

ABSTRAK

Sonata Simamora, NIM 4172220013 (2017). Isolasi dan Seleksi *Plant Growth Promoting Rhizobacteria* pada Tanaman Padi (*Oryza sativa* L.) Organik dan Anorganik.

Penggunaan pestisida dan pupuk kimia saat ini menjadi andalan para petani menjadi penyebab habisnya bahan organik tanah, hal tersebut menyebabkan populasi rizobakteri pada rizosfer tanaman mengalami tekanan dan akhirnya berkurang, sementara itu rizobakteri memiliki potensi sebagai pemacu pertumbuhan tanaman. Dalam sistem pertanian organik dapat memperbaiki sifat fisik, kimia, dan biologi tanah, sehingga rizobakteri pada rizosfer dapat merombak bahan organik yang akan menjadi sumber makanan utama bagi mikroba tanah. Penelitian ini bertujuan untuk mengetahui jenis rizobakteri dan seleksi bakteri yang termasuk *Plant Growth Promoting Rhizobacteria* yang diisolasi dari sampel tanaman padi (*Oryza sativa* L.) organik dan anorganik. Jenis penelitian ini deskriptif eksploratif dengan 2 kali pengulangan dan dilaksanakan pada bulan Januari-April 2021 di Laboratorium Kesehatan Daerah Medan. Penelitian ini dilakukan dengan beberapa tahap karakterisasi yaitu karakterisasi secara makroskopis, karakterisasi mikroskopis uji biokimia dan tahap seleksi meliputi uji fitohormon *Indole Acetic Acid* (IAA), bakteri penambat nitrogen dan pelarut fosfat. Hasil isolasi sampel rizosfer organik pada kepadatan 23×10^7 - $33,3 \times 10^7$ CFU g⁻¹ dan untuk rizosfer anorganik $2,5 \times 10^7$ - $11,4 \times 10^7$ CFU g⁻¹. Hasil identifikasi 13 isolat rizobakteri diperoleh 2 genus yang berbeda yaitu pada sampel rizosfer organik diperoleh 4 isolat genus *Bacillus* dan 5 isolat genus *Pseudomonas*, sampel rizosfer anorganik diperoleh 3 isolat genus *Bacillus* dan 1 isolat genus *Pseudomonas*. Isolat rizobakteri pada rizosfer tanaman padi yang memiliki kemampuan sebagai PGPR (penghasil fitohormon IAA, penambat nitrogen, dan pelarut fosfat) hanya ditemui pada sampel rizosfer organik, yakni: *Bacillus* sp. RPO.3 dan *Pseudomonas* sp. RPO.8.

Kata kunci: Karakterisasi, Seleksi PGPR, Rizobakteri, Rizosfer, Tanaman Padi (*Oryza sativa* L.).

ABSTRACT

Sonata Simamora, NIM 4172220013 (2017). Isolation and Selection of Plant Growth Promoting Rhizobacteria in Organic and Inorganic Rice (*Oryza sativa* L.).

The use of pesticides and chemical fertilizers is currently the mainstay of farmers to cause the depletion of soil organic matter, this causes the rhizobacteria population in the plant rhizosphere to experience pressure and eventually decreases, meanwhile rhizobacteria have the potential to promote plant growth. In organic farming systems, it can improve the physical, chemical, and biological properties of the soil, so that the rhizobacteria in the rhizosphere can remodel organic matter which will become the main food source for soil microbes. This study was aimed to determine the type of rhizobacteria and bacterial selection including Plant Growth Promoting Rhizobacteria isolated from organic and inorganic rice (*Oryza sativa* L.) samples. This type of research is descriptive exploratory with 2 repetitions and was carried out in January-April 2021 at the Medan Regional Health Laboratory. This research was carried out with several stages of characterization, namely macroscopic characterization, microscopic characterization of biochemical tests and selection stages including Indole Acetic Acid (IAA) phytohormonal tests, nitrogen fixing bacteria and phosphate solubilizing. The results of the isolation of organic rhizosphere samples at a density of 23×10^7 - 33.3×10^7 CFU g⁻¹ and for inorganic rhizosphere 2.5×10^7 - 11.4×10^7 CFU g⁻¹. The results of the identification of 13 isolates of rhizobacteria obtained 2 different genera, namely the organic rhizosphere sample obtained 4 isolates of the genus *Bacillus* and 5 isolates of the genus *Pseudomonas*, the inorganic rhizosphere sample obtained 3 isolates of the genus *Bacillus* and 1 isolate of the genus *Pseudomonas*. Rhizobacteria isolates in the rhizosphere of rice plants that have the ability as PGPR (producing phytohormones IAA, nitrogen fixing, and phosphate solubilizing) were only found in organic rhizosphere samples, namely: *Bacillus* sp. RPO.3 and *Pseudomonas* sp. RPO.8.

Keywords: Characterization, Selection of PGPR, Rhizobacteria, Rhizosphere, Rice Plants (*Oryza sativa* L.).