International Journal of Research in Social Sciences
Vol. 10 Issue 1, January 2020,
ISSN: 2249-2496 Impact Factor: 7.081
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

Studies on antifungal activity medicinal plant against seed mycoflora

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Abstract:

Seven medicinal plants and their different aerial parts were screened and their alcoholic extract used against eight fungi which were isolated from cereals, pulses and oilseeds. The results were found to be very much useful for control of test fungi. Alcoholic leaf extrat of *Celastrus emerginatus* proved to be maximum inhibition of all tested fungi followed by *Gymnea sylvestre* and *Andrographis peniculata*. Maximum growth inhibition of test seed mycoflora due to alcoholic leaf extract, bark extract of *Radermachera xylocarpa* and seed extract of *Datura metal*, *Dioplacyclos pulmatus*, and extract of screened medicinal plants.

Key words: Antifungal activity, medicinal plants, seed mycoflora

Introduction:

Kinwat is unique and popular Taluka in Marathwada in Nanded district of Maharashtra State, which is in rich in vegetation, valleys and montaions with ample forest has a huge wealth of medicinal plants with ethno-medico botanical values. The nine medicinal plants were collected from Kinwat forest by conducting exploration. Identification and confirmation of medicinal plants from seven families of different habits with their different localities. The alcoholic extracts of different parts of the medicinal plants have antifungal properties which were reports by (Zore et.al 2003, Paul et.al 2005, Anbuganapathi 2002, Gyana mani et.al 2003 and Dang Raman et. al 2005) and used against seed borne fungi such as species of *Aspergillus*, *Fusarium oxysporum*, *Curvularia lunata*, *Penicillium chrysogenum*, *Alternaria alternata* and *Helminthosporium tetramera* which were isolated from cereals, pulses and oil seeds. The results are very remarkable to maximum growth inhibition of the tested seed mycoflora.

Materials And Methods:

A. Isolation and Identification of seedborne fungi

(1) Collection of Seed Samples :

The methods described by Neergaard (1973) have been adopted for the collection of seed samles. Accordigly seed samples were collected from the field, store house and market places. A composite sample was prepared by mixing the individual samples together, preserved in cloth bags at room temperature during the studies.

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(2) Detection of Seed Mycoflora

The procedure for blotter test and agar plate methods was followed as described by International Seed Testing Association, ISTA (1966), Neergaard (1973)

(3) Identification of Fungi:

For the identification of different fungi the following available literature was used. The illustrated Kingdom of Fungi, Mukadam (1997). The genus of *Fusarium* New Survey Consult Booth (1971), Morphology and Taxonomy of fungi., Dodge (1928), Morphology and Taxonomy of fungi Bessey (1950), an Introduction to Fungi Dube (1990), the illustration to Fungi Mukadam *et.al.*, (2006).

Preparation of Extracts:

The plants collected from different ranges of the forest were brought in the laboratory. They were cut into small pieces and washed thoroughly with distilled water to remove contaminants and were dried under shade for about 8-10 days. The dried materials were ground into fine powder and stored in airtight containers at room temperature till extraction.

The crude extracts were prepared from medicinal plant parts by extracting 20 gm. dried powder with 200 ml. of distilled water by maceration method and soxhlet extractor for about 90 to 120 min. separately. The aqueous extracts by maceration method of different medicinal plants were filtered through muslin cloth and obtained as filtrates of various colours were used for antifungal studies.

Antifungal activity:

Antifungal activity of Botanicals against plant pathogenic fungi was carried out. The antifungal activity of the extract of Botanicals were evaluated by food poison plate method (R.Cruickshank 1975) against *Aspergillus niger, Aspergillus flavus, Aspergillus terrus, Helminthosporium, Fusarium oxysporum, Alternaria* on potato dextrose agar (PDA).

The fungal cultures were maintained in laboratory and fresh cultures were prepared before 48 hours of screening. During experimental phase all the fungal cultures were incubated in the laboratory at 27^0 C.

The 0.1 ml. of plant extracts were mixed with 20 ml. sterile, potato dextrose agar and poured on the plate. The medium was allowed to solidify. The fungi were inoculated on the solidified medium at a proper distance. The plates were incubated at 35-37^{o}c for 48-72 hrs. The same procedure was followed for control without plant extracts. The antifungal activities of plant extracts were measured in terms of ·(dot), -ve and retarded growth.

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Results and Discussion:

Nine medicinal plant with their bark leaf and seeds were utilized with their alcoholic extracts were utilized against eight seed borne fungi. The results are summerised in table which are very significant. Alcoholic bark extract of *Radermachera xylocarpa* proved to be highly efficient in growth inhibition of all the test fungi except *Alternaria alternata* and extract of *Boswellia serrata* does not response most of the tested fungi except *Penicillium chrysogenum*. Among the alcoholic leaf extract of *Cerestrus emerginatus* highly beneficial to maximum inhibition of growth of test fungi, followed by *Andrographic paniculata* and *Gymnema sylvestre*. The alcoholic seed extract of *Datura* metal and *Wrightia tinctoria* were proved to be highly beneficial to growth inhibition of most of tested fungi. The extract of *Citrillus colocynthis* found benefited for inhibition of growth in case of *Penicillium chrysogenum*, *Fusarium oxysporum* except remaining test fungi.

Table: Effect of alcoholic extracts of plants on growth of Fungi

Sl. No	Name of plant –with family	Part	AF	AN	AT	PC	AA	HT	FO	CL
1.	*Boswellia serrata – Bursaraceae*	STEM	.	.	.	-ve	.	.	-ve	.
2.	*Radermachera xylocarpa – Bignoniaceae*	BARK	-ve	-ve	-ve	-ve	.	-ve	-ve	-ve
3.	*Andrographis paniculata – Acanthaceae*		-ve	.	-ve	-ve	-ve	-ve	-ve	-ve
4.	*Celastrus emerginatus – Celastraceae*	LEAF	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve
5.	*Gymnema sylvestre – Asclepiadaceae*		-ve	-ve	-ve	-	.	-ve	-ve	-ve
6.	*Citrullus colocynthis – Cucurbitaceae*		.	.	.	-ve	.	.	-ve	.
7.	*Diplocyclos palmatus – Cucurbitaceae*	SEED	-ve	.	-ve	-ve	.	.	-ve	.
8.	*Datura metal – Solanaceae*		-ve	-ve	-ve	-ve	.	-ve	-ve	-ve
9.	*Wrightia tinctoria – Asclepiadaceae*		-ve	.	-ve	-ve	.	-ve	-ve	.

AF – *Aspergillus flavus,* CL – *Curvularia lunata,* AN – *Aspergillus niger,* FO – *Fusarium oxysporum.*
AT – *Apergillus terreus,* PC – *Penicillium chrysogenum,* AA – *Alternaria alternata,*
HT – *Helminthosporium tetramera,* • = fungal growth present, – ve = No fungal growth.

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