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PHYTOCHEMICAL SCREENING OF *JUSSIAEA HYSSOPIFOLIA* G. DON.

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ABSTRACT

The plant "*Jussiaea hyssopifolia*" has great medicinal value and reported as astringent, carminative, laxative, diuretic and anthelmintic properties. In the present investigation, 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 phytochemical screening was performed. Thus, present study revealed the plant extract contain different chemical constituents like alkaloid, phenolic compound, saponin, flavonoid, proteins & amino acids. Phytoconstituents in different extracts could be useful in setting some diagnostic indices for the identification and preparation of plant monographs. Hence objective of present investigation was planned to find out the quality level of different extract & powder drug of *Jussiaea hyssopifolia* in physicochemical studies.

Key Words: *Jussiaea hyssopifolia*, Powdered drug & Extract, Phytochemical screening, Fluorescence analysis.

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INTRODUCTION:

Herbal medicines are promising choice over modern synthetic drugs. They show minimum or no side effects and are considered to be safe. Generally, herbal formulations involve use of fresh or dried plant parts. Correct knowledge of such crude drugs is very important aspect in preparation, safety and efficacy of the herbal products. Pharmacognosy is a simple and reliable tool, by which complete information of the crude drug can be obtained^{1,2,3,4}. In Pharmacognosy, to overcome quality problems of herbal drugs, it is almost predictable to standardize the drugs for their rational therapeutic use. A disease cannot be managed comprehensively until the delivery of genuine samples of drug is ensured⁵. Therefore, in the present study, the preliminary phytochemical screening of the plant "*Jussiaea hyssopifolia*" 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 hyssopifolia*" G.Don. belongs to family "Onagraceae" commonly known as "Bila-labanga" in Oriya and "Banlunga" in Hindi. The plant is 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).



Figure 1: *Jussiaea Hyssopifolia* Entire Plant



Figure 2: *Jussiaea Hyssopifolia* Flower & Fruits

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 is 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 hyssopifolia* was collected from the dumpy field of Barpali in the district of Bargarh, in the state of Orissa. Then subsequently for more confirmation the herbarium sheet of plant was authenticated from Botanical Survey of India, Howrah, Kolkata with the reference no.CNH/I-I/4/2010/Tech.II/195. Few authentic samples were preserved in our department for future reference.

Pharmacognostical Studies

- **Fluorescence Analysis of powdered Drug under Ultra-violet Light**

Powdered drug was screened for fluorescence characteristics with and without chemical treatment.⁸

- **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 hyssopifolia* were performed according to the standard methods^{9,10,11,12}.

- **Successive Extraction with Various Solvents**

Successive extraction was carried out with Soxhlet using different solvents like Petroleum ether (60^o – 80^oC), Chloroform, acetone, Methanol & water as per their polarity successively. The extract was dried using rotary evaporator and was kept in a desiccator till experimentation. Obtained extract was weighed and percentage yield was calculated in terms of air-dried powdered crude^{9, 10, 11, 12}.

The percentage yield of different extracts of powdered drug of *Jussiaea suffruticosa* and their colour, consistency were reported in the table.

Phytochemical Screening

The powder of the air dried entire plant *Jussiaea hyssopifolia*, weighing about 100gm was successively extracted in Soxhlet apparatus with the solvents of increasing polarity such as petroleum ether (60^o – 80^oC), chloroform, acetone, methanol & water. The extract was 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 sterols & Sterols etc ^{2,4,13}. The resulting data were recorded in the table.

Fluorescence Analysis of drug extract under Ultra-violet Light

Extract of *Jussiaea hyssopifolia* 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 ¹⁴.

RESULT 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 observations pertaining to their colour in day light and under ultra-violet light (short & long) were recorded. (Table 1).

Table 1: Fluorescence Characteristics of Powder 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 ₂ SO 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

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 help 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 & flavonoides and was found to be 8.0% (Table 2).

Table 2: Physicochemical Parameters of *Jussiaea hyssopifolia*

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

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. (Table 3& 4)

Table 3: Extractives values of different extracts of *Jussiaea hyssopifolia* powdered drug

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

Table 4: Preliminary Phytochemical screening of plant *Jussiaea hyssopifolia*.

Sl. No	Phytochemical Test	Petroleum ether extract	Chloroform extract	Ethyl acetate extract	Methanol 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.	Molish's Test	–	–	–	–	–
b.	Fehling's Test	–	–	+	+	–
c.	Barfoed's Test	–	–	–	–	–
d.	Bensdict's Test	–	–	–	–	–
e.	Borntrager's Test	–	–	–	–	–
f.	Legal's Test	–	–	–	–	–
III	Test for Saponin -					
	Foam Test	+	+	+	+	+
IV	Test for Proteins and Amino acids					
a.	Millon's Test	–	–	+	+	+
b.	Biuret Test	–	–	–	–	–
c.	Ninhydrin Test	–	–	+	+	–
V	Test for Phytosteroids					
	Liebermann	–	+	+	+	–
	Burchard's Test					
VI	Test for Gum and Mucilage -					
	Alcohols 95% Test	–	–	–	–	–
VII	Tests for Phenolic Compounds and Flavanoides					
a.	Ferric chloride Test	–	+	–	+	–
c.	Lead acetate Test	+	+	–	+	+
d.	Alkaline Test	+	+	–	+	+

- Negative; + positive

All the extract was subjected to various chemical tests for preliminary identification of various phyto-constituents. The extract was observed to contain alkaloid, saponin, flavonoid, steroids in petroleum ether, chloroform, acetone and methanolic extract.

Further finding reveled that extract of *Jussiaea hyssopifolia* contains some fluorescence compound which gives colour fluorescence at short wave length. (Table 5)

Table 5: Fluorescence Characteristics of Different Extract of *Jussiaea hyssopifolia*

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

CONCLUSION:

The pharmacognostic standards for the entire plant of *Jussiaea hyssopifolia* 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.

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