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Efficacy of Different Botanicals Against *Alternaria brassicae* in *in vitro* Condition

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Abstract: ***An experiment was carried out 2012-13 at Plant Pathology research lab, Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumarganj), Faizabad (U.P.) to study the different botanicals against Alternaria brassicae in in vitro condition. The present study aims to evaluate the effectiveness of 46 botanicals extract viz., Cyperus rotundus (rhizome), Piper nigrum L. (seed), Eucalyptus (Leaf), Datura stramonium L. (Leaf), Chenopodium album L. (Leaf), Capsicum annum L. (Leaf), Cannabis sativa L. (Leaf), Aloe vera (Leaf) etc. @ against 10% concentration Alternaria brassicae condition by poisoned food technique. Nearly all the tested botanicals found effective against Alternaria brassicae fungi. Among the extract 10 per cent the minimum growth was recorded in Cyperus rotundus followed by Piper nigrum, Eucalyptus, Datura stramonium and Chenopodium album. Capsicum annum, Cannabis sativa, Aloevera, Cyperus rotundus (rhizome), Piper nigrum L. was significantly superiorunder other botanical extract.***

Keywords: Alternaria blight, *Alternaria brassicae* botanical.

1. Introduction

Oilseed crop is the back bone of agricultural of India since ancient period. Rapeseed mustard is a major Rabi oil seed crop ofnorthern India. Alternaria blight is the major diseases causing heavy losses throughout the country attacking all *Brassica* species. Four species *of Alternaria viz., A. brassicae* (Berk.) *Sacc., A. brassicola* (Schw.*) Wiltsh., A. raphani* Grovesandskolka and *A. alternata* (Fr.) Keissler have been reported to cause of Alternaria blight diseases in rapeseed mustard . Out of which *A. brassicae* is most widely prevalent in India. Plant (leaves, bulb rhizome, seed) 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 they are also harmful to human health because the environmental, and economic considerations, plant scientists are involved to find the cheaper and more environmental friendly bio compounds for the management of plant diseases using different forms of botanicals. Several studies have been showed that aromatic and medicinal plants are sources of diverse nutrient and non nutrient molecules. Many of them showed antioxidant and antifungal 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. Materials and Methods

In order to determine the efficacy of various plant extracts against the *Alternaria brassicae* 46 plants belonging to different families were tested. *Aloevera* (Leaves), *Cassia fistula* L. (Leaves), *Polyalthi alongifoli*a (Sonner) Thw. (Leaves), *With aniasomnifera* L. (Leaves), *Melia azadirachta* L. (Leaves), *Cynodon dactylon* L. (Leaves), *Pers -Cannabis sativa* L. (Leaves), *Aeglema rmelos* L. (Leaves), *Chenopodium album* L. (Leaves), *Capsicum annum* L. (Fruit) *Capsicum annum* L. (Leaves), *Gossypium* spp. (Leaves), *Datura stramonium* L. (Leaves), *Eucalyptus occidentalis* L. (Leaves), *Curcuma longa* L. (Leaves),*Curcuma longa* L.(Rhizome), *Allium sativum* L.(Bulb), *Hibiscus rosasinesis L.*(Leaves), *The vetianerifolia L.*(Leaves), *Anagallis arvensis* L. (Leaves), *Pongama pinnata* L.(Leaves), *Litchi chinensis* L.(Leaves) *Solanum nigrum* L. (Leaves), *Mangifera indica* L. (Leaves), *Cyperus rotundus* L. (Bulb), *Cyperus rotundus* L. (Leaves), *Brassica campestris* L. (Leaves), *Azadirachta indica* L.(Leaves), *Allium cepa* L. (Bulb), *Parthenium hysterophorus* L. (Leaves), *Ficus religiosa* L.(Leaves), *Mentha arvensis* L. (Leaves), *Piper nigrum* L. (Seed), *Solanum tuberosum* L. (Leaves), *Mentha piperita* L. (Leaves), *Rosa chinensis* L. (Leaves), *Raphanus sativus* L. (Leaves), *Rauwalfia serpentine* L. (Leaves), *Zizyphus mauritiana* L. (Leaves), *Asparagus racemosus* L. (Leaves)., *Dalbergia sissoo L.* (Leaves), *Eucalyptus citriodora Hook* (Leaves), *Ocimum sanctum* L. (Leaves), *Jasminum arborescens* L. (Leaves), *Lantana camara* L.(Leaves), *Lycopersicon esculentum* Mil. (Leaves). Evaluated in the form of crude and boil extracts @ 10 per cent 10 percent against Alternaria brassicae by adopting poisoned food technique. Fresh parts of the test plants were collected and washed thoroughly in clean water. Hundred grams of each washed samples were grinded in mortar and pestle by adding equal amount (100 ml) of sterilized distilled water (1:1 W/V) and boiled at 80^0C for 10 minutes in a hot water bath. The grinded material was filtered through muslin cloth followed by filtering through sterilized What man No. 1 filter paper and treated as standard plant extract (100 per cent) and then the mixture was diluted up to 10 per cent concentration by adding proper volumes of sterilized water. All the plant extracts were tested at 10 per cent concentration under *in vitro* conditions by using food poison technique to study the inhibitory effect of these botanicals against the mycelial growth of *Alternaria brassicae.* Hundred ml PDA medium was autoclaved in 250 ml conical flask. The concentration of plant extracts were separately amended and thoroughly mixed after sterilization when it cooled (40^0C) under aseptic condition. 20 ml medium was poured aseptically into each of the four Petri-dishes used for per treatment. Control treatment was maintained by pouring PDA medium without plant extracts. Three mm circular disc from 3 days old culture of *A. brassicae* were cut

