

The inhibitory growth of *Fusarium oxysporum* fsp *lycopersici*, the causal agent of tomato fusarium wilt by essential oils in comparison of *Trichoderma* antagonist fungus

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ABSTRACT

Tomato Fusarium wilt caused by *Fusarium oxysporum* fsp *lycopersici* is an important disease to tropical regions and sandy soils of Iran. In this study, the effect of essential oils of *thyme*, *znan*, *fennel* and antagonist fungus of *Trichoderma harzianum* (Th-va-104) evaluated on the colony growth rate and growth inhibition in seven concentrations of 100-1000 ppm on PDA medium *in vitro*. The minimum percentage of inhibitory growth (Ec50) determined in essences of *thyme*, *znan* and *fennel* with 83.95, 62/685, and 59.97% respectively. *Trichoderma* showed the maximum inhibition of fungal mycelial growth of *F. oxysporum* fsp *lycopersici* as 78.53% followed by *thyme*. The effect of *thyme*, *Fennel* and *znan* essential oils at the concentration of 0.5 and 1, Fungicide (Iprodione+Carbendazim 52.5% WP) by concentrations of 1.5 and *Trichoderma* were evaluated in a completely randomized block design in greenhouse experiments. The essential oils were incorporated with potting soil with planting seedlings and *Trichoderma* fungus simultaneously in three days before transplanting. The percentage of disease severity index was assessed four weeks after inoculation. The results demonstrated that the disease index severity of *thyme* and *Trichoderma* by 2.6 and 2.06 respectively were placed in the closest disease index to check. The root area fresh and dry of *thyme* treatment (1.53, 2 gr), shoot area weight mean (13.19, 1.82) and the root area fresh and dry of *Trichoderma* (1.79, 0.27 gr) and shoot area weight mean (12.77, 1.63 gr), respectively were classified in the similar statistical groups with check.

Keywords: *Fusarium oxysporum* fsp *lycopersici*, essential oils, inhibition, *Trichoderma*, Tomato

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