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# Phytochemical Analysis and Anti-Microbial Activity of Crude Leaf Extracts of *Lygodium flexuosum* (L.) Sw.



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### ABSTRACT

Aqueous and Methanol crude leaf extracts of a Pteridophyte, *Lygodium flexuosum* (L.) Sw. was tested for their phytochemical composition. The study revealed the presence of alkaloids, phenols and saponins both in methanol and aqueous extracts. Gallic tannins, steroids and flavonoids are present in methanol extract. Tests conducted for the presence of anthocyanin, anthocyanidin, anthracene, glycosides, anthraquinones, acubins, coumarins and fatty acids have given negative results with both the extracts. The antibacterial study revealed that both the extracts had remarkable effect against gram (+ve) bacteria only. Some more wide ranging studies of the plant are mandatory.



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## INTRODUCTION

Recently enormous efforts have been made to investigate ethnobotanical importance of Pteridophytes. But less work has been done on the phytochemical and antimicrobial activity of these plants. Though the medicinal qualities of ferns are mentioned as early as 300 B.C. by the Greek Philosopher Theophrastus and his Indian contemporaries Sushrut and Charak, the valuable potential applications of many species of Pteridophytes are yet to be known for future use and to isolate new active principles from them (SVSSL Hima Bindu N et al. 2012). Hence, the present study is carried out on *Lygodium flexuosum* (L.) Sw. of the family Schizaceae, collected from Ahobilam area of Nallamalai forest.



Fig.1



Fig.2



Fig.3

**Fig.1, 2 &3 are showing different stages of *Lygodium flexuosum* (L.) Sw.**

### Description of the plant:

This plant particularly being rhizomatous grows perennially and succeeds as a weed. Primary rachis branches not elongated. Secondary rachis-branches bearing alternate pinnately arranged leaflets. Basal leaflets often with large basal lobes, sometimes with two or three separate leaflets at the base. Largest leaflet on hairy winged stalks, broadly rounded to cordate at the base and more-or-less distinctly jointed to the end of the stalk, narrowed gradually to the apex, edges of sterile leaflets finely toothed, texture thin but firm ( Fig.1, 2 & 3).

## MATERIALS

### Medicinal uses:

*L. flexuosum* is an important medicinal plant and its medicinal properties have been reported from all parts of the plant. Some of the scholars of Indian System of Medicine reported that the plant may be 'Rudra Jata', an intermediate drug in classical text of Ayurveda. In the treatment of jaundice, the rhizome and root are useful. Kadar tribes of South Western Ghats of India have applied the leaf paste all over the body for 7 days to cure jaundice. Fresh root is boiled with mustard oil and is used for massage. Extract of the rhizome is used to cure gonorrhoea in India. The ash of plant is used for treating herpes. It is also used to reduce inflammation and acts as panacea for wounds, treat ulcer, various respiratory diseases, general disorders, muscles sprains and it also had the potential to act as the pain killer.

*L. flexuosum* extract had anti proliferative and apoptotic activity in both cancer cells. *n*-hexane extracts of the plant are responsible for the possible hepato protective action. Rabha, Oraon and Mech tribes in Jalpaiguri district of West Bengal, India uses the root in jaundice and stomach pain. This fern reported to exhibit anti fertility activity. Lodhas of West Bengal believe bhut raj (*L. flexuosum*) to be adobe of gods. During the time of scarcity, Chitwan people use it as vegetable for sustenance they collect tender plant and its parts from the common land. This fern is used as fodder and forage resources of common land in Western Chitwan. This plant is used to feed domestic animals and to treat foot and mouth diseases. It is used in the manufacturing of basket, hats, bags and other fancy articles. A successful weed would have phytochemicals suitable for the control of pathogens; thus such plants need a microbiological evaluation. Hence, the present study is carried out on phytochemical analysis of *Lygodium flexuosum* (L.) Sw. of the family Schizaceae/Lygodaceae collected from Ahobilam area of Nallamalai forest.

## METHODS

Standard procedure was used to get extraction from leaves of the collected plant. Bulk quantity of fresh leaves were collected and washed thoroughly with running tap water followed by sterile distilled water. They are chopped into small fragments and shade dried. The dried samples were ground to coarse powder and stored in polythene container at room temperature. The samples

were dissolved in methanol and distilled water and were used for the chemical analysis and for the analysis of antibacterial activity.

### **Phytochemical Analysis:**

The aqueous and methanol leaf extracts were subjected to preliminary phytochemical analysis to detect the presence of different chemical groups of compounds such as saponins, tannins, alkaloids, flavonoids, triterpenoids, steroids, glycosides, anthraquinones and coumarins by qualitative screening for secondary metabolites. The following tests such as salkowski's test for steroids, tests for triterpenoids and saponins, Mayer's reagent and Wagner's reagent tests for alkaloids, Fehling's and Benedict's tests for carbohydrates, Shinode's reaction test for flavonoids, tannins test, Keller kilani test for glycosides, folin-calteu method for polyphenols are conducted for detection of secondary metabolites.

