



## DUAL BEHAVIOUR OF THE EXTRACT OF THEVETIA LEAF: AS AN ANTIFUNGAL AND A FUNGI GROWTH PROMOTER

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### ABSTRACT

Plants contain a lot of chemicals in the form of secondary metabolites which may be used as antifungal components. Today due to health awareness a lot of research works have been carried out to detect their antifungal behaviour and as a result it has been demonstrated that these chemicals can successfully control the growth and sporulation of devastating fungus. Taking this aspect in this research work the extract of *Thevetia* leaf has been tested on the growth pattern of *Alternaria alternata* a harmful fungus of lot of crops and has been detected that the extract of the said plants completely control the growth and sporulation of *Alternaria*. The same extract when is applied on the *Fusarium* a Wilt pathogen of Banana the result was just opposite and a vigorous growth system was found on the petriplate treated with this extract. However in control the growth was found to be normal. This research proves the dual behavior of the extract that the antifungal in case of *Alternaria* and growth promoter in case of *Fusarium*.

**KEYWORDS:** Antifungal, Fungi growth promoter, Secondary metabolites, *Alternaria* and *Fusarium*.

### INTRODUCTION

Higher plants contain a lot of chemicals in the form of secondary metabolites which can be used in the treatment of plants suffering from the harmful fungus. In this research work it has been proved that the extract not only functions as an antifungal but also functions as the growth promoting components. Mahadevan, 1970 considered these secondary metabolites found in the plants as antifungal components and called them Prohibitin. This is a chemical which prohibit or inhibit the growth of pathogenic fungi. After Mahadevan a lot of workers entered in this field and advocated that these chemicals successfully control the growth and sporulation of plant pathogenic fungus. [Bansal and Gupta, 2000; Zewain et al, 2004; Masood et al, 2008; Khan and Tewari, 2011; Bansod and Rai, 2008; Manimegalai et al, 2011; Bhatt et al, 2010].

Medicinal plants are gift of nature which contain a lot of medicinal ingredients and are being used in the cure of different ailments of human beings. From the time immemorial they are in practice of indigenous system of medicines. Nowadays considering the medicinal properties of these plants researchers are engaged to find out the antifungal properties of the medicinal constituents of these plants. It is generally considered that the medicinal ingredients of these plants can be the

alternating source other than the commercial fungicides which are harmful for the health of human beings and are responsible for different health hazards. Considering this fact The World Health Organisation in 1987 (Fortieth World Health Assembly) also advocated the use of the alternating source other than the harmful chemicals in the form of commercial fungicides.

This chemicals have been proved potent harmful for the health of human beings. No doubt that these chemicals when applied on the infected plants control the growth and further spreading of disease but they persist there for longer period. They are not evaporated or consumed by the biological agents like bacteria and others. Besides this they are absorbed by the agricultural produce and there they persist longer. When the agricultural produce is consumed by human beings the loaded chemicals enter inside the human body through the food chain and create different health disorders in the form of gastric disorders, peptic ulcer, liver cirrhosis, kidney damage, intestinal cancer, and the lungs breakage. These are the severe health problems which directly lead to higher mortality rate. So there is need of the search of alternative of these harmful chemicals and this can be possible only when we may carry the research through the herbal source. It has been proved that the chemicals obtained from the herbal sources become nontoxic and easily degradable in nature. Taking this the matter as a fact the researchers are

engaged themselves to find out the chemicals from herbal sources which may be cheaper and safer for the environment. In this research it has been also observed that the chemicals hidden inside the extract is cidal in effect for some harmful fungus but has growth promoting effect for other fungus also. In this research it has been proved that the extract of *Thevetia* is dual in behavior.

