



Biofungicidal Properties Of Leaf Extract Of Some Weeds Against Alternaria Species

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ABSTRACT:

Although weeds are known to be detrimental for agricultural crops however, they also possess medicinal properties against various diseases and infections including fungi. Hence, selected weeds can be useful as eco-friendly medicinal candidates for plant disease control. In this study, we examined the anti-fungal efficacy of leaf extracts of 25 commonly found weeds against *Alternaria* species. Out of 25 plants screened, leaf extract of *Lantana camara*, *Parthenium hysterophorus* and *Xanthium stramonium* inhibited germination of spores by more than 70 % in *Alternaria solani*, *Alternaria brassicae* and *Alternaria alternata*. The minimum inhibition (33.3%) in spore germination of above 3 species of *Alternaria* was noted in leaf extract of *Phyllanthus niruri*. Further, leaf extract of *Ageratum conyzoides*, *Argemone mexicana*, *Calotropis procera*, *Malva sylvestris*, *Nicotiana glabra*, *Rumex dentatus* and *Solanum xanthocarpum* inhibited spore germination of all the pathogenic species of *Alternaria* in the range of 60.15 % to 67.35 %. Thus, these plants can be effectively used for minimizing disease intensity caused by *Alternaria* species in different crop plants.

Keywords: Leaf extracts, spore germination, pathogenic *Alternaria* species.

INTRODUCTION:

In the recent past several higher plants and their constituents have shown success in plant disease control and proved to be harmless and nonphytotoxic unlike chemical fungicides. The extracts of plants also exhibited significant effect on germination of fungal spores (Bisht and Kamal, 1994; Gautam et al., 2003; Lakpale et al., 2008). In agricultural fields, some plants grow with cultivated plants/crops. These undesirable plants are called weeds. On one place, where weeds compete with main crop for water and nutrients and cause so many losses, but they also have many beneficial uses in our daily life. The most important positive aspects of the weeds are nearly all of them possess medicinal properties and rural people use them for cure of a variety of diseases of human and cattle. Another important aspect is that many such weeds are resistant to fungal and bacterial diseases. It is because of their chemical constituents, which possess antimicrobial properties. Thus, such weeds can be exploited for eco-friendly approach of plant disease control. In the present study, leaf extract of 25

commonly found weeds have been screened for inhibition of spore germination of 3 species of *Alternaria* viz., *A. solani*, *A. brassicae* and *A.alternata* which cause early blight of potato, leaf spot mustard and leaf blight of wheat respectively. Further, *A. Solani*, *A.alternata* cause leaf spot of disease in many other commercial crop plants. Thus, this study will pave the way to develop biofungicide from weeds to control several plant diseases.

MATERIALS AND METHODS:

Fresh leaves of 25 weeds commonly found weeds in potato, mustard and wheat fields were washed with distilled water and dried at the room temperature. To prepare stock solution, the leaves were separately crushed with mortar and pestle in distilled water (w/v 25g/100 ml) and later filtered through linoleum cloth. To study inhibition percentage of spore germination, spore suspension was prepared in stock solution of leaf extract. A drop of spore suspension was placed in cavity slide and observation for germinated and non-germinated spores was made under microscope. Finally, percent inhibition of spore germination was calculated using following formula as suggested by Srivastava and Lal (1997)

$$\text{Inhibition \% of spore germination} = \frac{\text{Total No.of spores}-\text{No.of germinated spores}}{\text{Total No.of spores}} \times 100$$

RESULTS AND DISCUSSION:

Table 1: Effect of leaf extract of some weeds on percent inhibition of spore germination of *Alternaria* species

S.No	Name of plant	<i>Alternaria solani</i>	<i>Alternaria brassicae</i>	<i>Alternaria alternata</i>
1.	<i>Abutilon indicum</i>	46.33	45.00	46.66
2.	<i>Achyranthus aspara</i>	37.50	33.30	35.71
3.	<i>Ageratum conyzoides</i>	61.33	60.50	58.25
4.	<i>Amaranthus viridus</i>	35.71	34.50	35.00
5.	<i>Amaranthus spinosa</i>	40.76	41.25	40.50
6.	<i>Argemone mexicana</i>	66.30	65.25	67.35
7.	<i>Boerhavia diffusa</i>	44.28	43.30	45.25
8.	<i>Cassia occidentalis</i>	53.33	54.00	55.25
9.	<i>Cassia tora</i>	50.00	51.25	50.35
10.	<i>Cleome gynandra</i>	54.66	55.50	55.66
11.	<i>Calotropis procera</i>	60.71	58.25	60.20
12.	<i>Croton sparsiflorus</i>	55.55	54.10	55.00

13.	<i>Eclipta alba</i>	40.21	39.75	39.85
14.	<i>Euphorbia hirta</i>	58.25	60.00	61.15
15.	<i>Lantana camara</i>	73.25	75.00	74.25
16.	<i>Malva sylvestris</i>	60.71	61.15	62.00
17.	<i>Nicotiana plebiginifolia</i>	62.35	64.00	64.25
18.	<i>Parthenium hysterophorus</i>	72.00	71.85	70.10
19.	<i>Phyllanthus niruri</i>	33.30	34.00	34.66
20.	<i>Rumex dentatus</i>	65.60	65.10	64.85
21.	<i>Senebiera didyma</i>	47.50	48.00	48.25
22.	<i>Solanum nigrum</i>	47.69	47.25	46.80
23.	<i>Solanum xanthocarpum</i>	64.50	65.10	66.25
24.	<i>Vernonia cinarea</i>	58.16	60.00	59.20
25.	<i>Xanthium stromonium</i>	70.10	72.10	71.82

Perusal of Table 1 indicates that out of 25 plants screened, leaf extract of three weed plants viz. *Lantana camara*, *Parthenium hysterophorus* and *Xanthium stromonium* inhibited germination of spores of all the three pathogenic species of *Alternaria* by more than 70 % thus found more powerful than other weed plants. Further, extract of *Ageratum conyzoides*, *Argemone mexicana*, *Calotropis procera*, *Malva sylvestris*, *Nicotiana plebiginifolia*, *Rumex dentatus* and *Solanum xanthocarpum* inhibited spore germination of all the three pathogenic species of *Alternaria* in the range of 60.75 % to 67.35 %, thereby suggesting inhibiting potential of more than 60 %, which is quite satisfactory for minimizing disease intensity caused by *Alternaria solani*, *A. alternata* and *A. brassicae* in various crops. Leaf extract of remaining 15 weeds exhibited inhibition in spore germination of *Alternaria* species in the range of 33 to 59.20 %, thereby indicating poor inhibitory potential. Shekhawat and Prasad (1971) initially studied antifungal properties of some plant extracts through inhibition of spore germination of fungi. Since then, several workers like Singh and Dwivedi (1990), Nair and Arora (1996), Bisht and Srivastava (1996) and Singh (2010) reported effect of leaf extract of many indigenous plants on phytopathogenic fungi and their possible use in controlling various plant diseases. Our results are in accordance with these reports and suggest that therapeutic use of these medicinal weed plants may be a potential approach in green management of plant diseases.

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