



In Vitro Efficacy of Partially Purified Nails Component against Chilli Fruit Rot Pathogens

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Abstract: Two pathogens viz., *Alternaria solani* L. and *Fusarium solani* L. were isolated from the infected chilli fruits and their pathogenicity was confirmed. The partially purified nails component preparation was tested against these isolated pathogens. Efficacy of partially purified component isolated from human nails was tested against *Alternaria* and *Fusarium* fruit rot pathogens of chilli by poison food technique. The mycelial growth inhibition of the fungus *A. solani* and *F. solani* with nails component was 70.12% and 72.17%, at concentration 1000ppm over control. The concentration of 500 ppm was also effective (59.27% and 60.62%) but not as much effective as at concentration of 1000 ppm. The mycelial growth inhibition of the fungus *A. solani* was more in comparison to *F. solani*.

Keywords: Chilli, *Alternaria solani*, *Fusarium solani*, human nails,

Introduction

The chilli crops are widely cultivated in the country, but largely attacked by several diseases, particularly fungal diseases. The fungal diseases affecting chilli production are fruit rots, which causes severe damage to mature fruits in the field as well as harvested fruits during transit and storage. Post-harvest fungal rots, which are responsible for decaying the chilli fruits, are *Alternaria* rot, *Fusarium* rot, *Collectotrichum* and *Curvularia* rot. In Udaipur region *Alternaria* and *Fusarium* are most common. The losses, which occur due to post-harvest rots in chillies, ranged from 10 to 15 percent (Khanna, 1978³). So, in this context, it is most important to sustainable management of fruit rot pathogens of chilli.

Now a day's environmental consciousness on the part of Scientists and general public has been drawn attention to the increasing amount of pesticides used in crop plants and their deleterious effect on flora and fauna. These resulted in a search for biodegradable farmers' friendly products, which can be effective in management of plant diseases without any toxic effect. Natural products preparation can replace synthetic chemicals effectively.

So, by using the natural products like Nails components preparation can effectively replace the chemical or synthetic fungicides. Hence the present investigation would provide some comprehensive information about the effect of nails component preparation for

effective management of *Alternaria* and *Fusarium* fruit rot pathogens of chilli.

Materials and Methods

The experiment was carried out at Department of Plant Pathology, Rajasthan College of Agriculture, Udaipur. The infected chilli fruits were collected and brought to laboratory in polythene bags for isolation of fruit rot pathogens.

From infected chilli fruits two pathogens were isolated on Potato Dextrose Agar by single spore after sporulation. Identification of fungus was done on the basis of morphological characteristic including spores, for further identification a pathogenicity test was done in laboratory on chilli fruits by cork wounding method. The pathogens again isolated and comparing the pathogens with the original isolate.

Extraction of partially purified products component from Human nails

Extraction of component from Human nails was done by method given by Sharma and simlot (1971⁸). Human nails were collected then acidified with concentrated H₂SO₄. The waste material from acidified nails was removed with distilled water and sun dried the nails to evaporate the water. Then dried nails were ground in mortar and pestle. The powder nails were dissolved in 50ml ethyl alcohol in a round bottom flask. The round bottom flask was connected with condenser by round tube and upper side of condenser plugged with cotton and continuously heating

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at the temperature of 60°C in heated mental at least 30 minutes. The ethyl alcohol of extract was removed by above mention method. When the volume of the extract remained 1/3rd of total volume, the boiling was stopped. Then extract was solidified by vacuum evaporation method.

In vitro inhibitions of chilli fruit rot pathogens by human nails

The antifungal activity of partially purified product component obtained from nails was tested at two concentration viz., 500ppm and 1000ppm under this study in *in vitro* against mycelial growth of plant pathogens by using poison food technique (Grover and Moore, 1962²).

Human nails preparation was added in sterilized PDA aseptically, thoroughly mixed and 25ml of medium was poured in each petri dish. These petri dishes were inoculated with 2mm disc taken from fresh peripheral growth of seven days old culture of the pathogens and incubated at 28±1°C. Experiment was replicated thrice along with control. Observation was recorded on radial mycelial growth along with the two diagonals through the center of the colony after four days of inoculation. Growth inhibition percentage was calculated by the following formula (Bliss, 1934¹).

