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PHARMACOGNOSTICAL, PHYTOCHEMICAL AND PHARMACOLOGICAL ASPECTS OF THE LEAF OF *FICUSRACEMOSA (LINN.) MORACEAE*

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ABSTRACT

The traditional medicine involves the use of different plant extracts or the bioactive constituents. The study such as ethno medicine keenly represents one of the best avenues in searching new economic plants for medicine. This type of study provides the health application at affordable cost. The present study carried out to find out the phytochemical constituents in the *Ficusracemosa leaves*. The materials were grained and extracted with benzene, ethanol, ethyl acetate, and methanol and petroleum ether. Photochemical analysis was carried out according to standard procedures. Sugar, protein, alkaloids, flavonoids, sterols and glycoside were found to be present in the extracts.

KEY WORDS

Ficusracemosa (linn.) moraceae, Pharmacological and Phytochemical studies.

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INTRODUCTION

Many people around the world relay on medicinal plants because of their effectiveness, lack of modern alternatives and cultural preference. Plant kingdom represents a rich storehouse of organic compounds which has been use for medicine and other related purpose. From the beginning of civilization, men are faced with various kinds of diseases. With time man got the knowledge to cure diseases. The diseases are attacking and taking a toll on human population. Man adopted some control measures to get rid of diseases. Man tried to use different parts of various plants. All the systems of medicine that provide healing to ill people contain plant based medicine[1-4].

More than 25% of pharmaceuticals use today derived from plants and natural product. There is search of drug from plant as plants have the remarkable diversity of both chemical structure and biological activities of secondary metabolites. Now development of novel and sensitive techniques to detect biological activities of secondary compounds and improved techniques available for isolation, purification and structural characterization of these isolated compounds. Opium was the first plant drug to be investigated by method of plant analysis introduced by Fourcracy, morphine is the first phytoconstituent to be isolated and characterized as alkaloid, salicin or salicylic acid obtained from willow bark, quinine isolated from cinchona. The discovery of cardiac glycosides as digoxin, digitoxin from digitalis, qunidine isolated from bark of cinchona an anti-arythmic drug, reserpine from *rauwaolfia* as on antihypertensive agent. The changing scenario is also marked by increase in export of medicinal plants from india, leading to fetch valuable foreign exchange. India's export of essential oil during last few years has shown erratic trend. The sandal wood oil contributes 50% of world market. The major phytochemicals exported from india in recent year were *vinca* extract, *senna* derivative, castor oil, berberine hydrochloride and opium alkaloids etc[5-7].

PLANT PROFILE

Botanical Name	: *Ficusracemosa*
Synonym	: Ficusglomerata

Classification

Kingdom	: Plantae
Subkingdom	: Viridaeplantae
Phylum	: Tracheophyta
Subphylum	: Euphyllophytina
Division	: Magnoliophyta
Class	: Magnoliospida
Order	: Urticales
Family	: Moraceae
Genus	: Ficus
Species	: racemosa

Vernacular Name

Sanskrit	:Udumbara,Janthuphala, Hemadughda
Hindi	: Gular, Umar
English	: Crattock, Cluster fig, Cluster tree, Country fig, Redwood fig.
Telugu	:Arri, Athi, Bodda, Maydi, Paidi, Udumbaramu.
Urdu	: Dimiri
Tamil	: Athi, Atti, Anai
Ayurvedi	: Udumbarasara, Udumbaramrta, Udumbaravaleha

Habit and General Features

It is one of the herbs mentioned in all ancient scriptures of Ayurveda and has been used for medicinal purposes, since centuries and grown in garden. It is cultivated throughout India in sub-tropical regions and in Northern Australia, Moist areas, besides rivers and streams. It is an evergreen tree, growing up to 25-30mts in height.

Ethno medicinal uses

Leaf	:In inflammation of skin wounds, Lymphadenitis, Sprain and Fibrositis.
Fruit pulp	: In diabetes, Leucoderma, Nienorrhagia.
Bark	:Hepatoprotective, Larvicidal, Antidiabetic,Antidiuretic, Antipyretic, Anthelmintic.
Stem	:Antioxidant,Antimicrobial, Antitussive and Antiprotozoal.
Root	: Antioxidant, Antimicrobial.
Latex	: In Tooth ache.

Macroscopy

Leaves are dark green, Ovate or elliptic, 7.5-10cm long. Flowers are white, axillary, sessile, Calyx-lobes are 3 to 4 and linear Stamens are 2, female flowers are pedicellate. Style is lateral and stigma is clavate. Aggregate of fruits, green and when ripe orange, dull reddish dark crimson colored and have pleasant smell, 2-5cm in diameter, subglobose or pyriform, smooth or rarely covered with minute soft hairs. Barks are Brownish black or greyish green or reddish grey. 0.5-1.8cm thick.

