Available online www.jocpr.com

Journal of Chemical and Pharmaceutical Research, 2016, 8(10):69-73

Research Article

ISSN : 0975-7384
CODEN(USA) : JCPRC5

Phytochemical, Physicochemical and Antibacterial Activity of *Loranthus Elasticus*

T Krishnaveni[1], R Valliappan[1*] and R Selvraju[2]

Department of Chemistry, Chemistry Wing, DDE, Annamalai University, Annamalai Nagar, Tamil Nadu, India
Physics Section, FEAT, Annamalai University, Annamalai Nagar, Tamil Nadu, India

---

ABSTRACT

Loranthas elasticus are hemi parasitic plants (mistletoe) of Loranthaceae grown in all types of trees and some of the plants are used as traditional medicine for ailments. In the present study the Loranthus elasticus grown on the Odhiyan tree (Lannea coromandelica (Houtt.) Merr.) were chosen. It was designed to investigate the preliminary phytochemical, physicochemical antibacterial analysis of ethanol extract of the plant. Phytochemical screening of plant extract revealed the presence of cabohydrates,proteins, etc. A preliminary screening of the ethanol extract of the plant for their antibacterial activity against the Gram negative bacteria Escherichia coli, Klebsiella pneumonia, Gram positive bacteria Staphylococcus aureus and Bacills subtilis and antifungal activities against the Aspergillus flavus and Aspergillus niger. Thus, the results obtained was presented and discussed.

Keywords: Loranthus elasticus; Mistletoe; Phytochemical screening; Antibacterial activity

---

INTRODUCTION

The knowledge about the use of medicinal plants has been accrued through the centuries and such plants are still valued even today, although synthetics, antibiotics, etc., have attained greater prominence in modern medicine. The indigenous systems of medicine practiced in India are based mainly on the use of plants[1]. Herbal drugs play an important role in health care programmes especially in developing countries. Ancient Indian literature incorporates a remarkably broad definition of medicinal plants and considers "all" plant parts to be potential sources of medicinal substances[2]. Unfortunately the use of medicinal plants in these countries is based primarily on empirical knowledge, and many of the plants have not been scientifically evaluated for their safety and efficacy[3]. There is a need for documentation of research work carried out on traditional medicines[4]. With this background, a systematic study some plant materials for their characterization, biological activities are studied and the results discussed.

Loranthus elasticus a hemi-parasitic plant belongs to the family *Loranthaceae* that thrive favourably on a wide spectrum of host trees in India. The *Loranthaceae* are about 75 genera and most of them are globally known as mistletoes[5, 6]. Historically, the mistletoe, whose name is believed to be derived from the Celtic word for "all-heal", was used for a variety of treatments. There are many *Loranthaceae* plants are reported in the literature and their biological activities are reported[7, 8]. Mistletoe plants attached to lime trees reported to be used as medicinal herbs for the treatment of tonsilities and otitis media[9,10].

The aim of the study was to evaluate the phytochemical and physicochemical characters and antimicrobial activities of the plant extract of *Loranthus elasticus* grown in the Odhiyan tree (*Lannea coromandelica* (Houtt.) Merr.).

MATERIALS AND METHODS

The plant material *Loranthus elasticus* grown in the Odhiyan tree (*Lannea coromandelica* (Houtt.) Merr.) were collected from the trees in and around Annamalai University campus, Annamalai Nagar, Chidambaram, Cuddalore

district, Tamil Nadu, India. The plant material was authenticated by the Department of Botany, Annamalai University and specimen was submitted and preserved in the department.

Preparation of plant extract

The plant was dried under shade, separated and made to dry powder. It was then passed through the 40 mesh sieve. Dried and powdered plant material was defatted firstly to remove fatty material for this purpose powdered plant of *L. elasticus* was packed in Soxhlet apparatus and extracted with methanol and thereafter distilled water for 36 h and completion of extraction was confirmed by pouring a drop of extract from the thimble on a filter paper, which does not show the presence of any oil spot on that. After complete extraction the solvent was evaporated and concentrated to dry residue.

Phytochemical evaluation

The phytochemical evaluation of the different extract were performed by the standard methods and shows the presence of various phytochemical constituents[11-15].

Physicochemical evaluation

The crude plant material was subjected to the physical evaluation. The various parameters were evaluated such as solvent extract values, it includes water soluble methanol soluble extractive value, moisture content, ash value, including water soluble ash, acid insoluble ash and sulphated ash values[16,17].

Study of powder with different chemical reagents – Fluorescence analysis

The powder of the plant material was treated with different chemical reagents show different colour when seen with the naked eye. When they are exposed to ultraviolet radiation, it is important to observe all materials on reaction with different chemical reagents under UV light. The fluorescence character of the powdered material studied under UV light (254nm and 356nm after treating with different chemical reagents.

