

Research Article

Integrated Organic Modules for the Sustainable Management of Root Rot of Ashwagandha (*Withania somnifera* (L) Dunal)

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Abstract

Ashwagandha [*Withania somnifera* (L) Dunal] is an important medicinal herbs, mainly prone to the pathogens causing root rot disease resulted significant economic yield losses. Disease management organic modules consisting of neem cake mixture, biocontrol agents *Trichoderma viride* and *Pseudomonas fluorescens* formulations were evaluated for sustainable management of root rot (*Rhizoctonia solani* and *Fusarium solani*) of Ashwagandha under sick plot and inoculation condition. Among the modules; soil application of neem cake mixture @ 100 g sqm⁻¹ enriched with *Trichoderma* + *Pseudomonas* talc based formulation each @ 2.0 per cent resulted maximum germination (89.0%), minimum plant mortality (13.8%), higher yield of dry roots (5.67 q ha⁻¹) and seeds (5.04 q ha⁻¹) with improved alkaloid content (0.41%) and root quality parameters like length and diameter (24.6 cm and 6.42 mm, respectively) compared to their individual application as well as over the untreated control. This was followed by soil application of neem cake mixture 100 g sqm⁻¹ + seed treatment with *Trichoderma* + *Pseudomonas* talc based formulation each @ 10 g kg⁻¹ that also significantly enhanced dry roots and seed yield, roots length (cm), and diameter (mm). Enumeration of rhizospheric population of *T. viride*, *P. fluorescens* and pathogens revealed that disease suppression was mainly due to reduction in population count of *R. solani* and *F. solani*.

Key words: Ashwagandha, *Fusarium solani*, neem cake mixture, organic modules, *Pseudomonas fluorescens*, *Rhizoctonia solani*, root rot, sustainable management, *Trichoderma viride*, *Withania somnifera*

Citation: Rawal Pokhar, Sharma Pinki, Singh RP and Joshi A. 2016. Integrated organic modules for the sustainable management of root rot of Ashwagandha (*Withania somnifera* (L) Dunal). *J Mycol Pl Pathol* 46 (3): 284-293.