

## ABSTRACT

Sumaya Azizah. 24020121140194. **Exploration of Rhizospheric Fungi of Red Kidney Bean (*Phaseolus vulgaris* L.) and Their Potential as Antagonistic Agents against *Fusarium oxysporum* and Plant Growth Promoting Fungi.** Supervised by Hermin Pancasakti Kusumaningrum and Anto Budiharjo.

Red beans (*Phaseolus vulgaris* L.) are an important food commodity with high economic value, yet they are susceptible to Fusarium wilt caused by *Fusarium oxysporum*. In addition to their high nutritional value, these plants also contribute to soil fertility through their association with rhizospheric microbes. This study aims to explore rhizosphere fungi associated with red beans through isolation and morphological characterization, antagonistic assays, Plant Growth Promoting Fungi (PGPF) tests, and to evaluate their potential as antagonistic agents against *Fusarium oxysporum* as well as their role as PGPF. Rhizosphere soil samples from red bean plants were collected from agricultural land in Grabag, Magelang, Central Java, and isolated using Potato Dextrose Agar (PDA) medium. Four fungal isolates with distinct morphological characteristics (KM1–KM4) were obtained. In vitro antagonistic testing using the dual culture assay showed that isolate KM2 was able to inhibit the growth of *F. oxysporum* at a moderate level through an antibiosis mechanism. PGPF assays demonstrated that this isolate could solubilize phosphate and produce Indole Acetic Acid (IAA). Molecular identification using ITS4 and ITS5 primers confirmed that isolate KM2 had the closest genetic relationship to *Scedosporium dehoogii* with 98% similarity. Based on these findings, *S. dehoogii* has strong potential to be developed as a biological control agent against *F. oxysporum* as well as a PGPF through its role in phosphate solubilization and phytohormone production.

*Keywords: Red bean, rhizosphere, Plant Growth Promoting Fungi, molecular identification*