

ABSTRAK

UJI VIABILITAS DAN AKTIVITAS ANTAGONIS JAMUR AGEN HAYATI DARI PRODUK BIOFUNGISIDA TERHADAP *Fusarium oxysporum* SECARA *IN VITRO* DAN *IN VIVO*

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Biofungisida berbahan aktif jamur agen hayati merupakan alternatif pengendalian penyakit tanaman yang ramah lingkungan sebagai pengganti fungisida sintetis. Biofungisida ini memanfaatkan jamur antagonis seperti *Trichoderma* sp. dan *Gliocladium* sp. yang mampu menghambat perkembangan patogen. Penelitian ini bertujuan untuk menguji viabilitas dan efektivitas jamur agen hayati dari produk biofungisida terhadap *F. oxysporum* secara *in vitro* dan *in vivo*. Penelitian dilakukan dalam empat tahapan, yaitu: (1) karakterisasi morfologi jamur agen hayati yang terkandung pada produk biofungisida di media PDA, (2) uji viabilitas jamur agen hayati pada produk biofungisida, (3) uji efektivitas jamur agen hayati pada produk biofungisida terhadap *F. oxysporum* secara *in vitro*, dan (4) uji efektivitas jamur agen hayati pada produk biofungisida terhadap *F. oxysporum* secara *in vivo*. Perlakuan dalam penelitian ini disusun dalam rancangan acak lengkap (RAL), dengan tiga ulangan. Hasil penelitian menunjukkan bahwa kedua jamur agen hayati memiliki viabilitas yang hampir mencapai 100%. *Trichoderma* sp. memiliki kerapatan spora sebesar $4,08 \times 10^8$ spora/mL dengan persentase perkecambahan 85,46%, sedangkan *Gliocladium* sp. sebesar $5,34 \times 10^8$ spora/mL dengan persentase perkecambahan 92,57%. Pada uji *in vitro*, metode *dual culture* *Gliocladium* sp. menunjukkan daya hambat lebih tinggi 35,16% terhadap *F. oxysporum* dibandingkan *Trichoderma* sp. 21,50%. Pada metode *double dish system* *Gliocladium* sp. menunjukkan daya hambat yang lebih tinggi 50,83% dibandingkan *Trichoderma* sp. 48,70% dalam menghambat *F. oxysporum*. Namun, pada pengujian *in vivo* tampak bahwa kedua biofungisida tidak berpengaruh nyata terhadap keterjadian dan keparahan penyakit.

Kata kunci: antagonis, biofungisida, *F. oxysporum*, *Gliocladium* sp., *Trichoderma* sp., viabilitas

ABSTRACT

Judul: VIABILITY TEST AND ANTAGONISTIC ACTIVITY OF BIOCONTROL FUNGI FROM BIOFUNGICIDE PRODUCTS AGAINST *Fusarium oxysporum* IN VITRO AND IN VIVO

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Biofungicides containing biocontrol fungi are environmentally friendly alternatives to synthetic fungicides for managing plant diseases. These biofungicides utilize antagonistic fungi, such as *Trichoderma* sp. and *Gliocladium* sp., to suppress the growth of plant pathogens. This study aimed to evaluate the viability and antagonistic activity of biocontrol fungi from commercial biofungicide products against *Fusarium oxysporum* under in vitro and in vivo conditions. The study consisted of four stages: (1) morphological characterization of biocontrol fungi on Potato Dextrose Agar (PDA), (2) viability testing, (3) evaluation of antagonistic activity against *F. oxysporum* in vitro, and (4) evaluation of effectiveness against *F.*

oxysporum in vivo. The experiment was arranged in a Completely Randomized Design (CRD) with three replications. Both biocontrol fungi exhibited viability close to 100%. *Trichoderma* sp. had a spore density of $4,08 \times 10^8$ spores mL with 85,46% germination, whereas *Gliocladium* sp. had a spore density of 5.34×10^8 spores mL with 92,57% germination. In the in vitro assay, *Gliocladium* sp. exhibited a higher inhibition rate against *F. oxysporum* than *Trichoderma* sp. in the dual culture method, with inhibition percentages of 35,16% and 21,50%, respectively. Similarly, in the double dish system method, *Gliocladium* sp. showed a slightly higher inhibition rate 50,83% than *Trichoderma* sp. 48,70% in suppressing the growth of *F. oxysporum*. However, under in vivo conditions, neither biofungicide significantly affected disease incidence or disease severity.

Keywords: antagonism, biofungicide, *Fusarium oxysporum*, *Gliocladium* sp., *Trichoderma* sp., viability.