ABSTRACT

Adina Rahma Qorina. 24020121130068. **Potential of Root Associated Bacteria from Black Soybean Roots (*Glycine max* (L.) Merr.) as Biocontrol of Phytopathogen *Ralstonia solanacearum* and Plant Growth Promoting Rhizobacteria (PGPR)**. Under the guidance of Anto Budiharjo and Agung Suprihadi.

Root Associated Bacteria (RAB) are a bacterial community associated with roots. Root Associated Bacteria are very diverse, including rhizosphere, rhizoplane, and endophytic bacteria. These bacteria can be isolated from the roots of legume plants such as black soybeans (*Glycine max* (L.) Merr.). These bacteria are known to have antibacterial potential against plant pathogens and plant growth promoters that have not been widely explored. This study aims to explore the diversity of Root Associated Bacteria from black soybean roots (*Glycine max* (L.) Merr.) through isolation and characterization, antibacterial tests against plant pathogens, PGPR potential tests, and molecular identification. Bacterial isolation was carried out using the serial dilution method and the direct tissue cultivation method, followed by macroscopic and microscopic characterization of bacterial morphology. Antibacterial tests against the phytopathogen *Ralstonia solanacearum* were carried out using the paper disc diffusion method (Kirby-Bauer). Bacterial isolates that had the best ability in the antibacterial test were followed by qualitative Plant Growth Pomoting Rhizobacteria (PGPR) potential tests. The PGPR test consists of IAA production, phosphate solubilization, and nitrogen fixation. Bacterial isolates were identified molecularly based on the 16S rRNA gene. The results of bacterial isolation were 16 bacterial isolates (GM1-GM16) which included 11 Gram-negative bacteria and 5 Gram-positive bacteria. The characterization results of the bacterial isolates were that the bacillus form (12 isolates) dominated over the coccus form (4 isolates). The best antibacterial test result was isolate GM1 because it had the largest inhibition zone diameter, which was 12.5 mm, so isolate GM1 was selected for the PGPR test and molecular identification. The PGPR test results of isolate GM1 were positive in the IAA production test, phosphate solubilization, and nitrogen fixation so that isolate GM1 has the potential to be a PGPR. The results of molecular identification based on the 16S rRNA gene showed that isolate GM1 was *Pseudomonas monteilii* because isolate GM1 had the closest kinship relationship to *Pseudomonas monteilii* strain CIP with an identity percentage of 99.23%.

Keywords: *root, Glycine max, PGPR, Pseudomonas monteilii*