

# EFFECT OF PLANT LEAF EXTRACT ON FUNGAL DISEASES OF IVY GOURD

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## ABSTRACT

The present investigation with deals effect of leaf extract in fungal diseases of Ivy gourd in vitro condition. Leaf extracts use of *Azadirachta indica*, *Ocimum gratissimum*, *Adhatoda vasica*, *Aegle mormelos* and *Santalum album*. 25, 50, 75 and 100 ppm concentration antifungal activity against fungi in fruit rot of Ivy gourd viz. *Geotrichum candidus*.

**Keywords:** Ivy Gourd, *Geotrichum candidus* Plant Extract, Food Poisoning Technique

## INTRODUCTION

Ivy gourd (*Coccinia indica* L.) is a tropical plant in the family of *Cucurbitaceae*, commonly known as little gourd. The other common names for Ivy gourd are scarlet fruited gourd, Tindori, and locally known as Thondekai (Wasantwisut and Viriyapanich, 2003). The origin of ivy gourd lies in the tropical zone of Asia, North and Central Africa. It is commonly found in countries like India, Indonesia, Malaysia, Philippines and Thailand (Wasantwisut and Viriyapanich, 2003). The fruit of ivy gourd belongs to the berry type: ovoid to elliptical and hairless with thick and sticky skin. The raw fruit is green in color and turns bright red when it is ripe. The mature fruit is usually from 25 to 60 mm long by 15–35 mm in diameter and contains several pale, flattened seeds (Wasantwisut and Viriyapanich, 2003; Pekamwar et al., 2013). The harvesting maturity of ivy gourd is determined by the fruit colour which changes from green to light green.

The normal storage life of fruit is 3 to 4 days at room temperature and 7 to 10 days at refrigerated conditions (Sushmarani et al., 2013). The tender green fruits are nutritious and are good source of protein, calcium, fibre and  $\beta$ carotene (vitamin A as precursor). Consuming 100 grams of ivy gourd supplies, 1.4 mg of Iron 1.6g of total dietary fiber, 40 mg of calcium and 30 mg of phosphorus (Behl et al., 1993). In addition to nutrient composition, it is valued for its major biochemical constituents such as alkaloids, glycosides, flavonoids, tannins, saponins have been identified (Shaheen et al., 2009) Apart from its nutritional significance, ivy gourd is valuable in medicine and various preparations which have been mentioned in indigenous system of medicine (Behl et al.,

1993). Despite, its good nutritional and medicinal value. There is not much demand for ivy gourd fruit either in fresh market or in processed form which may be due to poor awareness of consumers about its nutritive and medicinal importance. Thus, ivy gourd being under-utilized indigenous crops may be useful in food industries in the formulation of value added products thus cater for the daily needs of the citizens nutritionally.

The present study reports the effects of different plant leaf extracts on fungal disease spores germination of Ivy gourd *Azadirachta indica*, *Ocimum gratissimum*, *Adhatoda vasica*, *Aegle mormelos* and *Santalum album*. Caused by some important fungal disease in *Geotrichum candidus* fruit rot of Ivy gourd.

## **MATERIALS AND METHODS**

### **Plant collection**

Fungi toxicity of leaf extracts was studied by food poisoning technique described by (Mishra and Tiwari, 1992). The plants were collected from the non-irrigated cultivated lands in and around Osmanabad (district), Maharashtra. Plants species such leaf extract *Azadirachta indica*, *Ocimum gratissimum*, *Adhatoda vasica*, *Aegle mormelos* and *Santalum album* were collected from Department of Botany, Arts Science and Commerce College of Naldurg for the study.

### **Sterilization of Plant Materials**

The disease free and fresh plants were selected. They were washed with distilled water for three times. Then surface sterilized with 0.1% mercuric chloride for 20 seconds. Again the leaves were washed thoroughly with distilled water (three times).

### **Preparation of Plant Extracts**

Oven dried and pulverized to obtain dry powder. Plant extract of each prepared with water i.e. 100gm powder dissolved in 100 ml distilled water. Mixed well and filter through double filter muslin cloth, it served as stock. This stock was used against tested fungi in four different concentrations (25, 50, 75 and 100%). Petri plates containing CZA supplemented with different leaf extract at four different concentrations with three replications were inoculated with fresh 8<sup>th</sup> days old culture of test fungi and (8mm) cork borer disc and kept upside down and incubated in BOD incubators at  $27 \pm 2^{\circ}\text{C}$ . Plates without leaf extracts were served as control. Radial growth of the tested pathogens was measured at regular intervals.

