

## ABSTRACT

Zefanya Juaneta Dohardo Siahaan, 24020121140133. **Morphological, Molecular Characterization, and Antagonistic Testing of Hypovirulent *Fusarium* spp. Isolates as Biocontrol Agents for Foc TR4 in Asymptomatic Bananas on Enggano Island.** Under the supervision of Arina Tri Lunggani and Rini Riffiani.

One of the regions in Indonesia where banana plants are abundant is Enggano Island, Bengkulu. *Fusarium* wilt disease is one of the main diseases affecting banana plants and is a major factor in the decline of banana production in Indonesia. This study is descriptive and quantitative in nature, aiming to explore the diversity of *Fusarium* strains associated with asymptomatic banana plants on Enggano Island, as well as to obtain hypovirulent isolates with potential as biocontrol agents against *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4 (Foc TR4). The isolates obtained will be characterized morphologically to be grouped into *Fusarium* species complexes, then tested for hypovirulence and antagonism. Hypovirulent isolates with inhibitory potential will undergo molecular testing. The isolation yielded 34 isolates, consisting of 16 isolates belonging to the *Fusarium oxysporum* species complex (FOSC), 1 isolate belonging to the *Fusarium fujikuroi* species complex (FFSC), 2 isolates belonging to the *Fusarium incarnatum–equiseti* species complex (FIESC), and 15 isolates belonging to *Neocosmospora* spp. (previously known as the *Fusarium solani* species complex, FSSC). Hypovirulence tests showed that there were three hypovirulent isolates. The three isolates were then tested antagonistically against Foc TR4 and identified molecularly using PCR and TEF1- $\alpha$  and RPB2 gene sequencing. The molecular identification results showed that: (i) isolate BE 05 AK was confirmed as *Neocosmospora falciformis* (ii) isolate BE 023 PSEU was identified as *Fusarium sacchari* (iii) isolate BE 024A PSEU was identified as *Fusarium hainanense*. The results of in-vitro antagonism tests showed that the three hypovirulent isolates were able to inhibit the growth of Foc TR4 with inhibition percentages of 48%, 45%, and 21%, respectively. The identified control mechanism was antibiosis, indicating that the isolates *N. falciformis*, *F. sacchari*, and *F. hainanense* have moderate potential to be developed as biological control agents in controlling *Fusarium* wilt disease in bananas, especially that caused by Foc TR4.

**Keywords:** *Biokontrol, fusarium, neocosmospora, antagonism test, hypovirulence test*