The T.S. of leaf consists of the following parts

Upper epidermis is Polygonal tabular cells with straight anticlinal wall. Below the epidermis in the

projection area collenchymatous tissues were observed, followed by palisade parenchymatous cells. Trichomes are unicellular, covering trichomes. The vascular bundle consisted of xylem parenchymatous cells, phloem, 3-4 layers of pericyclic sclerenchymatous cells. The Lower epidermis single layer of rectangular cells with smoothcuticle and just above the lower epidermis 4-5 layers of spongy parenchyma and collenchyma was present. Trichomes were unicellular the upper palisade cells were elongated and found beneath upper epidermis followed by Spongy parenchymatous cells was shown in Table No.1.

POWDER ANALYSIS[8-12]

The powdered analysis with different chemical reagents was show in Table No.2.

Fluorescence Analysis

Many drugs gave fluorescence when their powder was exposed to UV radiation. It was important to observe on reaction with different chemical regents was shown in Table No.3.

pH Determination

1 gm air dried plant material was taken in a conical flask and made volume up to 100 ml and in second conical flask taken 10 gm air dried plant drug and made volume up to 100 ml with distil water kept both for 20-25 minutes. Then filtered both the solution with the help of filter paper. The pH of both solutions with the help of pH meter was measured and it was shown in Table No.4.

Physical Evaluation

The glass stoppered shallow weighing bottle was dried and weighed and then transferred 5 gm powder drug in it. The bottle was then covered and weighed it with powder drug. The sample was then distributed as evenly as practicable by gentle side wise shacked to a dept not exceeding 10 mm. Then the bottle was placed in the hot air oven by remaining the stopper. The powder drug was then dried to constant weight at a temperature of 105^0 C. After drying was completed the hot air oven was opened and the bottle was closed promptly and allowed to cool to room temperature (where applicable) in a desiccators before weighing. The bottle and the contents were then weighed. This is continued until a constant weight is obtained (Table No.5).

ASH VALUE

Total ash

A clean dry silica crucible was weighed, 2gm of powder plant material was transferred and incinerated at a temperature not exceeding 450^0 until free from carbon, color and weighed if a carbon free ash could not be obtained in this way then charred mass was exhausted with hot water. Then the residue was collected on ash less filter paper and the residue was incinerated with filter paper until the ash is white or nearly so. Then the filtrate was added, evaporated to dryness and ignited at a temperature not exceeding 450^0C the percentage of ash was calculated shown in Table No.5.

Water soluble ash

The ash was boiled for 5 minutes with 25 ml distilled water and the insoluble matter was collected in a Gooch crucible or on an ash less filter paper, washed with hot water and ignited for 15 minutes at a temperature not exceeding 4500. The weight of the insoluble matter was subtracted from the weight of the ash; the difference in weight represents the water soluble ash. The percentage of water soluble ash with reference to the air dried drug was then calculated shown in Table No.5.

Acid insoluble ash

The ash was boiled for 5 minutes with 25ml. of 2(m) HCL in silica crucible and the insoluble matter was collected in Gooch crucible or on an ash less filter paper. Washed with hot water, ignited cooled in desiccators and weighed. The percentage of acid insoluble ash with reference to the air dried drug was then calculated shown in Table No.5.

EXTRACTIVE VALUE

Water extractive Value

5 gm of air dried powder drug was taken in a stoppered conical flask and added 50 ml distil water and put the cap on it. The conical flask was shaken during first six hours at some interval and kept for next sixteen hours. The content was filtered into a beaker being previously weighed. After filtration the filtrate was dried at a temperature 105^0C. After

dryness again taken the weight of beaker. The percentage of water soluble extractive was calculated with reference to the air dried drug. It was substituted the weight of empty small beaker from the weight of beaker with Evaporating drug shown in Table No.5.

Alcohol Soluble Extractive Value

5gm of air dried coarse drug powder was macerated with 100 ml ethanol in a stoppered conical flask for twenty four hours, shacked frequently during six hours and allowed to stand for24 hours .it was filtered rapidly, taking precaution against loss of solvent, the filtrate was evaporated to dryness in a tared flat bottom dish and dried at 105^0C, to constant weight and weighed shown in Table No.5.