Preliminary microbial screening - Antibacterial and antifungal activity

Antimicrobial activities of the plant material extract were determined by disc diffusion method. In the present study, six bacterial strains were analysed. Among the six, three strains of Gram positive strains (*Bacillus subtilis, Staphylococcus aureus, Enterococcus faecalis* and three strains of Gram negative *(Escherichia coli, Klebsiella pneumoniae* and *Pseudomonas aeruginosa*) were used. The test bacterial strains were previously inoculated into nutrient broth and incubated at 37°C for 24 hours. After the incubation period, the culture tubes were compared with the turbidity standard. Fresh bacterial culture of 0.1ml having 10^8 CFU was spread on Muller Hinton agar (MHA) plate using sterile cotton swab. Sterile filter paper disc (Whatmann No.1) was impregnated with 50µg of plant extract and placed on the MHA plates in aseptic condition. The plates were then kept in a refrigerator to allow pre-diffusion of extract for 30minutes. Further the plates were incubated in an incubator at 37°C for 24 hours. The antimicrobial activity was evaluated by measuring the zone of inhibition. The standard antibiotic used in the evaluation is Ciprofloxacin and for fungi Griesoflavin. Control acetone.

RESULTS AND DISCUSSION

Phytochemical analysis

The result of preliminary phytochemical screening of the different extracts of *Loranthus elasticus* present in the Odhiyan tree revealed the presence of alkaloids, carbohydrates, and other materials were given in Table 1.

The phytochemical analysis of the petroleum ether, benzene, chloroform, methanol and water extract of the plant *Loranthus elasticus* present in the Odhiyan tree was presented in the Table 1. The result indicated that the phytochemical constituents, namely alkaloids, amino acids, anthocyanin, carbohydrates, cardial glycosides, coumarins, diterpenes, emodins, fatty acids, phlobatannin, phenols, saponin and terpenoids were present in methanol extract, whereas the flavonoids, glycosides, leucoanthocyanin, phytosterol, proteins, steroids and tannin were absent in methanol extract. The other phytochemical constituents present in the rest of the solvents are given. Small amounts of Saponins were noticed in alcohol and water extracts. In water extracts of the leaves shows moderate amounts of gums and mucilage.

Physicochemical evaluation

The results obtained in the physicochemical analysis of the plant extract of *Loranthus elasticus* present in the Odhiyan tree are given in Table 2.

Table 1: Preliminary qualitative phytochemical screening of leaf powder of *L. elasticus* in Odhiyan

S. No.	Test applied	*L. elasticus* - Odhiyan					
		Reagents used	**Pet ether**	**Benzene**	**Chloroform**	**Alcohol**	**Water**
1	Alkaloids	Mayer's	-	-	-	-	+
		Wagner's	-	-	-	+	+
		Hager's	-	-	-	+	+
		Dragondroff's	-	-	-	+	+
2	Amino acids	Ninhydrin's	+	+	+	+	+
3	Anthocyanins		+	+	+	+	+
4	Carbohydrates	Fehling's	-	-	-	+	+
		Benedict's	-	-	-	+	+
5	Cardial glycoside		-	+	-	+	+
6	Coumarins		+	+	+	+	+
7	Diterpenes	Copper acetate	+	+	+	+	-
8	Emodins		-	-	-	+	-
9	Fatty acids		+	+	+	+	+
10	Flavonoids		-	-	-	-	+
11	Fixed oils and fats	Spot test	+	+	-	-	-
12	Glycosides		+	+	+	+	+
13	Gum and mucilage	Alcoholic precipitation	-	-	-	+	+
14	Leucoanthocyanin		-	-	-	-	-
15	Phenolic	$FeCl_3$	+	+	+	+	+
16	Phlobatannin		-	-	-	-	-
17	Phytosterols	L.B. Test	+	+	+	+	+
18	Proteins	Xanthophoretic	+	+	+	+	-
19	Saponins	Foam test	-	-	-	+	+
20	Steroids		+	+	+	+	-
21	Tannins and Phenols	10% lead acetate	-	-	-	+	+
22	Terpenoids		+	+	+	+	-

'+' presence of compounds; '-'absence of compounds

Table 2: Physicochemical analysis and extractive values of leaf powder *Loranthus elasticus* present in *Lannea coromandelica (Houtt.) Merr. (Odhiya Maram)*

S. No.	Parameter	L. elasticus in Odhiya Maram
	Organoleptic characteristics	Powder
	Appearance	Powder
	Colour	Green
	Smell	Aromatic
1	Taste	Pungent with astringent
2	Loss on drying at 105°C	6.0 -8.6
	Total Ash value	11.9
	Water soluble Ash	5.9
	Acid insoluble ash	1.2
3	Sulphated ash	3.5
4	Moisture content	8
5	Foreign organic matter	7.5
6	Crude fibre content	2.8
	Solubility values	
	Alcohol	7.09
7	Water	6.22

Fluorescence analysis

The fluorescence character of the plant material under daylight and UV light are given in Table 3.

The Behaviour of powders of the leaf of the plant sample of Odhiyan on treatment with different chemical reagents and their fluorescence behaviour is given in Table 3. The leaf powder of odhiyan treated with sulphuric acid to give a black colour in both UV and visible light. The leaves treated with Hydrochloric acid (HCl), Picric acid, Iodine (I_2), Ferric chloride ($FeCl_3$), and ammonium hydroxide (NH_4OH) gives almost green colour in both UV and visible light.

