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# **ORIGINAL ARTICLE**

# Efficacy of Plant Extracts of *Murraya paniculata* L. against *Fusarium oxysporum* f. sp. Udum (Butler) on Pigeon Pea (*Cajanus cajan* L. Mill sp.)

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#### ABSTRACT

Leaf extract of various angiospermic plants showed strong fungitoxicity against Fusarium oxysporum f.sp.udum however, Murraya paniculata extract completely inhibited mycelial growth of the test pathogen. The maximum dilution of extract of absolute inhibition (MDAI) was found to be 1:80 (w/v). The extract remained active up to the 30 days during storage and even after autoclaving up to 30 days when stored at room temperature.

Key words: Extraction, Efficacy, Fusarium oxysporum f sp. udum, Murraya paniculata

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## **INTRODUCTION**

Pigeon pea (*Cajanus cajan* L. Mill sp.) commonly known as Arhar is an important and traditional crop of this country. It is the second most important pulse crop only after Chickpea. The wilt disease of Pigeon pea was first reported from Bihar State of India as early as 1906 (Butler, 1906). Later Butler, 1910 isolated, identified and established the causal organism as *Fusarium udum*. The application of extracts of green plants for the control of diseases caused by various fungi had beed reported earlier (Dubey *et al.*, 1984; Mishra *et al.*, 1988; Nee and Thapilyal, 1993; Pinto *et al.*, 1998; Janisiewiez and Korsten, 2002; Rahman *et al.*, 2010). In present investigation, leaf extract of various higher plants were screened for their fungitoxicity against *Fusarium oxysporum* f. sp. udum, the causal organism of wilt disease of Pigeon pea. Various fungitoxic properties of the extract of *Murraya paniculata* were determined. The effect of increased inoculum and some physical factors viz. autoclaving, temperature and storage was also studied.

## **MATERIALS AND METHODS**

Fresh leaves of different plant collected locally were washed with 70% ethanol. Again the leaves were repeatedly with fresh water and finally with sterilized water in order to remove the traces of ethanol. These leaves were pulverized well and strained through two layers of sterilized cheese cloth and finally the filtrate was centrifuged at about 5000 rpm for five minutes. The extracts thus prepared were tested separately for their fungitoxicity against *Fusarium udum* by poison food technique of Grover and Moore (1962). The MDAI (Maximum Dilution for Absolute inhibition) of the leaf extract of *Murraya paniculata* against the test pathogen (*Fusarium udum*) was determined by usual poisoned food techniques. The fungistatic and fungicidal nature of extracts was evaluated by the method described by Garbour and Houston (1959). The fungitoxic spectrum of the extract against

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10 fungi and effect of increased inoculumn on the toxicity of the extract were studied by poisoned food technique. Besides, the effect of some physical factors viz. autoclaving, temperature and storage on the activity of extract by usual poisoned food technique. Each exp repeated twice and five replicates. The fungitoxicity was calculated and recorded in terms of percentage inhibition.

Plant species	Percentage mycelial inhibition
Aegle marmelos	92.0
Ageratum conyzoids	95.0
Artabotrys hexapetalous L	98.0
Bryophyllum pinnatum (Lam)	18.0
Croton ruxburghii Bal.	96.0
Calotropis procera L)R.Br	86.0
Cleome gynandra L	92.0
Delonix regia Orteg.	40.2
Ephorbia indica Orteg.	40.0
Ficus glomerata L	56.0
Ixora chinensis L.	81.2
Jatropha gossypifolia L.	30.5
Launea asplenifolia (Willd)	77.2
Murraya paniculata L.	100
Spinacea oleracea L.	23.5

**Table1:** Screening of leaf extract against *Fusarium oxysporum* f. sp. Udum

**Table 2:** Maximum Dilution for Absolute Inhibition (MDAI) of the leaf extract *M. paniculata*against *Fusarium oxysporum* f. sp. udum

Different dilutions of leaf extracts	Percentage mycelial inhibition
1:1	100
1:10	100
1:20	100
1:40	100
1:60	100
1:80	100
1:90	98.0

**Table 3:** Fungitoxic spectrum of the leaf extract of *M. paniculata*

Fungal species	Percent mycelial inhibition at MDAI of leaf
Alternata alternata (fr)Keissler	100
Aspergillus flavus Link ex Fr	58.2
Aspergillus niger Van Teigh	76.8
A.terrerus Thom	100
Curvularia ovodea (Hiroe Watanase)	100
Chaetomium globosum Kunje	100
Fusarium oxysporum f.sp.udum Butler	100
F. nivale Ces	78.7
F.moniliforme Sheldon	98.0
Gymnoacus sp.Baron	100
Nigrospora oryzae Mason	100
Penicillium chrysogenum Thom	92.1
P. funiculosum Thom	100
Sepedonium sp. Link	100
Trichoderma viridi Pers ex. Fr.	98.0

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Table 4: Effect of increase of inoculum on the fungitoxicity of leaf extract of *M. paniculata* 

Parameter Increase of inoculums (No. of disc of 5 mm diameter)	Percentage mycelia l inhibition <i>F. oxysporum</i> udum
2	100
4	100
6	100
8	100
10	100

**Table 5:** Effect of some physical factors on the fungi toxicity of leaf extract of *M. paniculata* 

Parameters	Percentage mycelial inhibition <i>F. oxysporum</i> udum	
Effect of storage temp.(30+.2) °C		
01days	100	
05 days	100	
10 days	100	
15 days	100	
25 days	100	
30 days	100	
Effect of temp. °C		
40	100	
60	100	
80	100	
100	100	
Effect of autoclaving (15 lb/sq inch pressure for 20 minute)	100	

## **RESULTS AND DISCUSSION**

During screening of leaf extract of higher plants, the extract of Murraya paniculata exhibited absolute toxicity inhibiting the mycelial growth of the test pathogen completely. The leaf extract of Aegle marmelos, Ageratum conyzoids, Artabotrys hexapetalous, Croton ruxburghii, Cleome gynandra and Murraya paniculata showed strong toxicity (Table 1). The leaf extract of *M. paniculata* was fungicidal at its MDAI of 1:80 (w/v) against the test pathogen (Table 2). The extract inhibited the mycelial growth of 09 fungi completely out of 15 fungi tested at MDAI (Table 3). The increase in inoculum had no adverse effect on activity of the leaf extract (Table 4). The temperature (40-100°C) treatment and autoclaving had no adverse effect on fungitoxicty of extract (Table 5). Further the extract exhibited absolute activity up to 30 days when stored at room temperature. A large numbers of plants from different localities have been screened for their fungi toxicity against different fungi (Pandey et al., 1981; Chandra et al 1981; Dubey et al., 1984; Mishra et al., 1988; Janisiewiez et al., 2005; Sharker et al., 2009; Sobowale et al., 2008; Mona et al., 2010) but the activity of these plants agaist *Fusarium oxysporum* f. sp. udum was neglected so far. In present investigation, M. paniculata showed absolute toxicity against Fusarium oxysporum f. sp. udum. Thus the extract of M. paniculata due to its strong fungitoxicity, broad range of activity, thermostability and persistant of activity during storage may prove useful for the control of causing wilt disease in Pigeon pea plant .Further *in vivo* investigations with active plant are in progress at the laboratory.

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