



MANAGEMENT OF FUNGAL DISEASES OF ONION (*ALLIUM CEPA* L.) BY USING PLANT EXTRACT.

K.N.GAIKWAD, SHOBHA U. JADHAV AND V.R.KAKULTE

S.V.K.T. College, Deolali Camp
Department of Botany, Nashik-2, India.

ABSTRACT

Onion is a most Important Vegetable crop grown throughout the world. Onion suffers from pest and fungal diseases but the fungicides cause pollution and disturb microbial balance of the soil. Under integrated fungal disease management programme cost effective and eco- friendly component like plant extracts are used to control plant pathogens. *Alternaria porri*, *Fusarium oxysporium*, *Stemphylium vesicarium* are soil borne pathogens of onion. Effect of three different plant extract (*Lawsonia alba*, *Parthenium hysterophorus*, *Moringa oleifera*) at five different concentration Viz, 10,25,50,75 and 100 percentage on these pathogens was studied by food poisoning technique. *Lawsonia alba* gave 88.88% growth of *Alternaria porri* at 10% extract concentration and 33.33% growth at 100% extract concentration. In *parthenium hysterophorus*. at 10% extract concentration 87.5% growth and at 100% extract concentration 20.83% growth of *Stemphylium vesicarium* was observed. *Stemphylium vesicarium* give good in inhibitory response as compared to *Alternaria porri* and *Fusarium oxysporium* . *Moringa oleifera* in 10% extract concentration 89.47% growth and in 100% extract concentration 47.36% growth of *Stemphylium vesicarium* was recorded. *Stemphylium vesicarium* give good inhibitory response as compared to *Fusarium oxysporium*.

Keywords : Pathogen, Onion, Plant extract.

INTRODUCTION

Onion (*Allium cepa* L.) a bulbous, biennial herb is one of the most important vegetable crops grown in India. It belongs to family Alliaceae and about 300 species of *Allium* are known, Diseases are limiting factors for the successful production of onion crop in India. The major fungal diseases of onion are leaf blight, purple blotch, basal rot and downy mildew. These diseases are mostly controlled by used of synthetic fungicides (Bollen, 1979; ShivpuriAsha and Gupta, 2001; Mathur and Sharma, 2006; Mathuret a/., 2007; Wainwright, 1979). Many pesticidal compounds are directly introduced into agricultural land for combating soil borne diseases and pests. These chemicals reach the soil, cause pollution and disturb the microbial balance in the soil. Thus, changing production system scenario demands for cost effective easily adaptable and eco-friendly tools for the efficient management of fungal diseases of onion. Integrated Fungal Disease Management

Programme emphasis the use of eco-friendly cost effective and easily available components like plant extracts for control of fungal disease and reduce the use of chemical fungicides. Many workers have reported the use of plant extract for controlling the growth of disease causing pathogens of onion (Bajwa, et al., 2003; Bansal and Gupta, 2000; Ghewande, 1989; Pushpker and Saler, 2010; Sharma, et al., 2004; Sharma and Sain, 2005; Singh and Singh, 2005; Rana, et al., 2007; Singh et al., 2007). The present study reports the effects of different plant leaf extracts viz. *Lawsonia alba* L, *parthenium hysterophorus* L, *Moringa oleifera* Lam. against fungal pathogens of onion like *Alternaria porri*, *Fusarium oxysporium* and *Stemphylium vesicarium*, extract on the growth of onion pathogens.

MATERIALS AND METHODS

The fungal pathogen of onion viz., *Alternaria porri*, *Fusarium oxysporium* and *Stemphylium vesicarium* were isolated from soil and infected onion leaves, by soil dilution and plate count method. Leaf extracts of three plants viz., *Lawsonia alba*, *parthenium hysterophorus*, *Moringa oleifera* was prepared by grinding 100 gm of freshly collected leaves in 100 ml distilled water. Fungi toxicity of the leaf extracts was determined against each pathogen by the food poisoning technique at 10, 25, 50, 75, 100% concentration in of each leaf extract. Petridishes were prepared with 10 ml CzapeckDox Medium and 10 ml of different plant extract at 10, 25,50, 75 and 100% concentration. These plates were inoculated with 7 days old culture of pathogens and plates without plant extract served as control. Linear growth of the fungus was measured after 8 days and the percentage inhibition in growth was calculated.

RESULTS AND DISCUSSION

Alternaria porri, *Fusarium oxysporium*, and *Stemphylium vesicarium* are common soil borne pathogens of onion. Three plant extracts were

used in the present study. It was observed that 100% concentration of all these extracts was more effective in inhibiting the growth of pathogens. *Lawsonia alba* leaf extract was most effective in controlling growth of *Alternaria porri* at 100% concentration, as compared to *Fusarium oxysporium* and *Stemphylium vesicarium*. *Lawsonia alba* gave 88.88% growth of *A. porri* at 10% concentration and 33.33% growth in 100% conc. was observed. *Parthenium hysterophorus* extract was most effective, in controlling growth of *Stemphylium vesicarium*. In *Parthenium hysterophorus* at 10% extract concentration 87.5% growth and at 100% concentration 20.83% growth of *Stemphylium vesicarium* was observed. In *Moringa oleifera* extract 10% concentration 89.47% of growth of- *Stemphylium vesicarium* was observed and in 100% 47.36% growth was recorded, *Stemphylium Vesicarium* give good inhibitory response as compared to *Alternaria porri* and *Fusarium oxysporium*. Thus all three plant extract were beneficial and showed result in inhibiting growth of pathogen. 100% of these extracts were found to be more effective in inhibiting growth of pathogen. *Lawsonia alba* was more effective against *Alternaria porri*, *Parthenium hysterophorus* and *Moringa oleifera* was more effective against *Stemphylium vesicarium*.

