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Role of *Ocimum basilicum* var. *thyrsiflora* (Thai Basil) Aqueous Extract Treated with Yeast Suspension in Enhancing Tomato Plant Resistance to *Fusarium oxysporum*

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Abstract

Tomato (*Solanum lycopersicum* L.) is the most popular vegetable crop in the world. It is grown almost all over the world. The biggest challenge in producing this crop is diseases caused by *Fusarium oxysporum*. In developing eco-friendly antifungal selective substances for controlling Fusarium diseases, the role of *Ocimum basilicum* var. *thyrsiflora* (Thai basil) aqueous extract against stimulated *F. oxysporum* was studied *in vivo*. The presoaked tomato seeds with yeast-treated and untreated *O. basilicum* var. *thyrsiflora* extracts were cultivated in *F. oxysporum*-infused soil. This part investigated the recovery role of these botanical extracts against the Fusarium infection on tomato plants, especially on its growth and biochemical traits. The research showed that the vegetative and floral growth parameters of plant decreased significantly due to *F. oxysporum* infection. The pigment contents, including carotenoids, β-carotene and lycopene in tomato fruits, were also passively affected by fungus infection at variance to phenolic and flavonoid content. Moreover, the *O. basilicum* var. *thyrsiflora* extract presoaked seeds remarkably enhanced the growth parameters of plant and the fruit pigment content. There was no significant difference in fungus infection recovery between infected plants that got yeast-treated extract and infected plants that got yeast-untreated extract. However, the pathogen inhibition percentage with extract from yeast-treated Thai basil plants *in vitro* increased. This research showed that utilizing *O. basilicum* var. *thyrsiflora* extract to control *F. oxysporum* infection of tomato plants was possible and available.

Keywords: eco-friendly antifungal; *Fusarium oxysporum*; *Ocimum basilicum* var. *thyrsiflora* extract; tomato

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INTRODUCTION

Tomato (*Solanum lycopersicum* L.) is the most widely consumed vegetable crop in Iraq due to the abundance and diversity of its daily consumption process. In 2019, tomato production in Iraq reached approximately 400 tons harvested from 20 ha, the total cultivated area in Iraq (FAO, 2021). Tomato production, especially in greenhouses, faces numerous challenges. Fungal infections are one of them. Fungal infections highly influence tomato production, especially those caused by *Fusarium* spp. (Fayyadh et al., 2017). *Fusarium oxysporum* f.sp. *lycopersici* is a fungus that specifically infects vascular tissues tomato plants and induces severe wilting leaves by blocking xylem transport and impeding water movement. The lack of water movement leads to plant death or a massive crop production reduction (Duniway, 1971). Most management

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