

## In vitro study of some plant extracts against *Alternaria brassicae* and *Alternaria brassicicola*

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### Abstract

Madhya Pradesh is an important rapeseed-mustard producing state of India contributing nearly of the total production in the country. The present study aims to evaluate the effectiveness of some botanicals viz., Neem, Eucalyptus, Datura, Pudina, Tulsi, Lantana under crude and Forms @ against 10% *Alternaria brassicae* under *in vitro* condition by poisoned food technique. Neem and Eucalyptus were also evaluated in the oil forms. Nearly all the tested botanicals found effective against these fungi. Among the crude extract 10 per cent the minimum growth was recorded in Neem followed by Eucalyptus, Tulsi, Lantana, Datura and Pudina. Neem was significantly superior over Tulsi, Lantana, Datura and Pudina but at par with Eucalyptus. Under boil forms the minimum radial growth was also recorded in Neem. The oil extract (Neem and Eucalyptus) were found less effective as compared to crude and boil extracts.

**Keywords:** *Alternaria* blight, *Alternaria brassicae*, *Alternaria brassicicola*, botanical

### INTRODUCTION

Rapeseed mustard is the major *rabi* oil seed crop of Chambal and Gwalior divisions of Madhya Pradesh. *Alternaria* blight are the most important diseases causing heavy losses throughout the country attacking all Brassica species. Four species of *Alternaria* viz., *A. brassicae* (Berk.) Sacc., *A. brassicicola* (Schw.) Wiltsh., *A. raphani* Groves and Skolka and *A. alternata* (Fr.) Keissler have been reported for the cause of *Alternaria* blight. Out of which *A. brassicae* is most widely prevalent in India.

Biological screening of plant extracts was carried out throughout the world for the determination of their antifungal activity. Synthetic chemicals used to control plant diseases not only pollute the environment, but are also harmful to human health. Because of environmental and economic considerations, plant scientists are involved to find the cheaper and more environmental friendly bio-compounds for the control of plant diseases using different forms of botanicals. [4, 7, 9].

Several studies have shown that aromatic and medicinal plants are sources of diverse nutrient and non nutrient molecules. Many of them showed antioxidant and antimicrobial properties which can protect the human body against both cellular oxidation reactions and pathogens. Thus it is important to characterize different types of medicinal plants for their antimicrobial potential [2, 8, 10].

### MATERIAL AND METHODS

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The leaves of botanicals viz., Neem, Eucalyptus, Datura, Lantana, Tulsi and Pudina were evaluated in the form of crude and boil extracts @ 10 per cent 10 percent. Neem and eucalyptus were also evaluated in the form of oil @ 5% against *Alternaria brassicae* and *Alternaria brassicicola* by Adopting poisoned food technique.

### Preparation of plant extracts

The botanicals were used in the form of crude (Fresh extract) and boiled extracts and methods of preparation and given below:-

#### Fresh extract (crude)

Fresh plant extract was prepared by grinding the required quantity of leaves (100g) before grinding equal quantity of water was added in the respective plant leaves (1:1 weight/ volume basis). The crude Extract of botanicals was filtered different leaves was sieved through muslin cloth. The filtered extracts were used @ 10 per cent by adopting poisoned food technique.

#### Boiled extracts

The fresh leaves (100 g) of respective botanicals were washed, weighted and were brought in the laboratory for the preparation of boiled extracts. The leaves were incorporated in to the 200 ml. water and were boiled for one hour to reduce the volume of water 200 ml. to 100 ml. the extract was stored in refrigerator and used for bioassay of the test fungus at the concentration of 10 per cent. Oil of Neem and Eucalyptus was purchased from the local market for *in-vitro* evaluation.

#### Bioassay of plant extracts by poisoned food technique

The respective plant extract were incorporated aseptically in melted potato dextrose agar medium in appropriate proportions. Twenty ml. of the medium is poured in each 9 cm diameter petriplate

and solidified. One disc (7 mm) of the medium containing fungal culture of the pathogen was cut from the 7 days old culture and was transferred in the centre of the petriplate under aseptic condition. The inoculated plates were incubated at 25°C and growth of the pathogen measured at the interval of 24 hours. The medium without plant extract was used as control.

**RESULT**

Result of the present investigation Reveals that the antifungal nature of plant products viz. Neem (leaf and oil), Eucalyptus (leaf and oil), Datura (leaf), Lantana (Leaf), Tulsi (leaf) and Pudina (leaf) was observed in the form of crude (Fresh extract) and boiled extracts @ 10 per cent and oil of Neem and Eucalyptus @ 5 per cent.

Table 1. *In-vitro* evaluation of different forms of botanicals against *Alternaria brassicae*

Treatments	Radial growth (mm)			Mean
	Crude extract @ 10%	Boiled extract @ 10%	Oil @ 5%	
Neem leaf	20.73	13.25		16.99
Neem oil			39.15	-
Eucalyptus Leaf	23.15	17.65		20.40
Eucalyptus oil			43.25	-
Datura leaf	39.22	19.92		29.57
Lantana leaf	35.50	30.10		32.80
Tulsi leaf	32.12	23.20		27.66
Pudina leaf	45.26	41.42		43.34
Control	75.62	77.20		76.41
S Em (±)	2.25	1.68		
C.D. at 5%	4.68	5.06		