$$I = \frac{C - T}{C} \times 100$$

Where,

I = Growth inhibition percentage

C = Average diameter of colony in control

T = Average diameter of colony in treatment

Results and Discussion

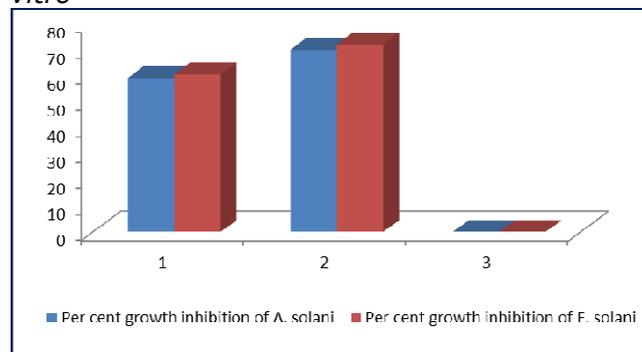
Results were revealed that nails, component varied greatly in their efficacy to inhibit the growth of *Alternaria* and *Fusarium* fruit rot pathogens of chilli (Table.1, Fig.1, and plate.2). The growth inhibition of the fungus *A. solani* and *F. solani* recovered after fourth days of inoculation with nails component was (70.12, 72.17 per cent, respectively) at concentration of 1000 ppm over control. The concentration of 500 ppm was also effective (59.27 and 60.62 per cent) but not as much effective as at concentration 1000ppm. The growth inhibition of the fungus *A. solani* was more in comparison to *F. solani*. The importances of horns of animals and cow dung against disorder in plant have been

mentioned in various ancient literature (Sadhale, 1999⁷). The utility of cow dung and cow urine in management of plant pathogens and pest have been mentioned by Nene *et al.*, (2002⁵) and Noor (2003⁶). Khanuhja *et al.*, (2003⁴). Scientific studies of utilization of biological activities of cow urine and it's Arka (distillate) for Agriculture and health. Hence, our results are also in conformity with their findings.

Table.1: Efficacy of partially purified product component from human nails against *Alternaria solani* and *Fusarium solani* fruit rot pathogens of chilli by poison food technique *in vitro*

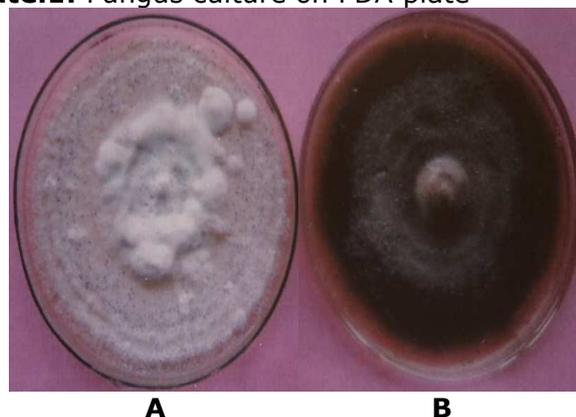
S.No.	concentrations	% growth inhibition of pathogen	
		<i>A. solani</i>	<i>F. solani</i>
1.	500 ppm	59.27	60.62
2.	1000 ppm	70.12	72.17
3.	Control	00.00	00.00
4.	SEm±	0.763	0.610
5.	CD at 5%	2.640	2.110
6.	CV %	3.063	2.386
7.	CD at 1 %	3.999	3.196

Fig.1: Efficacy of partially purified product component from human nails against *Alternaria solani* and *Fusarium solani* fruit rot pathogens of chilli by poison food technique *in vitro*



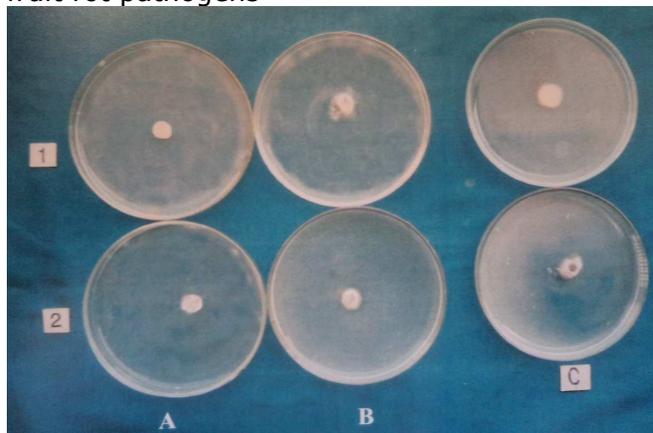
1. concentration 500 ppm
2. concentration 1000 ppm
3. control

Plate.1: Fungus culture on PDA plate



A - *Fusarium solani*
B - *Alternaria solani*

Plate.2: *In vitro* effect of human nails components on inhibition of mycelial growth of fruit rot pathogens



A - 500 ppm concentration 1- *Fusarium solani*
B - 1000 ppm concentration 2- *Alternaria solani*
C - Control

It was observed that nails component was found effective in controlling both fruit rot pathogens *in vitro*.

Conclusion

The present study revealed that the human nails preparation at concentration of 1000ppm was effective and reducing the growth of of *Alternaria* and *Fusarium* fruit rot pathogens of chilli *in vitro*. Hence, they can be used as alternative for effective management of fruit rot pathogens. These treatments may be eco-friendly and causes no environmental pollution as well as development of fungicide resistant in plant pathogens.

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