

Antifungal Activity of Some Fodder Plants Leaf Extract

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Abstract: Plants which are edible by the animals especially by pet animals shows great importance to them. They shows significance role to improve animal nutrition. Some shows ecobolic role towards nature and animals. The in vitro antifungal activity of *Alternanthera sessilis* (L.) R.Br. ex DC, *Dendrocalamus strictus* Nees, *Digera muricata* (L.) Mart., *Ficus religiosa* L. leaves aqueous extract was studied against two strains of fungi viz. *Aspergillus niger* and *Trichoderma viride*. Present study was carried out to evaluate the anti fungal activity of four plants leaves extract by disc diffusion methods. The present method shall done by only in aqueous medium. *Trichoderma viride* showed that maximum activity against *Dendrocalamus strictus* Nees. leaf extract.

Keywords: Ecobolic, antifungal activity, *Alternanthera sessilis* (L.) R.Br. ex DC., *Dendrocalamus strictus* Nees, *Digera muricata* (L.) Mart., *Ficus religiosa* L., *Aspergillus niger*, *Trichoderma viride*, etc.

1. INTRODUCTION

The plant kingdom has been the best source of remedies for curing a variety of disease and pain. In countries, the most important means for particularly the rural part of the country is animal husbandry activities. The level of animal food consumption is quite low. Because of animals are generally unproductive, the production of animal products are insufficient. This is why medicinal plant has played a key role in the world wide maintenance of health. Current advancements in drug discovery technology and search for novel chemical diversity have intensified the efforts for exploring leads from Ayurveda the traditional system of medicine in India. Plant pathology (also phytopathology) is the scientific study of diseases in plants caused by pathogens (infectious organisms) and environmental conditions (physiological factors). Organisms that cause infectious disease include fungi, bacteria, viruses, viroids, virus-like organisms, phytoplasmas, protozoa, nematodes and parasitic plants. As some endophytic fungi shows diverse effects on plant tissue that they reside inside them, differences in fungal community shows the various effects on growth of particular plant, some shows growth responses as they complete their life cycle by depending upon them with favorable atmospheric conditions. Besides agriculture and other forms of cultivation, animal husbandry also plays a significant role in the life of rural farmers. One major hurdle in the development of rural animal husbandry can be attributed to the unavailability of sufficient fodder and feed to sustain economically productive farms. As green fodder forms a major component in the balanced diet of livestock, it is very essential in keeping the animal in good health and improving reproductive efficiency. Green fodder is palatable and easy for digestion and gives a cooling effect on the body. Interestingly, they are also mild laxatives and provide fresh nutrients in their natural forms.

Bamboo, which is found all over the State, has proven to be an excellent cattle fodder. Like any fodder it has its seasons for palatability and digestibility depending on variety. Fresh bamboo leaves can be collected throughout the year owing to its 'evergreen' characteristics. Though the shoots may be toxic to livestock and become vulnerable and susceptible to foraging animals. This toxicity can, however, be readily removed by boiling for human consumption. The locally available *Dendrocalamus hamiltonii* which is the species of choice for bamboo shoot production in the State can also be utilized by the farmers as a more preferred species for fodder to cattle and goats. Bamboo is an arborescent woody grass with, belonging to the family Poaceae, and undoubtedly is the world's fastest growing plant which has become a symbol of strength, flexibility, tenacity, and endurance. They are intermingled with the tradition and culture of the rural and tribal populations and are an integral part of our cultural, social, and economic conditions. The growing stock of bamboo been estimated to be around 8.96 million hectares in India, out of which about 5% of the growing stock, consisting of 46 species, is assessed to be available. This fast-growing and wide spread resource is indeed a resource capable of providing ecological security and fostering in economic benefits to the people right from the grassroots. Easy renewability coupled with its versatility makes it a fodder of choice for the development of animal husbandry in the State. The stress caused on the livestock as well as the farmers during the lean period due to unavailability of green fodder can be effectively addressed. The indigenous plantation skills of the local farmers. This has led to further increase in the overall bamboo wealth of the State which is already catering to different applications, and can be potentially tapped in bulk as fodder for livestock.

Looking through this perspective, extensive species-wise studies have already been conducted on the nutritive value of bamboo shoot and bamboo leaves. The studies have indicated that besides the shoot, even the leaves contain appreciable quantity of carbohydrate and protein, suitable for livestock rearing.

