

ABSTRACT

EFFECTIVENESS TEST OF *Trichoderma asperellum* IN CONTROL OF ROOT KNOT NEMATODE (*Meloidogyne* spp.) IN VITRO

By

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Root knot nematodes (*Meloidogyne* spp.) are important pests that damage plant root systems and are difficult to control using conventional methods. The use of chemical nematicides risks environmental pollution, necessitating environmentally friendly control alternatives, one of which is the use of the biological agent *Trichoderma asperellum*. This study aimed to determine the effect of spore concentration and exposure duration of *T. asperellum* on the in vitro hatching of *Meloidogyne* spp. eggs. The study was conducted in the Plant Pest Science Laboratory and the Biotechnology Laboratory, Faculty of Agriculture, University of Lampung, from May to July 2025. The experiment used a completely randomized design (CRD). The first experiment tested five concentrations of spore suspension dilutions (10¹, 10², 10³, 10⁴, and the control), while the second experiment tested exposure durations (10, 15, 30, and 60 minutes). The results showed that a dilution of 10⁻³ (with a spore density of 2.7 x 10⁶ spores/mL) was able to reduce egg hatching with juvenile mortality of J2 NPA by 50.90%. Juvenile mortality increased with exposure time, namely 85.37% at 10 minutes and 99.83% at 60 minutes. The results of this study concluded that a spore density of 2.7 x 10⁶ spores/mL with a minimum exposure of 30-60 minutes effectively reduced the hatching rate of *Meloidogyne* spp. eggs and has the potential to be applied as a biological control agent for plant parasitic nematodes.

Keywords: Exposure duration, spore, *Meloidogyne* spp., biological control, *Trichoderma asperellum*

ABSTRAK

UJI EFEKTIVITAS *Trichoderma asperellum* DALAM PENGENDALIAN NEMATODA PURU AKAR (*Meloidogyne* spp.) SECARA *IN VITRO*

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Nematoda puru akar (*Meloidogyne* spp.) merupakan hama penting yang merusak sistem perakaran tanaman dan sulit dikendalikan dengan cara konvensional. Penggunaan nematisida kimia berisiko mencemari lingkungan, sehingga diperlukan alternatif pengendalian yang ramah lingkungan, salah satunya menggunakan agens hayati *Trichoderma asperellum*. Penelitian ini bertujuan untuk mengetahui pengaruh konsentrasi spora dan durasi paparan *T. asperellum* terhadap penetasan telur *Meloidogyne* spp. secara *in vitro*. Penelitian dilaksanakan di Laboratorium Ilmu Hama Tumbuhan dan Laboratorium Bioteknologi Fakultas Pertanian Universitas Lampung dari Mei–Juli 2025. Percobaan menggunakan rancangan acak lengkap (RAL). Percobaan pertama menguji lima konsentrasi suspensi spora pengenceran (10^{-1} , 10^{-2} , 10^{-3} , 10^{-5} , dan kontrol), sedangkan percobaan kedua menguji durasi paparan yaitu (10, 15, 30, dan 60 menit). Hasil penelitian menunjukkan pengenceran 10^{-2} (dengan kerapatan spora $2,7 \times 10^5$ spora/mL) mampu menurunkan penetasan telur dengan mortalitas juvenil J2 NPA sebesar 50,90%. Mortalitas juvenil meningkat seiring waktu paparan, yaitu 85,37% pada 10 menit dan 99,83% pada 60 menit. Hasil penelitian ini menyimpulkan, kerapatan spora $2,7 \times 10^5$ spora/mL dengan paparan minimal 30–60 menit efektif menurunkan tingkat penetasan telur *Meloidogyne* spp. dan berpotensi diaplikasikan sebagai agensia pengendali hayati nematoda parasit tumbuhan.

Kata kunci: Durasi paparan, konsentrasi spora, *Meloidogyne* spp., pengendalian hayati, *Trichoderma asperellum*.