

EFFECT OF SOME PLANT LEAF EXTRACTS ON THE GROWTH AND SPORULATION OF TWO PATHOGENIC FUNGI D. NAGARAJU¹* AND C. MANOHARACHARY²

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In the present investigation an attempt has been made to study the effect of ten plant extracts on the growth and sporulation of two pathogenic fungi i.e., *Fusarium semitectum* Berk and Rav. and *Phoma nebulosa* (Pers. ex. S.F. Gray) Berk. The plant leaf extracts of *Acalypha indica* L., *Canna indica* L., *Cannabis sativa* L., *Nerium odorum* Sol., *Papaver somniferum* L., *Tridax procumbens* L., *Thevetia nerefolia* J. and *Vinca rosea* L. have shown stimulatory effect (an increase in dry weight was observed). *Nerium odorum* Sol. has shown only slight stimulatory effect on the two pathogenic fungi. *Cannabis sativa* L. has shown only slight inhibitory effect on *F. semitectum Fusarium semitectum* only. However, *Datura metal* L. followed by *Ocimum sanctum* L. has shown inhibitory effect on the growth and sporulation of the two pathogenic fungi. This clearly shows the possible presence of an active principle of antifungal activity in *Datura metal* and *Ocimum sanctum*. **Keywords:** Antifungal activity, *Datura*, Fruit-rot, *Ocimum*, Plant Extract, Pathogenic Fungi.

Fungi being heterotrophs due to lack of fruit rot

chlorophyll have been found to colonize diversified habitats, as saprophytes and parasites on crop plants, forest vegetation, ornamental plants etc. Among which fungi like Alternaria. Curvularia, Cladosporium, Drechslera, Cercospora, Colletotrichum, Ascochyta, Mvrothecium. Cylindrocarpon. Fusarium, Nigrospora, Phoma and many other such fungi have been reported to be biotrophic as well as facultatives.

In recent times experimental data on low phytotoxicity and systemic activity has led to several attempts towards screening various plants and plant products for their antimicrobial activity against the pathogenic fungi. (Chandra 2013, Duncan et al. 2008, Fereshteh 2005, Fardos 2009, Jebakumar 2005, Mahadevan 1979, Mahesh and Satish 2008, Namita and Mukesh 2012) Nashwa and Kamal (2012), Somchit et al (2010) Sunita Bansod and Mahendra Rai (2008) Ríos (2005) have reported that several plants contain chemicals that are capable of inhibiting the germination and growth of pathogenic fungi. Therefore, in recent years some attention has been paid by various researchers towards the screening of fungitoxic properties of some higher plants.

During the survey conducted in Telangana on

fruit rot diseases of two important pathogens namely *Fusarium semitectum*, Berk and Rav. casual agent of fruit rot of *Prunus avium* L. and *Phoma nebulosa* (Pers. ex. S.F. Gray) Berk. the seed rot pathogen of coriander were identified as important pathogens. These two pathogens have caused a loss of 10-25% on fruits and seeds. Therefore, an attempt is made to investigate the efficacy of some plant leaf extracts on *Fusarium semitectum* and *Phoma nebulosa*.

MATERIAL AND METHODS

The following two pathogenic fungi were selected for the study; *Fusarium semitectum* casual agent of fruit-rot in *Prunus avium* and *Phoma nebulosa* seed-rot pathogen of Coriander. The above two fungi proved pathogenic, when inoculated on their respective healthy hosts. Monosporic cultures are used in all the studies.

The effect of plant leaf extracts of the following plants *Datura metel* L., *Tridax procumbens* L., *Ocimum sanctum* L., *Cannabis sativa* L., *Nerium odorum* Sol., *Thevetia nerefolia* J., *Canna indica* L., *Acalypha indica* L., *Papaver somniferum* L. and *Vinca rosea* L., has been studied on the growth and sporulation of *Fusarium semitectum* and *Phoma nebulosa*. One ml. of the sterile water leaf extract was added to a 20 ml basal liquid medium (Asthana Hawker's) in 100 ml Erelenmeyer flasks served as the substrate in

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every case which was sterilized fractionally by steaming for 30 minutes on three successive days. Garett (1936), Anonymous (1996) and Parez et al. (1990) agar disc method was used for inoculation of test fungi. The inoculated flasks were incubated at $26 \pm 2^{\circ}C^{\circ}$ for 5 and 10 days. All the experiments were conducted in triplicate. At the end of 5th and 10th day of incubation period fungal mats were harvested by filtering over previously dried weighed whatman filter paper No 42. The filter paper was dried between 70-80°C in an oven for 48 hours after which they were cooled in a desicator and weighed. The average dry mycelial weight was recorded. Sporulation was also recorded based on visual observation.

Preparation of plant extract

5 gms of the leaf of each plant was crushed in 100 ml of sterilized distilled water with a pestle and mortar and filtered through whatman No. 42 filter paper followed by seitz filtering. Then the extract was centrifuged at 1500 RPM for 10 minutes to get a supernatant clear extract. The effect of plant extract was studied by taking the dry mycelial weight and visual observation of sporulation.

RESULT AND DISCUSSION

In the present investigation an attempt has been made to study the effect of ten leaf extracts on the growth and sporulation of two pathogenic fungi i.e., *Fusarium semitectum* and *Phoma nebulosa*.

