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Bio-efficacy of leaf extract of *Aegle marmelos* (L) Corrs. on storage fungi

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Leaf extract of various angiospermic plant showed strong fungitoxicity against *Fusarium udum* (Linn). However, water extract of *Aegle marmelos* (L.) Corrs. completely inhibited the mycelial growth of the test pathogen. The maximum dilution of extract for absolute inhibition (MDAI) was found to be 1:80 (w/v). The extract remained active up to 30 days during strong and even after autoclaving up to 30 days when stored at room temperature.

Key words : *Fusarium udum, Aegle marmelos,* antifungal activity

INTRODUCTION

Research for environmentally sound pesticides received an impetus following the publiction of silent spring. Numerous higher plants and their constituents have shown success in plant disease control and proved to be harmless and non-phytotoxic unlike chemical fungicides (Spencer *et al.*, 1957 ; Sharma, 1989 ; Dubey, 1991). The application of extract of green plants for the control of disease caused by various fungi had been reported by Mishra *et al.* (1988), Sharma (2000). In the present communication leaf extracts from angiospermic plants were screened for their fungitoxicity against *Fusarium oxysporum* f. sp. *udum* Linn., the causal organism of wilt disease in *Cajanus cajans* (Arhar). The rationale for exploiting plants for antifungal drugs stems from the capability of plants to produce a wide array of secondary metabolites, which present a large and relatively untapped sourc of antifungal drugs (Sharma, 1998).

MATERIALS AND METHODS

Fresh leaves (100 g) of angiospermic plant collected locally were washed with 70% ethanol and water separately. Final wash with distilled/sterilized water to remove the traces of ethanol. These leaves were pulverized well in sterilized distilled water (100 ml) and strained through two layers of sterilized cheesecloth and finally the filtrate was centrifuged at about 5000 rpm for five minutes. The extract thus prepared were tested separately for their fungitoxicity against *F. oxysporum* f. sp. *udum* by Poisoned food technique of Grover and Moore (1962).

10 ml of Malt agar medium was aseptically poured into each petriplate. Test fungus was inoculated in each patridises separately. The inoculated pertiplate were turned upside down. 5 ml of the pulp picked up with sterilized spoons ws aseptically placed on the lower lid of petriplate.

Control sets were prepared similarity in which the extract was replaced by 5 ml sterilized distilled water containing 2.0 mg Strepto-penicillin soaked in sterilized cotton. Both the treatments and control sets were incubated at 28+°C for 6 days.

Colony diameters in natural perpendicular direction of treatment as well as control sets of each test fungus was measured on the seventh day. Per cent inhibiton of mycelial growth was calculated on mean values of colony diameter by following formula.

$$\text{Per cent inhibition of mycelial growth} = \frac{dc\text{-}dt \times 100}{dc}$$

Where dc = Average diameter of fungal colony in control sets.
dt = Average diameter of fungal colony in treatment sets.

Maximum dilution for absoulte inhibition (MDAI) of the leaf water extract of *Aegle marmelos* against the test pathogen was determined by poisoned food

technique. The fungistatic/fungicidal nature of the extract, the effect of some physical factors viz., autoclaving, temperaturre and storage were also determined by poisoned food technique. The fungitoxicity was calculated and recorded in terms of percentage of mycelial inhibition.

RESULTS AND DISCUSSION

Out of 120 plant species belonging to 48 families were screened leaf water extract of *Aegle marmelos* exhibited the strongest toxicity inhibiting mycelial growth of test fungi.

During screening of leaf extracts of angiospermic plants, the leaf water extract of *A. marmelos* exhibited absoulte toxicity inhibiting the mycelial growth of the test pathogen completely. The leaf water extract of *Aegle marmelos* showed strong toxicity (Table 1) The leaf extract of *Aegle marmelos* was fungicidal at its MDAI of 1 : 80 (w/v) against the test pathogen. The temperature (25–100°C) had no adverse effect on the fungitoxicity of the extract. Chandra *et al.* (1981) reported it to be inactive against *Helminthosporium oryzae.* Kishore *et al.* (1982) reported it to be an active against *Collectotricum fulcatum* and *Rhizoctonia solani.* Thus the extract of *Aegle marmelos* due to its efficacy of plant extracts against *Fusarium oxysporum* strong fungitoxicity broad range of activity, thermostability and persistence of activity during storage may prove useful for the control of *F. oxysporum* f. sp. *udum.* causing wilt disease of *Cajanus cajans.*

Table 1 : Maximum dilution for absolute inhibition (MDAI) of the leaf water extract of *A. marmelos* against *Fusarium udum*

Different dilution of Leaf water extraction	Per cent mycelial inhibition
1:1	100
1:5	100
1:10	100
1:20	100
1:40	100
1:60	100
1:80	100
1:90	98.20
1:100	92.00

Table 2 : Effect of some physical factors on the fungitoxicity of leaf water extract of *Aegle marmelos*

Parameters	Storage period (day)	Per cent mycelial inhibition *Fusarium udum*
Effect of Storage temperature (25 ± °C)	1	100
	5	100
	10	100
	15	100
	20	100
	25	100
	30	100
	35	100
	50	100
	100	100

REFERENCES

Crainage, M. D. and Severer, S. M. (1987). Antibacterial and antifungal activity of *Artabotrys hexapetalous* leaf extract. *Int. J. Disease* **5** : 173-179.

Chandra, H. and Dikshit, A. (1981). Volatile fungitoxicant from the leaves of *Ageratum conyzoides* against *Colletotrichum capsici* and *Penicillum italicum. J. Indian Bot. Soc. (Suppl.)* **60** : 13.

Dubey, N. K. ; Tripathi, N. N. and Dixit, S. N. (1984). Higher plants a promising source of antifungal constituents. In Sinha, R. P. (ed). Roy commemoration fund. Patna Recent Trends in Bot. Res. pp. 210-228.

Mishra, A. K. ; Mishra, D. N. and Tripathi, N. N. (1988). Mycotoxic evaluation of some higher plants. *Nat. Acad. Sci. Letters* **11** (1) : 5-6.

Pandey D. K. ; Tripathi, R. N. ; Tripathi, N. N. and Tripathi, R. D. (1988). Antifungal activity of and some seed extracts. *Environment India* **4** : 83-85.

Sharma, N. and Verma, H. N. (1991). Effect of leaf extract of *Chlerodendron* spp. on fruit rotting fungi. *J. Fitoterapia* **6** : 517-518.

Sharma, N. (1994). Fungitoxic properties of plant latex against some post-harvest disease. *J. Bioved.* **5** : 84-85.

Sharma, N. (1998). Control of post-harvest disease with natural plant products. Post harvest diseases of Horticultural Perishable, 254-162.

Tripathi, R. N. ; Panday, D. K. ; Tripathi, N. N. and Dixit, S. N. (1982). Antifungal activity of some higher plants. *Indian Phytopathology,* **35** : 346-348.

Upadhayay, P. P. ; Singh, J. P. ; and Rao G. P. (1997). Fungitoxic and Phytotoxic studies of vapours of essential oil extracted from *Oscimum* spp. against sugarcane pathogen. *Int. conf. Intregated plant disease Management,* New Delhi. 449.

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