## RESULTS AND DISCUSSION

Plant leaf used in this study was tested against four pathogenic fungi to determine their antifungal activity. Different concentrations of plant leaf (25, 50, 75 and 100%) were tested against pathogenic fungi. Minimum inhibitory concentration (MIC) was measured to determine the antifungal activity. The inhibition effects of the *Azadirachta indica*, *Ocimum gratissimum*, *Adhatoda vasica*, *Aegle mormelos* and *Santalum album* medicinal plant on pathogenic fungi are presented in table 1. Among leaf extracts tested, *Azadirachta indica* leaf extract it showed reduction of radial growth of *Geotrichum candidus* sensitive (88.88 %) at 50% conc. and resistant (83.33 %) at 100% conc. respectively. It also showed significantly results at 100% concentration (Plate I).

*Azadirachta indica* inhibiting growth of *Alternaria alternate*, *Bipolaris sorokiniana* and several other fungi have been reported (Singh and Dwivedi, 1990; Alam et al., 2002a). In most cases, *Ocimum sanctum* extract exhibited less inhibitory effect against *B. sorokiniana* (Nargis Akhter et al., 2006). *Azadirachta indica* (leaf, root and seed) extracts showed good (100%) inhibition results on *Bipolaris sorokiniana*, and *Rhizopus artocarp*i (Shahidul, Alam et al., 2002). Aqueous extract of *A. indica* has also been reported to cause significant growth inhibition of other fungi such as *Rhizoctonia solani*, *Botrytis cinera* and *Fusarium oxysporum* (Alkhail, 2005). Hasan et al. (2005) Alcoholic extracts of neem (*Azadirachta indica*) and garlic (*Allium sativum*) completely controlled the intensity of *Bipolaris sorokiniana*, *Fusarium* sp., *Aspergillus* sp., *Penicillium* sp. and *Rhizopus* sp. after the treatment on wheat seeds. Next to garlic and neem, *Vinca rosea* extract showed good inhibition and 1.40% intensity of *Bipolaris sorokiniana* followed by bulb extract of *Allium cepa* and leaf extract of *Achyranthes aspera* (1.53 and 1.53%). Chaudhary and Raj (2004) *in vitro* effect of aqueous extract (1.5%) of three medicinal plant parts namely rhizome of *Zinziber officinalae*, *Cucurcuma longa* and bulb of *Allium sativum* on four plants pathogenic fungi viz. *Helminthosporium oryzae*, *Alternaria solani*, *Fusarium solani* and *Sclerotium rolf*sii, *Allium sativum* showed maximum inhibition at 15% in four test fungi. Ganguly, (1994) reported that aqueous neem leaf extract inhibited mycelial growth and spore germination of *Helminthosporium oryzae* and *pyricularia oryzae* responsible for blast and brown spot of rice plant respectively.

These results are in accordance with many workers. Similar results were recorded from preliminary investigations by Hassanein et al., (2008) reporting antifungal activity of *Azadirachta indica* leaf extract against *Alternaria solani*. According to Shivpuri et al. (1997) ethanol extracts of *Azadirachta indica*, *Datura stramonium*, *Ocimum sanctum*, *Polyalthia longifolia* and *Vinca rosea* were more toxic to *Alternaria brassicicola*, *Colletotrichum capsici*, *Fusarium oxysporum*,

*Rhizoctonia solani* and *Sclerotinia sclerotium*, their efficacy was more pronounced at 100 µg/ml. Overall, *Dodonaea viscosa* appeared significantly the most effective and suppressed the radial mycelial growth of the *Alternaria solani* and *Rhizoctonia solani*, whereas, *Adhatoda zeylanica* exhibited maximum inhibition (77.44%) against *Macrophomina phaseolina* Aqsa Aslam (2010).