PHYTOCHECHEMICAL INVESTIGATION[13-16]

Preparation of Extract by Successive solvent Extraction

The leaf of *Ficusracemosa* was shade dried and powdered to get a coarse powder. About 500 gm of dry powder was extracted in the Methanol by continuous hot percolation using soxhlet apparatus. The extraction was continued for 72 hrs. The Methanolic extract was filtered and concentrated to a dry mass by using vacuum distillation. A greenish black residue was obtained.

QUALITATIVE CHEMICAL EVALUATION

The qualitative chemical evaluation results were shown in Table No.6.

PHARMACOLOGICAL SCREENING

Anthelmintic activity of the leaves of the plant *Ficusracemosa (linn.)Moraceae*

The suspensions of Methanolic extract were prepared in Tween 80 (1%) to obtain 1, 2.5 and 5% concentrations. Solutions of similar concentrations of the reference standard drug albendazole were also prepared in distilled water. Two ml of each concentration of Methanolic extract and standard drug albendazole were diluted to 10 ml separately with normal saline and poured in petridishes. The petridishes were divided into 3 groups. Group I consists of normal saline, Group II consists of standard drug albendazole and Group III consists of Methanolic extract. Each group consists of 1, 2.5 and 5% concentrations and to each concentration equal size of adult earthworms of 3 numbered were released into petridishes. Times were recorded at the time of releasing the earthworms to each concentration. Then the time was taken in minutes for the paralysis and death of the earthworms.

The anthelmintic activity was evaluated on adult Indian earthworm *Pheritimaposthuma* due to its anatomical and physiological resemblance with the intestinal round worm parasites of human beings.

Paralysis was said to occur when the worms did not revive even in normal saline. Death was concluded when the worms lost their mobility followed by fading away of their body colour. Methanolic extract of the leaves of *Ficusracemosa* were screened for anthelmintic activity was shown in Table No.7.

RESULTS AND DISCUSSION

Ficusracemosa(linn.)Moraceae is a plant of 20-30m height found in tropical and subtropical regions in asia. It grows in all parts of India. The leaves have smooth texture. The flowers are fairly White coloured. It is commonly known as Gular, Umar, Cluster fig, Crattock etc. It has been used as astringent, vermicide and to treat inflammation of skin wounds. The microscobical characters of the leaf were studied. The leaf showed the presence of epidermis with anti-clinal cell wall. The trichomes were unicellular. Below the epidermis were collenchymatous cells followed by palisade parenchymatous cells. The vascular bundle contains xylem, phloem, 3-4 layered sclerenchymatous cells.

Powder microscopy showed the presence of unicellular trichomes. Xylem vessels were observed. Collenchymatouscells, Paracytic stomata were seen. In the powder analysis the powders were treated with different reagents and different colours were seen on nacked eye as well as on UV light. pH of powdered drug at 1% and 10% with triple distilled water were 7.59 and 6.99. Physical evaluation of the powdered drug showed 14.0%w/w total ash, 6.05%w/w acid insoluble ash, 8.0%w/w water soluble ash,36%w/w

water soluble extractive, 28%w/w alcohol soluble extractive.

The leaf powder was subjected to successive extraction in soxhlet extraction in soxhlet apparatus by methanol solvent, extract and powdered material showed the presence of alkaoids, phytosterols, flavonoids, tannins and phenolic compounds.

The methanol extract was studied for tits anthelmintic activity by ayaioba method on the Indian earthworm (pheritimaposthuma) and found that it was showing some anthelmintic effect.

Table No.1: Treatment of T.S. of leaves with different chemical reagents

S.No	Sample + Chemical reagent	Observation	Result
1	T.S. of leaf + Iodine solution	Blue colour was observed	Starch grain absent.
2	T.S. of leaf+ 5% aqueous potassium hydroxide solution	Yellow colour was observed	Flavonoid present
3	T.S. leaf + 10% Ferric Chloride solution	No bluish colour was observed	Tannin present
4	T.S. of leaf + Caustic alkali + hydrochloric acid	No Yellow Patch was observed	Calcium Oxalate crystal absent

Table No.2: Treatment of powder drug with chemical reagents

S.No	Reagent	Colour
1	Powder drug + glacial acetic acid	Greenish Yellow
2	Powder drug + conc. HNO_3	Yellowish brown
3	Powder drug + conc. H_2SO4	Reddish brown
4	Powder drug + 50% HNO_3	Brown
5	Powder drug + 50% HCL	Pale green
6	Powder drug + 1 (N) aq. NaOH	Dark green
7	Powder drug + 1 (N) alc.NaOH	Dark green
8	Powder drug + 50% H_2SO_4	Yellowish green
9	Powder drug + 5%KOH	Light green
10	Powder drug + 5% $Fecl_3$ Sol^n	Green
11	Powder drug + 5% KOH	Brown
12	Powder drug + I^2 Sol^n	Reddish brown
13	Powder drug + Conc. HCL	Dark green