Table 1

Effect of Lawsonia albaL,extract on the percentage growth of pathogens on the 8th day of incubation.

Sr. No.	Name of fungi	Concentration of plants extract in percentage				
		Percentage growth over control				
		10%	25%	50%	75%	100%
1.	<i>Alternaria porri</i>	88.88	77.77	72.22	50.00	33.33
2.	<i>Fusarium oxysporium</i>	92.30	84.61	76.92	73.07	65.38
3.	<i>Stemphylium vesicarium</i>	90.90	90.90	63.63	54.54	40.90

Table 2

Effect of Parthenium hysterophorus,L extract on the percentage growth of pathogens on the 8th clay of incubation.

Sr. No.	Name of fungi	Concentration of plants extract in percentage				
		Percentage growth over control				
		10%	25%	50%	75%	100%
1.	<i>Alternaria porri</i>	84.21	73.68	68.42	57.89	42.10
2.	<i>Fusarium oxysporium</i>	89.47	78.94	73.68	63.15	52.63
3.	<i>Stemphylium vesicarium</i>	87.5	83.33	87.5	83.33	20.83

Table 3
Effect of, Moringa oleifera Lam. extract on the percentage growth of pathogens on the 8th day of incubation.

Sr. No.	Name of fungi	Concentration of plants extract in percentage				
		Percentage growth over control				
		10%	25%	50%	75%	100%
1.	<i>Alternaria porri</i>	81.81	77.27	68.18	54.54	54.54
2.	<i>Fusarium oxysporium</i>	88.88	83.33	77.77	72.22	55.55
3.	<i>Stemphylium vesicarium</i>	89.47	89.47	68.42	57.89	47.36

REFERENCES

- Bajwa, Rukhsana, Khalid, Afia and Checma.TabindaShahid. 2003. Antifungal activity of Allelopathic plant extracts : Growth response of some pathogenic fungi to aqueous extract of *Parthenium hysterophorus*. Pakistan Journal of Plant Pathology 2 (3): 145 -156.
- Bansal, R.K. and Gupta, Rajesh Kumar, 2000. Evaluation of plant extracts against *Fusarium oxysporium*, wilt pathogen of *fenugreek*. Indian phytopath.53 (1): 107 -108.
- Bollen, G.J. 1979. Slide effect of pesticides on microbial interactions. In : soil borne plant pathogen (B. Schippers and W. Gams eds.).Academic press, London, pp : 451 - 481.
- Ghewande, M.P. 1989. Management of foliar diseases of groundnut using a plant extract. Indian J. Agri. Sci. 59 (2): 133-134.
- Kancihari, Janki 2007.Management of sheath blight of rice through fungicides and botanicals. Indian phytopath.60 (2): 214 - 217.
- Mathur, Kamlesh and Sharma, S.N. 2006. Evaluation of fungicides against *Alternaria porri* and *Stemphylium vesicarium* disease of onion in Rajasthan. J. Mycol PI Pathol. 36 (2).
- Mathur, Kamlesh , Gurjar, R.B.S., Shanna, S.N. and Sharma, Kuldeep 2007. Efficacy of fungicides, bioagents and plant extracts against pink root rot disease of onion induced by *Fusarium solani*, J. Mycol. PI. Pathol.37(3):
- Pushpker, R. and Saler, R.S. 2011. Use of eco-friendly components in integrated fungal disease management of groundnut C. V. SB-11 (*Archis hypogea* L.)Bionano Frontier Vol. 4 (2) July - Dec.2011.
- Ran aUsha, Sugha, S.K. and Rana, S.K. 2007. Intergrated management of Colocasi (*Colocasia esculenta*) J, blight. Indian phytopath, 60 (4): 457 - 461.
- Shivpuri, Asha and Gupta, R.B.L. 2001. Evaluation of different fungicides and plant extracts against *Sderotinia selerotiorum* causing stem rot of mustard, India phytopath. 54 (2): 272 - 274.
- Sharma, Pratibha, Kulshrestha, G., Gopal, M. and Kadu, LN. 2004. Integrated management of chilli die back anthracnose in Delhi region. Indian phytopath.54 (4): 427 - 734.
- Sharma, Pratibha and Sain, S.K. 2005. Use of biotic agents and a biotic compounds against damping off of cauliflower caused by *Phytium aphanidermatum* .Indian phytopath.58 (4): 395 - 401.
- Singh, Mandvi and Singh, R.P. 2005. Management of mushrron pathogens through botanicals. Indian phytopath.58 (2): 189 - 193.
- Singh, Sheo Raj, Prajapati, R.K., Srivastava, S.S.L., Pandey, R.K.and Gupta, P.K. 2007. Evaluation of different botanicals and non-target pesticides against *Scterotium rolfsii* causing collar rot of lentil. Indian phytopath.60 (4): 499 - 501.