MORPHOANATOMICAL AND PHYSICOCHEMICAL ANALYSIS OF

**IPOMOEA SEPIARIA Koenig Ex.Roxb** LEAVES

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**ABSTRACT**

*Ipomoea sepiaria Koenig Ex. Roxb* (convolvulaceae) is otherwise called as hedge bindweed. It is a climber distributed in tropical and subtropical region. Ethanomedical and traditional usage of this plant reveals to have antidote for arsenic poisoning, uterine tonic, aphrodisiac and antiulcer, diuretic, leucorrhoea, deobstruent and in burning sensation during urination. Till date the plant was not completely explored about pharmacognostical, physicochemical, phytochemical and phytopharmacological relevance. Hence we aimed to study the pharmacognostic and phytochemical properties of the Hedge bind weed. The study was undertaken with standard protocol for evaluation of quality of medicinal plants. Thus, this study reveals the preliminary information about microscopical characters and physicochemical constants. For identifying the species and to know the adultrant present within the original species.

**KEY WORDS**

Ipomoea sepiaria Koenig Ex.Roxb, Powder microscopy, Physiochemical studies, Fluorescence

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INTRODUCTION

*Ipomoea sepiaria* Koenig Ex. Roxb., Convolvulaceae [Figure no.1] is otherwise called as Hedge bind weed. It is a slender twining perennial plant with usually villous stems and lightly tuberous roots, leaves are simple, alternate, petiolate, ovate, and cordate with a wide sinus and rounded basal nerves, blocked with brownish or purplish patches towards the center. Flowers are delicate purple or white with purple eye along with short to long peduncles and short pedicels.

This plant is distributed in tropical and sub tropical regions. In traditional practice this herb is used as an antidote for arsenic poisoning, uterine tonic, aphrodisiac and anti ulcer drug. It is reported to be used in burning sensation and diabetics. It is also used as a diuretic, deobstruent and tonic[1,2]. Ethnomedicinally the herb is considered for treating burning sensation, general debility and to treat sterility in women[3,4]. In ayurvedic texts it is mentioned that root powder in the dose of one tea spoon is administered with rice water for leucorrhoea[5,6]. It was reported that both methanolic and water extracts of the plant show alkaloids, glycosides, flavonoids, tannins, phenolic compounds, steroids, terpenoids, resins and saponins[7,8] as its secondary metabolites and carbohydrates as primary its metabolites.

Even though it was considered to be a potential herb so far there are no pharmacognostical relevance and physicochemical constants reported, hence this study is aimed to reveal the pharmacognostical relevance and physicochemical constants of the leaf part of the species Hedge bind weed.

![Fig. 1: Whole Plant of *Ipomoea sepiaria*.](image)

MATERIALS AND METHODS

COLLECTION AND PREPARATION OF PLANT:

The whole plant of *Ipomoea sepiaria* was collected from the open field of Salapadu village, Guntur district, Andhra Pradesh during the month of September to November. The collected samples were authenticated by Dr. G. V. S. Murthy, scientist F & Head office Botanical Survey of India (BSI), Coimbatore and the specimen was deposited in the department. From the plant,
leaves are separated and washed properly with water and are shade dried for 15 days. After drying the leaves are powdered using a mechanical grinder and was sieved with mesh no #60, and are stored in air tight containers for further studies.

**PHARMACOGNOSTICAL STUDY:**

**LEAF MORPHOLOGY:**

As per standard procedure matured 25 leaves are taken for the evaluation of morphology of leaves and various parameters such as length, width, margin, apex, surface, colour, odour, taste, type, base, midrib and size are studied.

**T.S OF LEAF:**

The transverse section the of leaf of ipomoea sepiaria was done by using method described in the standard protocol.

**POWDER MICROSCOPY:**

Powder characters of the leaf of *Ipomoea* sepiaria are studied with standard protocol.

