Available online on www.ijppr.com
International Journal of Pharmacognosy and Phytochemical Research 2013; 5(3); 192-196

ISSN: 0975-4873

Research Article

Pharmacognostical & Phytochemical Approach of *Jussiaea suffruticosa* Linn.

*[1]Kumar Anand, [2]Kashyap Pranita

[1]*Department of Pharmacy, University Teaching Department, Sarguja Vishwavidyalaya, Ambikapur – 497001, (C.G.), India.*
[2]*Department of Pharmacognosy, Shri Rawatpura Sarkar Institute of Pharmacy, Behind Holiday Resort, Kumhari – 490042, (C.G.), India.*

ABSTRACT
The present study deals with the Pharmacognostical & Phytochemical study of the plant "*Jussiaea suffruticosa*" for its identification and to distinguish it from the co-existing weeds and adulteration. In the present investigation, microscopical characters are evaluated and different parameters are applied for the physico-chemical studies include evaluation of colour, consistency of different extracts, extractive value, ash value, moisture content, fluorescence analysis and also qualitative phytochemial screening was performed. It was earlier reported as an astringent, carminative, laxative, diuretic and anthelmintic properties. Since there is no proper information regarding this plant, our efforts were devoted to study the pharmacognostical and phytochemical properties of this plant. Thus, present study revealed the plant extract contains different chemical constituents like alkaloid, phenolic compound, saponin, flavonoid, proteins & amino acids.

Key Words: *Jussiaea suffruticosa*, Microscopic Characters Powdered drug & Extract, Phytochemial screening, Fluorescence analysis.

INTRODUCTION

Herbal drugs have a great growth potential in the global market because of their wide biological activities and purported higher safety margin then the synthetic drugs and lesser costs. India has a reach history of using plants for medicinal purposes. Pharmacognosy is a simple and reliable tool, by which complete information of the crude drug can be obtained [1- 4]. In Pharmacognosy, to overcome quality problems of herbal drugs, it is almost predictable to standardize the drugs for their rational therapeutic use. A disease can't be managed comprehensively until the delivery of genuine samples of drug is ensured [5]. Therefore, in the present study, the preliminary phytochemical screening of the plant "*Jussiaea suffruticosa linn*" was carried out. The parameters applied in the present study makes valuable test to check the quality of drug.

The traditional medical practitioners use the plant "*Jussiaea suffruticosa linn*" belongs to family "Onagraceae" commonly known as "Bila-labanga" in Oriya and "Banlunga" in Hindi. The plants are semi-shrubby, erect annual herb with tap root system. The stem often 3 to 4 angled, 15 -150 cm of height and minutely hairy during early stage of growth. Leaves are lanceolate, acute to acuminate at tip, may be white green, up to 10 cm long, 1 to 3 cm wide, petiole short, margin may be seriate, flowers small axillary, solitary, sessile, acuminate, sepals are 2 to 4 mm long, pubescent, petals are four, elliptic, a little larger than sepals, stamens are eight & carpel are two, syncarpel, ovules one or many in each cell. Fruits are clove like appearance, seeds are minute ovoid, brown polished [6,7] (Figure 1 & 2). It is reported to be used as astringent, carminative, laxative, diuretic and anthelmintic. A decoction of the plant is given for dropsy, flatulence, leucorrhoea and spitting of blood. It used also in diarrhoea. A decoction of the root is given in fever. In Africa, the plant enters into prescription for rheumatic pains. Proper pharmacognostical studies have not been reported for this plant.

MATERIALS AND METHODS

The plant *Jussiaea suffruticosa linn* was collected from the dumpy field of Ambikapur in the district of Sarguja, in the state of Chhattisgarh. Then subsequently for more conformation the herbarium sheet of plant was authenticated by the Director (Farm Forestry), Dr. M. L. Naik of University Teaching Department, Sarguja University, Ambikapur, Sarguja (C.G.) with the reference no. SUA/UTD/12/08. Few authentic samples were preserved in our department for future reference.

