

# Efficacy of Biological Antagonists and Phyto Extracts Against *Fusarium oxysporum* in Okra Seeds †

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**Abstract:** Selected seed samples of okra (*Abelmoschus esculentus* L. Monech) carrying 35-45 % natural infection of *Fusarium oxysporum* were used. Seeds were categorized as symptomatic i.e., seeds with white crust or brown discoloration, and asymptomatic. Pure suspension culture of antagonists *Trichoderma harzianum* and *Gliocladium virens* were tried as seed treatments against the pathogen. *T. harzianum* and *G. virens* enhanced seed germination in treated asymptomatic (85%, 70%) and symptomatic (65%, 55%) seeds as compared to their control (60%, 42%). *T. harzianum* was highly antagonistic to *F. oxysporum* and showed significant percent disease control (75% and 63%) in asymptomatic and symptomatic treated seeds, respectively. Among the 11 plant leaf extracts used, *Eucalyptus rudis* (pure, 100% conc.) and *Azadirachta indica* (30% dil.) were found most efficacious and showed effective percent control of pathogen incidence and seedling infection (81.81%, 80%) and (81.81%, 75%) respectively. Treatments with *Eucalyptus rudis* and *Lawsonia rosea* enhanced significant seed germination (90%, 78.33%) concerning their control (50%), respectively. Pure extracts of rhizome/ bulb of ginger, turmeric, onion, and garlic were more effective in promoting seed germination than 30% dilution. However, the extract (both pure and diluted) of turmeric was found significantly superior over all other extracts in promoting seed germination and percent control of pathogen incidence. , The application of bio agents and plant extracts against seed-borne diseases, are cost-effective and eco-friendly alternatives.

**Keywords:** biological antagonists; *Fusarium oxysporum*; okra; plant leaf/rhizome/bulb extracts.

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## Conflicts of Interest

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