**PHYSICO CHEMICAL STUDIES:**[9,10]

**FOREIGN MATTER:**

Weigh 100 – 500 g of the drug sample to be examined or the minimum quantity prescribed in the monograph, and spread it out in a thin layer. The foreign matter should be detected by inspection with the unaided eye or by the use of lens (6 xs). Separate and weigh it and calculate the percentage present

\[
\text{% of Foreign Matter} = \frac{\text{Amount of Foreign Matter} \times 100}{\text{Amount of Drug Taken}}
\]

**MOISTURE CONTENT:**

Place about 10g of drug (without preliminary drying) after accurately weighing (accurately Weighed within 0.01g) it in a tarred evaporating dish. For example, for underground or un powdered drug, prepare about 10g of the sample by shredding so that the parts are about

3mm in thickness. Seeds and fruits, smaller than 3mm should be cracked. Avoid the use of high speed mills in preparing the samples, and exercise care that no appreciable amount of moisture is lost during preparation and the portion taken is representative of the official sample. After placing the above said amount of the drug in the tarred evaporating dish dry at 105\(^{\circ}\)c for 5 hours, and weigh. Continue the drying and weighing at one hour interval until difference between two successive weighing corresponds to not more than 0.25 per cent. Constant weight
is reached when two consecutive weighings after drying for 30 minutes and cooling for 30 minutes in a desiccator, show not more than 0.01 g difference.

**EXTRACTIVE VALUES:**

**Alcohol soluble extractive:**

Macerate 5g of the air dried drug, coarsely powdered, with 100ml of Alcohol of the specified strength in a closed flask for twenty four hours, shaking frequently during six hours and allowing to stand for eighteen hours. Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tared flat bottomed shallow dish, and dry at 105°C to constant weight and weigh. Calculate the percentage of alcohol soluble extractive with reference to the air dried drug.

**Chloroform soluble extractive :**

Macerate 5g of the air dried drug, coarsely powdered, with 100ml of chloroform water of the specified strength in a closed flask for twenty four hours, shaking frequently during six hours and allowing to stand for eighteen hours. Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tared flat bottomed shallow dish, and dry at 105°C to constant weight and weigh. Calculate the percentage of chloroform water soluble extractive with reference to the air dried drug.

**DETERMINATION OF ASH VALUES:**

**Total ash value:**

Incinerate about 2to 3 gm accurately weighed, of the ground drug in a tared platinum or silica dish at a temperature not exceeding 450°C until it is free from carbon, cool and weigh. If a carbon free ash cannot be obtained in this way, exhaust the charred mass with hot water, collect the residue on an ash less filter paper, incinerate the residue and filter paper, add the filtrate, evaporate to dryness, and ignite at a temperature not exceeding 450°C . Calculate the percentage of ash with reference to the air dried drug.

**Determination of Water soluble ashes**

Boil the ash for 5 minutes with 25ml of water, collect insoluble matter in a Gooch crucible, or on an ash less filter paper, wash with hot water, and ignite for 15 minutes at a temperature not exceeding 450°C. Substract the weight of the insoluble matter from the weight of the ash. Calculate the percentage of water – soluble ash with reference to the air dried drug.

**Determination of Acid Insoluble Ash**

Boil the ash obtained in total ash for 5 minutes with 25 ml of dilute hydrochloric acid, collect the insoluble matter in a Gooch crucible or on an ash less filter paper, wash with hot water and ignite to constant weight. Calculate the percentage of acid- insoluble ash with reference to the air dried drug.
Determination of Sulphated Ash:

Weigh 1 gm of fresh powder in a Gooch crucible and ignite it at 600ºc for 10mins remove the crucible and add 10ml of sulphuric acid and again ignite for 10mins at 600 ºc. Remove and calculate the percentage of sulphated ash with reference to the air dried drug.

Fluorescence analysis:

Fluorescence characteristics of the powdered leaves of *Ipomoea sepiaria* was observed in the daylight and UV light. Also the fluorescent study was performed by treating the drug powder with different chemical reagents, and the samples are studied under UV-cabinet at 254 and 365 nm.

RESULTS AND DISCUSSION

In this study the preliminary pharmacognostical studies such as, morphology, transverse section, and powder microscopy of the leaf were observed. Physicochemical evaluation such as, foreign matter, moisture content, different extractive values, different ash values and fluorescence analysis were performed to explore the constants of the study species.

MORPHOLOGICAL CHARACTERS:

Size: length- 2.5 to 3 cm; Width- 6 to 8.5 cm; Colour: dark green- pale green ; Odour: characteristic; Taste: Acrid to sour ; Surface: plain surface green in colour darker on the upper side and pale on the lower side of the leaf . Margin: Entire; Apex: sharp; Midrib: Upper surface- midrib is not prominent; Lower surface- midrib is prominent[Figure no.2].

Fig. 2: Leaf of *Ipomoea sepiaria.*
TRANSVERSE SECTION: The observed microscopical characteristics are discussed and shown in Figure no.3

Upper Epidermis: The epidermal cells are polygonal, transverse, elongated, thick walled, non lignified cells.

Lower Epidermis: Lower epidermis is arranged as that of upper epidermis.

