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Comparative antifungal Evaluation of *Azadirachta indica* juss leaf extract against *Rhizoctonia solani* causing leaf blight of Turmeric

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Abstract:

In the present study the aqueous and methanol leaves extracts of *Azadirachta indica* using different concentrations from 10 to 40% were tested in Vitro by following poisoned food technique against *Rhizoctonia solani* causing leaf blight of turmeric. The used concentrations of leaves extract were as 0.0 (control), 10, 20, 30 and 40%. The aqueous *Azadirachta indica* leaves extract at 30% concentration and methanolic leaves extract at 40% concentration were found to be best in reducing the mycelial growth of *Rhizoctonia solani*.

Keywords: *Azadirachta indica*, Turmeric. *Rhizoctonia solani.*

Introduction:

Turmeric is one of the most important spice crop grown in India. The use of turmeric dates back nearly 4000 years to the Vedic culture in India, where it was used as a culinary spice and had some religious significance. Turmeric is a product of *Curcuma longa*, a rhizomatous, herbaceous, perennial plant belonging to the family Zingiberaceae. Among all of the world's turmeric production, India is having major share in turmeric production and nearly 80% of it is consumed by Indian people. Indian turmeric is considered to be the best because of its high curcumin content. In Southeast Asia, turmeric is used not only as a principle spice but also as a component in religious ceremonies. Turmeric is also known as "Indian saffron" because of its bright yellow colour. Turmeric has been also used as a foodstuff, cosmetic and medicine. It is widely used as a spice in South Asian and Middle Eastern cooking. It is used as a colouring agent in cheese, butter and other foods (Govindarajan 1980; Ammon and Wahl 1991). Turmeric is also used in manufactured food products such as canned beverages, dairy products, baked products, ice cream, yellow cakes, biscuits, popcorns and

sweets. The reported consumption of turmeric in Asian countries in humans is in the range of 200-1000mg/ day (Thimmayamma,Rau and Radhaiah 1983;Polasa et al.1991).Turmeric is used as an herbal medicine for rheumatoid arthritis, conjunctivitis, skin cancer, small pox, wound healing, urinary tract infections and liver ailments (Dixit, Jain and Joshi 1988).It has anti-inflammatory ,antimicrobial and carminative actions (Mills and Bone 2000).It is also used for digestive disorders, to reduce flatus, jaundice, menstrual difficulties, for abdominal pain and distension (Bundy et al.2004).

Turmeric contains more than 100 components. The main component of the root is a volatile oil, containing tumerone and there are other coloring agents called curcuminoids consist of curcumin, demethoxycurcumin, 5'-methoxycurcumin and dihydrocurcumin, which are found to be natural antioxidants (Ruby et al.1995; Selvam et al. 1995).

Such an economically and medicinally important crop gets suffered by different diseases. One of them is leaf blight caused by *Rhizoctonia solani*.Taking into consideration the importance of crop and seriousness of disease, the present study was undertaken.

Materials and methods:

By using poisoned food technique (Mishra and Tiwari 1992) in Vitro at different concentrations having 10 to 40% aqueous and methanol leaf extract of *Azadirachta indica* juss were tested against *Rhizoctonia solani*. Fresh and healthy leaves of *Azadirachta indica* were collected from nearby region of Latur field and the leaves were washed thoroughly under sterilized tap water. The leaves were shed dried and pulverized to obtain dry powder. The fine powder was extracted with 80% aqueous and 80% methanol solvents and was vacuum dried to obtain the dried methanol and aqueous extracts. One liter of 80% aqueous extract solvent was mixed with 200gm of powdered plant material and it is kept for two days in tightly sealed vessels at room temperature. The mixture is stirred at certain intervals using sterile glass rod. Then this mixture was filtered through muslin cloth. The process of filteration is repeated until a clear colourless supernatant extraction liquid was obtained. The extracted liquid was subjected to water bath evaporation at 400^0c to remove the solvent. Using same procedure, the methanol solvent was obtained. The extract was weighed and portion of it is used for phytochemical screening. The antifungal efficacy of leaf extract was tested by poisoned food technique. The required amount of stock solution was mixed with sterilized molten PDA medium respectively so as to get 10,20,30 and 40% concentration. 20 ml of medium was poured into 90mm sterilized petriplates and all plates were inoculated with actively growing 5mm mycelial disc of

Rhizoctonia solani in the centre of media. The plates were incubated at room temperature for 7 days. Control was maintained without adding any leaf extract to the medium.The radial growth of pathogen was measured in the form of millimeter (mm).