Other tests have also revealed that Bamboo also contains a high amount of crude ash, most of which is silicate. Looking further into the prospects, ensiling of bamboo leaves is also a possibility. Actively growing bamboo leaves can be harvested (usually chopped) at high moisture (40 to 80%), packed to eliminate O₂, and allowed to partially ferment to low pH (acid) conditions for preservation, the end product is a ruminant forage called silage. Since bamboo leaves remain functional and green for an extended period, the leaves can be harvested almost any time of the year to make good silage and preserved for feeding. Ensiling can only preserve those nutrients already present in the plant. It does not improve the feeding value of a plant. Forage for silage is preserved by anaerobic fermentation. Thus, this is one area which also needs attention for further research, analysis and production.

With the emerging trend in the global bamboo industry, it is an accepted fact that bamboo is capable of providing ecological, economic and livelihood security to the people. And since India is home to the second largest bamboo resources in the world next only to China with 136 species in 10 genera, the livestock farmers can potentially become a major stake holder in the bamboo industry, through mass utilization of bamboo leaves as fodder for livestock farming.

The demand for novel antifungal agents from natural resources has been increased worldwide for preservation of various species of plants and habitat (Velu S. et al., 2014). Certain fungi causes various infections on plants and animals, mostly shows adverse effects in nature. So considering all of them as adverse affects there in need of new cheaper and harmless antifungal agents to get minimized on them.

Natural antimicrobials received popularity from a series of issues related to microorganisms control and as a source of pharmaceutical active compounds (Amrita et al., 2009). Alternatively as the safety aspects of chemical or synthetic food additives are dubious, the demand for naturally occurring preservatives is on the rise worldwide (Chanthaphon et al., 2008). The exploration of novel antimicrobial agents from natural resources such as plant or plant products and others has been used mainly for treating diseases, food safety and food preservation purpose (Hammer et al., 1999). Thus plants are the good resource to get remedy on them (Serafin et al.). In the present investigation aqueous extracts were subjected for antifungal activity against strains *Aspergillus niger* and *Trichoderma viride*.

Dendrocalamus strictus is an important host plant all over the world. This is a dry deciduous forest tree. This tree is commonly known as 'Bamboo'. It is used as fibre, fodder

or dye (Patil et al., 2006). It is also employed in various indigenous systems of medicine against several diseases and almost every part of the plant has diversified medicinal properties. It grows on variety of soils including dry regions also. As a deciduous tree, it adds large amount of organic matter into the soil that increase both productivity and fertility of the cultivated lands. Apparently no research work has yet been taken to investigate the problem. Considering this fact an elaborate study was undertaken to record the prevalence of the disease and to identify the cause of the disease along with the control measures.

Sr. No	Plant name	Family	Part used
1	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC.	Amaranthaceae	Leaves
2	<i>Dendrocalamus strictus</i> Nees	Poaceae	Leaves
3	<i>Digera muricata</i> (L.) Mart.	Amaranthaceae	Leaves
4	<i>Ficus religiosa</i> L.	Moraceae	Leaves

2. MATERIAL AND METHODS

Collection of materials

All four plants leaves were collected and air dried in shade. After that fine powder was made with the help of electric grinder machine and stored in zip-lock polythene bag for further uses.

Activation of fungi

Loopful fungal spores were streaked on potato dextrose agar (Hi- media) plates and incubated at 37°C for 2-3 days. All fungus plates were maintained at 4°C in refrigerator for further use.

Zone of Inhibition

For determination of zone of inhibition, basically three methods are used. One of them is a well diffusion method which we have used.

Extract procedure

For making extract of each powder take 3gm of powder in 30 ml of sterilized distilled water was added and it was boiled to concentrate. It was filtered with the help of Whatman filter paper no.1. Now the obtained filtered was used for further analysis by disc diffusion method.(Kubo et al., 1981).

Media preparation

Media should be prepared by using sterilized distilled water with standard pH PDA medium.

Broth preparation

PDA broth should be prepared by using standard ph medium. For using kept it in freeze for 24 hrs for better growth of fungi.

