

# Antifungal potential of Parthenium hysterophorus and Catharanthus roseus against Aspergillus sp., Candida sp. and Penicillium sp. of aquarium fish

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## ABSTRACT

Different type of fungi affects the health of plants and living organisms. Sometimes even in aquarium, fishes get infected with fungal infection due to aquarium conditions or other factors. In severe conditions these infections may be fatal for the fishes. So to prevent such infections fishes get treated with conventional chemicals available in market. We have an excellent substitute to avoid this use of conventional chemicals in aquariums through plants. Number of bioactive molecules, making them an affluent source of variants of medicines. In this study, in-vitro antifungal activity of crude leaves extract of medicinal plants Parthenium hysterophorus and Catharanthus roseuswas evaluated against Candida sp, Penicillium sp, Aspergillus sp which isolated from infected aquarium fish. The solvents used are Ethanol, Methanol, acetone and Chloroform. "The disc diffusion method used to assay the antifungal activity." The Antifungal activity exhibited by cold ethanol extracts and chloroform extracts (leaves) has shown prominent results, also these extracts can be utilized as an option for the antifungal conventional chemicals available in market. These extracts are also ecofriendly, which can help in maintaining good aquarium conditions.

**Keywords:** Parthenium hysterophorus, Catharanthus roseus, Antifungal activity, Candida sp, Penicillium sp, Aspergillus sp.

## I. INTRODUCTION

Aquarium fish are prone to fungal infections which is a high risk to the aquarium business. In addition Aspergillus sp., Candida sp. and Penicillium sp. become more prevalent in fish infections.

Aspergillus sp., Candida sp. and Penicillium sp. genera are prominent for their production of mycotoxins (Simon G. Edwards et.al.2002) which cause severe effects on aquarium fishes. To dispense these infections conventional chemicals are being used like Lotrimin AF, Gyne-Lotrimin, Malachite, etc. These chemicals are known to have hazardous effects on the environment as well as on animals. The plants have shown effective defense system with natural compounds which may provide potential alternative to the utilization of synthetic chemical fungicides. An attempt has been made to use plant extracts, which are considered to be safe with an environmental perspective, as antifungal agent. Many plants has been studied recently for their insecticide, bactericide, fungicide and other effects. The plants selected for this work is Parthenium hysterophorus and Catharanthus roseus.

Parthenium hysterophorus is an unwanted plant i.e. weeds in agriculture. "P. hysterophorus is an annual herb that aggressively colonises perturbed sites". "It is much-branched with vigorous magnification habit, aromatic, annual (or an ephemeral perennial), an erect, herbaceous plant with a deep taproot. These species reproduces by seed." It grows to 30-90 cm in height (Lorenzi,1982; Kissmann and Groth,1992), can be up to 1.5 m, or even 2.5 m, in exotic situations (Haseler, 1976; Navie et al., 1996). The reason og plant being toxic is 'parthenin' and other phenolic acids such as caffeic, vanillic, anisic, panisic, chlorogenic and parahydroxybenozoic are lethal to human beings and animals. (Mahadevappa, 1977; Oudhia, 1998).Rastogi and Mehrotra (1991) describe Parthenium hysterophorus L. as a medicinal plant because it used in many diseases. Even Parthenium hysterophorus has shown the antimicrobial activity (TerefeTafeseBezuneh .2015).

Catharanthus roseusis anconsequentialmedicinal plant. This perennial plant grows as a herb or a subshrub, spreading along the ground or standing erect up to a meter in height. It has captivating flower in white or pink colour with five petals while the leathery, dark green leaves are arranged in antithesis pairs. "It contains different type of alkaloids and chemotherapeutic agents that are effective in treating various types infections. diseases, etc." (K. Kabesh of et.al.2015).Muhammad et al. (2009) reported that Catharanthus roseus showed the antibacterial in crude extracts of different potential components (viz., leaves, flower, root and stem) against clinically significant bacterial strains. Catharanthus roseus possesses known antibacterial, antifungal, antidiabetic, anticancer and antiviral activities (Prajakta J. Patil and Jai S. Ghosh .2010).

Acetone, ethanol, chloroform, methanol and aqueous extract of these plants were assessed for its antifungal activity against Aspergillus sp., Candida sp. and Penicillium sp. This extract can further be analyzed for its active component and be included in the strategy to manage the fungal infections. Parthenium hysterophorus and Catharanthus roseus are the plants which are utilized during the study. These are facilely available.

#### **II. METHODS AND MATERIAL**

1) Extract collection and preservation : Fresh plant leaves of Parthenium hysterophorus and Catharanthus roseus were amassed from ManjariBudruk, Pune, Maharashtra 411028 (MS) (18.5042° N, 73.9539° E) and washed with distilled water. The samples were homogenized manually with mortar and piston. In order to obtain extract amassment 25ml of solvents (Ethanol, Methanol, chloroform, acetone and dihydrogen monoxide) was integrated with 15g fresh samples. Then the extracts were discretely filtered and amassed from paste by utilizing Whatmann filter paper no.1. Amassed crude extracts were then preserved in the refrigerator at low temperature for further assay.