In India some workers have reported the antifungal efficacy of the plant extracts (Amini 2012; Amit Kumar *et al.* 2013; Bharadwaj 2012; Duraipandiyan and Ignacimuthu 2011; Jalander and Gachande 2012; Kavitha 2002; Masih *et al.* 2014; Narasimharaju *et al.* 2015; Prince and Prabakaran 2011; Satish et al. 2007; Sati and Joshi 2011; Uma Reddy 2009; Usha *et al.* 2009). In the present investigation an attempt has been made to study the effect of plant leaf extracts of *Datura metal* L. *Cannabis*

sativa L., Canna indica L., Tridax procumbens L. Acalypha indica L., Ocimum sanctum L. Thevetia nerefolia J. Papavar somniferum L. and Vinca rosea L. on the growth and sporulation of Fusarium semitectum and Phoma nebulosa. Among the ten plants tested the leaf extracts of Datura metel L. followed by Ocimum sanctum L. have inhibited the growth and sporulation of the two test fungi. This clearly shows the presence of an active antifungal principle in the extracts of *Datura metel* and *Ocimum sanctum*. *Nerium odorum* has also shown slight inhibitory effect on the two pathogenic fungi. Cannabis sativa has shown slight inhibitory effect on *Fusarium* only. Further the extracts of *Papavar* somniferum, Vinca rosea, Tridax procumbens, Thevetia nerefolia, Canna indica and Acalypha *indica* were stimulatory. These plant extracts might have been detoxified by the respective pathogens. (Table-1 and 2).

Hence the present data throws some light on the biological activity of some plant leaf extracts and thus paving the way for the identification of such plants whose chemicals can be used as controlling agents for plant diseases.

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SI .No.	Plant extracts 5gm in 100 ml sterile distilled water	Days of Incubation	Dry weight of the Mycelium in mg. (Values are rounded to near)	Radial growth in mm (Values are rounded to near)	Sporulation
	Papaver somniferum L.	5	58	2	++
		10	74	4	++
1	Control	5	62	3	++
		10	80	4	++
	Ocimum sanctum L.	5	42	2	
		10	51	3	
2	Control	5	58	3	+
		10	66	5	+
	Vinca rosea L.	5	28	7	++
		10	60	9	++
3	Control	5	30	5	++
		10	64		++
	Tridax procumbens L.	5	53	5	++
1	Control	10	80	8	
4	Control	<u> </u>	<u> </u>	4	
	Datura motol I	10	78	0	
		10	65	3	
5	Control	5	76	6	 +
5		10	92	8	+
	Cannahis sativa L	5	53	2	, , , , , , , , , , , , , , , , , , ,
		10	70	4	+
6	Control	5	66	3	+
Ŭ		10	74	6	+
	Thevatia nerifolia J.	5	62	3	+
		10	84	5	+
7	Control	5	66	4	+
		10	89	7	+
	Nerium odorum Sol.	5	56	4	
		10	73	6	
8	Control	5	65	9	+
		10	78	11	+
	<i>Canna indica</i> L.	5	60	5	
9		10	78	7	+
	Control	5	65	7	+
		10	83	9	+
	Acalypha indica L.	5	48	2	
10		10	63	5	+
10	Control	5	56	3	+
		10	/4	/	+

Table-1. Effect of different plant extracts on dry matter yield (mg) of Fusarium semitectum

Note: += Average sporulation, ++= More sporulation, -=Inhibition, - -= More Inhibition

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SI .No.	Plant extracts 5gm in 100 ml	Days of	Dry weight of the Mycelium	Radial growth in	Sporulation
	sterile distilled water	Incubation	m liquid media	mm	
	Papaver somniferum L.	5	54	2	
		10	68	5	+
1	Control	5	66	6	++
		10	82	9	++
	Ocimum sanctum L.	5	35	2	
		10	41	5	
2	Control	5	54	6	+
		10	67	8	+
	<i>Vinca rosea</i> L.	5	64	6	++
		10	108	10	++
3	Control	5	48	8	++
		10	112	12	++
	<i>Tridax procumbens</i> L.	5	52	5	++
		10	78	9	+++
4	Control	5	65	3	++
		10	82	10	++
	Datura metel L.	5	58	3	
		10	69	5	
5	Control	5	72	6	+
		10	89	9	+
6	<i>Cannabis sativa</i> L.	5	59	2	_
		10	64	4	_
	Control	5	72	5	+
		10	86	7	+
	<i>Thevatia nerifolia</i> J.	5	48	3	+
		10	68	5	+
7	Control	5	52	4	+
		10	71	7	+
	Nerium odorum Sol.	5	51	3	
		10	62	6	
8	Control	5	67	5	+
		10	78	9	+
	<i>Canna indica</i> L.	5	57	2	+
		10	90	5	+
9	Control	5	59	3	+
		10	94	6	+
	Acalypha indica L.	5	48	2	
		10	79	5	+
10	Control	5	54	3	+
		10	82	7	+

Table-2. Effect of different plant extracts on dry matter yield of Phoma nebulosa

Note: += Average sporulation, ++= More sporulation, -=Inhibition, - -= More Inhibition

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