Antifungal activity test

Antifungal activity was screened by agar well diffusion method (Perez et al., 1990). The methanol, ethanol and aqueous extracts of eight different plants were tested against plant pathogen *C. falcatum*. The PDA medium was poured in to the sterile petri plates and allowed to solidify. The test fungal culture was evenly spread over the media by sterile cotton swabs. Then wells (6 mm) were made in the medium using sterile cork borer. 200µl of each extracts were transferred in to the separate wells. The plates were incubated at 27°C -30°C for 48-72 hrs. After the incubation the plates were observed for formation of clear incubation zone around the well indicated the presence of antifungal activity. The zone of inhibition was calculated as diameter of inhibition of zone.

3. RESULT AND DISCUSSION

Fig. 1: Showing antifungal activity of four leaves extracts on *Trichoderma viridae*.

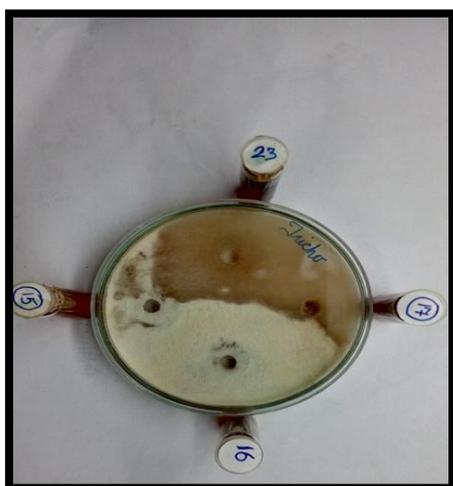


Fig. 2: Showing antifungal activity of four leaves extracts on *Aspergillus niger*.

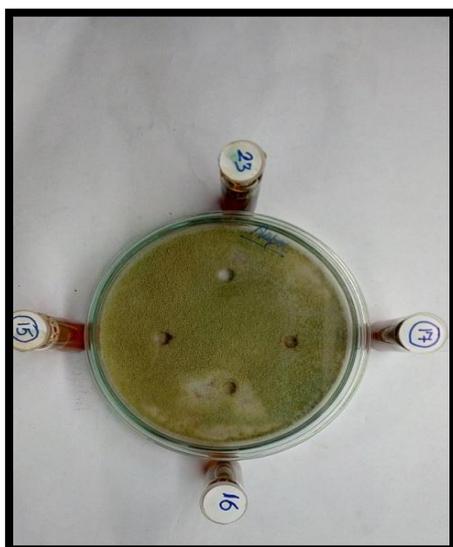


Table 2: Antifungal activity of leaf extracts showing results of diameter of inhibition of zone.

Sr. No.	Plant Name	Extract Medium	DIZ (mm) against <i>T. viride</i>	DIZ (mm) against <i>A. niger</i>
1	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC.	Aqueous	---	5.5
2	<i>Dendrocalamus strictus</i> Nees	Aqueous	22.5	---
3	<i>Digera muricata</i> (L.) Mart.	Aqueous	---	---
4	<i>Ficus religiosa</i> L.	Aqueous	8.5	---

*DIZ- diameter of inhibition zone

4. SUMMARY AND CONCLUSION

Present Study of four plants viz. *Alternanthera sessilis* (L.) R.Br. ex DC., *Dendrocalamus strictus* Nees, *Digera muricata*(L.) Mart., and *Ficus religiosa* L. shows antifungal activity against two strains of fungi viz. *Trichoderma viridae* and *Aspergillus niger*. Banso et al (1999) reported that the antifungal substances contained in the extracts were fungi static at lower concentrations, while becoming fungicidal at higher concentrations of the extracts. Once the crude extract was diluted, the inhibiting effect of one extract on the other was significantly reduced. These data indicate that the appropriate extract concentration to show a specific effect depends on the plant used and the nature of the extract. This emphasizes the need to know the compound/s responsible for the inhibitory activity through studies to purify, identify and characterize the biomolecules.

The present plant materials were extracted with sterilized distilled water for further antifungal process. The diameter of inhibition zone were determined by well diffusion method and potato dextrose agar broth dilutions. The result shows in Fig 1. and 2 clearly shows the broad spectrum of antifungal activity of four plants against two strains. The *Trichoderma viridae* shows more efficient as compare to the *Aspergillus niger*. *Dendrocalamus strictus* Nees shows more efficient result against *Trichoderma viride*.

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