The leaf powder Odhiyan gives brown colour in nitric acid (HNO_3) in visible light and brownish green in UV light whereas in CH_3OH produce dark green in daylight and orange red colour in UV light.

Table 3: Fluorescence analysis of leaf powder of *L. elasticus* - Odhiyan

S. No.	Powder + Reagent used	L. elasticus in Odhiyan	
		Daylight	UV light
1	Powdered plant material	Pale green	Light green
2	Powder + 1M H2SO4	Black	Dark black
3	Powder + dil. HNO3	Brown	Yellowish brown
4	Powder + 50% HNO3	Brown	Brownish green
5	Powder + Acetic acid	Dark brown	Brown
6	Powder + 1M HCl	Light green	Greenish yellow
7	Powder + picric acid	Light green	Greenish yellow
8	Powder + Iodine solution	Green	Green
9	Powder + FeCl3 (5% solution)	Dark green	Light green
10	Powder + 1M NaOH	Green	Dark green
11	Powder + 25% NH4OH	Green	Greenish yellow
12	Powder + CH3OH	Green	Orange red

Table 4: Antimicrobial activity of *L. elasticus* extracts of Odhiyan

Microorganism	Petroleum ether	Chloroform	Ethyl acetate	Methanol	Ethanol
Escherichia coli	7	7	7	12	14
Klebsiella pneumoniae	7	7	7	14	12
Pseudomonas aeruginosa	7	6	7	14	12
Bacillus sublitis	7	6	7	12	14
Staphylococcus aureus	7	6	7	12	12
Enterococcus faecalis	7	6	7	12	12
Aspergillus niger	7	7	7	7	7
Aspergillus flavus	7	7	7	7	7

< 8 mm – inactive; 8-12mm – moderate 12 mm active

Standard drug for bacteria: Ciprofloxacin. For fungi: Griesoflavin. Control: Acetone.
Antimicrobial activity was conducted against few pathogenic microorganisms, including Gram positive and Gram negative bacteria and fungi. The antibacterial activity and antifungal activity by disc diffusion technique. The results are comparable with standard drugs. The results are given in Table 4.

CONCLUSION

Establishing standards is an integral part of establishing the correct identity of a crude drug. Before any plant material can be included in the pharmacopoeia as a drug material, these standards must be established. The majority of the information on the identity, purity and quality of the plant material can be obtained from its physicochemical and phytochemical analysis.

ACKNOWLEDGEMENTS

Authors are much thankful to the authorities of Annamalai University and Professor and Head, Department of Chemistry and Microbiology, RMMC, AU for providing necessary facilities to carry out the work.

REFERENCES

[1] AA Farooqi, BS Sreeramu, Cultivation of Medicinal andaromatic Crops. University Press (India) Ltd. **2001**, 6-10.
[2] D Shankar; DK Ved, *The Indian Forester*, **2003**, 129, 275-288.
[3] AGM DeSe, *Br. Med. J.* **1995**, 310, 1023-1024.
[4] A Dhanukar; RA Kulkari; N Ege, *Ind J Pharmacol*. **2000**, 32, 81-118.
[5] B Barlow, *Flora Malesiana Bull.* **1991**, 10, 335-338.
[6] CL Calvin; CA Wilson, *Flora-Morphology, Distribution, Functional Ecology of Plants*, **2006** 201(1), 51-64.

[7] BA Iwalekun; AO Oyenuga; GM Saibu; J Ayorinde, A, *Curr Res. J. Biol. Sci.,* **2011**, 3(5), 459-467.
[8] ZA Omar; MS Ibrahim; JQ Ko; ZA Mohd, *J. Pharmacopuncture*, **2015,** 18(1), 007-018.
[9] PO Osadebe; SE Ukweze, *J. Biol. Res. Biotechnol.,* **2004**, 2, 18-23.
[10] P Othbert; HR Chandan; S Nayimulla; RN Suresha; S Naveen, *J. Harm. Res. Pharmacy*, **2013**, 2(1), 24-30.
[11] J Jayaraman, Laboratory Manual in Biochemistry, Birla Pub. New Delhi, **1991**, (1) 50-53.
[12] A Kar, Pharmacognosy and Pharmacobiotechnology, New Age Pub., New Delhi, **2002**, (II) 147.
[13] CK Kokate, Practical Pharmacognosy, Nirali Prakashan, New Delhi, **2004**, 29, 107.
[14] LM Shivastava, Essential Practical Biochemistry, CBS Pub., New Delhi, **2002**, (I): 41-50.
[15] SP Singh, SP Practical Manual of Biochemistry, Birla ub., New Delhi **2004**, 17-31.
[16] P Mukherjee, Quality control of herbal drugs (III), Business Horizons Pub., **2005**, 282-284.
[17] Indian Pharmacopia, Part-II, Vol II Published by Indian Pharmaceutical Commisson, Ghaziabad, **1996**, A-50 and A52.