Table 1.	names of selec	ted plants
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Local Name	English	Scientific	Use
	Name	Name	d
			part
GajarGavat	Carrot	Partheniu	Leav
	grass	m	es
		hysteroph	
		orus	
PandhriSada	Tiny	Catharant	Leav
phuli	periwi	hus	es
	nkle	roseus	



Figure 1. Parthenium hysterophorus



Figure 2. Catharanthus roseus

2) **Test organisms** :In order to investigate the effects of plants on fungal pathogens of fish fresh fungus isolated from diseased fish from aquarium.

#### 3) Isolation of fungi:-

Cotton plug was acclimated to accumulate the fungi from the skin of the infected fish. Then this Cotton plug was introduced to saline water for the further processing. After accumulation of fungi these were introduced to sterile petri dish a PDA media. The petridish was incubated until the occurrence of fungi for about 24 hours at 25°C.After identification of fungi; they were separated to different petridishes. Subcultivations on petridishes were carried out and utilized for further assay.

#### 4) Antifungal Assay:

Antifungal activities of plants were observed by utilizing the disc diffusion method (Kerby Bauer method) on sterile petri dish of PDA media by introducing each fungus in separate petridishes. Then petridishes were incubated for 24 hours at 25°C.

## 5) Investigation of effects of selected plants:

Culture media and crude extract of the plants were utilized in the disc diffusion method discretely Pathogenic organisms were spread on the surface of the potato dextrose agar plates and discs (Whatmann No.1 filter paper with 9 mm diameter) impregnated with the 10  $\mu$ l of P.hysterophorus and C. roseus leaves extract. Plants samples were place on the surface individually. The plates were incubated 25°C for 24 h. he antifungal potential of the test samples were quantified by determining the diameter of the zones of inhibition in centimeter.

## **III. RESULTS AND DISCUSSION**

Extract of the Parthenium hysterophorus with cold acetone and chloroform showed the eminent antifungal activity against Penicillium sp.(Figure 5) in virtually double zone of inhibition than that of control. And against Aspergillus (Figure 3) and Candida sp. (Figure 4)effect was good with quite more zone of inhibition than control.

Table 2.	Parthenium hysterophorus zone of
	inhibition (cm)

Fungi		Aspergillus (Figure 3)	Candida (Figure 4)	Penicilium (Figure 5)
Acetone	control	1.0	1.0	1.0
	leaves	1.2	1.4	2.0
Ethanol	Control	1.0	1.0	1.0
	Leaves	1.3	1.5	1.3
Chloroform	Control	0.9	0.9	0.9
	Leaves	0.9	0.0	2.0
Methanol	Control	1.3	0.3	0.0
	leaves	0.9	0.9	0.0



Figure 3



Figure 4



# Figure 5

Extract of the Catharanthus roseus with cold ethanol showed a notable antifungal activity against Penicillium sp.(Figure 8) and with cold chloroform it showed activity against Aspergillus sp.andPenicillium sp. (Figure 6) in almost double zone of inhibition than that of control. And against Candida sp. (Figure 7)it showed no activity.

**Table 3.** Catharanthus roseuszone of inhibition (cm)

Fungi		Aspergill	Candida	Peniciliu
		us	(figure	m
		(figure 6)	7)	(figure 8)
Acetone	con	1.0	1.0	1.0
	trol			
	lea	1.1	1.3	1.2
	ves			
Ethanol	Со	1.0	1.0	1.0

	ntr			
	ol			
	Lea	13	1.6	2.0
	ves	1.5	1.0	2.0
	Со			
Chlorofor	ntr	0.9	0.9	0.9
m	ol			
	Lea	2.7	1.4	2.0
	ves			
Methanol	Со			
	ntr	1.3	0.3	0.0
	ol			
	lea	0.0	0.8	1.0
	ves	0.0	0.0	1.0



Figure 6



Figure 7



Figure 8 IV. DISCUSSION

"Antifungal property of P.hysterophorus has been reported against the common fungi that we used on plants and animals" (TerefeTafeseBezuneh 2015). According to A. Devkota and A. Sahu 2016, "methanol crude leaf extract had higher antifungal potential than the distilled water" extract, but in present study it has been observed that P.hysterophorus is more efficacious with acetone and chloroform. In KratikaKumari, Sharmita Gupta 2005 studies C.roseus showed 1.62 cm and 1.5 cm zone of inhibition against Aspergillus sp. and Candida sp. with acetone whereas in current studies we have visually perceived C.roseus showed 1.1 cm and 1.3 cm zone of inhibition respectively. C.roseus has showed good activity against fungal pathogens with ethanol and chloroform with maximum zone of inhibition (Divya Paikaraa1 et.al.2017). The leaf extract of C. roseus is very effective on Candida sp. (Unival et al. 2006, Bhadauria and Kumar 2011) Aspergillus sp. and Penicillium sp.

## V. CONCLUSION

The present study provides utilizable information regarding the efficiency of plants against fungal infection in fishes. Parthenium hysterophorus and Catharanthus roseus products used virtually both showed better antifungal activity against Aspergillus sp. followed by Candida sp. and Penicillium sp. We have an excellent substitute to<br/>avoid use of conventional chemicals in aquariums<br/>through Parthenium hysterophorus<br/>andCatharanthus roseus.

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