INTERNATIONAL JOURNAL OF PLANT PROTECTION | VOLUME 7 | ISSUE 1 | APRIL, 2014 | 272-274
e ISSN-0976-6855 | *www.researchjournal.co.in* | Open Access

IJPP

RESEARCH NOTE

Efficacy of plants leaf extracts on mycelia growth and sclerotial production of *Rhizoctonia solani* causing web blight of groundnut

■ BHUMIKA KOMA*, PRASHANT DEWANGAN, SANGHMITRA BAGHEL, R.K. DANTRE AND K.P. VERMA

Department of Plant Pathology, Indira Gandhi Agriculture University, RAIPUR (C.G.) INDIA

ARITCLE INFO

Received : 08.01.2014
Accepted : 30.03.2014

Key **W**ords :
Groundnut, *Rhizoctonia solani*, Web blight, Phytoextract

***Corresponding author:**
Email: koma.bhumi@gmail.com

ABSTRACT

Soilborne phytopathogens affect groundnut production. The present study was conducted to find out the bioresource to control *Rhizoctonia solani* causing web blight of groundnut, thirteen plants leaf extracts were tested *in vitro* for their potential to control *Rhizoctonia solani.* Garlic, eucalyptus, lemongrass, *Gokhru* and *Van tulsi* significantly inhibited the mycelial growth and sclerotial production except *Tulsi*, onion, *Aak*, jatropha, *Beshram* faild to inhibit the mycelial growth of *Rhizoctonia solani*.

How to view point the article : Koma, Bhumika, Dewangan, Prashant, Baghel, Songhmitra, Dantre, R.K. and Verma, K.P. (2014). Efficacy of plants leaf extracts on mycelia growth and sclerotial production of *Rhizoctonia solani* causing web blight of groundnut. *Internat. J. Plant Protec.*, **7**(1) : 272-274.

Groundnut (*Arachis hypogaea* L.) is one of the major oilseed crops in the world. It is valuable cash crop planted by millions of small farmers because of its economic and nutritional value. About two third of world production is crushed for oil and remaining one third is consumed as food. Groundnut seeds (kernels) contain 40-50 per cent fat, 20-50 per cent protein and 10-20 per cent carbohydrate. *R. solani* is the most important soilborne fungal pathogen, which develop in both cultivated and non-cultivated soils, causing the symptoms of web blight disease to wide range of crop plants.*Rhizoctonia* induced diseases can occur on all parts and at all growth stages of the peanut. *Rhizoctonia solani* Kuhn is the primary pathogen in the *Rhizoctonia* group, affecting the seeds (seed decay), seedlings (damping off), leaves (foliar blight), roots (root rot), limbs (limb rot), peg (peg rot) and pods (pod rot). This fungus usually causes decaying of germinating seed and forms light to dark brown sunken lesions on infected hypocotyls, branches, roots, pegs and pods. Disease losses caused by *Rhizoctonia* are difficult to assess due to its association with other soil borne and foliar pathogens.

***In-vitro* evaluation of plants leaf extracts against mycelial growth and sclerotial production of *Rhizoctonia solani* :**

Antifungal activity of thirteen plants leaf extracts were studied under *in vitro* condition by using respective Plant leaf dextrose agar medium. The medicinal plants included were neem (*Azadirachta indica*), tulsi (*Ocimum basilicum*), garlic *(Allium sativum*), onion (*Allium cepa*), Eucalyptus (*Eucalyptus* sp.), Aak (*Calotropis gigantea*), Satyanasi (*Argemon mexicana),* lantana (*Lantana camara*), lemongrass (*Cymbopogon citrates*), jatropha *(Jatropha* sp.), Gokhru (*Xanthium strumarium*), Beshram (*Ipomea carnea*) and Van tulsi (*Ocimum camum*) which were used and evaluated by poisoned food technique method. Medium without extract was used as control.

The preparation of leaf extract medium was same as PDA medium. 20g leaves of each medicinal plant were taken in 100 ml water and boiled till it became softened. Softened medicinal plant leaves were crushed with pestle and mortar, and then

extract was filtered. 2g dextrose and 2g Agar agar were mixed in filtered leaf extract and volume was made up to 100 ml and sterilized in an autoclave. To avoid the bacterial contamination, a pinch of Streptomycin sulphate was added at the time of pouring of media in Petriplate. About twenty ml medium was poured in a sterilized Petriplate and allowed to solidify. A five mm disc from four days old culture of test fungus was placed in the centre of medium. Three replications were maintained in each treatment along with a control. The inoculated Petriplates were then incubated in the BOD incubator at 27 ± 2^0 C. Observations were recorded for mycelial growth regularly after inoculation and sclerotia were counted 15 days after inoculation.

