



Volume 1 | Issue 1 | April, 2021

www.sabujeema.com

SABUJEEMA

An International Multidisciplinary e-Magazine

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ROOT ROT OF GROUNDNUT (ARACHIS HYPOGAEA L.) CAUSED
BY MACROPHOMINA PHASEOLINA (TASSI) GOID.

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In Vitro Efficacy Of Trichoderma Viride Against Dry Root Rot Of Groundnut (Arachis Hypogaea L.) Caused By Macrophomina Phaseolina (Tassi) Goid

[Article ID: SIMM0008]

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ABSTRACT

Groundnut (*Arachis hypogaea* L.) originated in South America (Southern Bolivia/north west Argentina region) is considered to be one of the most important oilseed crop in the world. Groundnut is primarily used for extraction of oil, with an analysis of about 46.70%. Dry root rot of groundnut caused by *M. phaseolina* is emerging as a serious threat to the groundnut production worldwide. *M. phaseolina* attacks crop plants

at different stages of plant growth and causes complex disease syndromes like root rot, seedling blight, charcoal rot, ashy stem blight, wilt, collar rot, dry rot, pod rot and seed rot in several crops. In the present investigation an attempt has been made to study the in vitro efficacy of *Trichoderma viride* against *Macrophomina phaseolina*. The antagonistic effect of *Trichoderma viride* were observed by the Dual culture technique under the in vitro conditions. In Dual culture technique the effective antagonists were selected based on the inhibition to the growth of the pathogen.

KEY WORDS: Groundnut, Dry root rot, *Macrophomina phaseolina*, *Trichoderma viride*, Dual culture technique.

INTRODUCTION

Groundnut (*Arachis hypogaea* L.) the 'king' of oilseed is popularly called as wonder nut, poor men's cashew nut, earthnuts, goober peas, monkey nuts, pygmy nuts and pig nuts. It belongs to the family of Fabaceae and it contains the valuable source of all the nutrients. In India it's grown under rainfed as well as irrigated conditions. India exports groundnut kernels, handpicked selected (HPS) groundnut and its oil cake forms.

Groundnut is grown on a large scale in almost all the tropical and subtropical countries of the world. The most important groundnut growing countries are India, China, Nigeria, Sudan and USA. Asia accounts for about 50% of area and 60% of world production of groundnut with largest share of India (>20%) in the groundnut coverage.

The groundnut seed contain 45-50% oil, 27-33% protein as well as essential minerals and vitamins. The crop is affected by various diseases caused by fungi, bacteria and viruses. Of these pathogens, *Macrophomina*



phaseolina (Tassi) Goid., is an important pathogen, distributed worldwide and groundnut at all stages are susceptible to infection. *M. phaseolina* attacks crop plants at different stages of plant growth and causes complex disease syndromes like root rot, seedling blight, charcoal rot, ashy stem blight, wilt, collar rot, dry rot, pod rot and seed rot in several crops (Ma et al., 2010).

Management of *M. phaseolina* using chemical control is arduous, uneconomical and not advisable owing to the risk of ground water pollution, heavy metal toxicity, death of non-target beneficial micro flora and evolution of fungicidal resistant pathogen variants. Meeting the future challenge for productive, but sustainable agriculture will require the use of all strategies that are effective, economical, safe and compatible. (*Trichoderma* have been known for their potential antifungal, plant growth promoting and plant defense inducing activities (Zaidi et al., 2004).

SYMPTOMATOLOGY

M. phaseolina attacks crop plants at different stages of plant and causes complex disease syndromes like root rot, seedling blight, charcoal rot, ashy stem blight, wilt, collar rot, dry rot, pod rot and seed rot in several crops (Ma et al., 2010). Rasheed et al. (2004) observed that in *M. phaseolina*, caused pre emergence and post-emergence rot resulting in root rot and damping-off in seedlings.

THE PATHOGEN, *M. PHASEOLINA*

Among the pathogens that attacks peanut, *M. phaseolina* (Tassi) Goid. is considered as one of the most destructive soil borne pathogen. *M. phaseolina* is an anamorphic Ascomycete of the family Botryosphaeriaceae (Reichert and Hellinger,

1947) and causes the root rot/ charcoal rot disease in most agricultural and forest crops. It has been reported that dry rainfed conditions favored higher root rot disease in crops. The disease incidence was more in sandy loam as compared to clay loam (Muthukumar et al., 2014).

ANTAGONISTIC EFFECT OF *TRICHODERMA* SPP.

The parasitic activity of *Trichoderma* against *Rhizoctonia solani* was first demonstrated by (Weindling, 1932). Many *Trichoderma* species are regarded as growth promoter of plants by increasing ftvsh12 weight, height and flowering in plants while potentially inhibiting pathogen growth. Rajkonda et al. (2011) also reported that the species of *Trichoderma* significantly inhibited the mycelial growth of many plant pathogenic fungi. Hence *Trichoderma* spp. are extensively exploited and seeking attention of scientists from all over the world, and are also being commercially marketed as bio-pesticides, bio-fertilizers and soil amendments.

RESULT:

EFFECT OF ANTAGONISTS ON MYCELIAL GROWTH BY DUAL CULTURE TECHNIQUE

The radial mycelial of the pathogen and per cent reduction over control was calculated by using the formula (Vincent, 1927).

$$\text{Per cent inhibition (I)} = \frac{C-T}{C} \times 100$$

Where, C- mycelial growth of pathogen in control

T- mycelial growth of pathogen in dual plate
However, among the isolates, the isolate Tv3 showed the maximum inhibition and significantly inhibited the growth of *M.*

phaseolina (22.00 mm) which was 75.55 per cent reduction on the growth of the pathogen when compared to control. Rettinasababady and Ramadoss (2000) observed that a native isolate of *T. viride* from rice fallow blackgram not only inhibited the growth of *M. phaseolina*. The isolates of *T. viride* were found to produce inhibitory volatile substances and reduced the radial growth of the *M. phaseolina* in vitro. Both *T. viride* and *T. harzianum* were found to be capable of sclerotial population of *M. phaseolina* and *T. harzianum* produced the maximum inhibition zone against *M. phaseolina* (Ramezani, 2008). In dual culture, *T. viride* and *T. harzianum* reduced *M. phaseolina* mycelial growth through the action of non-volatile and volatile etabolites (Sreedevi et al., 2011).

CONCLUSION:

In this work was conducted under the in vitro conditions. Different isolates of *Trichoderma viride* have the ability to control the *Macrophomina phaseolina* causes the Dry root rot in Groundnut to the efficient manner.

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