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Efficacy of botanicals against *Fusarium oxysporum* f. sp. *dianthi*

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Abstract

Studies were conducted Efficacy of botanicals against *Fusarium oxysporum* f.sp. *dianthi* *in vitro* conditions. The extracts of different botanicals were tested against *F. oxysporum* f.sp. *dianthi* by poisoned food technique *in vitro*. Least growth of pathogen was recorded in extracts of neem leaf extract showing excellent inhibitory effect of (78.19 %) reduction over control. Next best in order of merit was Eucalyptus extract (75.87%) followed by ashoka extract (72.48%) and colotropis extract (65.22%) and least by others. Among the neem oil cake and Datura extract maximum growth inhibition of (62.09%) and (60.27%) over control, respectively.

Keywords: Colotropis extract, *Fusarium oxysporum* f. sp. *dianthi*, Neem leaf extract.

Introduction

Carnation (*Dianthus caryophyllus* L.) is one of the most popular commercially grown flowers of the world. Carnation is preferred to roses and chrysanthemums by several exporting countries, on account of its excellent keeping quality, wide range of forms and colours and ability to withstand long distance transportation. Cut carnations, roses and chrysanthemums contribute close to 50 per cent of the world cut flower trade (Jawaharlal *et al.*, 2009) [1]. There are several diseases reported in carnation including rust caused by *Uromyces dianthi*, leaf blight by *Alternaria dianthi*, grey mold by *Botrytis cinerea*, *Fusarium* wilt caused by *Fusarium oxysporum* f. sp. *dianthi*, leaf spot by *Cercospora* and *Cladosporium* and root and stem rots caused by *Rhizoctonia solani* or *F. roseum*. Among them, *Fusarium* wilt is an important soil borne disease occurring prevalently in carnation fields (Kyoung *et al.*, 2001) [2]. The wilt is being controlled through systemic fungicides but it leads to health hazards, environmental pollution and toxicity. It also reduces population of beneficial microorganisms in soil. Hence, it is obligatory to find out some alternate resources to reduce the chemical fungicides usage. Therefore, research on suitable botanical needed to get positive results in the botanical control of soil borne pathogens. The present investigation was taken to manage the disease by use of botanical due soil borne nature of the pathogen.

Materials and Method

In vitro evaluation of botanical against *Fusarium oxysporum* f. sp. *dianthi*. The aqueous plant extracts of neem leaf extract, Eucalyptus leaf extract, Ashoka leaf extract, Calotropis leaf extract, Neem oil cake, Datura leaf extract, were prepared as per the method described by Bhatti (1988). The effect of plant extracts on mycelial growth was studied by 'Poisoned Food Technique' (Rao and Srivastava (1994). All the plant extracts were tested at 10 per cent concentration against the test pathogen using oat meal agar as a basal medium. The experiment was planned with CRD and all the treatments replicated thrice. The observations on colony diameter of the fungus were recorded when untreated control Petri plate was fully covered with mycelial growth and the per cent inhibition of the test fungus was calculated.

Results and Discussion

In vitro evaluation of botanical against *Fusarium oxysporum* f. sp. *dianthi*. The aqueous extracts of six plant species were tested against the test fungus to exploit their antifungal properties. All the plant extracts were tested at 10 per cent concentration by using Poisoned Food Technique. All the plant extracts tested showed antifungal activity against *F. oxysporum*. The data presented in Table 1 revealed that the complete inhibition of *F. oxysporum* f. sp. *dianthi* was achieved due to neem leaf extract and was significantly superior over rest of the treatments. Extracts of Eucalyptus, ashoka, Calotropis leaf, neem oil cake, Datura leaf exhibited 75.87, 72.48, 65.22, 62.09, 60.27 per cent inhibition of the test fungus over control, respectively.

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In vitro evaluation of botanical against *Fusarium oxysporum* f. sp. *dianthi*. The complete inhibition of pathogen was achieved due to Neem and was significantly superior over rest of the treatments. Extracts of Eucalyptus, ashoka, Calotropis leaf, neem oil cake, Datura leaf exhibited 75.87, 72.48, 65.22, 62.09, 60.27 per cent inhibition of the test fungus over control, respectively. According to Kadam *et al.* (2014) [3] neem showed maximum growth inhibition of *Fusarium oxysporum* f. sp. *gladioli* followed by Nilgiri). Ashoka and

Nilgiri showed 72.48 and 75.87 per cent inhibition over control, respectively and were at par with each other. The leaf extract of Neem oil cake and Datura were found to be least effective in inhibiting the mycelial growth of the test pathogen which recorded only 62.09 and 60.27 per cent inhibition over control. C. Kishore and Kulkrani also reported the antifungal activity of different phyto extracts against wilt causing *Fusarium oxysporum* f. sp. *dianthi* in carnation.

Table 1: Per-cent inhibition mycelial over control of botanicals against *Fusarium oxysporum* f.sp. *dianthi*.

Treatments	Treatment	Concentration	Mean colony diameter (mm)	Per-cent Inhibition
T ₀	Control	-	86.00	00a
T ₁	Neem leaf extract	(10%)	18.75	78.19g
T ₂	Eucalyptus leaf extract	(10%)	20.75	75.87f
T ₃	Ashoka leaf extract	(10%)	23.66	72.48e
T ₄	Calotropis leaf extract	(10%)	29.91	65.22d
T ₅	Neem oil cake	(10%)	32.60	62.09c
T ₆	Datura leaf extract	(10%)	34.16	60.27b
			S.E. (m) ± 0.5.08	
			C.D. (5%) 1.14	

Conclusion

Among different plant extracts Neem leaf extract (78.19 per cent inhibition over control) was emerged as most effective botanical tested against *Fusarium oxysporum* f. sp. *dianthi* followed by the extracts of Eucalyptus leaf, Ashoka leaf, Calotropis leaf, Neem oil, Datura leaf.

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