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RESEARCH ARTICLE

Bio-efficacy of Plant Extracts of *Ageratum conyzoides* L. against *Fusarium oxysporum* psidii on Wilt Disease of Guava

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ABSTRACT
Leaf extract of various angiospermic plants showed strong fungitoxicity against Fusarium oxysporum psidii, however Ageratum conyzoids L. 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 25 days during storage and even after autoclaving up to 25 days when stored at room temperature.
Key words: *Extraction, Efficacy, Fusarium oxysporum psidii, Ageratum conyzoids*

INTRODUCTION
The application of extracts of green plants for the control of diseases caused by various fungi had been reported earlier. (Dubey, *et al.,* 1984; Mishra, *et al.,* 1988; Nee and Thapilyal, 1993; Pinto, *et al.*, 1998; Janisiewiez and Korsten, 2002; Mogle, U. P., 2013). In present investigation, leaf extract of various higher plants were screened for their fungitoxicity against *Fusarium oxysporium* psidii, the causal organism of wilt disease of guava. Various fungitoxic properties of the extract of *Ageratum conyzoides* 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 *F. oxysporum psidii* by poison food technique of Grover and Moore (1962). The MDAI (Maximum Dilution for Absolute inhibition) of the leaf extract of *A. conyzoids* against the test pathogen (*Fusarium oxysporium* psidii) 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 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.

RESULTS AND DISCUSSION

During screening of leaf extract of higher plants, the extract of *A. conyzoids* exhibited absolute toxicity inhibiting the mycelial growth of the test pathogen completely. The leaf extract of *Ageratum conyzoids, Artabotrys hexapetalou, Aegle marmelos, Calotropis procera, Cleome gynandra* and *Croton ruxburghii* showed strong toxicity (Table 1). The leaf extract of *A. conyzoids* was fungicidal at its MDAI of 1:80 (w/v) against the test pathogen (Table 2). The extract inhibited the mycelial growth of 04 fungi completely out of 10 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 25 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; Sobowale, *et al.,* 2008; Mona *et al.,* 2010) but the activity of these plants agaist *Fusarium oxysporum* psidii was neglected so far. In present investigation, *A. conyzoids* showed absolute toxicity against *F. oxysporum* psidii.

Table1: Screening of leaf extract against *F.oxysporum* psidii

Plant species	Percentage mycelial inhibition
Aegle marmelos L	90.2
Artabotrys hexapetalous L	96.0
Ageratum conyzoids L	100
Calotropis procera L	84.0
Cleome gynandraL	90.0
Croton ruxburghii Bal.	95.0
Ixora chinensis L	79.8
Launea asplenifolia Hook.	75.2
Ficus glomerata L	54.0
Delonix regia L	38.9

Table 2: Maximum Dilution for Absolute Inhibition (MDAI) of the leaf extract of *A. conyozoids* against *F. oxysporum* psidii

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 *A. conyzoids*

Fungal species	Percent mycelia inhibition at MDAI of leaf
Alternata alternate(fr *:)*Keissler	100
Aspergillus flavus Link ex Fr	58.2
Aspergillus niger Van Teigh	76.8
F.oxysporum psidii L	100
F. nivale Ces	78.7
Penicillum chrysogenum Thom	92.0
Trichoderma viridi Pers ex. *Fr.*	98.0
F.moniliforme Sheldon	98.00
Curvularia avoidea (Hiroe& Watanase)	100
P. funiculosum Thom	100

Table 4: Effect of increase of inoculum on the fungitoxicity of leaf extract of *A. conyzoids*

Parameter Increase of inoculums (No. of disc of 5 mm diameter)	Percentage mycelia inhibition *F. oxysporum* psidii
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 *A. conyzoids*

Parameters	Percentage mycelial inhibition *F. oxysporum* psidii
Effect of storage temp.(30+2) °C	
01days	100
05 days	100
10 days	100
15 days	100
25 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

Thus the extract of *A. conyozoids* 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 guava plant. Further *in-vivo* investigations with active plant are in progress at the laboratory.

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