates and two Gram-negative isolates. Biochemical activity test showed different results from each isolates. Based on the test results of antibacterial activity, isolates VD3, VD4, and VD8 has the ability to inhibit the growth of both *E. coli* and *P. aeruginosa* and also isolates VD13 and VD14 has the ability to inhibit the growth of *S. aureus*. The results of bioinformatics analysis showed that isolate VD3 is *Paenibacillus* sp. with 97% identity similarity, isolate VD4 is *Bacillus methylotrophicus* with 97% identity similarity, isolate VD8 is *Bacillus velezensis* with 99% identity similarity, isolate VD13 is *Bacillus thuringiensis* with 99% identity similarity, and isolate VD14 is *Bacillus cereus* with 97% identity similarity.

Keywords: *Vetiveria zizanioides*, endophytic bacteria, antibacterial.