Pharmacognostical Studies: Morphological studies were done with simple microscope. The shape, size, apex, surface, base, margin, venation, colour, odour, taste of leaf, flower, seed, petiole, root were determined. Microscopically, studies were done by preparing a thin hand section of the leaf part, petiole part, root part and stem part. Microscopical studies were carried out as per the standard method [8]. Thin section of about 10-12µm thick were prepared and cleared with 5% NaoH and stained with phloroglucinol and hydrochloric acid and mounted in glycerine and observed under microscope. The powdered drug was separately treated with phloroglucinol-HCl solution and mounted in glycerine for microscopical evaluation[9]. (Figure no.3,4,5,6)

**Author for correspondence: E-mail: anandpharm007@gmail.com*

Figure 1: *Jussiaea suffruticosa* Entire Plant.

Figure 2: *Jussiaea suffruticosa* Flower & Fruits

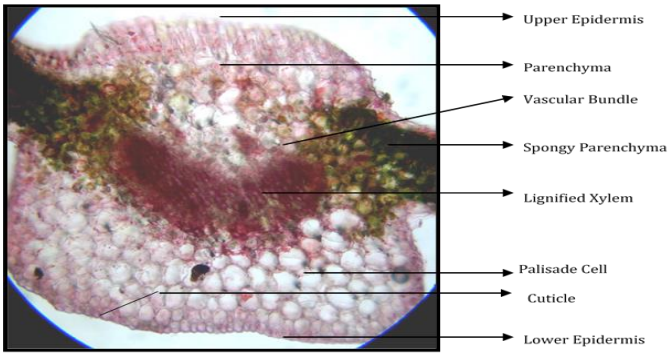


Fig. 3: T.S. Leaf of *Jussiaea suffruticosa.*

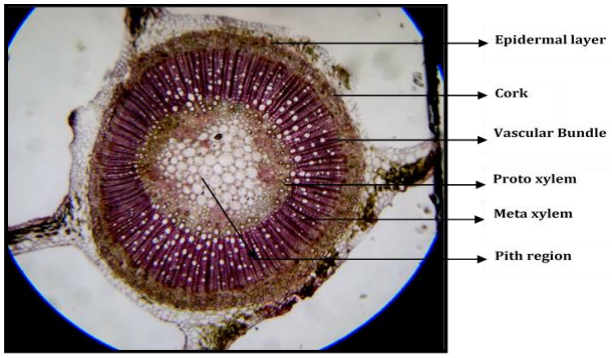


Fig. 4: T.S. Stem of *Jussiaea suffruticosa.*

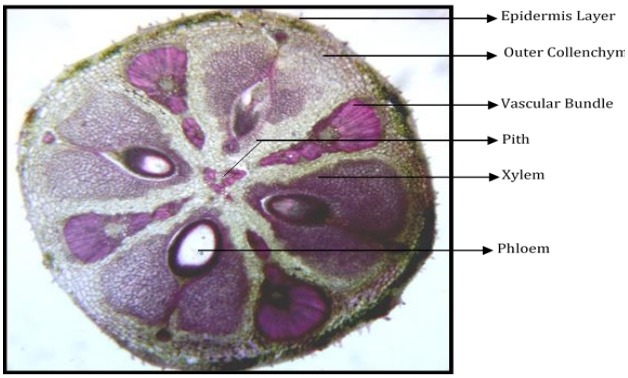


Fig. 5:T.S. Petiole of *Jussiaea suffruticosa.*

Table No. 1: Quantitative Microscopy of Leaves of *Jussiaea suffruticosa linn*

Sl. No	Leaf Constant	Value
1	Stomatal Index	17.94
2	Vein-islet number	23
3	Vein termination number	16
4	Palisade ratio	56

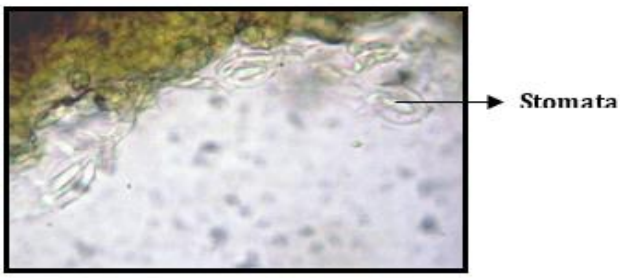
Leaf constants such as stomatal index, vein islet number, vein termination number and palisade ratio were determined by using fresh leaves of the plant. Standard procedures were followed for all the evaluations [10]. All the chemicals and solvents used in experiment were of analytical grade. (Table. 1)

Fluorescence Analysis of powdered Drug under Ultra-violet Light: Powdered drug was screened for fluorescence characteristics with and without chemical treatment. The observations pertaining to their colour in day light and under ultra-violet light (short & long) were recorded. (Table 2) [11]

