



## ANTIFUNGAL ACTIVITY OF *VITEX NEGUNDO* LINN. AGAINST SOME PHYTOPATHOGENIC FUNGI

P. Tamuli\*, J. Das<sup>1</sup> and P. Boruah<sup>2</sup>

Department of Botany, Darrang College, Tezpur (Assam), India.

<sup>1</sup>Department of Biotechnology, Defence Research Laboratory, Tezpur (Assam), India.

<sup>2</sup>Division of Medicinal Aromatic and Economic Plants, North East Institute of Sci. and Tech., Jorhat (Assam), India.

### Abstract

Antifungal activity of leaf extract of *Vitex negundo* was tested against *Alternaria alternata*, *Cucurbitaria lunata* and *Sclerotinia sclerotiorum*, causing severe losses to many economically important crop plants. The ethanolic leaf extract was found to be effective against the pathogens when compared to commercial fungicide *in vitro*. It was observed that the inhibitory effect of the commercial fungicide (Dithane M-45) was marginally higher. The per cent inhibition was found higher in *Sclerotinia sclerotiorum* (67.60), while it was 50.56 and 44.43 in *Cucurbitaria lunata* and *Alternaria alternata*, respectively.

**Key words:** Antifungal activity, *Alternaria alternata*, *Cucurbitaria lunata*, Dithane M-45, *Sclerotinia sclerotiorum*, *Vitex negundo*.

### Introduction

With the increase of interest in antibiotics plants as a source of potential antimicrobial substances are receiving considerable attention throughout the world. The presence of naturally occurring substances in plants with anti microbial properties have been recognized and tested against a wide range of pathogenic microbes. Recently, many aqueous plant extracts have been shown to have inhibitory action against some plant as well as human pathogenic microbes. The anti fungal activity of some isolated principles from plant extracts may be more effective than some commercial synthetic fungicides. Now-a-days some synthetic as well as semi-synthetic antimicrobial agents have been developing, among which very few have broad spectrum activity and most of them are environmentally hazardous in nature. The extensive use of agrochemicals especially fungicides, resulted more carcinogenic risk than other pesticides, which may give rise to undesirable biological effects on animals and human beings (Osman and Abdulrahman, 2003).

*Vitex negundo* Linn. Vern. Pasutia (Family - Verbanaceae) is large strongly scented deciduous shrub with various ethnomedicinal uses. Leaves and roots of the plant are regarded as febrifuge and tonic. Warm leaves are applied in rheumatoid arthritis. Leaf powder mixed with water is used in the treatment of fever. An investigation was carried out to evaluate the antifungal

activity of ethanolic extract of dried leaves of *V. negundo* against some destructive phytopathogens, viz., *Alternaria alternata*, *Cucurbitaria lunata* and *Sclerotinia sclerotiorum*.

### Materials and Methods

#### Plant material and test pathogens

The leaves of *V. negundo* were collected from different localities of Sonitpur and Nagaon districts (Assam), India. These were washed 2-3 times in tap water and air dried at room temperature (25<sup>o</sup>-30<sup>o</sup>C). The microorganisms used in this study were obtained from Defence Research Laboratory (DRDO), Tezpur (Assam), India.

#### Preparation of the extract

The dried leaves were ground into powder form, sieved and packaged into polyethylene bags until when needed. 50 g sample of powdered dried leaves were weighed and extracted in Soxhlet extractor with ethanol at 40<sup>o</sup>-60<sup>o</sup>C. The extract obtained was assayed against the test organisms to determine the antifungal properties.

