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# ANTIFUNGAL ACTIVITY OF SOME PLANT LATEX AGAINST FUNGAL PATHOGENS OF *COLOCASIA*

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**ABSTRACT**

The *in vitro* antifungal potency of four plant latex extracts were evaluated for their botanical fungi toxicants on pathogenic fungi of Colocasia (*Colocasia esculanta* L.) The antifungal effect of aqueous extracts of latex namely *Jatropa curcus, Calotropis gigentea,Ficus bengalensis* and *Ficus glomerata* were selected. Due to the presence of bioactive molecules the latex extracts showed significant inhibition in different concentrations. *Jatropa curcus* latex extract showed 100% reduction of radial growth of *Phytophthora colocasiae*.

**Key words**: Colocasia, Pathogens, Medicinal plants latex, Antifungal activity.

## INTRODUCTION

*Colocasia* (*Colocasia esculenta Lin*) of *Araceae* family, is a perennial monocotyledonous herb, it grows to a height of 1-2 metres, the plant consist of central corn (lying just below the soil surface) from which leaves grow upward, roots grow downwards, while cormels, daughter corms and runners (stolons) grows laterally, east Asia is said to be an important region for ethnobotanical and genetic diversity of *Colocasia esculenta* Lin . From its centre of origin, it spread east ward to the rest of South –East Asia and to China, Japan and the Pacific Islands. From Asia it spread west ward to Arabia and the Mediterranean region. It arrived on the east coast of Africa over 2,000 years ago. It was taken by voyagers, first across the continent of Africa, and later on slave trade to the Caribbean. Today *Colocasia esculenta* lin is pantropical in its distribution and cultivation. The largest area of cultivation is in West Africa, which therefore account for the greatest quantity of production. Significant quantities of taro are also grown in the Caribbean and virtually in all humid and sub-humid parts of Asia (Purseglove, 1972). Since pesticides are designed specifically to fight harmful or even dangerous life forms and therefore are toxic to them, they may present hazards to the environment by their potential effect upon non-target organisms, including humans,

particularly when misused. The need to balance these benefits against the risks presents a challenge to the EPA (Environmental Protection Agency) unlike other chemicals.

This complex emulsion consisting of alkaloids, starches, sugars, oils, tannins, resins and gums that coagulates on exposure to air. It is also rich in enzymes like proteases, glucosidases, chitinases and lipases. It has been demonstrated that this substance is a source of natural fungicides (Barkai-Golan, 2001) which is regarded as both safe and effective against various diseases of banana, papaya and other fruits. The water-soluble fraction of papaya latex can completely digest the conidia of many fungi, including important postharvest pathogens (Indrakeerthi & Adikaram, 1996).Other latex extracted from several plants showed a strong antifungal activity against *Botryti cinerea*, *Fusarium* sp. and *Trichoderma* sp. (Barkai-Golan, 2001). The aim of this study was to evaluate the antifungal activity of some medicinal plant used in Ayurveda and traditional medicinal system for treatment of manifestations caused by pathogens.

## MATERIALS AND METHODS

**Plant material and latex collection:** The fresh latex of *Jatropa curcus, Calotropis gigentea, Ficus bengalensis* and *Ficus glomerata* were aseptically collected from the aerial parts of the healthy plants as described by Aworh et al. (1994) in clean glass tubes containing distilled water to yield a dilution rate of 5:5 (v/v). The latex mixture was gently handled to maintain homogeneity during transport to the laboratory where it was stored at (4°C) until further use.

**Fungal Pathogens**

The pathogens such as of *Phytophthora colocasiae* caused by *Colocasia esculanta* leaf blight of were used.

**Preparation of latex extract:**

The fresh latex was selectively decanted and centrifuged at 5000 rpm for 5 min. The precipitated material showing rubber aspect (poly-isoprene) was pooled apart and the supernatant was decanted carefully. Finally the samples were centrifuged as previously described and the clear soluble supernatant was collected and lyophilized The stock solutions of latex extract was diluted suitably as required from stock solution (Juncker et al.,2009).

**Determination of antifungal activity**

Plant latex aqueous extracts of each prepared with distilled water and condensed to serve as stock extract was determined by food poisoning technique (Mishra & Tiwari, 1992) against tested pathogens in five different concentrations. Petriplates containing Czapek Dox Agar (CZA) medium, supplemented with different plant latex extracts at five concentrations (25, 50, 75 and 100%) with three replications were inoculated with fresh 7 days old culture of test fungi in 8 mm discs and kept upside down. The plates were incubated in BOD incubator at 28 ± 2 $^{o}$C., Plates without plant latex extracts served as control. Starting two days after inoculation (DAI), radial growth was recorded daily for 8 days or until the plates were

overgrown. The growth inhibition was calculated by using the formula: 100 X C - T / C, Where C = growth in control and T = growth in treatment (Vincent, 1947).

**RESULTS**

Plant latex used in this study was tested against two pathogenic fungi to determine their antifungal activity. Different concentrations of plant latex (25, 50, 75 and 100%) were tested against pathogenic fungi.

The inhibition effects of the medicinal plant on pathogenic fungi were represented in Table1. *Jatropa curcus* latex extract showed 100% reduction of radial growth of *Phytophthora colocasiae* at 100% &75% conc. respectively.

**Table 1: Antifungal activity of plant latex extracts against pathogenic fungi of *Colocasia esculanta.***

| Plant species | Family | Conc. (%) | Radial growth of *Phytophthora colocasiae* (mm) | Inhibition (%) |
|---|---|---|---|---|
| *Jatropa curcas* | Euphorbiaceae | 25 | 12 | 86.53 |
| | | 50 | 10 | 88.77 |
| | | 75 | 06 | 93.26 |
| | | **100** | **04** | **95.51*** |
| *Calotropis gigantean* | Asclepiadaceae | 25 | 42 | 52.86 |
| | | 50 | 38 | 57.35 |
| | | 75 | 34 | 61.91 |
| | | 100 | 30 | 66.32 |
| *Ficus bengalensis* | Moraceae | 25 | 45 | 49.49 |
| | | 50 | 40 | 55.10 |
| | | 75 | 36 | 59.59 |
| | | 100 | 30 | 66.32 |
| *Ficus glomerata* | Moraceae | 25 | 34 | 61.84 |
| | | 50 | 29 | 67.45 |
| | | 75 | 26 | 70.81 |
| | | 100 | 21 | 76.43 |
| **Control** | | **--** | **89.10** | **--** |
| **CD (P=0.05)** | | **--** | **--** | **8.30** |

## DISCUSSION

The result agrees with Takazawa *et al.*, (1982) that there is a need to employ broad range of extractive solvents in the extractions of possible photochemical from medicinal plants. The growth of four test fungi were inhibited by ethanol and chloroform extracts while the aqueous extract was the least effective on the test fungi. The best antifungal activity was recorded in ethanol extract of *C.procera* latex against *Candida albicans* **(**Kareem et al., 2008). Leaf extracts, chopped leaves and latex of *C. procera* have shown great promise as a nematicide *in vitro* and *in vivo* (Khirstova and Tissot, 1995). The mycelia growth, percentage spores germination and germ- tube extension in *Fusarium oxysporum* and *Aspergillus carbonaris* decreased when *Calotropis procera* extract concentration increases, where as growth of *Humicola brevis* and *Penicillium lanosum* were not affected (Rizk,2008).

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