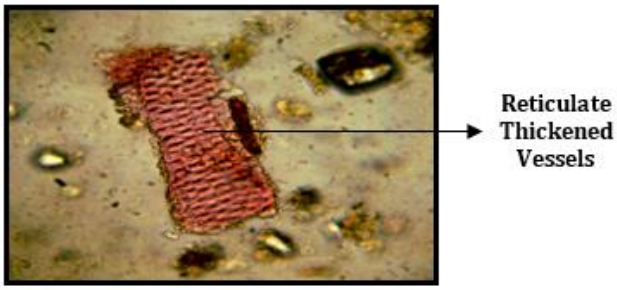
Physiological Parameters: Physicochemical parameters of the powdered crude drug such as loss on drying, total ash, acid-insoluble ash, water soluble ash, alcohol soluble extractive value, water soluble extractive value for the plant *Jussiaea suffruticosa linn* were performed according to the standard methods [12,13,14,15] and recorded in the table (Table 3) Successive Extraction with Various Solvents: The plant was collected and dried in the shade and then pulverized in a grinder. The powdered drug was utilized for extraction.

Material was passed through 120 meshes to remove fine powders and coarse powder was used for extraction. Successive extraction was carried out with Soxhlet using different solvents like Petroleum ether (60^0 – 80^0C), Chloroform, Acetone, Methanol & Water as per their polarity successively. The extract was dried using rotary evaporator and was kept in a dessicator till experimentation. Obtained extract was weighed and percentage yield was calculated in terms of air-dried powdered crude [12,13,14,15].

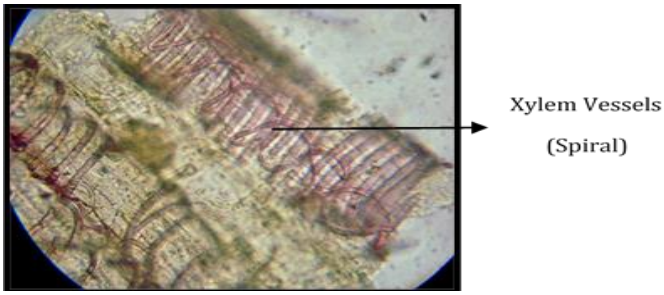
The percentage yield of different extracts of powdered



A



B



C

Fig.6: Powder Characteristics of different parts of *Jussiaea suffruticosa*

Table No. 2: Fluorescence Characteristics of Powdered drug with different reagents.

Sl. No.	Reagent + Drug	Colour of powder at Day light	UV Light Short	UV Light Long
1	Untreated Powder	Light Green	Green	Black
2	Powder + Saturated Picric Acid	Yellowish green	Light Green	Black
3	Powder + Nitric Acid	Brown	Deep Green	Black
4	Powder + 1N HCl	Brown	Dark Green	Black
5	Powder + Conc. H_2SO_4	Deep Brown	Greenish Black	Black
6	Powder + Glacial acetic Acid	Reddish Brown	Brown	Dark green
7	Powder + 1N NaOH	Yellowish Brown	Dark Brown	Black
8	Powder + Iodine	Reddish Brown	Black	Black
9.	Powder + Ferric Chloride	Yellowish Green	Dark Green	Black

Table No. 3: Physiological Parameters of *Jussiaea suffruticosa linn.*

Sl. No.	Parameters	Mean Percentage (w/w)
1	Loss on Drying	8.9
2	Total ash Value	4.8
3	Acid-insoluble ash Value	1.3
4	Water soluble ash Value	2.8
5	Alcohol soluble extractive Value	8.0
6	Water soluble extractive Value	8.8

Table 4: Extractives values of different extracts of *Jussiaea suffruticosa linn* powdered drug.

S. No.	Type of Extract	Colour	Odour	Consistency	Extractive Value (w/w)
1	Petroleum ether Extract (60^0 – 80^0C)	Light Green	Characteristic	Greasy	0.50 %
2	Chloroform Extract	Dark Green	Characteristic	Sticky	0.58%
3	Acetone Extract	Deep brown	Characteristic	Sticky	0.98%
4	Methanolic Extract	Deep brown	Characteristic	Greasy	1.55%
5	Water extract	Black	Characteristic	Greasy	2.25%

drug of *Jussiaea suffruticosa linn* and their colour, consistency were reported in the table. (Table 4).