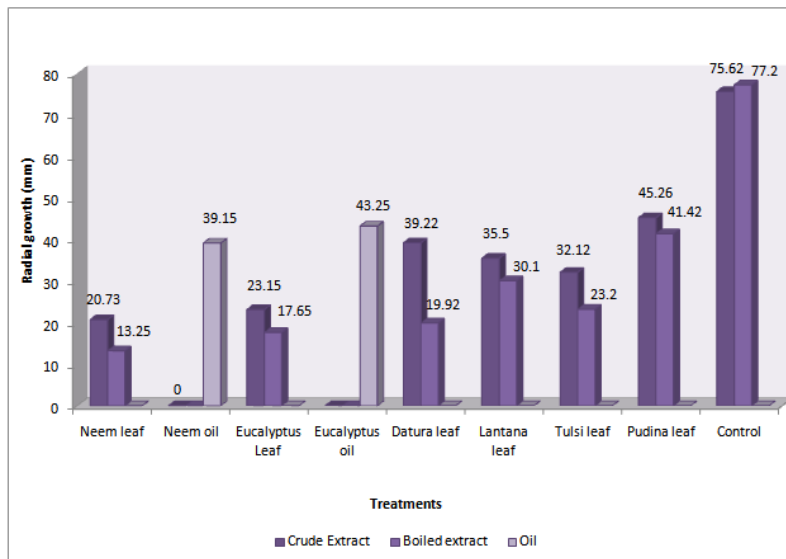


Fig 1. *In-vitro* evaluation of different forms of botanicals against *Alternaria brassicae*.

The result, summarized in Table 1 indicates that all the tested botanicals significantly inhibited the fungal growth in the tested form (Crude/boiled /oil). Among the crude extract (10 per cent) the minimum growth was recorded in Neem (20.73 mm) Neem was significantly superior over Tulsi, Lantana, Datura and Pudina except Eucalyptus. Data indicate that the boil Form of *Azadirachta indica* also recorded minimum growth 13.25 mm, which was significantly superior over rest of the botanicals except Eucalyptus. Apart from Neem, Eucalyptus (17.65 mm) also showed good inhibition of fungal growth followed by Datura (19.92 mm), Tulsi (23.20 mm), Lantana (30.10 mm) and Pudina (41.42 mm). Among Neem and Eucalyptus oil @ 5 per cent against *A. brassicae* were significantly superior over control in inhibiting The growth of the the *A. brassicace*. The oil extract were found less effective as compared to crude and boil extracts (Fig. 1).

**DISCUSSION**

The botanical viz., Neem, Eucalyptus, Datura, Pudina, Tulsi, Lantana were evaluated under crude and boiled forms against *Alternaria brassicae* under *in vitro* condition. Neem and Eucalyptus were also evaluated in the oil forms. All the tested botanicals significantly inhibited the fungal growth in the tested forms (Crude/Boil/ Oil). Among the crude extract 10 per cent the minimum growth was recorded in Neem followed by Eucalyptus, Tulsi, Lantana, Datura and Pudina. Neem was significantly superior over Tulsi, Lantana, Datura and Pudina except Eucalyptus. Similar to crude extract the minimum growth under boil forms also recorded in Neem which was significantly superior over rest of the botanicals except Eucalyptus. The oil extract (Neem and Eucalyptus) were

found less effective as compared to crude and boil extracts. Neem crude extract is confirmed to have antifungal effect on *Alternaria brassicae*. The present finding is in agreement with the work of Khare [5], who also reported that leaf extract of Neem distinctly reduced the growth of *Alternaria brassicae*. Khare and Shukla [6] published a review on utility of plants in crop disease control and concluded that the use of botanical pesticides are of immense value in controlling crop diseases and will occupy a privileged position in near future.

Contrary to the problems associated with the use of synthetic chemicals, botanicals are environmentally non pollute, indigenously available, easily accessible, non phytotoxic, systemic ephemeral, readily biodegradable, relatively cost effective and hence constitute a suitable plant protection in the strategy of biological management of diseases. Hence, screening of plant products for its effective antifungal activity against the pathogen is essentially required to minimize the use of fungicides and to consider as one of the components in the integrated disease management.

### PERSPECTIVE

Work on the evaluation of botanicals for the control of *Alternaria* blight of rapeseed-mustard may be continued with some other botanicals locally available.

### REFERENCES

- [1] Anonymous, 2005. Basic Agricultural statistics. Report of M.P., Published by the Land
- [2] Records, Head office, M.P., Gwalior.
- [3] Bajpai, M., A. Pande, S.K. Tewari and D. Prakash 2005. Phenolic contents and Antioxidant activity of some food and medicinal plants. *Int. J. F. Sci. Nutrition*, 96(4):287-291
- [4] Bilgrami, K.S., S. Jamaluddin and M.A. Rizuli 1981. Fungi of India, Part II *Today and Tomorrow's Publication*, New Delhi.
- [5] Gerretsen, F.C. and N. Haagsma 1951. Occurrence of antifungal substances in *Brassica rapa*, *Brassica oleracea* and *Beta vulgaris*. *Nature* (London), 168-659.
- [6] Khare, R.K. 1998. Effect of some plant products on *Alternaria* blight of mustard. M.Sc. Thesis, JNKVV, JBP.
- [7] Khare, M.N. and B.N. Shukla 1998. Utility of plants in crop disease control. *Vasundhara*, 3: 1-13.
- [8] Kumar, B.P., M.A.S. Charya and S.M. Reddy 1979. Screening of plants extracts for antifungal properties. *New Botanist*, 6: 41-43.
- [9] Mothana, R.A.A. and U. Lindequist 2005. Antimicrobial activity of some medicinal plants of the island Soqotra. *J. Ethnopharmacol.*, 96: 177-181.
- [10] Naidu, V.D. and V.T. John 1982. *In vitro* inhibition of rice fungal pathogens by extracts from higher plants. *Int. Rice Res. Newsletter*, 6: 12.
- [11] Wojdylo, A., J. Oszmianski and R. Czemerys 2007. Antioxidant activity and phenolic compounds in 32 selected herbs. *F. Chem.*, 105: 940-949.