**Table 1: Antifungal activity of plant extracts (leaf) against pathogenic fungi of *Coccinia indica*.**

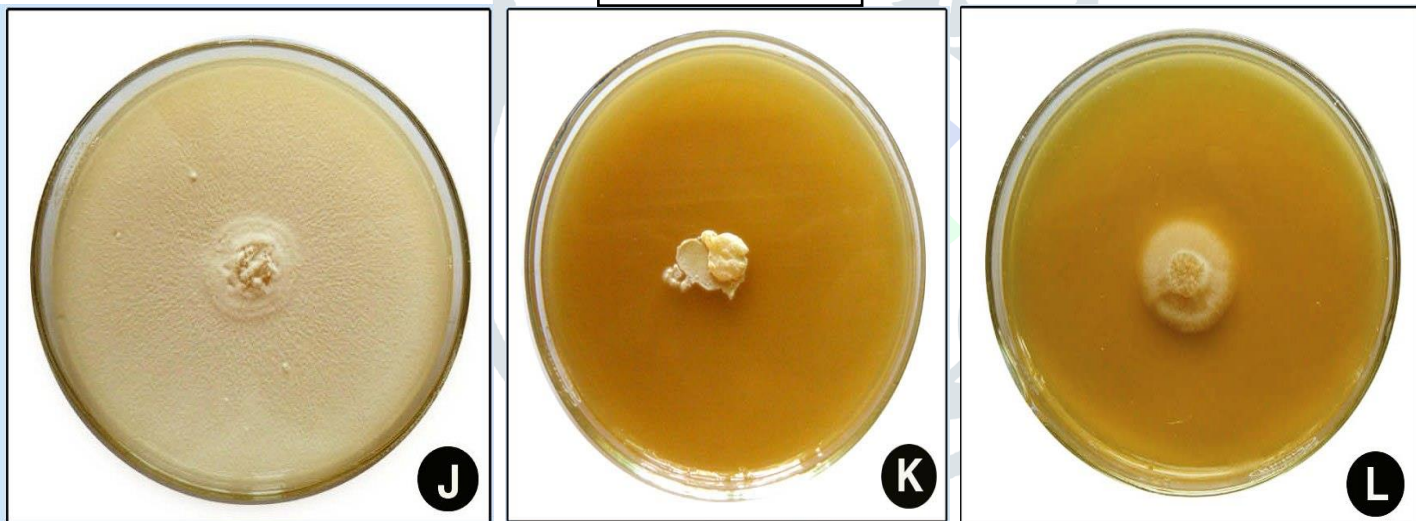
Plant species	Conc. (%)	Isolates	Radial growth of <i>G. candidus</i> (mm)
<i>Azadirachta indica</i>	25	S	15 (83.33)
		R	19 (78.88)
	50	S	<b>10* (88.88)</b>
		R	19 (78.88)
	75	S	00 (00.00)
		R	18 (80.00)
100	S	00 (100.00)	
	R	<b>15+ (83.33)</b>	
<i>Ocimum gratissimum</i>	25	S	31 (65.55)
		R	34 (62.22)
	50	S	30 (66.66)
		R	32 (64.44)
	75	S	25 (72.22)
		R	28 (68.88)
100	S	20 (77.77)	
	R	22 (75.55)	
<i>Adhatoda vasica</i>	25	S	29 (67.77)
		R	30 (66.66)
	50	S	26 (71.11)
		R	28 (68.88)
	75	S	20 (77.77)
		R	23 (74.44)
100	S	19 (78.88)	
	R	20 (77.77)	
<i>Aegle mormelos</i>	25	S	38 (57.77)
		R	40 (55.55)
	50	S	31 (65.55)
		R	35 (61.11)
	75	S	28 (68.88)
		R	30 (66.66)
100	S	25 (72.22)	
	R	29 (67.77)	

<i>Santalum album</i>	25	S	23 (74.44)
		R	29 (67.77)
	50	S	20 (77.77)
		R	27 (70.00)
	75	S	19 (78.88)
		R	25 (72.22)
	100	S	00 (100.00)
		R	23 (74.44)
<b>Control</b>	-	-	<b>90.00</b>

Figures in parentheses are % value of inhibition,\*Sensitive, +- Resistant.

### PLATE - I

Control



**Fig.** *Geotrichum candidus*. **A.** Control, **B.** 14mm (Sensitive), and **C.** 20mm (Resistant) against *Azadirachta indica*.

### REFERENCES

- Alam, S., Begum, M. F., Alam, M. S. and Chowdhury, A. N. (2002a). *Invitro* germination of *Rhizopus artocarp*i spores in different substrates- a jackfruit rot pathogen, *RajshahiUniv. Studies* (Part B). **30**: 179-183.