Per cent inhibition of mycelial growth was calculated by the following formula :

$$\text{Inhibition per cent} = \frac{C - T}{C} \times 100$$

whereas,

C = Diameter of fungus colony (mm) in control plate

T = Diameter of fungus colony (mm) in treated plate.

The findings of the present study as well as relevant discussion have been presented under following heads :

Inhibitory effect of different plant leaf extracts on radial growth of *Rhizoctonia solani* in *in vitro* condition :

Leaf extracts of thirteen plants were evaluated for their antifungal activity against *Rhizoctonia solani* by supplementing in PDA medium under *in vitro* condition. We could divide the effects of supplemented leaf extracts were divided in three different catagories based on the inhibitory effects on the growth of *R. solani*: (1) Plant extracts not inhibitory to the growth of *R. solani,* (2) Plant extracts with sub-optimum inhibitory effect on growth of *R. solani,* (3) Plant extracts with optimum inhibitory effects on the growth of *R. solani*.

Leaf extracts derived from Beshram, onion, jatropha, tulsi and supplemented in PDA did not inhibited / had negligible (Aak, Satyanasi) inhibitory effect on the growth of *R. solani*. *R solani* was able to produce normal growth and sclerotia. Leaf extracts were therefore categorized as "1=Plant extracts not inhibitory to the growth of *R. solani"* (Table 1).

Leaf extracts derived from Neem and Lantana inhibited to some extent the growth of *R. solani* and were therefore categorized as "2=Plant extracts with sub-optimum inhibitory effect on growth of *R. solani*" (Table 1).

Leaf extracts derived from garlic, eucalyptus, lemongrass, Gokhru, Van tulsi completely inhibited the growth of *R. solani* and were therefore categorized as "3=Plant extracts with optimum inhibitory effects on the growth of *R. solani*" (Table 1). No sclerotia were observed in the medium supplemented with leaf extract of garlic, eucalyptus, lemongrass, Gokhru and Van tulsi.

Some of the reports are in support of the present observations like Reddy *et al.* (2002) who reported that extract of *Eucalyptus globules*, *Allium sativum* and *Zingiber officinale* caused 61 to 100 per cent inhibition of the mycelial

Table 1 : *In vitro* evaluation of inhibitory effects of medicinal plant leaf extract (supplemented in PDA) on *Rhizoctonia solani*

Plants leaf extracts	Botanical name	Radial growth (mm)	Inhibition (%)	No. of sclerotia per plates *
1. Control	–	90.00	00.00	*****
Plant extracts not inhibitory to the growth of *R. solani*				
1. Beshram	*Ipomea carnea*	90.00	00.00	****
2. Onion	*Allium cepa*	89.17	00.92	****
3. Jatropha	*Jatropha* sp.	89.00	01.11	***
4. Tulsi	*Ocimum sanctum*	88.33	01.85	*****
5. Aak (Madar)	*Calotropis procera*	82.67	08.14	**
6. Satyanasi	*Argemone mexicana*	74.83	16.85	****
Plant extracts with *sub-optimum* inhibitory effect on growth of *R. solani*				
1. Neem	*Azadirachta indica*	35.67	60.37	***
2. Lentana	*Lantana camara*	24.83	72.4	**
Plant extracts with optimum inhibitory on the growth of *R. solani*				
1. Garlic	*Allium sativumf*	00.00	100	-
2. Eucalyptus	*Eucalyptus* sp.	00.00	100	-
3. Lemongrass	*Cymbopogon citrates*	00.00	100	-
4. Gokhru	*Xanthium strumarium*	00.00	100	-
5. Van tulsi	*Ocimum camum*	00.00	100	-
S.E. ±		2.19		
C.D. (P=0.05)		6.35		

Average of three replications; *= 20 sclerotia, - = no sclerotia formation

growth of *Rhizoctonia solani* causing root rot of chickpea. Monika and Gupta (2003) reported that leaf and seed extracts were of *Lantana camara* least effective against *Rhizoctonia solani*. Mishra *et al.* (2005) also reported highest inhibitory action against *Rhizoctonia solani* by *Azadirachta* and *Eucalyptus.*

REFERENCES

Reddy, C.S., Sudhaker, R., Purohit, D.K. and Girisham, S. (2002). Efficacy of plant products and other chemicals in the management of sheath blight of rice. In : *Frontiers in Microbial Biotech. Pl. Pathol.*, pp. 263-267.

Mishra, B.N., Sahu, R. and Parihar, P. (2005). Neem (*Azadirachta indica*), a versatile plant. *Agerobios Newsletter*, **3** : 41-43.

Monika, S. and Gupta, S.K. (2003). Ecofriendly methods for the management of root rot & web blight (*Rhizoctonia solani*) of French bean. *J. Mycol. Pl. Pathol*., **33**(3) : 345-361.