### **Antimicrobial studies:**

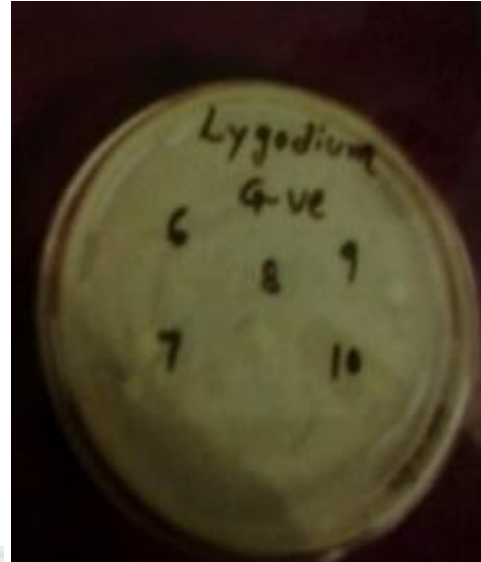
The gram- positive bacteria, *Lactobacillus* and a gram negative bacteria, *Escherichia coli* are collected from Biotechnology laboratory, Rayalaseema University, Kurnool and are maintained on the nutrient agar slants at 4° C until further use. Disc diffusion method was used to determine the growth inhibition of bacteria by plant extracts.

## **RESULTS**

Phytochemical analysis of methanol crude leaf extract revealed the presence of alkaloids, gallic tannins, flavonoids, phenols, saponins and steroids. In aqueous extract alkaloids, phenols and saponins are reported. Tests for anthocyanins, anthocyanidins, anthracene glycosides, anthrax quinines, albumins and fatty acids are given negative results indicating their absence in both the extracts. Both methanolic and aqueous leaf extracts showed their activity against gram +ve bacteria i.e. on *Lactobacillus*. There was no effect on gram -ve bacteria i.e. on *E.coli* (Fig.4 & 5)



**Fig.4 showing the effect of methanol crude leaf extract on gram-positive bacteria**



**Fig.5 showing the effect of methanol crude leaf extract on gram-negative bacteria**

## DISCUSSION

Though the Pteridophytes possess equal economic importance including medicinal ones, much consideration has not been given towards their utility. The leaves of *L.flexuosam* were used to cure rheumatism, sprains, scabies, ulcers, eczema, cuts and wounds (Mannan, M.M. *et al.* 2008). But the phytochemical and antibacterial analysis of the plant is not studied. Recently John De Britto *et al.* (2012) reported the chemical constituents of methanol and aqueous extracts of the whole plant of *L.flexuosam*. In their study they revealed the presence of alkaloids, gallic tannins, flavonoids, phenols, saponins and steroids in methanolic extract of the whole plant. Present study revealed the same constituents in crude leaf methanol extract. Aqueous leaf extract of the present study revealed the presence of alkaloids, phenols and saponins. But in earlier study of John De Britto *et al.* (2012) only steroids are reported in the whole plant water extract.

Alkaloids, flavonoids and saponins are the important sources for antimicrobial activities. Tannins may be used as anticancer agents due to their potential values as cytotoxic agents (Aguinaldo A.M. *et al.*, 2005). Saponins have been implicated as bioactive antibacterial agents (Mandal, P *et al.*, 2005).

Study of Thomas, T (2013) revealed that there was no effects of the methanolic extract on all gram +ve and gram –ve bacteria that were selected for the test. But the present study revealed that the methanolic and aqueous crude leaf extracts had shown inhibitory zones and showed their effect against the growth of gram +ve bacteria, *Lactobacillus*. There was no inhibitory zone at gram –ve bacteria, *E.coli*. This result indicates that methanolic leaf extract of *L.flexuosam* works against certain gram +ve bacteria and inhibits their growth. Studies of yadav, E.*et al.*, 2012 revealed more effective against Gram-positive bacteria like *M. luteus* and *S. aureus* compared to Gram negative. Thus some more extensive studies of the plant are required.

## REFERENCES

1. Aguinaldo AM, Espeso EI, Cuevara BQ, Nonato MC. Phytochemistry. In:Guevara BQ (ed). A guidebook to plant screening:phytochemical and biological. Manila: University of Santo Tomas; 2005. pp. 121-125.
2. Hima Bindu SVSSL, Suvarnalatha Devi NP, Rukmini K and Singara Charya MA. Phytochemical screening and antibacterial activity of *Hemionitis arifolia* (Burm.) Moore. Indian Journal of Natural Products and Resources. 2012. Vol. 3 (1) pp.9-13.
3. John De Britto A, Herin Sheeba Gracelin D, Benjamin Jeya Rathna Kumar. Phytochemical studies on five medicinal ferns collected from Southern Western Ghats, Tamilnadu. Asian Pacific Journal of Tropical Biomedicine. 2012. Pp.S536-S538.
4. Mandal P, Sinha Babu SP, Mandal NC. Antimicrobial activity of saponins from *Acacia auriculiformis*. Fitoterapia. 2005. 76(5).pp.462-565.
5. Mannan MM, Maridas M and Victor B. A Review on the Potential uses of Ferns. Ethno botanical Leaflets, 2008. 12: 281-285.
6. Thomas T. Antibacterial and Phytochemical Screening of Ferns. 2013. shodhganga.inflibnet.ac.in:8080/jspui/bitstream/.../12\_chapter%203.pdf pp.52-79.
7. Yadav E, Mani M, Chandra P, Sachan N and Ghosh AK . A review on therapeutic potential of *Lygodium flexuosum* Linn. Pharmacogn.Rev.2012, Jul – Dec. 6(12): 107-114. Doi. 104103/0973- 7847.99944.