

Isolasi, Identifikasi, Skrining dan Penghambatan Kapang Rizosfer terhadap *Fusarium oxysporum* f.sp. *lycopersici* = Isolation, identification, screening and inhibition rizhosphere mould against *Fusarium oxysporum* f.sp *lycopersici*

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Abstrak

ABSTRAK

Kapang rizosfer mempunyai kemampuan menghambat *Fusarium oxysporum* f.sp. *lycopersici* (Sacc.) W.C. Snyder & H.N. Hans. penyebab penyakit layu pada tanaman tomat (*Lycopersicon esculentum* Mill.). Kapang rizosfer diisolasi dari daerah perakaran tanaman tomat di lahan konvensional Desa Cikahuripan dan Sukamulya, Sukabumi. Tujuh belas spesies yang antagonis terhadap *F. oxysporum* f.sp. *lycopersici* telah diidentifikasi dari 47 isolat yang diisolasi dan 2 isolat koleksi LIPI MC. Mekanisme antagonis untuk mengendalikan patogen terlihat beragam dari tiap spesies kapang rizosfer. Kompetisi dengan kapang patogen terlihat pada *Trichoderma* sp. dan *Mucor* sp. Semua isolat kapang rizosfer memproduksi agen antifungi volatil bukan HCN dan tidak dapat memproduksi enzim kitinase. Kapang rizosfer memproduksi agen antifungi non-volatil iturin yaitu *Aspergillus fumigatus* Fres., *Aspergillus niger* Van Tieghem, dan 2 isolat *Aspergillus* sp. Enzim protease diproduksi oleh *A. fumigatus*, *Aspergillus* sp., *Fusarium oxysporum* Schlecht, dan *Humicola fuscoatra* Traaen. *Aspergillus niger* dan *Penicillium* sp., merupakan kapang rizosfer yang memproduksi agen antifungi non-volatil dan volatil terhadap patogen. Baik pada suspensi konidia patogen yang disimpan 4° C dan tidak disimpan dalam lemari pendingin yang diberi agen antifungi non-volatil *Aspergillus niger* (1:1) memperlihatkan persentase hambatan pertumbuhan konidia patogen tertinggi masing-masing 77,97 % dan 76,08 % pada pengamatan jam ke-8. Agen antifungi non-volatil *Aspergillus niger* pada berbagai konsentrasi meningkatkan perkecambahan tomat masing-masing 4,17 % pada benih tomat yang diberi filtrat atau suspensi konidia patogen yang diinkubasi selama 30 menit. Sedangkan waktu inkubasi 60 menit, agen antifungi non-volatil *A. niger* pada berbagai konsentrasi meningkatkan perkecambahan tomat 5,25 % ?21,04 % pada benih tomat yang diberi suspensi konidia patogen dan menurunkan perkecambahan tomat 6,38 % ?13,04 % pada benih tomat yang diberi filtrat patogen. Perpanjangan waktu inkubasi 30 menit menghambat selama 4 hari kolonisasi patogen pada tomat yang diberi campuran filtrat atau suspensi konidia patogen dan agen antifungi non-volatil *A. niger* pada berbagai konsentrasi. Agen antifungi volatil dari *Penicillium* sp. dapat menghambat perkecambahan konidia patogen sebesar 22,07 %.

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Abstract

Rhizosphere moulds have activities to reduce the growth of *Fusarium oxysporum* f.sp. *lycopersici* (Sacc.) W.C. Snyder & H.N. Hans, the causal pathogen of wilt disease of tomato (*Lycopersicon esculentum* Mill.) plant. Moulds were isolated from rhizosphere of tomato plants growing in the Villages of Cikahuripan and Sukamulya, Sukabumi. Seventeen species that have antagonistic effect to *F. oxysporum* f.sp. *lycopersici* were identified from 47 isolates isolated from rhizosphere of tomato plant and 2 isolates of LIPI MC collection. Antagonistic mechanism for control the pathogen seemed different from each species of the rhizosphere moulds. Competition with the pathogen was produced by *Trichoderma* sp. and *Mucor* sp. All isolates of the rhizosphere moulds produced non-HCN volatile antifungal agent and did not produced chitinase enzyme. Rhizosphere moulds that produced iturin non-volatile antifungal agent were *Aspergillus fumigatus* Fres., *Aspergillus niger* Van Tieghem, and 2 isolates of *Aspergillus* sp. Protease enzyme was produced by *A. fumigatus*, *Aspergillus* sp., *Fusarium oxysporum* Schlecht, and *Humicola fuscoatra* Traaen. *Aspergillus niger* and *Penicillium* sp. were rhizosphere moulds that produced non-volatile and volatile antifungal agents respectively against the pathogen. Both on the suspension of the pathogen conidia stored in 4° C and unstored in refrigerator that given non-volatile antifungal agent of *A. niger* (1 : 1) showed the highest percent inhibition of the pathogen conidia respectively 77.97 % and 76.08 % in observation to-8 hours. Non-volatile antifungal agent of *A. niger* at various concentrations increased the germination of tomato respectively at 4.17 % on tomato that given the filtrate or suspension of conidia of the patogen at 30 minutes incubation. While in the incubation time of 60 minutes, non-volatile antifungal agent of *A. niger* at various concentration increased the germination of tomato at 5.25 % and 21.04 % on tomato that given suspension of conidia of the pathogen and decreased the germination of tomato at 6.38 % and 13.04 % on tomato that given the pathogen filtrate. Extending of incubation time for 30 minutes 4 days delayed the colonization of the pathogen on tomato that given a mixture of the filtrate or the suspension of the pathogen conidia and non-volatile antifungal agent of *A. niger* at various concentrations. The volatile antifungal agent of *Penicillium* sp. decreased the germination of conidia of the patogen at 22.07 %.