

ABSTRAK

EFEKTIVITAS ASAP CAIR TEMPURUNG KELAPA TERHADAP PENYAKIT LAYU FUSARIUM (*Fusarium sp.*) PADA TANAMAN CABAI MERAH (*Capsicum annuum*)

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Penyakit layu *Fusarium* pada cabai merah merupakan kendala utama budidaya dan memerlukan alternatif pengendalian yang efektif sekaligus ramah lingkungan. Penelitian ini bertujuan untuk mengevaluasi efektivitas asap cair tempurung kelapa sebagai fungisida nabati secara uji *in vitro* dan *in vivo*. Penelitian dilaksanakan Februari hingga Juni 2025 di Laboratorium Mikrobiologi dan lahan percobaan Fakultas Pertanian Universitas Siliwangi, Tasikmalaya. Pada *in vitro* menggunakan Rancangan Acak Lengkap diuji perlakuan konsentrasi: 0%, 0,2%, 0,4%, 0,8%, 1,6%, dan 3,2% dengan empat ulangan. Sedangkan pada *in vivo* diuji perlakuan konsentrasi 0%, 0,8%, 1,6% (taraf terbaik dari *in vitro*), 3,2% dengan enam ulangan menggunakan Rancangan Acak Kelompok (RAK). Hasil *in vitro* menunjukkan perlakuan konsentrasi 1,6% dan 3,2% mampu menekan pertumbuhan *Fusarium sp.* 100% konsisten pada 3 sampai 7 hari setelah inkubasi (HSI). Sementara perlakuan 0,8% hanya efektif awal 100% pada 3 HSI, lalu menurun pada 5 hingga 7 HSI. Hal ini menandakan bahwa, efeknya lebih fungistatik pada konsentrasi tersebut. Pada *in vivo*, perlakuan konsentrasi asap cair efektif memperpanjang masa inkubasi penyakit dari 14,46 hari pada kontrol menjadi 27,71 hari pada perlakuan 3,2%. Insidensi penyakit menurun dari 79,17% pada kontrol menjadi 4,17% pada perlakuan 3,2%. Intensitas penyakit pada 4 minggu setelah tanam (MST) menurun dari 66,27% pada kontrol menjadi 1,04% pada perlakuan 3,2%). Selain itu, perlakuan asap cair mampu menjaga tinggi tanaman cabai merah 26,97 cm pada perlakuan dibanding 12,59 cm pada kontrol; bobot basah akar 0,41 g pada kontrol dibanding 0,77 g pada perlakuan pada 4 MST. Dapat disimpulkan bahwa konsentrasi asap cair paling efektif adalah 1,6% pada uji *in vitro* dan 3,2% pada uji *in vivo*.

Kata kunci: asap cair tempurung kelapa, *Fusarium sp.*, layu fusarium, cabai merah, *in vitro*, *in vivo*.

ABSTRACT

EFFECTIVENESS OF COCONUT SHELL LIQUID SMOKE AGAINST FUSARIUM WILT DISEASE (*Fusarium* sp.) IN RED CHILI PLANT (*Capsicum annuum*)

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Fusarium wilt disease in red chili is a major constraint to cultivation and requires effective and environmentally friendly control alternatives. This study aimed to evaluate the effectiveness of coconut shell liquid smoke as a control agent for *Fusarium* sp. botanical fungicide through *in vitro* and *in vivo* tests. The study was conducted from February to June 2025 at the Microbiology Laboratory and experimental field of the Faculty of Agriculture, Siliwangi University, Tasikmalaya. *In vitro* using a Completely Randomized Design tested concentration treatments: 0%, 0.2%, 0.4%, 0.8%, 1.6%, and 3.2% with four replications. While *in vivo* tested concentration treatments of 0%, 0.8%, 1.6% (the best level from *in vitro*), 3.2% with six replications using a one-factor Randomized Block Design. *In vitro* results showed that the concentration treatments of 1.6% and 3.2% were able to suppress the growth of *Fusarium* sp. 100% consistently at 3 to 7 days after incubation (DSI). Meanwhile, the 0.8% treatment was only 100% effective initially at 3 DSI, then decreased at 5 to 7 DSI. This indicated that the effect was more fungistatic at that concentration. *In vivo*, the liquid smoke concentration treatment was effective in extending the disease incubation period from 14.46 days in the control to 27.71 days in the 3.2% treatment. Disease incidence decreased from 79.17% in the control to 4.17% in the 3.2% treatment. Disease intensity at 4 weeks after planting (WAP) decreased from 66.27% in the control to 1.04% in the 3.2% treatment. In addition, the liquid smoke treatment was able to maintain the height of red chili plants at 26.97 cm in the treatment compared to 12.59 cm in the control; root wet weight was 0.41 g in the control compared to 0.77 g in the treatment at 4 WAP. It may be concluded that the most effective concentration of coconut shell liquid smoke is 1.6% under *in vitro* conditions and 3.2% under *in vivo* conditions.

Keywords: coconut-shell liquid smoke, *Fusarium* sp., *Fusarium* wilt, red chili pepper, *in vitro*, *in vivo*.