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Phytochemical Screening and Antifungal Activity of Medicinal Plant

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ABSTRACT

Phytochemicals are secondary metabolites produced by all plants in which some has medicinal uses. This study is to analyse the presence of Phytochemicals in Leucas aspera (Wild.) Link. and the antifungal activity. Extractions of Ethanol, Chloroform and aqueous of various parts of Leucas aspera such as stem, leaves and root were used in this study. The extracts were screened for the presence of Phytochemicals and their effect on various microbes especially fungi Rhizopus was determined. Phytochemical analysis showed the presence of Alkaloids, Phytosterol, Fixed oils, Saponins and Phenolic compounds. The extracts tested for antifungal activity. The chloroform extract showed effective inhibition over the fungus Rhizopus.The plant Leucas aspera (Wild.) Link. showed the abundant presence of Phytochemicals and effective inhibition of fungus Rhizopus.

KEYWORDS: Phytochemicals, Leucas aspera, Rhizopus, antifungal activity

Introduction

Medicinal plants are of great importance to the health of individuals and communities. Medicinal value of these plants lies in some chemical substances that produce a definite physiological action on the human body. Many of these indigenous medicinal plants are used as spices and food. They are also sometimes added to foods meant for pregnant and nursing mothers for medicinal purposes (H. Edeoga et al., 2005).

Medicinal herb is considered to be a chemical factory as it contains multitude of chemical compounds like alkaloids, glycosides, saponins, resins, oleoresins, sesquiterpene, lactones and oils (essential and fixed) (Amrit pal Singh, 2005). Today there is growing interest in chemical composition of plant based medicines. Several bioactive constituents have been isolated and studied for pharmacological activity.

During the last two decades, the pharmaceutical industry has made massive investment in pharmacological and chemical researches all over the world in an effort to discover much more potent drugs, rather, a few new drugs. Plants have successfully passed the tests of commercial screenings (Amrit pal Singh, 2005).

Leucas aspera (Wild.) Link. belongs to the family Labiatae (Lamiaceae) is one of the largest families of flowering plants. The generic name Leucas (Wild.) Link. is derived from the greek word Leukos meaning white, referring to the colour of the flower. Leucas aspera (Wild.) Link. found throughout India from the Himalayas down to Ceylon. Leucas aspera (Wild.) Link. flowers contain a small quantity of essential oil and an alkaloid.

Plant extracts of many higher plants have been reported to exhibit antibacterial, antifungal and insecticidal properties under laboratory trials. Plant metabolites and plant based pesticides appear to be one of the better alternatives as they are known to have minimal environmental impact and danger to consumers in contrast to the synthetic pesticides

Hence an attempt is made in the present study to find out

- The presence of secondary metabolites in the stem, leaf and root of Leucas aspera (Wild.) Link.
- Antifungal effect of entire plant extract.

Materials and Methods

Collection of Plant Materials

The plant Leucas aspera (Wild.) Link. as they are distributed throughout India, It is easy to collect the plant on the road side and cultivated lands. The plant for the present study was taken from the Tirupur district, Tamilnadu

Extraction of Plant materials

The different plant materials stems, leaves and root were crushed separately with different solvents such as water, acetone and chloroform. The extract was filtered through a Whatmann filter paper. The filtrate was used for phytochemical analysis and antifungal activity.

Phytochemical Screening

Phytochemical screening was performed using the method of Harbone (1998) and Parekh and Chand (2007). The extracts used were Aqueous, Acetone and Chloroform.

Test for Glycosides and Phytosterol

Salwaski Test

0.5 ml of extract was dissolved in 2 ml of chloroform, H2So4 was carefully added to form a layer. A reddish brown colour indicates the presence of steroidal ring and 2 ml of extract was mixed with conc H2SO4, shaked and allowed to stand for 5 min. turning of golden yellow colour indicates the presence of sterols and phytosterols.

Test for Alkaloids

2 ml of extracts of Leucas aspera (Wild.) Link. was stirred with few drops of diluted HCl and filtered. 2 ml of the filtrate was treated with the Mayer's reagent and Wagner's reagent for the presence of alkaloids. Creamy precipitate for Mayer's reagent and Reddish brown precipitate for Wagner's reagent indicates the presence of alkaloids.

Test for Fixed Oils

2 drops of extracts pressed between 2 filter papers. Appearance of oil strain on the paper indicates the presence of fixed oils.

Test for Gums and Mucilage

2 ml of extracts added to 25 ml of 90% alcohol, stirred well and filtered. The precipitate was dried and examined for swelling which indicates the presences of gums and mucilage.

Test for Saponins

Foam Test

2 ml of extract was diluted with 20 ml of distilled water and shaken vigorously. It was observed for a stable persistent froth. The

frothing was mixed with 3 drops of olive oil, shaken vigorously for an emulsion.

Test for Proteins and Free Amino acids
2 ml of extracts dissolved in 3 ml of water and Biuret test, Ninhydrin test and Xanthoprotein test were performed. The purple colour for Biuret and Ninhydrin test and Orange precipitate for Xanthoprotein test indicates the presence.

