SHORT COMMUNICATION

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Antifungal potential of plant extracts against *Fusarium moniliforme* Sheldon

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ABSTRACT

Aqueous extracts from twenty plants were tested for their antifungal activity against Fusarium moniliforme inciting foot rot of paddy. Test results showed a differential activity of the plant extracts against the mycelium growth. The maximum inhibitory effect (60.23%)was shown by stem extracts of Acacia arabicae against the mycelium growth of test fungi followed by leaf extracts of Datura stramonium (56.00%) and Dedonia viscosa (52.67%) effect against the test fungi. The seed extracts of Aegle marmelos, root extracts of Ficus glomarata, seed extracts of Euclyptus globolus and seed extracts of Anthocephalus cadamba showed appreciable good inhibitory effect.

Key words: *Fusarium moniliforme*, *antifungal*, *activity, plant-extracts*, *phytochemicals*

Production of rice is happened due to several biotic and abiotic factors. Among the biotic factors various diseases such as foot rot, brown leaf spot, blast and bacterial leaf streak, caused due to phytopathogens are major hindrances. The foot rot disease caused by *Fusarium moniliforme* is considered an important disease and has been reported to cause 3.7% to 70% loss in yield in different countries (Bagga and Kumar, 1999). Attempts have been made to manage the disease either by treating with chemical compounds (Goyal, 2001) or through plant extract (Yasmin *et al*., 2008). In the present study, efficacy of twenty plants extracts for antifungal activity against foot rot pathogen was tested.

Plant materials viz. fruit, leaves, rhizome, root, and seed were collected from various parts of Haryana and their neighboring states. Each plant sample was individually grounded into powder for preparation of extract. The fungi *Fusarium moniliforme* (IARI 4824 F) used for the study was obtained from the Division of Plant Pathology, IARI, New Delhi. The cultures were maintained at 4°C on Yeast Glucose Agar medium with periodic sub-culturing. Plant part extract (15% w/v) was prepared by brewing in hot water. 15g dry powder of each plant sample was weighed and put in a cheese cloth bag and suspended in 100ml of boiling distilled water for 20 minutes. The extract was decanted off in to the flask and final volume was raised 100ml. by adding boiled distilled water. The supernatant was used for assay, the antifungal activity of each plant part extract was determined by measuring the mycelium growth inhibition of test fungi as described by Bragulat *et al*. (1991). A known volume of 15% plant sample extract was supplemented with yeast extract, glucose and agar. The medium was sterilized by autoclaving. Yeast Glucose Agar plates, without any plant extract supplementation, was run as control. The test inoculum consisted of a disc 0.65cm. in diameter cut out from the edge of a growing fungal colony on glucose agar medium using a sterilized cork borer and placed at the centre of the agar medium in sterilized conditions. The experiments were conducted in triplicates along with equal number of controls. The fungus was incubated at 27 ± 1°C and their growth diameters were measured after five days. The percentage inhibition was calculated by the formula as:

$$\% \text{ Inhibition} = [(C-T) \times 100/C]$$

Where C = Diameter of control, T = Diameter of test.

The activity of the plant extracts against the mycelial growth of *Fusarium moniliforme* is presented in table 1. It was observed that out of twenty plants tested, stem extracts of *Acacia arabicae* (60.23%)

Table 1. Anti-fungal activity of plants-extracts against *Fusarium moniliforme*

Plant species	Part Used	Percentage Inhibition of Mycelium Growth (Mean ± SD)
Acacia arabicae Willd.	Stem	60.23 ± 0.86
Acacia catechu Willd.	Stem	23.08 ± 2.78
Aegle marmelos (L.)	Seed	48.75 ± 1.12
Anthocephalus cadamba (Mig.)	Seed	37.12 ± 1.66
Capparis decidua (Roth.)	Stem	15.32 ± 2.12
Cassia gulaca (Lam.)	Seed	13.50 ± 1.97
Cedrela toona (Roxb.)	Seed	0.00
Curcuma domastica (L.)	Leaf	16.88 ± 1.76
Dalbergia sisoo (Roxb.)	Leaf	17.44 ± 2.98
Datura stramonium (L.)	Leaf	56.00 ± 1.44
Dedonia viscosa (L.)	Leaf	52.67 ± 1.38
Delonix regia (Vahl.)	Seed	5.95 ± 1.77
Diospyrous melanoxylon (Roxb.)	Seed	0.00
Enga dulcis (Bth.)	Seed	10.59 ± 1.89
Erythrina indica (Roxb.)	Seed	4.23 ± 2.12
Euclyptus globolus (Lab.)	Seed	39.18 ± 1.88
Euphorbia hirta (L.)	Leaf	30.59 ± 1.42
Ficus bengalensis (L.)	Leaf	27.84 ± 2.42
Ficus glomarata (Roxb.)	Root	41.18 ± 1.82
Ficus religiosa (L.)	Leaf	24.75 ± 1.52

showed maximum inhibitory effect against *Fusarium moniliforme*. The leaf extracts of *Datura stramonium* (56.00%) and leaf extracts of *Dedonia viscosa* (52.67%) were observed to show strong inhibitory effect against *Fusarium moniliforme*. Five plants showed moderate inhibitory effect against the mycelial growth of test fungus i.e. seed extracts of *Aegle marmelos* (48.75%), root extracts of *Ficus glomarata* (41.18%), seed extracts of *Euclyptus globolus* (39.18%), seed extracts of *Anthocephalus cadamba* (37.12%), leaf extracts of *Euphorbia hirta* (30.59%) and while ten plants have shown insignificant inhibition of mycelium growth against the test fungus. The strong inhibitory effects of various plant extracts against the mycelium growth of test fungus could be due to the presence of some antimicrobial phytochemicals (Usher, 1971; Pandey, 1993).

Extracts of *Acacia arabicae*, *Dalbergia sisoo, Delonix regia, Enga dulcis* and *Erythrina indica* as inhibitor of phytopathogenic fungi are reported for the first time.

The results indicated of the differential activities of the plant extracts on the mycelium growth of *Fusarium moniliforme* because many of these extracts have shown very strong inhibition against the mycelium growth of test fungi and a definite potential for new effective fungicides.

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