Phytochemical Screening: The powder of the air dried entire plant *Jussiaea suffruticosa linn*, weighing about

Table No. 5: Preliminary Phytochemical Screening of plant *Jussiaea suffruticosa linn*.

S.No	Phytochemical Test	Petroleum ether extract	Chloroform extract	Ethyl acetate extract	Methanolic extract	Water extract
I	Test for Alkaloids:					
A	Mayer's Test	–	+	–	+	+
B	Wagner's Test	–	+	+	+	+
C	Hager's Test	+	+	+	+	+
D	Dragendroff's Test	–	–	–	–	–
II	Test for Carbohydrates and Glycosides:					
a.	Molisch's Test	–	–	–	–	–
b.	Fehling's Test	–	–	+	+	–
c.	Barfoed's Test	–	–	–	–	–
d.	Benedict's Test	–	–	–	–	–
e.	Borntrager's Test	–	–	–	–	–
f.	Legal's Test	–	–	–	–	–
III	Test for Saponins:					
	Foam Test	+	+	+	+	+
IV	Test for Proteins and Amino acids:					
a.	Millon's Test	–	–	+	+	+
b.	Biuret Test	–	–	–	–	–
c.	Ninhydrin Test	–	–	+	+	–
V	Test for Phytosterols:					
a.	Liebermann Burchard's Test	–	+	+	+	–
VI	Test for Gum and Mucilages:					
a.	Alcohols 95% Test	–	–	–	–	–
VII	Tests for Phenolic Compounds and Flavonoids:					
a.	Ferric chloride Test	–	+	–	+	–
c.	Lead acetate Test	+	+	–	+	+
d.	Alkaline Test	+	+	–	+	+

- *Negative ; + positive*

Table No. 6: Fluorescence Characteristics of Different Extract of *Jussiaea suffruticosa linn.*

Sl. No.	Types of Extract	Day Light	UV Light Short	UV Light Long
1	Petroleum Ether Extract	Light Green	Green	Dark Green
2	Chloroform Extract	Green	Dark Green	Black
3	Acetone Extract	Brown	Deep Brown	Black
4	Methanolic Extract	Brown	Deep Brown	Black
5	Water Extract	Black	Black	Black

100gm was successively extracted in Soxhlet apparatus with the solvents of increasing polarity such as petroleum ether ($60^0 – 80^0$C), chloroform, acetone, methanol & water. The extracts were dried using rotary evaporator and percentage extractive value was determined. The dry extracts were screened for the presence of various phytoconstituents / secondary metabolites responsible for the therapeutic values of the drug like presence of alkaloids, glycosides, carbohydrate, tannins – phenolic compounds, proteins & amino acids, gums & mucilage, flavours & flavonoides, saponins and steroids & Sterols etc [2,4,116]. The resulting data were recorded in the table. (Table 5)

Fluorescence Analysis of drug extract under Ultra-violet Light: Extract of *Jussiaea suffruticosa linn* was screened for fluorescence analysis. The observations pertaining to their colour in day light and under ultra-violet light (short wave length & long wave length) were recorded [17]. (Table 6)

RESULTS AND DISCUSSION

Generally the herbal drugs are currently being used in the treatment of various diseases without standardization. The quantitative determination of some pharmacognostical parameters is useful for setting standards for crude drugs. The results of these investigations could serve as a basis for proper identification, collection and investigation of the plant.

By performing the fluorescence characteristic of the powder drug with different chemical reagents, change in colour of the drug with fluorescence was observed when seen in short UV light.

The moisture content was 8.9% which was not so high as to facilitate bacterial growth. The other physicochemical parameters which ascertain the quality, purity and also helps in evaluation the crude drug. The total ash value of the plant materials indicated the amount of minerals and earthy materials attach to the plant materials. Analytical results showed total ash value, acid insoluble ash value and water soluble ash value which were determined to be not more than 4.8% w/w, 1.3% w/w & 2.8% w/w respectively. While study of extractive value, water soluble extractive

value indicated the presence of sugars, acid & inorganic compounds and was found to be 8.8% where as alcohol soluble extractive value indicated the presence of polar constituents like phenols, alkaloids, steroids, glycosides & flavonoids and was found to be 8.0%.

