Pharmacognostic and Phytochemical investigations of aerial parts of Acalypha indica Linn.

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ABSTRACT

In the present study, aerial parts of Acalypha indica Linn. belonging to family Euphorbiaceae was subjected to basic pharmacognostic examinations like morphological, and histological evaluations, Quantitative Microscopy including ash values, extractive values and preliminary phytochemical screening. The plant material after defatting with pet. Ether (60-80) extracted with ethanol and fractionated with chloroform, ethyl acetate and n-butanol. Qualitative chemical tests of various extracts and fractions revealed the presence of Alkaloids, Steroids, Flavonoids, Glicosides, Tannins, Carbohydrates, etc. These observations will enable to standardize the botanical identification of the drug in its crude form. Data obtained in this investigation can be used as standards of pharmacopoeial guidelines in inclusion of this drug studies of herbal monograph.

Key words: Acalypha indica, Pharmacognostic, morphological, histological, Phytochemical.

INTRODUCTION

Today 80% of world population is depends on the herbal medicine as a primary as a primary health care, with the recent advances in the field of pharmacy it is now some what easy to obtained the data of the medicinal plant and to give the scientific back ground to the traditional claims. Acalypha indica is an erect annual herb of 30-100 cm in height occurring as a weed throughout the plains of India, hills of Orissa up to 210 m. it also found in hottest parts throughout the world. It has so many therapeutic actions such as laxative, anti-bacterial, anthelmintic, anti-diabetic, expectorant, etc. The plant is reported to have a post-coital antifertility effect. Acalypha indica is also having diuretic effect.

Now a days it is very essential to obtain the pharmacognostic and phytochemical data of the various medicinal plant in order to give the scientific background to the traditional claims. The present study was under taken to develop pharmacognostical parameters such as morphology, proximate values and phytochemical studies of aerial parts of Acalypha indica Linn.

MATERIALS AND METHODS

Collection and authentication

The aerial parts of Acalypha indica linn. were collected from the local areas of Hubli-Dharwar in the month of July and authenticated by Dr. B.D Huddar, Head of the Department of Botany, Shri Kadasiddheshwar H.S. Kothambari Science Institute, Vidyanagar, Hubli, India. A voucher specimen of 08PG-657 is preserved at KLES’s college of pharmacy, Hubli, India.

Pharmacognostical Studies

The morphological prominent fetchers like color, odor, taste, size, shape, apex, margin, base, venation pattern, petioles, surface including composition of the Leaves were studied and documented according to the standard Procedures. The Transverse section of leaf & stem (Figure 1) was taken and developed with phloroglucinol and HCl. The powder drug studies are carried out with saffranin, sudan red, phloroglucinol and HCl, for different diagnostic characters (Figure 2). The Quantitative Microscopy (Figure 3) and the other proximate values such as ash value, extractive values, and moisture content was carried out by standard procedure.

Phytochemical investigations

The coarse powder of shade dried aerial parts of A. indica was defatted with pet. ether (60-80°C) and then extracted
with ethanol.[12,13] The ethanolic extract was further fractionated with chloroform, ethyl acetate, and finally with n-butanol according to increasing order of their polarity.[14] The extracts and fractions were concentrated, dried and subjected for phytochemical investigations by qualitative chemical tests to detect the presence of various phytoconstituents.[15] (Table.2)

RESULTS AND DISCUSSION

a. Morphological Evaluation
As per the observations the Acalypha indica collected from the region of Hubli-Dharwad is an erect annual herb, 30-60 cm in height. Leaves are dark green on dorsal side and light green on ventral side with smooth texture and serrate-crenate margin. They are ovate or rhombic-ovate, 3-6 cm. long and 3-4 cm broad with slender petioles which may be longer than the blades. It has Characteristic and admissible odor; male flowers minute, clustered at the top, and female flowers with accrescent, broad, leafy bract; capsules often one-seeded, concealed in the bract; seeds pale-brown, ovoid, acute, smooth.

b. Microscopical Evaluation
T.S. of Acalypha indica leaf (Figure 1) shows the presence of Upper and Lower Epidermis containing single layered cells covered with thick cutical. Then mesophyll is differentiated in to palisade and spongy Parenchyma. Palisade Parenchyma is one layered, compact with radially elongated cells whereas spongy Parenchyma is many layered, loosely arranged with intercellular spaces. The collenchyma consists of thick walled collenchymatous cells below the vascular bundle. Vascular bundle shows xylem towards upper epidermis and phloem towards lower epidermis. In between xylem cell, xylem parenchyma is found. The phloem is found below xylem. Trichomes are multicellular epidermal hairs present on upper epidermis (very rare) and lower epidermis (numerous).
Table 1: Proximate values

<table>
<thead>
<tr>
<th>Ash values</th>
<th>Extractive values</th>
<th>Moisture content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total ash</td>
<td>Sulphated ash</td>
<td>Water soluble ash</td>
</tr>
<tr>
<td>16%</td>
<td>26%</td>
<td>2.33%</td>
</tr>
</tbody>
</table>

Table 2: Preliminary phytochemical investigations

<table>
<thead>
<tr>
<th>Phytoconstituents</th>
<th>Petroleum ether (60-80°C)</th>
<th>Ethanol extract</th>
<th>Chloroform</th>
<th>Ethyl acetate</th>
<th>n-Butanol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steroids</td>
<td>+</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Triterpenoids</td>
<td>+</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Glycosides</td>
<td>–</td>
<td>+</td>
<td>+</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>–</td>
<td>+</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Alkaloids</td>
<td>–</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Flavonoids</td>
<td>–</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Tannins</td>
<td>–</td>
<td>+</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

*“+”* Present, “–” Absent

**Quantitative Microscopy**

Quantitative microscopy of leaf of *Acalypha indica* revealed for stomatal index, Vein islet number and Vein termination number (Figure 3) which are very specific character for identification and characterization of leaf crude drug. In this study the stomatal index for upper and lower surface was found to be 15-16 and 17-18 respectively. Whereas Vein islet and vein termination number was found to be 2-3 and 16-17 respectively.

**Powder microscopy**

The powder characteristics of dried powder of *Acalypha indica* (Figure 2) show the presence of Fibers which are large, lignified with moderately thickened walls. Epidermal cells with paracytic stomata. Calcium oxalate crystals are square in shape. Xylems vessels are numerous, bordered, thickened, and frequently associated with other xylem elements. Trichomes are larg in numbers; Medullary rays are parenchymatous & multiseriate.

c. **Physico-Chemical Values**

Various Physical Values namely Extractive value, Moisture content, and Ash values was mentioned in Table 1.

d. **Phytochemical investigations**

Qualitative chemical examinations of various extracts and fractions revealed the presence of Alkaloids, Steroids, Flavonoids, Glycosides, Tannins, and Carbohydrates. Results are expressed in Table 2.

**CONCLUSION**

From the pharmacognostic, and phytochemical investigations, it is quite possible to set the standards of this plant as per the pharmacopoeial guidelines and further additional contribution like isolation of phytoconstituents is required for the fulfillment of the studies regarding Herbal monograph.

**REFERENCES**