

Intisari

Bakteri endofit yang resistan terhadap tembaga dari tanaman air diperlukan untuk meningkatkan proses fitoremediasi di lingkungan perairan yang tercemar tembaga. Penelitian ini bertujuan untuk mengisolasi dan mengidentifikasi bakteri endofit dari *Lemna perpusilla* yang resistan terhadap logam tembaga divalen (Cu^{2+}). Isolasi bakteri endofit dilakukan dengan menggunakan medium *Tryptic Soy Agar* (TSA), dilanjutkan dengan seleksi kemampuan pertumbuhan isolat di medium minimal, setelah itu dilakukan analisis *Amplified Ribosomal DNA Restriction Analysis* (ARDRA) menggunakan enzim restriksi *AluI* dan *HaeIII* untuk mengelompokkan variasi sekuens gen 16S rRNA, serta dilakukan uji inti berupa uji resistansi isolat bakteri terhadap Cu^{2+} dengan konsentrasi 0 ppm, 20 ppm, 40 ppm, 60 ppm, dan 80 ppm. Isolat bakteri yang telah diketahui kemampuan resistansinya terhadap Cu^{2+} diambil beberapa perwakilan untuk diidentifikasi secara molekuler melalui penentuan urutan basa DNA gen penyandi 16S rRNA dan identifikasi biokimia. Hasil yang didapatkan menunjukkan bahwa terdapat 33 isolat bakteri endofit yang berhasil diisolasi, 16 di antaranya mampu tumbuh di medium minimal, dan dari 16 isolat tersebut terdapat tiga pengelompokan pola pemotongan ARDRA. Sebanyak 6 bakteri yang resistan terhadap Cu^{2+} kemudian diambil sebagai perwakilan untuk diidentifikasi secara molekuler dan biokimia. Melalui hasil identifikasi molekuler dan biokimia, dua bakteri diketahui memiliki kekerabatan paling dekat dengan *Acinetobacter baumannii*, dua bakteri memiliki kekerabatan paling dekat dengan *Peribacillus simplex*, dan dua bakteri memiliki kekerabatan paling dekat dengan *Rhizobium straminoryzae*. Kesimpulan yang didapatkan dari hasil penelitian ini, yaitu genus *Acinetobacter*, *Peribacillus*, dan *Rhizobium* merupakan bakteri yang dominan dari *Lemna perpusilla* yang resistan terhadap Cu^{2+} .

Kata kunci: bakteri endofit, *Lemna perpusilla*, resistansi, tembaga divalen, ARDRA.

Abstract

Copper-resistant endophytic bacteria from aquatic plants are needed to improve the phytoremediation process in copper-contaminated aquatic environments. The aim of this study was to isolate and identify the endophytic bacteria from *Lemna perpusilla* which are resistant to divalent copper (Cu^{2+}). Isolation of endophytic bacteria was carried out by using Tryptic Soy Agar (TSA) medium, followed by selection of the isolate's growth ability in minimal medium, after that an Amplified Ribosomal DNA Restriction Analysis (ARDRA) using the restriction enzymes *AluI* and *HaeIII* were performed to classify variations of the 16S rRNA gene sequence, and also a core test was carried out with a resistance test of bacterial isolates to Cu^{2+} in concentrations of 0 ppm, 20 ppm, 40 ppm, 60 ppm, and 80 ppm. Bacterial isolates with known their resistance to Cu^{2+} were taken several representatives to be identified molecularly by determining the DNA base sequence of the 16S rRNA encoding gene and biochemical identification. Thirty tree endophytic bacteria have been isolated, 16 of them were able to grow in minimal medium, and from the 16 isolates there were three groupings of ARDRA cutting patterns. Six bacteria that were resistant to Cu^{2+} were then taken as representatives to be identified molecularly and biochemically. Through the results of molecular and biochemical identification, two bacteria are known to have the closest relationship with *Acinetobacter baumannii*, two bacteria have the closest relationship with *Peribacillus simplex*, and two bacteria have the closest relationship with *Rhizobium straminoryzae*. The conclusion obtained from the results of the study, the genus *Acinetobacter*, *Peribacillus*, and *Rhizobium* were the dominant bacteria from *Lemna perpusilla* that were resistant to Cu^{2+} .

Key words: endophytic bacteria, *Lemna perpusilla*, resistance, divalent copper, ARDRA.