14	Powder drug + methanol	Green
15	Powder drug + Chloroform	Green
16	Powder drug + Ammonia	Green
17	Powder drug + Pet. Ether	Green
18	Powder drug + Picric acid	Yellow
19	Powder drug + Ethanol	Green
20	Powder drug + Ammonia +50% HNO_3	Dark Brown

Table No.3: Fluorescence analysis

S.No	Reagent	Colour
1	Powder drug + 50% HNO_3	Light green
2	Powder drug + 5% NaOH	Green
3	Powder drug + 5% $Fecl_3$	Yellowish green
4	Powder drug + 50% H_2SO4	Green
5	Powder drug +50% HCL	Light green
6	Powder drug + 5% KOH	Green
7	Powder drug + 1 gm. Aq.NaoH	Light green
8	Powder drug + 1 (N) alc. NaOH	Dark green
9	Powder drug + Methanol	Light green
10	Powder drug +$CHcl_3$	Light green
11	Powder drug + pet. Ether	Green
12	Powder drug + picric acid	Light green
13	Powder drug + Ethanol	Light green

Table No.4: pH of powdered drug

S.No	pH of powdered drug	
1	**1% solution**	**10% solution**
	7.59	6.99

Table No.5: Parameter of physical evaluation

S.No	Parameter	Values (%)W/W
1	Loss on drying	76
2	**Ash value**	
	Total ash	14.0
	Acid insoluble ash	6.5
	Water soluble ash	8.0
3	**Extractive values**	
	(A) Water soluble Extractive	36
	(B) Alcohol soluble Extractive	28

Table No.6: Qualitative chemical evaluation of various extracts of leaves of*Ficus racemosa*

S.No	Plant constituents test/reagent used	Powdered drug	Methanolic extract
I	**Test for Carbohydrates**		
1	Molisch's Test	+	+
2	Fehling's Test	-	-
3	Benedict's Test	-	-
4	Barfoed's Test	-	-
5	Test for Starch	–	–
II	**Test for Mucilage**	-	–
III	**Test for Proteins and Amino Acids**		
1	Ninhydrin Test	-	+
2	Biuret Test	–	+
3	Millon's Test	-	–
4	Xanthoproteic Test	-	–
5	Tannic Acid (10% w/v)	–	+

6	With Heavy Metals	-	–
7	Trichloro Acetic Acid	-	–
IV	**Test for Fixed Oils and Fats**		
1	Spot Test	–	-
2	Saponification Test	–	-
V	**Test for Alkaloids**		
1	Dragendroff's Test	-	-
2	Mayer's Test	-	-
3	Wagner's Test	+	+
4	Hager's Test	+	+
5	Phosphomolybdic Acid	+	+
6	Tannic acid	-	-
VI	**Test for Flavonoids**		
1	$FeCl_3$ Test	+	+
2	Shinoda's Test	+	+
3	Fluorescence Test	+	+
4	Reaction with alkali and acid	+	+
VII	**Test for Tannins**		
1	5% $FeCl_3$ solution	+	+
2	Reaction with copper sulphate	+	+
3	Reaction with lead acetate	+	+
4	Reaction with Potassium dichromate	+	+
5	Drug + $K_3Fe(CN)_6$ + NH_3	+	+
VIII	**Test for Saponins**		
1	Foam Test	-	–
2	Haemolysis test	_	_
IX	**Test for Volatile Oils**	**_**	**_**

Table No.7: Anthelmintic effect of the leaves of *Ficus racemosa*

S.No	Group	Concentration of extract in %	Time taken in minutes ± SEM	
			Paralysis	Death
1	Albendazole	1.0	400±11.4	500±6.9
		2.5	250±9.1	400±4.3
		5.0	180±14.4	200±4.3
2	Methanolic extract	1.0	500±17.3	600±9.0
		2.5	300±13.2	480±12.1
		5.0	190±16.4	240±10.8

Control: worms were alive upto 24 hrs of observation.
Data was expressed as mean ± SEM.

CONCLUSION

Extensive and more pharmacological investigations are needed to be done at receptor level, characterizations of therapeutically significant lead molecules are necessary to standardize this plant drug and finally the clinical trials. The plant is a valuable plant source for traditional drug preparations. The plant has shown Anthelmintic activity. It can also be considered in combination treatment with other scientific medicines available. The use of traditional plant extracts as well as other alternative forms of medical treatments has been getting momentum since 1990. This plant has been used traditionally as curative agent.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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