Test for Phenolic Compounds
FeCl3 Test
2 ml of diluted extracts was treated with dilute FeCl3 solution. Appearance of violet colour showing the presence of Phenolic compounds and tannins.

Test for Flavonoids
The extracts were treated with conc H2So4 and Yellowish orange was observed for the presence.

Antifungal Activity
Antifungal activity was performed by Disc Diffusion method.
- PDA plates was prepared and inoculated with the fungus Rhizopus.
- The extracts were prepared as disc and placed on the plates.
- The zone of inhibition was noted after 24-48 hrs.

Results and Discussion
Phytochemical screening of Leucas aspera (Wild.) Link.
The Phytochemical screening of different extracts of stem, leaf and root showed the presence of Alkaloids, Fixed Oils, Phytosterols, Saponins and Phenolic compounds and absences of Glycosides, Gums and Mucilage and Amino acids. They are tabulated in Table –1. Aqueous extract of stem, aqueous and chloroform extract of leaves gave positive to alkaloids and root extract showed the absence. The aqueous extract of stem and leaves showed the presence of phytosterol, Saponins and fixed oils. The root extracts showed absence for many tests. The Phenolic compounds and flavonoids showed positive in acetone and chloroform extracts of stem and leaves.

Antifungal Activity
Chloroform Acetone extract exerted inhibitory effect on the fungus Rhizopus and extent of inhibition chloroform extract is more effective as tabulated in Table –2 and Figure –1.The potent antifungal activity of some medicinal plants have been reported (Okigbo R. N and Ogbonnaya O. U, 2006).

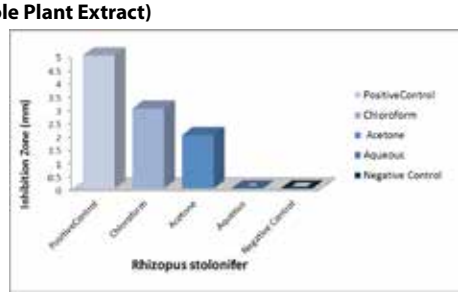
The antifungal effect of chloroform and acetone extract of Leucas aspera (Wild.) Link. may be attributed to the presence of Phenolic compounds which play an important role in defense mechanism of plants against infectious agents.

Conclusion
Thus, from the present study the plant Leucas aspera (Wild.) Link. showed an abundant production of Phytochemicals as secondary metabolites and they can be used in the pharmaceutical industries for producing a potent drug against infectious agent especially Rhizopus fungi.Further studies on analysis of the compounds responsible for antimicrobial activity and molecular studies to confirm the same is in progress.

TABLE – 2: Antifungal effect of Leucas aspera (Wild.) link. (Whole Plant Extract)

S.No	Tested Organism	Inhibition Zone (mm)				
		Positive Control	Plant Extracts			Negative Control
			Chloroform	Acetone	Aqueous	
1.	Rhizopus stolonifer	5.0	3.0	3.0	Nil	Nil

FIGURE – 1: Antifungal effect of Leucas aspera (Wild.) link. (Whole Plant Extract)



Phytochemicals		Stem			Root			Leaf		
		Aqueous	Acetone	Chloroform	Aqueous	Acetone	Chloroform	Aqueous	Acetone	Chloroform
Glycosides		–	–	–	–	–	–	–	–	–
Alkaloids	Mayers reagent	+	–	–	–	–	–	+	–	+
	Wagners Reagent	+	–	–	–	–	–	+	–	+
Phytosterol		+	–	+	+	–	–	–	+	–
Fixed oil		+	–	–	–	–	–	–	–	–
Gums and Mucilage		–	–	–	–	–	–	–	–	–
Saponins		+	+	–	+	+	–	+	+	–
Protein free amino acid	Biuret test	–	–	–	–	–	–	–	–	–
	Ninhydrin test	–	–	–	–	–	–	–	–	–
	Xanthoprotein test	–	–	–	–	–	–	–	–	–
Phenolic compounds FeCl3 test		+	+	+	–	–	–	+	+	+
Flavonoids		+	–	+	–	–	–	–	+	–

TABLE – 1: Qualitative Phytochemical Analysis of Leucas aspera (Wild.) link. + = Positive; - = Negative

REFERENCES

1. Amrit Pal Singh. 2005. Promising Phytochemicals from Indian Medicinal plants. Ethnobotanicals Leaflets, Vol:2005, Issue 1, Article 18. 2. Okigbo R. N and Ogbonnaya O. U 2006. Antifungal effects of two tropical plant extracts (Ocimum gratissimum and Afromaomum melegueta) on postharvest yam (Dioscorea spp.) rot. Afr. J. Biotechnol. 5(9): 727-731. 3. Edeoga H. G, Okwu D.E., and Mbaebie B.O, 2005. Phytochemical analysis of some Nigerian Medicinal Plants, African Journal of Biotechnology Vol. 4 (7), pp. 685-688. 4. Harborne, J.B. 1998. Phytochemical Methods, 3rd Edn, Chapman and Hall, London, ISBN: 0412 – 57260-5, pp.1-302. 5. Parekh. J and Chands. S, 2008. Phytochemical screening of some plants from Western regions of India, Plant Arch, 8: 657 – 662.