

## ABSTRACT

Afina Rista Layalia, 24020121120007. **Potential of Root Associated Rhizobacteria from Red Beans (*Phaseolus vulgaris*) Plant Roots as Biocontrol Against *Ralstonia solanacearum* and PGPR (Plant Growth Promoting Rhizobacteria).** Under the guidance of Anto Budiharjo and Wijanarka.

Root associated rhizobacteria are bacteria associated with plant cell roots, acting as antibacterial agents and Plant Growth Promoting Rhizobacteria (PGPR). Red beans (*Phaseolus vulgaris*) are widely cultivated by farmers. In Indonesia, the demand for red beans is very high, reaching 103,376 tons. *Ralstonia solanacearum* is a pathogen that causes bacterial wilt in plants. This study aims to test the antibacterial potential and PGPR ability of root associated rhizobacteria isolated from the roots of *Phaseolus vulgaris*. The research methods included testing antibacterial activity using the disk diffusion method on MHA media, where the formation of a clear zone indicated antibacterial activity. The ability of PGPR was tested through the production of Indole-3-Acetic Acid (IAA), nitrogen fixation, and phosphate solubilization. The isolates with the best ability to fight *Ralstonia solanacearum* and possess PGPR capabilities were identified using 16S rRNA gene sequencing. The results showed that isolate A5 had the best antibacterial activity against *R. solanacearum* with an average inhibition zone of 7.35 mm, which is classified as moderate. In addition, isolate A5 was also capable of producing IAA (Indole-3-Acetic Acid) and dissolving phosphate. Based on 16S rRNA gene analysis, isolate A5 was identified as *Pseudomonas aeruginosa* with a Percent Identity of 99.56%. This isolate is a Gram-negative bacillus-shaped bacterium with macroscopic morphology consisting of a circular shape, undulate wavy margins, flat elevation, dry texture, transparent white color, and the ability to produce green pigment. This study concluded that *Pseudomonas aeruginosa* from *Phaseolus vulgaris* roots has the potential to be used as a biological control agent for *Ralstonia solanacearum* as well as a plant growth-promoting agent.

*Keywords: Root-Associated Bacteria, Phaseolus vulgaris, Ralstonia solanacearum, Plant Growth-Promoting Bacteria, Pseudomonas aeruginosa*