The powder plant material was extracted with a series of solvent in there increasing order of polarity i.e. petroleum-ether, chloroform, acetone, methanol and water by soxhlet apparatus to isolate all kinds of phytoconstituents in plant material. Then colour, consistency, and extractive value of the extracts were evaluated. The methanolic and water extract have more extractive value (1.6% & 2%) and petroleum ether have less percentage (0.05%) of the extractive value.

All the extracts were subjected to various chemical test for preliminary identification of various phyto constituents. The extracts were observed to contain alkaloids, saponins, flavonoids, steroids in petroleum ether, chloroform, acetone and methanolic extract.

Further finding reveled that extract of *Jussiaea suffruticosa linn* contains some fluorescence compound which gives colour fluorescence at short wave length.

CONCLUSION

The pharmacognostic standards for the entire plant of *Jussiaea suffruticosa linn*, are laid down for the first time in this study. The information obtained from preliminary phytochemical screening will be useful in finding out the genuity of the drug. Ash values, extractive values, fluorescence analysis can be used as reliable aid for detecting adulteration. These simple but reliable standards will be useful to a lay person in using the drug as a home remedy. Also the manufacturers can utilize them for identification and selection of the raw material for drug production.

ACKNOWLEDGEMENT

The Authors are grateful to Dr. M. L. Naik, (Director), University Teaching Department, Sarguja University, Ambikapur, (C.G.) for his consistent advice & fruitful expertise knowledge & also very thankful to Dr. R. D. Sharma, (Registrar), Sarguja University for providing all kinds of facilities for this work**.**

REFRENCES

1. Shrikumar S, Ravi TK., Approaches towards development and promotion of herbal drugs. Pharmacog Rev; 2007, p.180.
2. Mukherejee PK. Quality control of herbal drugs – An Approach to evaluation of Botanicals, Kolkata:
3. Business Horizones, Pharmaceutical Publishers; 2002, p.246-378.
4. Raghunathan K, Mitra R. Pharmacognosy of indigenous plants, New Delhi: Central Council for Research in Ayurveda and Siddha; 1982, p.199-236.
5. Trease GE, Evans WC. Pharmacognosy, 15th ed., Harcourt Brace & Co., Asia, Pvt. Ltd., W.B. Saunders
6. Company Ltd.; 2002, p.80-104.
7. Hashmi S, Singh VK. Standardization of controversial herbal drugs: A Dire Need of the day, 1st ed., New Delhi: proceeding of the National seminar on Research methodology in Unani Medicine; 1995, Dept. of History of Medicine; 1998, p.60.
8. Kirtikar KR, Basu BD. Indian Medicinal Plants, 2nd ed., 2nd vol., Dehradun: International Book Distributors; 2006, p.1088.
9. Saxena HO, Brahmam M. The flora of Orissa, 2nd vol., Bhubaneswar: Regional research laboratory & Orissa forest development Corporation; 1995, p.727.
10. Johansen DA, Plant Microtechnique, Mc Graw Hill, Book Co. Inc, New York and London; 1940, p. 523.
11. Saas JE, Elements of Botanical, Mc Graw Hill Co. Inc, New York and London; 1940, p. 222.
12. Kokate CK, Practical Pharmacognosy, Vallabh Prakashan, Delhi, 4th Edition; 1994, p. 115.
13. Ansari MM, Ahmad J, Ahmad A, Ansari SH. Pharmacognostical characterization and
14. Standardization of *Morus alba* stem bark, Journal of Medicinal and Aromatic Plant Science; 2006,p. 28.
15. Government of India, Ministry of Health and Family Welfare, The Ayurvedic Pharmacopia of India Part-1, 1st ed., Vol. III. The Controller of Publication, New Delhi; 2001, p.233.
16. Government of India, Ministry of Health and Family Welfare, Indian Pharmacopoeia, Vol. II. The Controller of publications, Delhi; 1996, p.A-54.
17. Khandelwal KR. Practical Pharmacognosy: Technique and exprriments, 5th ed., Mumbai: Nirali Prakashan; 1994, p.124.
18. Kamick CR. Pharmacopoeial Standards of herbal plants, Sri Saguru publication; 1994, p.124.
19. Ramaan N. Phytochemical Techniques, New Indian Publishing Agency; 2006, p.19.
20. Kokashi CJ, Kokashi RJ, Sharma M. Fluorescence of powdered vegetable drugs in ultra-violet radiation, J Am Pharm Assoc 1958; 47, p.715-717.