with sterilized cork borer and placed in the centre of plant extracts amended Petri-dishes. The Petri-dish having PDA alone were inoculated in the same manner. These Petri-dishes were incubated at 25 ± 1^0C. The observations were recorded on radial growth after 10 days of incubation in each treatment. Per cent growth inhibition was calculated by using formula (Vincent, 1927) given below:

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

Where,
I = Per cent inhibition of fungal growth
C = Radial growth of control
T= Radial growth in treated Petri-dish

3. Results and Discussion

The 40 leaf, 2 Rhizome, 2 bulb,1 fruit1 seed extracts plant species belonging to 32 families were tested for their mycotoxic studies against the *Alternaria brassecae.* All the test plant species showed different levels of toxicity against test fungus and inhibit the mycelial growth of fungus significantly in comparison to untreated check. Inhibition percentage due to treatments of different plant varied from 0.00 to 85.33 per cent. Extract of *Cyperus rotundus* (rhizome) (85.33%), Pepper seed (84.94%) and *Eucalyptus* leaf extract (84.22%) exhibited maximum inhibition to the mycelial growth of *Alternaria brasscsicae* which were up to 85.33%, 84.34% and 84.22% respectively. These were followed by statistically at par with the each other *Chenopodium album* (leaf) (69.91%), *Azadirachta indica* (leaf) (69.86%), *Capsicum annum* (leaf) (69.66%), Sarpgandha (68.91%), which were also statistically at par. Rest of the plants showed either moderate or poor inhibition. During screening, 2 plant extracts of *Cyperus rotundus* (rhizome) and *Piper nigrum* (seed) exhibited between 85.33 to 84.44 per cent, 4 plants (*Azadirachta indica*, *Capsicum annum*, *Chenopodium album* and *Ocimum tenuiflorum*) exhibited in between 69.91 to 68.93 per cent, 4 plant (*Mentha piperita*, *Asparagus racemosus*, *Ocimum sanctum* and *Anagallis arvensis*) exhibited 63.71 to 60.61 per cent, 8 plants (*Xanthium strmarium*, *Curcuma longa*, *Solanum nigrum*, *Cannabis sativa*, *Ficus religiosa*, *Mentha arvensis*, *Datura stramonium* and *Polyalthia longifolia* (Sonner) Thw. exhibited in between 59.40 to 53.60 per cent, 16 plants (*Lantana camara*, *Cassia fistula*, *Litchi chinensis*, *Cynodon dactylon*, *Capsicum annum*, *Gossypium* spp., *Allium sativum*, *With aniasomnifera*, *Mangifera indica*, *Cyperus rotundus*, *Partheium*, *Raphanus sativus*, *Zizyphus mauritiana*, *Dalbergia sissoo*, *Eucalyptus citriodora* exhibited in between 49.67 to 41.19 per cent, 6 plants (*Jasminum arborescens*, *Lycopersicon esculentum*, *Brassica compestris*, *Solanum tuberosum*, *The vetianerifolia*, *Oleander*, and *Aeglecorrea*) exhibited in between 39.61 to 35.24 per cent, 4 plants (*Melia azadirachta*, *Allium cepa*, *Hibiscus rosasin ensis* and *Rosa chinensis*) exhibited in between 25.43 to 17.50 per cent inhibition of mycelium of the test fungus. Zero per cent inhibition was recorded with *Aloevera* leaf extract**. (Table 1).**

