

ABSTRACT

CHARACTERIZATION, IDENTIFICATION, AND EVALUATION OF THE POTENTIAL OF SUGARCANE ENDOPHYTIC FUNGI AS ENTOMOPATHOGENS OF THE SUGARCANE STEM BORER

By

QANNITHA SHAFFA JULIEBE SUBROTO

*Biological control using endophytic fungi is one of the effective control options for suppressing the population of *Chilo auricilius*. To date, there have been no reports of endophytic fungi from sugarcane plants acting as entomopathogens of *C. auricilius* in Lampung. This study aimed to determine the characteristics and identity of endophytic fungal isolates from sugarcane plants and their pathogenicity levels against *C. auricilius*. The research was conducted from August to December 2024 at the Pest Laboratory of PT Gunung Madu Plantation (GMP) and the Biotechnology Laboratory, Faculty of Agriculture, University of Lampung. The results showed that the highest colony growth, sporulation, and viability were produced by isolate G3D1.1, with a spore density of 15.5×10^7 and a viability rate of 96.41%. The highest pathogenicity against *C. auricilius* was exhibited by isolate G3D2.5 (66.67%), followed by G3D3.2 (35%) and G3D1.1 (18.33%). The Plant Growth-Promoting Fungi (PGPF) test results indicated that isolate G3D1.1 demonstrated the ability to promote plant growth, whereas isolates G3D2.5 and G3D3.2 did not. These findings suggested that all three isolates had significant potential as biological control agents, each with diverse mechanisms of action. Isolate G3D2.5 was recommended for field application as a biological control agent for sugarcane stem borers, while isolate G3D1.1 was recommended as a plant growth promoter for sugarcane. Based on molecular identification, isolates G3D1.1, G3D2.5, and G3D3.2 were identified as *Trichoderma asperellum*, *Beauveria bassiana*, and *Penicillium javanicum*, respectively.*

*Keywords: endophytic fungi, entomopathogen, *Chilo auricilius*, *Trichoderma asperellum*, *Beauveria bassiana**

ABSTRAK

KARAKTERISASI, IDENTIFIKASI, DAN UJI KEMAMPUAN JAMUR ENDOFIT TANAMAN TEBU SEBAGAI ENTOMOPATOGEN PENGGEREK BATANG TEBU

Oleh

QANNITHA SHAFFA JULIEBE SUBROTO

Pengendalian hayati menggunakan jamur endofit merupakan salah satu pilihan pengendalian yang baik untuk menekan populasi *Chilo auricilius*. Hingga saat ini belum ada laporan mengenai jamur endofit tanaman tebu yang berperan sebagai entomopatogen *C. auricilius* di Lampung. Penelitian ini bertujuan untuk mengetahui karakter dan identitas isolat jamur endofit tanaman tebu serta tingkat patogenisitasnya terhadap *C. auricilius*. Penelitian dilaksanakan dari Agustus sampai Desember 2024 di Laboratorium Hama, PT Gunung Madu Plantation (GMP) dan Laboratorium Bioteknologi, Fakultas Pertanian, Universitas Lampung. Hasil penelitian menunjukkan bahwa pertumbuhan koloni, sporulasi, dan viabilitas tertinggi dihasilkan oleh isolat G3D1.1 dengan kerapatan spora sebesar $15,5 \times 10^7$ dan viabilitas 96,41%. Hasil patogenisitas tertinggi (terhadap *C. auricilius*) dihasilkan oleh isolat G3D2.5 (66,67%), diikuti oleh isolat G3D3.2 (35%) dan isolat G3D1.1 (18,33%). Hasil uji PGPF menunjukkan bahwa isolat G3D1.1 merupakan isolat yang menunjukkan kemampuan sebagai PGPF, tetapi tidak untuk isolat G3D2.5 dan G3D3.2. Temuan ini menunjukkan ketiga isolat memiliki potensi besar sebagai agen pengendali hayati dengan mekanisme aksi yang beragam. Isolat G3D2.5 merupakan isolat yang direkomendasikan untuk diaplikasikan di lapangan sebagai agens pengendali hayati penggerek batang tebu. Isolat G3D1.1 merupakan isolat yang direkomendasikan sebagai pemacu pertumbuhan tanaman tebu. Berdasarkan hasil identifikasi molekuler, isolat G3D1.1, G3D2.5, dan G3D3.2 merupakan spesies *Trichoderma asperellum*, *Beauveria bassiana*, dan *Penicillium javanicum*.

Kata kunci: jamur endofit, entomopatogen, *Chilo auricilius*, *Trichoderma asperellum*, *Beauveria bassiana*