



## EVALUATION OF ANTIFUNGAL ACTIVITY OF MEDICINAL PLANT EXTRACTS AGAINST *FUSARIUM oxysporum* f.sp. *lycopersici*

■ Kahkashan Arzoo and S. K. Biswas

Department of Plant Pathology, C.S.A. University of Agriculture & Technology Kanpur (U.P.) INDIA

Email : samirkrbiswas@rediffmail.com

Tomato is an important vegetable crop but its efficient production is challenged by many pest and diseases. Among diseases, Fusarium wilt is one of the most important diseases. The causal organism of the disease is *Fusarium oxysporum* f.sp. *lycopersici*. The conventional method for management of the disease is use of resistant varieties and spray of fungicides. Botanicals can serve as an alternative method of the management of the disease. The presence of antifungal compounds in higher plants has long been recognized as an important factor for disease control. Such compounds being biodegradable and selective in their toxicity are considered valuable for controlling plant diseases. The pesticidal compounds of plant origin are more effective and have little or no side effects on human beings in comparison to synthetic compounds (Kumar *et al.*, 1995). Therefore, a study was carried out for the evaluation of various plant extracts against the pathogen.

The plant and plant parts namely Bark of Eucalyptus (*Eucalyptus lanceolatus*), Bark of Arjun (*Terminalia arjuna*), Tubers of motha (*Cyperus rotundus*), Ashwagandha leaves (*Withania sominifera*), Neem leaves (*Azadirachta indica*), Onion bulb (*Allium cepa*), Datura leaves (*Datura stromonium*), Garlic cloves (*Allium sativum*), Babool leaves (*Acacia arabica*), Lemongrass leaves (*Cymbopogon flexosus*) were collected from Students Research Farm, C.S. Azad University of Agriculture and Technology, Kanpur and the vicinity area of Kanpur. The extracts of such plants were used as inducers in induce resistance. Exactly 5 g of each plant part were taken and crushed in mortar and pestle along with distilled water ratio of (1 : 5). It was later filtered with muslin cloth and pure extracts were collected for further study. At the time of using, the extracts were diluted in 225 ml of distilled water to make

final solution of 250 ml. The experiment was conducted by using poison food technique in the Department of Plant Pathology, C. S. A. University of Agriculture & Technology, Kanpur. The sterilized media with plant extracts (5:1) was poured in sterilized Petri plates under aseptic condition under a laminar air flow. After solidification of media a 0.5 mm diameter mycelia disc was cut from periphery of actively growing pure culture of the pathogen (*Fusarium oxysporum* f.sp. *lycopersici*) and was placed at the centre of each Petri plate. Three replications were kept for each treatment and PDA without any treatment served as control. Petri plates were incubated at 28±1°C and mycelia growth was measured at every 24 hrs interval upto seven days.

The antifungal activity of different plant extracts was determined *in vitro* following poison food technique. The results are presented in Table 1 shows that garlic extract (14.67mm) was able to reduced maximum inhibition of mycelia growth of *Fusarium oxysporum* f.sp. *lycopersici*, followed by neem, ginger, onion and motha, showing 19.00 mm, 25.00 mm, 28.00 mm, 41.33 mm diameter respectively. The per cent inhibition were recorded by 82.11%, 76.33%, 69.51%, 65.85% and 49.59% over control 1 in case of garlic extract, neem, ginger, onion and motha, respectively. Other treatments were also significantly inhibited mycelial growth of *Fusarium oxysporum* f.sp. *lycopersici*. Srivastava and Yadav (2008). showed that the antifungal activity of some medicinal plants against *Fusarium oxysporum* f. sp. *lycopersici*. in garlic. Kumar *et al.* (2009) also found that the antifungal activity of plant extract against leaf blight of maize. Raja and Kurucheve (1999) also found that hot water extracts of garlic and ginger completely inhibited the mycelial growth of *Macrophmina phasiolina* and *F. oxysporum* f.sp. *lycopersici*. Ray *et al.*

**Table 1: Effect of plant extract on the mycelial growth of *Fusariumoxysporum* f. sp. *lycopersici***

Treatments	Mycelial growth in Diam (mm)	% reduction against control-1	% reduction against control-2
Eucalyptus lanceolotus	70.67	13.8	14.1
Terminalia arjuna	73.67	10.1	10.5
Cyperusro tundus	41.33	49.5	49.8
Withamiaso minifera	53.34	34.9	35.2
Azadirachta indica	19.0	76.8	76.9
Allium cepa	28.0	65.8	65.9
Daturastromonium	71.34	13.0	13.
Allium sativum	14.67	82.1	82.1
Acacia Arabica	57.34	30.0	30.3
Cymbopogon flexosus	62.00	24.3	24.7
Emblica officinalis	65.00	20.7	21.0
Zingibe rofficinale	25.00	69.5	69.6
Partheniumhysterophorus	76.00	7.3	7.7
Control-1	82.00		
Control-2	82.34		
S.E.	0.506257		
C.D. (P=0.05)	1.03377		

(2004) observed that the effective inhibition of mycelial growth *F. oxysporum* f.sp. *lycopersici* by leaf extract of neem. Bodhini *et al.* (2003) also proved the antifungal activity of ginger rhizome by showing the presence of chitin hydrolyzing enzyme chitinase.

## REFERENCES

**Bodhini D, Patani P, Vidyalakshmi A and Blasubramanian R (2003).** Partial purification and properties of chitinase from skin and tissues *Zingiber officinale* rhizome. *J. Mycol. Pl. Pathol.*, **33** (2): 185-194.

**Kumar A, Roy S K and Saxena A R (1995).** *In vitro* control of *Escherichiacoli* by herbal treatment, *Neo Botanica*. **3**: 1-2.

**Kumar Sanjeev, Rani A and Jha M M (2009).** Evaluation of Plant extracts for management of maydis leaf blight of maize. *Ann. Pl. Protec. Sci.* **17**: 130-132

**Raja J and Kurucheve V (1999).** Fungicidal activity of plant and animal products. *Ann. Agric. Res.*, **20** (1): 113-115.

**Ray A B, Sharma B K and Singh U P (2004).** Medicinal Properties of Plants; Antifungal, Antibacterial and Antiviral Activities. IBDC Publishing Division.

**Srivastava D K and Yadav H L (2008).** Antifungal activity of some medicinal plants against *Fusarium oxisporum* f. sp. *lycopersici*. *Indian Phytopath.* **61**(1):99-102.

\*\*\*\*\*