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EVALUATION OF BOTANICALS AGAINST *FUSARIUM OXYSPORUM* F. SPP. *VIGNI* WILT PATHOGEN OF MUNG BEAN (*VIGNA RADIATA* L. WILEZEK)

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Abstract

Nine plants extracts *i.e.* Neem (*Azadirachta indica*), Karanj (*Pangamia pinnata*), Babul (*Acacia nilotica*), Neelgiri (*Eukalyptus tereticornis*), Ashok (*Polyalthia longifolia*), Tulsi (*Ocimum sanctum*), *Bougainvillea* (*Bougainvillea* sp) and Mehndi (*Lausonia alba*) showed antifungal properties against *Fusarium oxysporum* f. spp. *vigni* when tested under laboratory condition at three concentrations (10%, 20% and 30%). Among nine plants leaf extracts, Neem (*Azadirachta indica*) showed highly toxic against *Fusarium oxysporum* at 48 hours observation time for concentration 30%.

Key words : Inhibition, plant extract, *F. oxysporum*, *V. radiata*.

Introduction

Botanicals are gaining importance in crop protection in view of their selective properties, low cost and safer to ecosystem. Many botanicals have been identified to be effective in the control of plant diseases (Ahmed and Grainage, 1982). Presence of antimicrobial substances in plant has attracted attention of many research workers in recent year. A number of plants have been shown to have antimicrobial substances (Spencer *et al*., 1957; Mercer *et al*., 1970; Nicalis, 1970; Nene and Kumar, 1966; Defoses, 1966). The antifungal properties of plants have been proved in number of instances as potential means for the control of soil borne disease. Looking to the above said causes present study was done at JNKVV, Jabalpur, M.P., India; to evaluate the efficacy of different botanicals in different concentrations against *Fusarium oxysporum*.

Materials and Methods

The experiment was conducted under laboratory condition to evaluate the efficacy of plant leaves against *Fusarium oxysporum* f. sp. *vigni.* For which fresh plant leaves of nine Botanicals *viz*. *Azadirachta indica*, *Pangamia pinnata*, *Acacia nilotica*, *Eukalyptus tereticornis*, *Polyalthia longifolia*, *Ocimum sanctum*, *Bougainvillea* sp, *Lausonia alba*) were collected and thoroughly washed in running tap water so undesirable contents may remove. Hot water extract was prepared by drying these at 60^0C in hot air oven till complete dryness. Leaves were ground with the help of pestle and mortar in to a fine powder. Ten gram powder of each plant leaf was suspended in 100 ml distilled water and heated at 70^0C for 30 minutes. The decoction was filtered through cotton wool to obtain clear extract (Saramangala *et al*., 1993). Extract of each plant were evaluated using poisoned food technique. Water deficit potato dextrose agar (PDA) medium was prepared and 50 ml medium was poured in 150 ml capacity Erlenmeyer flask. Required quantities (10, 20 and 30 per cent) of extracts were mixed with this water deficit medium and autoclaved as per the method described earlier. The medium along with leaves extract was then poured in to sterile Petri plates. After solidification, the plates were inoculated with five mm disc of test fungus *i.e. Fusarium oxysporum* f. sp. *vigni*. The plates were then incubated at 25 ± 1^0C. Observations on colony diameter were recorded at 48, 96 and 144 hours after inoculation.

Results and Discussion

The effect of botanicals leaf extract on mycelium growth of *F. oxysporum* f. sp. *vigni* at three concentrations 10%, 20% and 30% were observed and mycelial growth was recorded 48, 96 and 196 hours after inoculatiand as presented in the (table 1). The observed data revealed that at ten per cent concentration after 48 hours of incubation neem leaf extract showed maximum

Table 1 : Effect of leaf extract on mycelia growth of *Fusarium oxyporum* f. sp. *vigni*.

Plant species	Table - 1			Table - 2			Table – 3		
	48 Hours			96 Hours			144 Hours		
	Concentrations								
	10%	20%	30%	10%	20%	30%	10%	20%	30%
Azadirachta indica	20.08* (4.54)**	14.02 (3.81)	10(3.24)	30* (5.52)**	25(5.05)	22(4.74)	48* (6.96)**	40(6.71)	38(6.56)
Ocimum sancatum	21(4.64)	17(4.18)	11(3.39)	31(5.61)	26(5.15)	23(4.85)	49(7.04)	42(6.52)	40(6.36)
Pongamia pinnata	25(5.05)	22(4.74)	18(4.30)	32(5.70)	27(5.24)	25(5.05)	50(7.11)	42(6.52)	40(6.36)
Jatropha curcas	28(5.34)	23(4.85)	20(4.53)	33(5.79)	27(5.24)	24(4.95)	54(7.38)	45(6.75)	42(6.52)
Acacia nilotica	28(5.34)	22(4.74)	18(4.30)	33(5.79)	27(5.24)	25(5.05)	55(7.45)	46(6.82)	44(6.67)
Polyanthia longiifolia	29(5.43)	26(5.15)	24(4.95)	33(5.79)	29(5.43)	27(5.24)	56(7.52)	48(6.96)	44(6.67)
Bouganivillea sp.	28(5.34)	25(50.05)	18(4.30)	33(5.79)	28(5.34)	25(5.05)	56(7.52)	49(7.04)	45(6.75)
Lawsonia inermeris	29(5.43)	22(4.74)	20(4.53)	33(5.79)	28(5.34)	24(4.95)	55(7.45)	50(7.11)	47(6.89)
Eucalyptus globulus	29(5.43)	25(5.05)	21(4.64)	33(5.79)	30(5.52)	27(5.24)	56(7.52)	51(7.18)	46(6.82)
Control	30(5.52)	27(5.24)	25(5.05)	50(7.11)	45(6.75)	35(5.96)	60(7.78)	60(7.78)	60(7.78)
S.Em.±	**0.072911**			**0.07063**			**0.044862**		

*Each value is a mean of three replications. **Figure in parentheses are square root transformed values.

