

Test of *Thevetia* leaf extract against *Alternaria alternata* a versatile pathogen of different crops

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ABSTRACT

Alternaria alternata is a versatile fungus infecting different group of plants and produce serious disease which results the great damage in net production. Farmers apply the recommended fungicides available commercially. These chemicals become harmful for human health. They cause different health disorders which is responsible for high mortality rate. There is need of research to such chemical which can control the pathogenic fungus and may reach no harm to human beings. In this research that aspect is considered and an attempt has been taken to find out an effective chemical for the control of *Alternaria* and non harmful for the human health.

Keywords: *Thevetia* leaf, *Alternaria alternata*, Fungus, Pathogen, Crops.

INTRODUCTION

Alternaria with its different species is a versatile fungus of Deuteromycetes. It has vast range of host and cause serious deceases after infection. The host on which this fungus infects belongs to economically important crops including grains, vegetables, fruits and even the important medicinal plants. Generally fungus damages the photosynthetic region, the leaf and as a result of which the entire plants get exhausted. Initially black or brown, round or oval spots appear on the leaf surface which later on gets converted into blighted shape. After leaf the infection travels to young shoot which turns to black.

This fungus is responsible for total loss of net production. Farmers generally apply different commercial fungicides to get rid of this fungus. They apply this chemical without knowing the appropriate concentration and how much quantity of dosage should be given to the infected plants as a result of which the plant becomes lodged with heavy quantity of chemicals. The fungus is controlled no doubt but it is also clear that the produce of that plant remain in field chemically treated and finally reach to consumer when they are sold. After consuming this chemical the health of consumer *i.e.* man or cattle get affected by different ailments in the form of digestive disorders like gastric ulcer, peptic ulcer, intestinal disorders, liver cirrhosis, and kidney damage *etc.* (Mishra *et al.*, 1997; Mishra and Dixit, 1977.; Murugesan, 1999 and Sharma *et al.*, 1999) Some of these chemicals become harmful even at low concentration. So, there is need of search a group of chemicals which may become cheaper and safer for the health of people. This will be possible only when we may go through the natural source the plant. Higher plants contain different secondary metabolites in the form of phenol and their derivatives. These chemicals have been proved fungi static or fungicidal. Mahadevan (1970) called them '**Prohibitin**' which prohibit or inhibit the growth and sporulation of pathogenic fungi. This chemical will be used ecofriendly because having low toxicity and biodegradable in nature. Taking such view, in this research it has been decided to taste the efficacy of *Thevetia* leaf against the mycelial growth and conidial

development of *Alternaria alternata* prevalent on the leaf of lady finger the source of inoculums.

MATERIALS AND METHODS

Initially a survey was made to the crop fields which were with standing crop of *Abelmoscus esculentus* (lady finger). The diseased sample was collected and brought to laboratory where they were washed thoroughly with tap water. Now they were cut into pieces average 3-5 mm. in length. Now two or three pieces of sample were again washed with distilled water for 3 minutes. After that they were dipped into 1% solution of AgNO₃ for 1-2 minutes, already kept in a clean watch glass. Now they were transferred in sterilized distilled water to remove the excessive amount of AgNO₃ attached on the surface. This material is now ready for inoculation. They were lifted with the help of sterilized inoculation needle and inoculated on PDA medium containing petriplates. At first a mixed culture was obtained containing different fungal pathogens. Pure culture of required pathogen was obtained by sub culturing petriplates containing PDA medium and adopting single mycelium or single spore technique. The cultured petriplates were maintained at room temperature 28° C inside the chamber of BOD incubator for seven days.

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

Antifungal Test: 5ml. of supernatant was added in the petriplates containing sterilized Czapek's media to poison the food of pathogen. After solidification of media inside the petriplates the source of inoculums was lifted from 7days old petriplates containing pure culture of *Alternaria* and was placed in the centre of petriplates. The triplicate series were maintained at 28°c inside the chamber of incubator. One petridish without the extract was treated as control.

RESULTS AND DISCUSSION

After 7 days only small streak of mycelium was found and after 18 days the retarded mycelium growth was found but no conidial development. The mycelium diameter was measured and presented in Table 1. The result was clearly indicating that the extract shows fungistatic behaviour at 2% concentration (Plate 1 and 2).

Table 1

The effect of extract of *Thevetia* leaf on growth and sporulation of *Alternaria alternata* at 28±1°C.

Extract 2%	Mycelial growth after 7 days	Conidial development
5 ml	2.00 mm	—
10 ml	1.00 mm	—
15 ml	0.00 mm	—
Control	15.1 mm	++

++ = Excellent conidial growth, Cd 5% = 0.00125 and SE = 0.046,

– = No. conidial growth

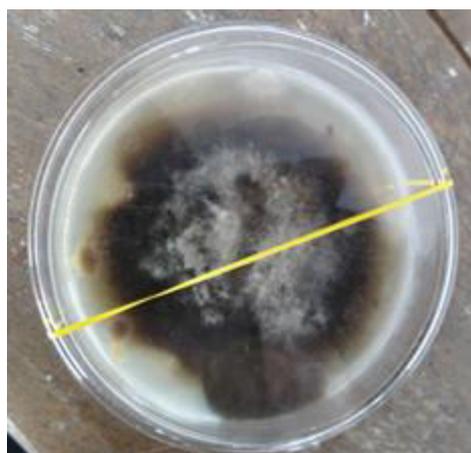
Plate 1: *Alternaria* in culture condition

Plate 2: Petriplate after treatment

From perusal of table, it is evident that the aqueous extract or *Thevetia* has potent antifungal constituents which completely siege the growth of fungus from both the aspects *i.e.* the mycelial and conidial. This finding is in accordance with the findings of Shrivastava and Lal (1997) while working on biofungicidal properties of leaf extract of some plants. They found the leaf extract of *Calotropis procera*, *Lantena camara*, *Ocimum basilicum* and *Azadirachta indica* stopped the mycelia growth of *Curvularia tuberculata* and *Alternaria alternata*. They also reported the maximum toxicity against spore germination. Further this result Justifies the result of Bansal and Gupta (2000) who evaluated some plant extract against *Fusarium oxysporum*, a wilt pathogen of Fenugreek. They have reported the inhibition of growth and sporulation by the extract of *Calotropis procera*, *Atropa belladonna*, *Azadirachta indica* and *Lantena camara*. This research is in accordance with the findings of Zewain *et al.* (2004) who studied the effect of fungicides and neem extract on the mycelial growth of *Sclerotinia sclerotiorum* and reported the mycelial growth only 2mm in length. In this research the mycelium of *Alternaria alternata* has been recorded only 2mm. at 5ml dose.

CONCLUSION

From research it can be concluded that the nature has provided a lot of facilities to man for their protection but there is need of proper search and investigation. Medicinal plants grow in nature and contain a lot of chemical constituents which can be applied to treat the infected plants. These chemicals do in the same way like commercial fungicides. As we know that these commercial chemicals in no mean are useful for the health of mankind but we are applying these chemicals on our infected crops. Finally we engulf the produce of these crops loaded with these chemicals and get result in the form of different health disorders. If such type of research work is carried out and eco-friendly chemicals will be found out then our infected crops will be treated with these beneficial chemical which at any doge will be no harmful for our health. In this way we will provide some beneficial aspects to the suffering society.

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