ABSTRAK

POTENSI MIKROORGANISME DALAM PRODUK PUPUK ORGANIK CAIR (POC) SEBAGAI ANTIFUNGI TERHADAP *Fusarium oxysporum*

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Fusarium oxysporum adalah patogen tular tanah penyebab penyakit layu pada berbagai tanaman. Hal ini mendorong pencarian alternatif ramah lingkungan, salah satunya melalui mikroorganisme dari Pupuk Organik Cair (POC). Penelitian sebelumnya menunjukkan bahwa bakteri dari POC tipe *Soluble Liquid* (SL) memiliki aktivitas antibakteri terhadap *Vibrio parahaemolyticus*, membuktikan potensi POC sebagai sumber senyawa bioaktif. Penelitian ini bertujuan mengisolasi dan mengkarakterisasi mikroorganisme dari POC serta menguji aktivitas antifungi terhadap *F. oxysporum*.

Isolat fungi diperoleh dari sampel produk pupuk cair tipe *Soluble Liquid* (SL) melalui metode pengenceran bertingkat pada media *Potato Dextrose Agar* (PDA), teridentifikasi sebagai genus *Aspergillus*. Selanjutnya, isolat dikultivasi menggunakan metode *Solid State Fermentation* (SSF) pada media beras dan ampas tebu, serta *Submerged Fermentation* (SmF) pada media *Potato Dextrose Broth* (PDB) kemudian metabolit sekunder diekstraksi menggunakan etil asetat.

Uji difusi agar menunjukkan bahwa ekstrak dari media PDB menghasilkan zona hambat terbesar. Pemisahan dan karakterisasi senyawa aktif dilakukan menggunakan Kromatografi Lapis Tipis (KLT), fraksinasi kromatografi kolom, *Fourier Transform Infrared Spectroscopy* (FTIR), *Liquid Chromatography Tandem Mass Spectrometry* (LC-MS/MS). Hasil analisis mengidentifikasi senyawa utama berupa turunan flavylium, yakni *6,7 Dihydroxy-5-methoxy-2-(4-methoxyphenyl)-4a,7-dihydrochromenium*, yang memiliki potensi sebagai agen antifungi. Temuan ini mengindikasikan bahwa POC mengandung mikroorganisme penghasil senyawa bioaktif yang berpotensi sebagai pengendali hayati patogen tanaman.

Kata kunci: *Aspergillus*, pupuk cair organik, antifungi, *Fusarium oxysporum*, flavylium.

ABSTRACT

THE POTENTIAL OF MICROORGANISMS IN LIQUID ORGANIC FERTILIZER (POC) AS ANTIFUNGAL AGENTS AGAINST *Fusarium oxysporum*

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Fusarium oxysporum is a soil-borne pathogen that causes wilt in various plants. This has prompted the search for environmentally friendly alternatives, one of which is through microorganisms from liquid organic fertilizers. Previous research has shown that bacteria from Soluble Liquid (SL) POC have antibacterial activity against *Vibrio parahaemolyticus*, demonstrating POC potential as a source of bioactive compounds. This study aims to isolate and characterize microorganisms from POC and test their antifungal activity against *F. oxysporum*. Fungal isolates were obtained from Soluble Liquid (SL) liquid fertilizer samples using a serial dilution method on Potato Dextrose Agar (PDA) media and identified as belonging to the genus *Aspergillus*. Subsequently, the isolates were cultivated using Solid State Fermentation (SSF) on rice and bagasse media, and Submerged Fermentation (SmF) on media Potato Dextrose Broth (PDB). Secondary metabolites were extracted using ethyl acetate. Agar diffusion tests showed that the extract from PDB media produced the largest inhibition zone. Separation and characterization of active compounds were carried out using Thin Layer Chromatography (TLC), column chromatography fractionation, Fourier Transform Infrared Spectroscopy (FTIR), Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS). The analysis results identified the main compound as a flavylium derivative, namely 6,7 Dihydroxy-5-methoxy-2-(4-methoxyphenyl)-4a,7-dihydrochromenium, which has potential as an antifungal agent. This finding indicates that POC contains microorganisms producing bioactive compounds that have the potential as a biological control of plant pathogens.

Keywords: *Aspergillus,* organic liquid fertilizer, antifungal*, Fusarium oxysporum,* flavylium.