Observation Table1 :Effect of methanolic and aqueous leaf extract of Azadirachta indica on Rhizoctonia Solani causing leaf blight of Turmeric

Incubation period (Days)	Growth mm									
	Concentration of leaf extract (%)									
	Aqueous					Methanol				
	0 Control	10	20	30	40	0 Control	10	20	30	40
1	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
2	14.00	13.00	12.00	8.00	5.00	13.33	12.00	11.00	9.00	7.00
3	21.33	16.66	10.66	8.66	5.00	25.00	24.66	17.66	12.66	10.66
4	33.66	21.66	10.66	5.00	5.00	35.66	34.55	23.66	23.15	21.45
5	48.00	25.66	13.66	5.00	5.00	51.45	50.65	38.43	27.66	21.66
6	64.66	33.66	16.66	5.00	5.00	73.00	64.42	45.66	32.00	25.65
7	79.33	40.66	22.66	5.00	5.00	90.05	73.66	52.66	39.66	31.66
S.E.=	1.942	1.429	1.347	0	0	1.257	1.242	1.154	1.146	1.135
C.D.@5 %	3.913	3.912	3.828	0	0	3.869	3.869	3.826	3.528	3.423

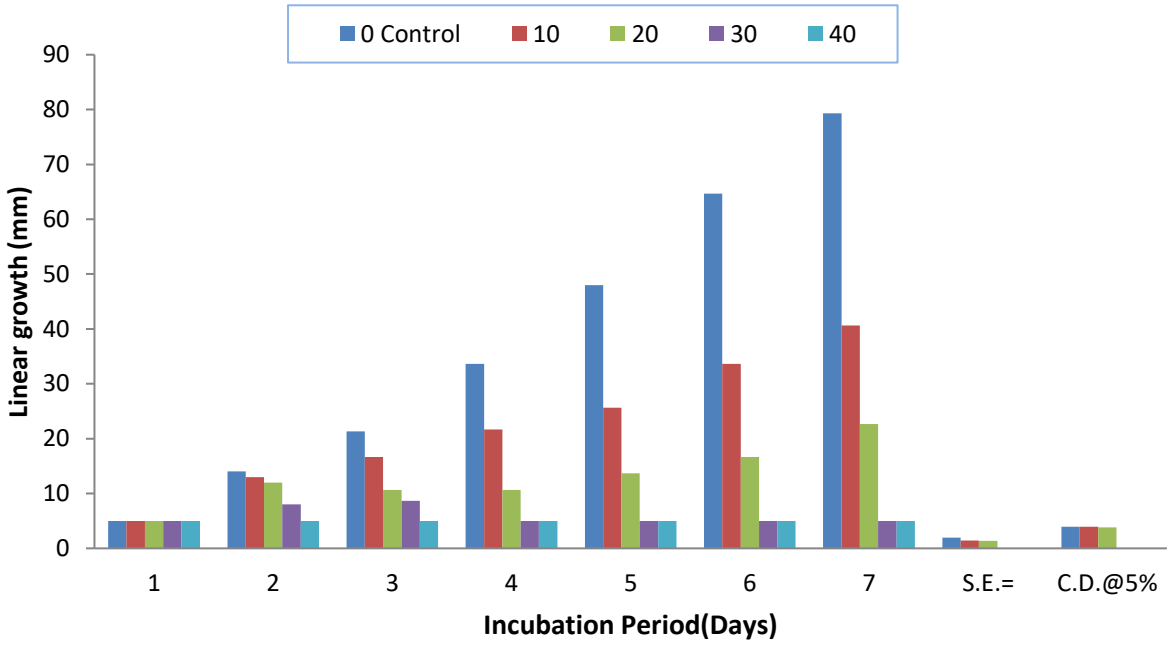

Fig. 1 : Effect of aqueous leaf extract of *Azadirchta Indica* juss. on linear growth of *Rhizoctonia solani*