(20.08 mm) inhibition in mycelium growth of *F. oxysporum* f. sp. *vigni* followed by tulsi (21.00 mm) and karanj (25.00 mm). Mehndi and Neelgiri did not have any significant inhibition and remained at par with control. At 20 per cent concentration neem, tulsi and mehndi followed the same trend however babool also showed its inhibitory effect where mycelium growth was recorded to be 22.00 mm against control (26.00 mm). The efficacy of mehndi declined (18.00 mm) at 20 percent concentration after 48 hours of inoculation however neem and mehndi remained at par in their efficacy in inhibiting the mycelium growth of the fungus.

The neem leaf extracts showed better results even at ten percent concentrations and its efficacy increased as the concentrations increased upto 40 percent whereas the mycelial growth was reduced as concentrations of leaf extracts increased. Observed results are in accord with the finding of Govindachari *et al*. (1996), Singh and Magumdev (2001) and Shivpuri *et al*. (1997).

Govindachari *et al*. (1996) observed that the neem extracts contained major compounds such as 6 deace tylnimbin, azadiradione nimbin, salanin and exoxyaxdcrae dione, which show antifungal activity. Tulsi (*Ocimum sanctum*) stood second in order of its efficacy where recorded myclial growth was recorded similar results were also recorded by Shivpuri *et al*. (1997) and Tiwari and Nayak (1991). The leaf extracts of mehndi (*Lausania alba*) was also found effective in reducing the myclinl growth of *F. oxysprum* f. sp. *vigni*. The myeclial growth was noted to he reducing at so percent concentration. Similar results were also noted by Bhatragen *et al*. (2004). In general, all the leaf extracts were found superior over control where reduction of mycelial growth was noted Skinner (1995) reported that inhibition of mycelia growth suggests the preserves of antibiotics constitnents or some unknown substances contribute to the inhibiting activity of the plant extract.

References

Agrios, G. N. (1988). *Plant Pathology*, 3rd. ed. Academic press, Inc.: New York. 803pp.

Ahmed, N. and M. Grainage (1982). Some promising plant for pest control under scale farmig operatin in development countries. Working paper resource system institute East-West centre, Honolulu,Hawai and U.S.A.

Anonymous (2008). Cemmissiner Land Resorces M.P. Ministiry of Agriculture, Goverment of India.

Bansal, R. K. and R. K. Gupta (2000). Evaluation of plant extract against *Fusarium oxysporum* wilt pathogen of chickpea *Indian Phytopath*., **53(1)** : 107 – 108.

Defoses, L. (1966). Note on the inhibitory effect of root extracts of clover and mazie on the growth of *Ophibolus graminis* sacc. *Parasitics*, **22** : 17-19.

Govindachari, T. R., G. Suresh and S. Masilamani (1996). Antifugal active of *Azadirachta indica* leaf hexane extract.

Fitoterapia, **70(4)** : 417 - 42

Mercer, P., R. K. S. Wood and A. D. Greenwood (1970). The effect of orange extract an other additives on anthracnose of french beans caused by *Collettotrichum thianum*. *Ann. Bot*., **34** : 593-604.

Nene, Y. L. and K. Kumar (1966). Antifungal properties of *Erigeron linifolius* wild. *Extracts, Natus wissenschaften*, **53** : 363.

Nicalls, J. M. (1970). Antifungal activity in *Passiflora* species. *Ann. Bot*., **34** : 229-237.

Rahman, G. M. M., M. R. Islam and M. A. Wadud (1999). Seed treatment with plant extract and hot water potential biophsical method of controlling seed borne infection in wheat. *Bangladesh Journal of Training and devvelopment*, **12** : 185 – 190.

Sarvamangala, Govindaiah and R. K. Datta (1993). Evaluation of plant extract for the control of fungal disease of murberry. *Indian Phytopatho*., **46(4)** : 398-401.

Smith, I. M., J. Dunez, D. H. Phillips, R. A. Lelliott and S. A. Archer eds (1988). *European handbook of plant diseases*. Blackwell Scientific Publications: Oxford. 583pp.

Spencer, D. M., J. H. Topps and R. L.Wain (1957). Fungistatic properties of plant tissue. An antifugal from the tissue of *Vicia fava*. *Nature, lond*. **179** : 651-652.

Skinner, F. A. (1955). *Modern methods of plant analysis*. Vol. III In : K. Peach and M.V. Tracey (Eds.), Springer – Verlog , Viertev- Band, pp 626-725.

Shivpuri, A., O. P. Sharma and S. L. Jhamaria (1997). Fungi toxic properties of plant extract against pathogenic fungi. *J. Mycol. Pl. Pathol*., **27** : 29 -31.

Singh, U. P., K. K. Pathak and R. B. Singh (1979). Effect of leaf extract of garlic on *Fusarium oxysporum* f. sp. *Ciceri*, *Sclerotinia sclerotiorum* on gram seed. *Mycologia*, **71** : 556 – 564.

Tiwari, S. N. and M. Nayak (1991). Activity of four plant extracts against three fungal pathogens of rice. *Trop. Agri.*, **68** : 373- 375.