#### Determination of antifungal activity

The retrieved extract was tested for its antifungal activity using agar-well diffusion method. Broth cultures of the test pathogens (400 µl) was spread evenly over the PDA plates separately. Well of 10 mm diameter was made in the centre of the media plate and each well was

\*Author for correspondence : E-mail: tamulip@yahoo.com

**Table 1 :** Efficacy of the ethanol extract of leaf of *Vitex negundo* on plant pathogens.

Conc. (%) / Test pathogen	Zone of inhibition (mm)		
	<i>A. alternata</i>	<i>C. lunata</i>	<i>S. sclerotiorum</i>
2.0	30.32±0.56	32.24±0.43	37.22±1.04
1.0	24.32±0.44	27.22±0.74	29.09±0.78
0.5	20.43±0.52	22.34±0.77	24.31±0.86
0.1	16.22±0.33	18.24±0.33	19.39±0.64
Dithane M-45 (0.003)	36.42±0.49	37.66±1.12	37.41±1.22
Control	0	0	0
Solvent (DMSO)	0	0	0

**Table 2 :** Percent inhibition of the ethanol extract of leaf of *Vitex negundo*.

Conc. (%) / Test pathogen	Percent inhibition		
	<i>A. alternata</i>	<i>C. lunata</i>	<i>S. sclerotiorum</i>
2.0	44.44	50.56	67.60
1.0	28.44	36.00	41.53
0.5	19.75	23.90	28.44
0.1	12.64	16.00	17.52
Dithane M-45 (0.003)	64.00	67.60	67.60

then aseptically filled with the test extract and allowed to diffuse at room temperature for 2 hrs and incubated at  $28 \pm 2^{\circ}\text{C}$  for suitable period. Another set of plates with DMSO was used as control. Comparison was also made with commercial fungicide Dithane M-45. Each treatment was replicated thrice. The efficacy of the extract was determined by measuring the diameter of inhibition zone.

## Results and Discussion

The present study tested the antifungal activity of ethanolic leaf extract of *V. negundo* against *A. alternata*, *C. lunata* and *S. sclerotiorum*. The results showed that the antifungal activity increases with the increase in concentration of the extract (table 1). The maximum zone of inhibition formed by the test extract at 2% concentration were 30.32 mm, 32.24 mm and 37.22 mm in *A. alternata*, *C. lunata* and *S. sclerotiorum*, respectively. It was also observed that the inhibitory effect of the commercial fungicide (Dithane M-45) was marginally higher (36.42 mm, 37.66 mm and 37.41 mm for respective pathogens) than that of the leaf extract. Control plates showed no zone of inhibition in case of all the tested pathogens. Percent inhibition of growth of fungi was as high as 67.60% for *S. sclerotiorum* while it was 50.56% and 44.44% for *C. lunata* and *A. alternata*, respectively (table 2).

In present investigation, *Vitex negundo*, a common

shrub was found to be effective against *A. alternata*, *C. lunata* and *S. sclerotiorum*. They too showed increasing inhibitory effect on the fungal growth with higher concentration compared to control. Sood and Dohroo (2003) while studying the efficacy of 16 plant extracts in controlling the leaf spot in ginger caused by *Phyllosticta zingiberis* found that growth inhibition of fungi increased with increasing concentration of extracts. Das and Das (2006) screened 12 angiospermic plant extracts in and around the same locality of Sonitpur district. Out of these, 6 plant extracts *Mikania scandence*, *Eupatorium odoratum*, *Cassia sophera*, *Leucus plunketii*, *Occimum basilicum* and *Clitoria ternate* were found effective in total inhibition of mycelia growth of *S. sclerotiorum*.

The results of this study showed that the leaf extract of *Vitex negundo* exhibit antifungal properties justifies its traditional use as medicinal plant. The inhibition of the growth of the pathogenic fungi is due to the active ingredients predominantly found in the plant (Shetty *et al.*, 1989). The present investigations are in line with the investigations carried out by other workers (Sarvamangala *et al.*, 1993), which infers that leaf extracts in general have great potentiality in the control of fungal diseases in commercially important crop plants. It may be concluded that keeping aside the environmentally hazardous commercial fungicides, these leaf extracts could be suitable substitute for controlling fungal pathogens.

## Acknowledgement

Authors are grateful to Defence Research and Development Organization (DRDO), Ministry of Defence, New Delhi, India for financial assistance to carry out the work.

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