Table 1: Effect of plant extracts against test fungus *Alternaria brassicae*

Treatment	*Extracts*	*Radial growth of mycelium (mm) at 10 %*	*Per cent inhibition of mycelia growth at 10%*
T_1	*Aloevera*	90.00	0.00
T_2	*Cassia fistula*	41.66	47.12
T_3	*Polyalthia longifolia*	28.67	55.63
T_4	*Withanias omnifera*	41.66	47.12
T_5	*Melia azadirachta*	73.33	25.43
T_6	*Cynodon dactylon*	43.33	46.05
T_7	*Cannabis sativa*	29.33	55.17
T_8	*Aegle correa*	60.00	35.24
T_9	*Chenopodium album*	10.33	69.91
T_{10}	*Capsicum annum*	43.33	46.05
T_{11}	*Capsicum annum*	10.83	69.66
T_{12}	*Gossypium* spp.	48.33	42.86
T_{13}	*Datura stramonium*	31.66	53.60
T_{14}	*Eucalyptus stramonium*	0.34	84.22
T_{15}	*Curcuma longa*	30.00	54.70
T_{16}	*Curcuma longa*	25.00	58.18
T_{17}	*Allium sativum*	48.33	47.12
T_{18}	*Hibiscus rosasinesis*	80.00	19.46
T_{19}	*Thevetia nerifolia*	60.00	35.24
T_{20}	*Anagallis arvensis*	21.66	60.63
T_{21}	*Pongama pinnata*	26.66	59.40
T_{22}	*Litchi chinensis*	38.33	49.26
T_{23}	*Solanum nigrum*	31.66	56.14
T_{24}	*Mangifera indica*	46.66	43.93
T_{25}	*Cyperus rotundus*	0.56	85.33
T_{26}	*Cyperus rotundus*	46.66	43.93
T_{27}	*Brassica campestris*	60.00	35.24
T_{28}	*Azadirachta indica*	10.66	69.86
T_{29}	*Allium cepa*	81.66	17.50
T_{30}	*Parthenium spp.*	42.66	46.45
T_{331}	*Ficus religiosa*	26.00	57.47
T_{32}	*Mentha arvensis*	31.66	53.60
T_{33}	*Piper nigrum*	0.36	84.94
T_{34}	*Solanum tuberosum*	53.33	39.61
T_{35}	*Mentha piperita*	17.66	63.71
T_{36}	*Rosa chinensis*	81.66	17.50
T_{37}	*Raphanus sativus.*	48.33	42.86
T_{38}	*Ocimum tenuiflorum*	11.66	68.93
T_{39}	*Zizyphus mauritiana*	43.33	46.05
T_{40}	*Asparagus racemosus*	18.33	63.17
T_{41}	*Dalbergia sissoo*	49.00	42.43
T_{42}	*Eucalyptus citriodora*	51.00	41.19
T_{43}	*Ocimum sanctum*	21.66	60.61
T_{44}	*Jasminum arborescens*	53.33	39.61
T_{45}	*Lantana camara*	37.66	49.67
T_{46}	*Lycopersicon esculentum*	55.00	38.52
T_{47}	Control	90.00	-
	SEm±	**1.402**	**1.395**
	CD at 5%	**3.938**	**3.919**

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