- Alkhail, A. A. (2005).** Antifungal activity of some extracts against some plant pathogenic fungi. *Pak.J. Biol. Sci.*, **8 (3)**: 413-417.
- Aqsa, Aslam., Farah, Naz., Muhammad, Arshad., Rahmatullah, Qureshi.and Rauf, C. A. (2010).** *In vitro* antifungal activity of selected medicinal plant diffusates against *Alternaria solani*, *Rhizoctoniasolani* and *Macrophomina phaseolina*.. *Pak. J. Bot.*, **42(4)**: 2911-2919.
- Behl P. N, Arora ,R. B, Srivastava G. (1993).** Herbs useful in dermatological therapy, *CBS, Delhi, India*,
- Chaudhary, H.C. and Raj, S. K.(2004).** Antifungal property of some medicinal plant *in vitro*.*J. Mycopathol. Res.*,**42**: 109-111.
- Ganguly, L. K.(1994).** Fungitoxic effect of certain plant extracts against rice blast and brown spot pathogen, *Enviro. and Ecol.*, **12 (3)**: 731-733.
- Hasan, M.M., Chowdhury, S. P., Shahidul, Alam., Hossain, B. and Alam , M.S. (2005).** Antifungal Effects of Plant Extracts on Seed-borne Fungi of Wheat Seed Regarding Seed Germination, Seedling Health and Vigour Index. *Pakistan Journal of Biological Sciences*, **8**: 1284-1289.
- Hassanein, N.M., Abou Zeid, M.A., Youssef, K.A. and Mahmood, D.A. (2008).** Efficacy of leaf extracts of Neem (*Azadirachta indica*) and Chinaberry (*Melia azedarach*) against early blight and wilt diseases of tomato. *Aust. J. Basic Appl. Sci.*, **2(3)**: 763-777.
- Mishra, M and Tiwari S. N. (1992).** Toxicity of *Polyalthia longifolia* against fungal pathogens of rice. *Indian Phytopathology* .**45** : 59-61.
- Nargis, Akhter., Most, Ferdousi, Begum., Shahidul, Alam. and Md, Shah, Alam. (2006).**Inhibitory Effect of Different Plant Extracts,Cow Dung and Cow Urine on Conidial Germination of *Bipolaris sorokiniana*.*J. bio-sci.*,**14**: 87-92.
- Pekamwar S.S, Kalyankar T.M, Kokate S. S. (2013).** Pharmacological activities of *Coccinia grandis*: review. *J App. Pharm. Sci.* **3(5)**:114-119.
- Shaheen S.Z, Bolla K, Vasu K, Singara M.A. (2009).** Antimicrobial activity of the fruit extracts of *Coccinia indica*. *African Journal of Biotechnology*. **8(24)**: 7073-7076.
- Shahidul, Alam., Nargis, Akhter., Most. Ferdousi, Begum., Sabina, Banu, M. and Rafiqul, Islam, M. (2002).** Antifungal Activities (*In vitro*) of Some Plant Extracts and Smoke on Four Fungal Pathogens of Different Hosts. *Pakistan Journal of Biological Sciences.*, **5**: 307-309.

- Shivpuri Asha, Sharma, O.P. and Jhamaria, S. L. (1997).** Fungitoxic properties plant extracts against pathogenic fungi. *J.Mycol.Pl.Pathol.*, **22(1)**:29-31.
- Singh, R. K. and Dwivedi, R. S. (1990).** Fungicidal properties of neem and babul gum against *Sclerotium rolfsii*. *Acta. Bot. Indica.*, **18**: 260-262.
- Singh, R. K. and Dwivedi, R. S. (1990).** Fungicidal properties of neem and babul gum against *Sclerotium rolfsii*. *Acta. Bot. Indica.*, **18**: 260-262.
- Sushmarani T, Kavitha Abirami C.V and Alagusundaram K. (2013).** Studies on respiration rates in *Coccinia Grandis* (ivy gourd) at different temperatures. *J Foo. Process. Technol.* **4(4)**:1-5.
- Wasantwisut E, Viriyapanich T. (2003).** Ivy gourd (*Coccinia grandis* Voigt, *Coccinia cordifolia*, *Coccinia indica*) in human nutrition and traditional applications. *World. Rev. Nutr. Diet. Basel. Karger.* **91**: 60-66.

