

## **IN VITRO EVALUATION OF PLANT EXTRACTS AGAINST PHYTOPHTHORA MEADII MCRAE**

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### **ABSTRACT**

The use of botanicals and other bioagents in the management of plant diseases is gaining importance. In the present study, aqueous extracts of 20 plant species were tested against 20 isolates of *Phytophthora meadii* McRae causing fruit rot disease of areca palm. The plants commonly available in and around areca plantations were selected for this study. The extract was prepared macerating the plant tissue with equal quantity of distilled water and added in the basal medium of carrot agar to get 10 per cent concentration. The efficacy of different extracts was calculated based on the radial mycelial growth and sporangial production of the fungus. Among the tested plants, the extract of 'henna' (*Lawsonia inermis*) and scented basil (*Ocimum sanctum*) caused maximum reduction in mycelial growth. The possibility of utilizing these plant extracts for control of soil population of *Phytophthora* species could be explored, especially where cocoa and black pepper are grown along with areca palms in the cropping system.

### **INTRODUCTION**

Botanicals and bioagents are widely used for the management of various plant diseases. In the present study, aqueous extracts of 20 plant species collected from in and around areca gardens of the institute were tested against *Phytophthora meadii* McRae, the incitant of fruit rot of areca palm, *Areca catechu* Linn. The fungus causes bud rot, crown rot and leaf rot of seedlings also. Fruit rot is seasonal and appears during south west monsoon period and the crop loss, in severe cases, shoots up to 100 per cent. The existing management measures are spraying the bunches with one per cent Bordeaux mixture and covering of individual bunches with polythene bags. Application of 10 per cent Bordeaux paste and drenching the crown with Bordeaux mixture are the control methods for bud rot disease. The present study was aimed to find out an alternate and eco-friendly method of management of the various *Phytophthora* diseases of areca palm.

### **MATERIALS AND METHODS**

The plant species tested belong to seventeen different families consisting of common weeds, ornamentals and plants with

known medicinal properties (Table 1). These plants are available locally. The extracts were prepared by macerating the leaf tissues with distilled sterile water at 1:1 ratio (w/v) and filtering and squeezing through two layers of muslin cloth. The bioefficacy of the extracts was studied following the poisoned food technique. Uniform concentration of the extract (10%) was used throughout the studies. Twenty isolates of *P. meadii*, isolated from different affected tissues i.e., husk, calyx, kernel, leaf, bud and dry rachis of fruit rot affected bunches were tested. The poisoned plates inoculated with '5mm' fungal disc of the above isolates were kept in the BOD incubator at 24°C for five days. The antifungal property of the extracts was calculated by measuring the radial mycelial growth and the sporangial production. For the sporangial count, the fungal discs cut out from five day old colony of the test fungi was smashed on a macroscopic slide and recorded the number of sporangia present at 10x magnification. The mean of ten observations were calculated for each isolate.

### **RESULTS AND DISCUSSION**

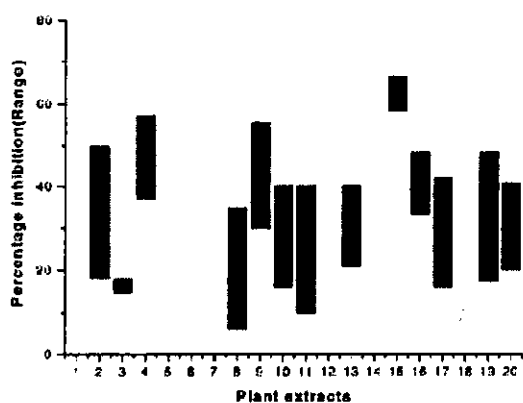
The aqueous extract from henna (*Lawsonia inermis* Linn.) completely suppressed the growth

**Table 1. List of plants used as plant extracts against *P.meadii* McRae**

Sl.No	Common/ vernacular name	Botanical name	Family name
1	Garlic plant	<i>Adenocalymma allicea</i> L.	Bignoniaceae
2	Adalodakam	<i>Adhatoda vasica</i> Nees	Acanthaceae
3	Kiriath	<i>Andrographis paniculata</i> Nees	Acanthaceae
4	Periwinkle	<i>Catharanthus roseus</i> (L.)Don.	Apocynaceae
5	Hydrocotyle	<i>Centella asiatica</i> L.	Umbelliferae
6	Clerodendron	<i>Clerodendron inerme</i> L.	Verbenaceae
7	Cinnamon	<i>Cinnamomum zeylanicum</i> Nees	Lauraceae
8	Blue glum	<i>Eucalyptus globulus</i> Labill.	Myrtaceae
9	Communist pacha	<i>Eupatorium odoratum</i> L.	Asteraceae
10	Narunandi	<i>Hemidesmus pubescens</i> Hook	Asclepiadaceae
11	Lantana	<i>Lantana camara</i> L.	Verbenaceae
12	Henna	<i>Lawsonia inermis</i> L.	Lythraceae
13	Curry leaf	<i>Murraya koenigii</i> Spreng.	Rutaceae
14	Nilenaraga	<i>Naregamia alata</i> W&A	Meliaceae
15	Sacred basil	<i>Ocimum sanctum</i> L.	Labiatae
16	Ashoka tree	<i>Polyalthia longifolia</i> B&H	Anonaceae
17	Nilanelli	<i>Phyllanthus neruri</i> L.	Euphorbiaceae
18	Saraca	<i>Saraca indica</i> L.	Caesalpineaceae
19	Strychine tree	<i>Strychnos nux-vomica</i> L.	Loganiaceae
20	Tamarind	<i>Tamarindus indica</i> L.	Caesalpinaceae

of all the isolates irrespective of the source. Raghu (1990) recorded inhibitory or fungicidal properties of *L. inermis* against *Phytophthora palmivora*, the pod rot pathogen of cocoa *Theobroma cacao* Linn. The next highest per cent reduction in radial growth i.e 58.3-66.7 per cent, was recorded in plates poisoned with extracts of sacred basil (*Ocimum sanctum* Linn.) followed by 'kiriath (*Andrographis paniculata*) at 37.1-57.1 per cent. Asoka tree (*Polyalthia longifolia* B&H.) showed 33.3-48.3 per cent

**Fig. 1. Percentage inhibition of radial growth in different plant extracts**



reduction and the blue gum (*Eucalyptus globulus* Labill..) caused 30.0-45.4 per cent reduction (Fig. 1). Datar(1999)reported the effect of *P.longifolia* against *Macrophomina phaseolina* causing charcoal rot of sorghum. The variation observed in the radial mycelial growth of different isolates on different plant extracts might be due to the variation in concentration of the toxic compounds and also due to the reaction of various isolates to the toxicants in the leaf extracts. In general, the number of sporangia produced by different isolates was the least i.e, 0-20 and did not show significant difference on different extracts. Toxic effect of extracts from a number of plants against a variety of plant pathogens including *Phytophthora* spp. have been reported by many workers (Anandaraj and Leela, 1996; Chauhan and Singh, 1991; Krupa *et al.*, 1973; Datar, 1999; Bisht and Khulbe, 1995; Biswas *et al.*, 1995; Dwivedi and Dubey, 1986).

#### SUMMARY

The present study revealed the possibility of utilising the toxic principles of plant extracts for the management of *P.meadii* diseases of areca palm. Further studies are to be undertaken to isolate the toxic principles of the promising

plant species for their large-scale field application.

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