

Research Article

Evaluation of Fungicides, Bio-agents and Botanicals against Root Rot Disease of Pea (*Pisum sativum* L.) under *in vitro* and Field Conditions

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Abstract

Root rot of pea is assuming the status of major disease in mainly south-west zone of Haryana. The study was conducted to test the fungicides, bio-agents and botanicals for the management of this disease under *in vitro* and field conditions. The efficacy of seven fungicides at concentration of 25, 50 and 100 ppm was tested in inhibiting the growth of *Fusarium solani* f. sp. *pisi* using poisoned food technique. The carbendazim 50 WP was the most effective in inhibiting the mycelial growth of the test fungus (98.11%) followed by tebuconazole 25.9 EC (97.42%). Among four bio-agents, *Trichoderma harzianum* showed highest growth inhibition (74.68%) followed by *Trichoderma viride* (72.71%). Among botanicals, the neem leaves extract was the most effective in inhibiting the mycelial growth of the test pathogen (73.13%) followed by Bougainvillea (53.99%). Under field conditions, carbendazim 50 WP was found superior over other treatments with highest per cent disease reduction over control (83.23%) followed by tebuconazole 25.9 EC (73.46%). The maximum yield was recorded in plots treated with carbendazim 50 WP @ 2g kg⁻¹ of seed (23.14 q ha⁻¹) followed by tebuconazole 25.9 EC @ 2g kg⁻¹ of seed (22.39 q ha⁻¹). Among the bio-agents, seed treatment with *Trichoderma harzianum* exhibited the lowest disease incidence of 21.97 per cent and seed yield of 20.71 q ha⁻¹. Among the botanicals, seed treatment with neem leaves extract exhibited the lowest disease incidence of 34.89 per cent and seed yield of 18.84 q ha⁻¹. These results support an integrated approach combining chemical, biological, and botanical methods for effective and sustainable management of this disease.

Key words: Bioagents, botanicals, fungicides, *in vitro*, pea root rot

Citation: Singh R, Singh N, Chugh RK, Yadav NK and Kumar S. 2025. Evaluation of fungicides, bio-agents and botanicals against root rot disease of pea (*Pisum sativum* L.) under *in vitro* and field conditions. *J Mycol Pl Pathol* 55(3): 272-280 (<https://doi.org/10.59467/JMPP.2025.55.272>)