Palisade Cells:

They are vertically, compactly arranged below the upper epidermis and above the lower epidermis. The palisades are continued up to the lamina portion at lower epidermis and are terminated at the midrib portion, replaced by collenchyma. In the upper part, the palisades continued, but at the center of the midrib they are occupied by reticulate parenchyma.

Vascular bundle:

The center portion of the midrib is occupied by mono arc type of vascular bundle embedded with lignified xylem and non lignified phloem. Both xylem and phloem are encircled by parenchymatous cells.

Trichomes: In both the epidermal layers, glandular trichomes are seen. They are uniseriate, unicellular and glandular in nature.

Collenchyma: Irregular, spherical shaped collenchymatous cells are present in the midrib as well as in the bottom of midrib.

Lamina

Spongy parenchyma: The lamina portion between the upper and lower palisade cells are occupied by spongy parenchyma & some of the cells have calcium oxalate crystals and starch grains.

Fig. 3: T.S. of leaf of Ipomoea sepiaria.
POWDER MICROSCOPY:

Powder microscopical characters are observed under microscope and shown in Figure no 4-7.

The observed characters are as follows:

**Epidermal Cells:** Transversely arranged rectangular shaped cells are observed.

**Stomata:** Isolated anisocytic stomata are observed.

**Xylem Fibers:** A bunch of xylem fibers are seen with lignification.

**Phloem Fibers:** Non lignified phloem fibers are seen single or in a bunch.

**Trichomes:** Conical shaped thickwalled, lignified covering trichomes are seen.

Fig. 4: Palisade cells of *Ipomoea sepiaria.*

Fig. 5: Stomata of *Ipomoea sepiaria.*

Fig. 6: Epidermal cells of *Ipomoea sepiaria.*

Fig. 7: Trichome of *Ipomoea sepiaria.*
PHYSICOCHEMICAL CONSTANTS:

Determination of Physicochemical constants is performed as per the standard protocol followed in the Ayurvedic pharmacopoeia. The values are tabulated in (Table 1 and 2).

The foreign matter adulterated in one gram powder was found to be 0.15gms.

The moisture content was found to be 0% in one gram of powder

### Table 1: Different extractive values.

<table>
<thead>
<tr>
<th>Extractive value</th>
<th>Values in grams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol soluble extractive</td>
<td>0.25</td>
</tr>
<tr>
<td>Chloroform soluble extractive</td>
<td>1.75</td>
</tr>
</tbody>
</table>

### Table 2: Different ash values of *ipomoea sepiaria* leaves.

<table>
<thead>
<tr>
<th>ASH VALUES</th>
<th>Values in grams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total ash value</td>
<td>1.02</td>
</tr>
<tr>
<td>Acid insoluble ash value (dil.Hcl)</td>
<td>0.85</td>
</tr>
<tr>
<td>Sulphated ash value ($\text{H}_2\text{SO}_4$)</td>
<td>0.43</td>
</tr>
<tr>
<td>Water soluble ash value ($\text{H}_2\text{O}$)</td>
<td>0.78</td>
</tr>
</tbody>
</table>

**FLUORESCENCE ANALYSIS:**

Fluorescence analysis was studied under ultraviolet light and daylight background of uv cabinet and the observations was tabulated in Table no.3.

### Table 3: Fluorescence analysis.

<table>
<thead>
<tr>
<th>Reagent used</th>
<th>Result obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentrated sulphuric acid</td>
<td>Orange fluorescence</td>
</tr>
<tr>
<td>Nitric acid</td>
<td>No fluorescence</td>
</tr>
<tr>
<td>Concentrated Hcl</td>
<td>No fluorescence</td>
</tr>
<tr>
<td>1N Hcl</td>
<td>No fluorescence</td>
</tr>
<tr>
<td>1N NaOH</td>
<td>Orange fluorescence</td>
</tr>
<tr>
<td>Dilute nitric acid</td>
<td>No fluorescence</td>
</tr>
</tbody>
</table>
ACKNOWLEDGEMENT

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CONCLUSION

Though Ipomoea sepiaria Koenig Ex. Roxb has been possessing traditional and ethnomedical potentiality there was no basic preliminary information about microscopic, physicochemical, phytochemical constituents are reported, Thus this study reveals preliminary idea about microscopical and physicochemical observation of the leaf of Hedge bind weed. Further the study suggests to isolate various phytochemicals of the plant used for treating different ailments and to improve the social status and health of the people.

REFERENCES


