

ABSTRAK

IDENTIFIKASI MOLEKULER DAN UJI EFEKTIVITAS FUNGSI MIKORIZA ARBUSKULAR INDIGENOS DENGAN BEBERAPA KONDISI MEDIA TANAM DALAM MENINGKATKAN PERTUMBUHAN BIBIT STEK LADA (*Piper nigrum* L.)

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Rendahnya produktivitas lada (*Piper nigrum* L.) di Lampung akibat manajemen pembibitan yang kurang optimal dapat diatasi melalui pemanfaatan Fungi Mikoriza Arbuskular (FMA) indigenos. Karena keberhasilan simbiosis bergantung pada spesifisitas isolat dan lingkungan tumbuh, penelitian ini bertujuan mengidentifikasi spesies FMA rizosfer secara molekuler serta menguji efektivitasnya pada berbagai media tanam (organik dan anorganik) guna memacu pertumbuhan bibit lada yang unggul.

Penelitian ini dilaksanakan dalam dua tahap yaitu identifikasi molekuler dan uji efektivitas FMA. Tahap pertama meliputi identifikasi molekuler lima jenis FMA dominan (SP1-SP5) dari rizosfer lada asal Lampung Barat. Tahap kedua merupakan uji efektivitas FMA indigenos pada bibit stek lada menggunakan Rancangan Acak Kelompok (RAK) dengan 6 perlakuan yaitu M0 (tanah saja), M1 (tanah + bahan organik), M2 (tanah + pupuk anorganik), M3 (tanah + FMA), M4 (tanah + bahan organik + FMA), M5 (tanah + pupuk anorganik + FMA) yang diulang sebanyak 5 kali. Data pengamatan meliputi variabel pertumbuhan vegetatif dan persentase kolonisasi akar, yang selanjutnya dianalisis menggunakan sidik ragam dan uji lanjut Beda Nyata Jujur (BNJ) pada taraf 5%.

Hasil identifikasi molekuler menunjukkan bahwa dari lima isolat (SP1–SP5) terdapat empat spesies FMA) berhasil diidentifikasi: *Archaeospora leptoticha* (sekarang *Ambispora leptoticha*) (SP1), *Acaulospora spinosa* (SP2), *Glomeromycotina* sp. (SP3 dan SP5), dan *Entrophospora colombiana* (SP4). Sementara itu, pada percobaan efektivitas FMA, perlakuan media tanah + bahan organik + FMA berhasil meningkatkan sebagian besar variabel pertumbuhan bibit stek lada jika dibandingkan dengan kontrol. Sementara itu, perlakuan media tanah + pupuk anorganik + FMA menunjukkan pertumbuhan yang terhambat dan tingkat kolonisasi FMA yang rendah.

Kata kunci: bahan organik, FMA, lada, media tanam, molekuler, pupuk anorganik

ABSTRACT

MOLECULAR IDENTIFICATION AND EFFECTIVENESS OF INDIGENOUS ARBUSCULAR MYCORRHIZAL FUNGI UNDER VARIOUS GROWTH MEDIA CONDITIONS IN ENHANCING THE GROWTH OF BLACK PEPPER (*Piper nigrum* L.) CUTTINGS

By

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The low productivity of black pepper (*Piper nigrum* L.) in Lampung, often caused by suboptimal nursery management, can be addressed through the utilization of indigenous Arbuscular Mycorrhizal Fungi (AMF). Given that symbiotic success depends on isolate specificity and the growing environment, this study aims to molecularly identify rhizosphere AMF species and evaluate their effectiveness in various planting media (organic and inorganic) to promote the growth of high-quality pepper seedlings. This research was conducted in two stages: molecular identification and an AMF effectiveness test. The first stage involved the molecular identification of five dominant AMF types (SP1–SP5) from the black pepper rhizosphere in West Lampung. The second stage tested the effectiveness of indigenous AMF on pepper cuttings using a Randomized Block Design (RBD) with six treatments: M0 (soil only), M1 (soil + organic matter), M2 (soil + inorganic fertilizer), M3 (soil + AMF), M4 (soil + organic matter + AMF), and M5 (soil + inorganic fertilizer + AMF), replicated five times. Observed data included vegetative growth variables and the percentage of root colonization, which were analyzed using Analysis of Variance (ANOVA) followed by Tukey's Honestly Significant Difference (HSD) test at the 5% level. Molecular identification results showed that among the five isolates (SP1–SP5), four AMF species were successfully identified: *Archaeospora leptoticha* (currently *Ambispora leptoticha*) (SP1), *Acaulospora spinosa* (SP2), *Glomeromycotina* sp. (SP3 and SP5), and *Entrophospora colombiana* (SP4). In the effectiveness experiment, the treatment of soil + organic matter + AMF significantly increased most vegetative growth variables in pepper cuttings compared to the control. Conversely, the treatment of soil + inorganic fertilizer + AMF resulted in inhibited growth and low rates of AMF colonization.

Keywords: organic matter, AMF, black pepper, growth media, molecular, inorganic fertilizer.