## MATERIALS AND METHODS

The freshly cut 250 gm green leaves of *Thevetia peruviana* were washed with tap water and grinded with a mixer and grinder. The liquid solution containing paste of leaf was filtered with Whatman filter paper no. 1. Now the residual containing filter paper was left inside the thermostat incubator at 80° c for three days. Now the dried residual of leaf was again grinded by mixer machine and a powder was obtained. Now 2 gm of that powder was finally dissolved in 100 ml sterilized distilled water taken inside 250ml conical flask. The mixture was shaken well and the solution was taken in bolted centrifuge tubes. The mixture was centrifuged for 15 minutes by 5000 rpm centrifuge machine. Now the supernatant was ready as the cold extract of *Thevetia* leaf with 2% concentration. This can be applied for the antifungal test.

## ANTIFUNGAL TEST

5ml of supernatant was added in the conical flask

**Table 1: Showing the reduction in mycelium and conidial growth of *Alternaria alternata* on the medium treated with *Thevetia* leaf extract.**



Reduced mycelium growth on petriplate after the treatment.

Extract	Mycelium growth after 7 days	Conidial development
5ml	2.00mm	--
10ml	1.00mm	--
15ml	0.00mm	--
Control	15.1mm	++

Cd5% = 0.00125 and SE= 0.046

++= Excellent conidial growth

--= No conidial growth

**Table 2: The effect of *Thevetia* leaf extract on the mycelial growth of *Fusarium oxysporum* on the Richard solid medium.**

Extract	Mycelium growth after 7 days	Mycelium growth after 18 days	Conidial growth
5ml	10.00mm	25mm	++
10ml	18mm	Complete plate	+++
15ml	22mm	Hypertrophy growth	++++
Control	7mm	25mm	++

Cd5% =0.00115 and SE= 0.42

++= Good growth

+++ = Better growth

++++=Excellent growth

**Table 3: Showing the mycelial growth biomass in Richard liquid medium.**

Extract	Mycelium growth after 7 days	Mycelium growth after 18 days
5ml	120mg	160mg
10ml	180mg	210mg
15ml	196mg	260mg

**Petriplate showing the hypertrophy.**

From the perusal of the table 1, it is evident that the aqueous extract of *Thevetia* leaf has potent antifungal constituents which completely siezes the growth of fungus from both the aspects i.e the mycelial and conidial. This finding is in accordance with the findings of Bansal and Gupta, 2000 who evaluated some plant extract with the pathogen of *Fenugreek*. Further this work is in accordance with the findings of Kuruchev et al, 1997 while working with the screening of higher plants for fungitoxicity against *R. solani*. They thought the inhibitory effects of plant products on the sclerotial production might be attributed to the presence of some antifungal ingredients. The variation in yhr inhibitory effects of various plant extracts may be attributed to the quantitative and qualitative differences in the antifungal principles. In this regards some compouhds of plant origin have recently proved their effectiveness as fungal toxicants because of low phytotoxicity, more systemically, easy biodegradability in estimation in host metabolism.

Dixit et al, 1983, have also screened 2500 samples of different plant sps. against the various pathogens . Of these 70 samples of various plant sps. Have been found to possess strong volatile fungitoxicity., broad fungiyoxic spectrum, thermo stability, long storage period and non phytotoxicity. Many of the essential oils can be exploited as harmless, idigenous and non pollutive sources of fungicides. It was thought that these extracts would provide better coverage for the control of storage disease of different food stuffs.

Zewain et al, 2004, studied the effects of fungicides and neem extract on mycelial growth of *sclerotinia sclerotiorum*. The ethanol extract of neem showed fungitoxic property against this patogen. They have recorded 2mm mycelial growth on mycelium with 1000 ppm extract. In the present investigation it was observed that the extract of *Thevetia* stopped the mycelial growth upto 2 mm only which is the sign of strong antifungal property.

### CONCUSION

From the research it can be concluded that the higher plants contain a lot of antifungal property which can be used as ecofreindly fungicides. This can be the alternative source of the commercial fungicides which is threat for our healthy lives. Nowadays a lot of metabolic disorders have been reported and that may be due to the engulfing the chemically treated food stuffs. If ecofreindly fungicides will be discovered and agricultural crops will be treated with this then healthy products will be available to consume and then no health problrm related to metabolism will occur.

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