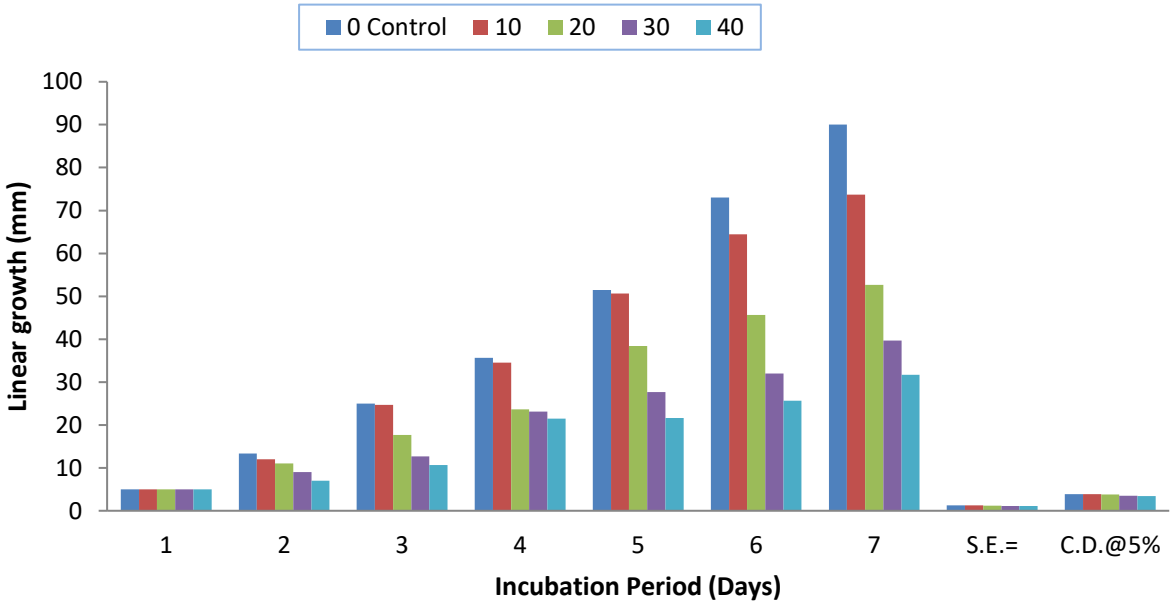

Fig. 2 : Effect of methanolic leaf extract of *Azadirchta Indica* juss. on linear growth of *Rhizoctonia solani*

Results and Discussions:

The methanolic and auqeous leaves extract of *Azadirachta indica* Juss plant was used to study its effect on growth of *Rhizoctonia solani* causing leaf blight of turmeric. The different concentrations of leaves extract used were as 0.0 (control), 10, 20, 30 and 40%.The *Azadirachta indica* Juss. methanolic leaves extract at 10% shows 73.66 mm growth, at 20% Shows 52.66 mm growth, at 30% shows 39.66 mm growth and at 40% shows 31.66 mm growth on 7th day of incubation period. The 40% methanolic concentration of *Azadirachta indica* leaves was found to be most effective in reducing the mycelial growth of the pathogen. The aqueous leaves extract at 10% shows 40.66 mm growth, at 20% shows 22.66 mm growth, at 30% shows 5.00 mm growth and at 40% shows 5.00 mm growth on 7thday of incubation period.30% of aqueous extract was found to be most effective in reducing the mycelial growth of the pathogen. The observations indicate that both aqueous and methanolic extract of *Azadirachta indica* reduces the mycelial growth of *Rhizoctonia solani* over control as mentioned in Table 1.

Conclusion:

Above study reveals that both the aqueous and methanolic extract of *Azadirachta indica* inhibits the mycelial growth of *Rhizoctonia solani* with increasing concentration.

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