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Antifungal potentiality of some medicinal plant extracts against *Bipolaris oryzae* (Breda de Haan)

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ABSTRACT

Rice (Oryza sativa L.) is one f the most widely grown and utilize food plants in the world, orginated in Asia. The plants practice of growing rice in wet lands, popularly known as paddy has led to a number of diseases affecting the crop. Suffer from many diseases called by fungi, bacteria, viruses and nematdes. Bipolaris oryzae is a soil borne pathogenic fungus which causes brown spot disease in paddy. Plants are reservoir of biological active compounds to combat various pathogens. Various plants such as Bergia capensis L., Marselia quadrifolia L., Lippia nodiflora L., Eclipta prostrata L., and Commleina clavata C.B Clarke. Totally four solvents were used for the present work. Out of four solvents used (Methanl, Acetone, Petroleum ether and Aqueous) the methanolic extract showed good inhibitory activity.

Key words: *Bipolaris oryzae*, *Oryza sativa*, Plant extract, antimicrobial activity, Medicinal plants.

INTRODUCTION

The fungi are major disease causing agents on plants and can lose up to 90% agricultural yield. Plants contain hundreds or thousands of metabalites. Medicinal and aromatic plants a gift of nature are being used against various infections and diseases in the world since past history (Khalil *et al*.,2007).Among the estimated 2,50,000 to 5,00,000 plant species, only a small percentage has been investicated phytochemically and the fraction submitted to biological screening is even smaller. Plant kingdom represents an extraordinary reserviour of novel molecules. Plant derived products have been used for medicinal purposes for countries (Hema *et al.*,2009) and plants have been an important source of medicine for thousands of years (Arunkumar *et al*,.2009) .The World health organization estimated that 80% of the population in developing countries still relies on traditional medicines. Higher plants are a treasure house of phytchemicals which serve as voluble drugs that helped compact several fetal disease world over (Umamekeshwari *et al*., 2008).

The presence of phytochemicals in medicinal plants have attracted a great deal of attention, concentrate on their role in preventing diseases (Harpyaree *et al*., 2010).The antimicrobial activity of plant extracts has formed the basis of many applications in food preservations, pharmaceuticals, alternative medicines and natural therapies (Karuppusamy *et al.*,2009). Researchers are increasingly turning their attention to natural products looking for new leads to develop better drugs against microbial infections (Philip *et al.*,2009).

Many angiosperm plants are store houses of effective chemotherapeutants and results biological screening of these plants for a wide range of activities proved that these can be used for treating diseases (Tewari *et al.*,1988). Hence a detailed systematic investigation was conducted to test in *invitro* antimicrobial activity against important seed borne pathogens of paddy.

MATERIALS AND METHODS

Plant Collection

The Medicinal Plants were collected from paddy feild in and arround Thanjavur (Dt),Tamilnadu. Medicinal Plants such as *Bergia capensis* L., *Marselia quadrifolia* L., *Lippia nodiflora* L., *Eclipta prostrata* L., and *Commleina clavata* C.B.Clarke. brought into the laboratory for further processes. The collected samples were carefully stored in sterile polythene bags and used for the further study.

Sterilization of Plant Materials

The disease free and fresh plants were selected for this investigation. About 2gms of fresh and healthy leaves were taken for each solvent including aqueous. Then, surface sterilized with 0.1% mercuric chloride and alcohol for few seconds and the plant materials were washed thoroughly with distilled water (Three times).

Preparation of Plant Extracts

One gram of sterilized plant leaves were kept in the 10 ml organic solvents such as ethanol, ethyl acetate, chloroform and distilled water. Then these were grind with the help of mortar and pestle. The ground plant material was subjected to centrifugation, for 10-15min at 10,000rpm. Again, it was filtered through whatmann No. 1 filter paper. The supernatant was collected and stored for further antifungal screening purposes.

Test pathogen

Bipolaris oryzae (Breda de Haan) is a soil-borne pathogenic fungus which causes Brown spot disease leaves of in paddy. The pathogen was isolated from paddy field soil, Thanjavur (Dt), Tamilnadu .

Preparation of Microbial Inoculum

Composition of Potato Dextrose Agar Medium

Potato (Peeled)	-	200g
Dextrose	-	20g
Agar	-	18g
Distilled water	-	1000ml
pH	-	5.6

The young microbial inoculum culture was prepared and used during the research period. The Potato Dextrose Broth (PDB) was prepared. The pure microbial cultures were collected inoculated into potato dextrose broth tubes by using inoculation loop. The tubes were incubated at 27^{o}C for 48-72 hours. The developed cultures were used for the experiments.

Screening for Antifungal Activity

Antifungal Activity assay (Agar - well diffusion method)

In the freshly prepared and sterilized potato dextrose agar medium, a pinch amount of streptomycin was added and mixed well. Then these 20 ml of medium was poured into each petriplate and allowed to solidify. The test fungal cultures were evenly spread over the media by using sterile cotton swabs. Then a well (6mm) was made in the medium by using sterile cork borer, 200µl of the each plant extracts were transferred into separate wells. Then these plates were incubated at 27^{o}C for 48-72 hours. After incubation period the results were observed and measured the zone of inhibition around the each well.

RESULTS AND DISCUSSION

In the present investigation, the antifungal properties of Methanol, Acetone, Petroleum ether and Aqueous of medicinal plant viz., *Bergia capensis* L., *Marselia quadrifolia* L., *Lippia nodiflora* L., *Eclipta prostrata* L., and *Commelina clavata* C.B Clarke. were tested against soil borne pathogenic fungus *Bipolaris oryzae* .

The research for naturally occurring materials with biological activity and the use of occurring antifungal substance in plant chemotherapy is gaining more importance (Schmutterer,1990).

The organic solvent extracts exhibited greater antimicrobial activity and suitable to verify the antimicrobial properties of medicinal plants and they were supported by many investigators (Krishna *et al*, 1997; Singh and Singh, 2000). Satish *et al*., 2009 reported the antifungal activity of different solvent extracts of 12 plants against *Fusarium proliferatum.* Solvents with different polarity were selected for the study, and this suggests that the bioactive principle responsible for antifungal activity in medicinal plants is soluble in petroleum ether, benzene and chloroform solvents.

Table-1 Antifungal activity of some medicinal plants against *Bipolaris oryzae*

S. No.	Name of the plants	Zone of inhibition (diameter in mm)			
		Methanol	Petroleum ether	Acetone	Aqueous
1.	*Bergia capensis* L.,	15	5	12	-
2.	*Marselia quadrifolia* L.,	10	8	5	-
3.	*Lippia nodiflora* L.,	5	4	3	2
4.	*Eclipta prostrata* L.,	12	7	-	-
5.	*Commelina clavata* C.B.Clarke.,	25	8	1	2

In the present investigation, methanolic extract of *Commelina clavata* C.B.Clarke and *Bergia capensis* L.,exhibited maximum zone of inhibition as 25mm and 15mm against soil borne pathogenic fungus *Bipolaris oryzae.* Methanolic extract showed better antifungal activity when compared to all other solvent extracts. The results of the antifugal activity of medicinal plants

were given in table-1. It has been revealed that the methanol extracts exhibited moderate activity against *Bipolaris oryzae*.

CONCLUSION

The present investigation concluded that antimicrobial activity of medicinal plants showed better activity to control seed borne pathogenic fungi. The results also indicated the necessity for further investigation to isolate and characterize active principle responsible for the activity and its subsequent exploitation for paddy disease management, using locally available medicinal plants.

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