Preliminary Pharmacognostic Evaluations and Phytochemical Studies on Leaves of Bauhinia Racemosa (Sonapatti)

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Abstract

The leaves of Bauhinia Racemosa (Sonapatti) are reported to have great medicinal value. Also known as Kachnar & Mountain ebony belongs to family Caesalpiniaceae. Pharmacognostic evaluation including examinations of morphological and microscopic characters, ash value, powder analysis, phytochemical screenings with help of TLC and extractive values were carried out. The objective of this work was to provide some additional parameters to test the Bauhinia racemosa leaf so as to determine the identity and quality.

Keywords: Sonapatti; Beedi leaf; Bauhinia Racemosa; Pharmacognostic evaluation; Phytoconstituents.

Introduction

Bauhinia racemosa commonly known as the Beedi leaf tree is a rare medicinal species of flowering shrub with religious significance. It is a small crooked tree with drooping branches that grows 3–5 meters (10–16 ft) tall and flowers between February and May. It is native to tropical Southeast Asia.

Religious significance

Vijayadashami and Dussehra: In Maharashtrian families it is customary to exchange leaves of the Aapta tree on the Hindu festive day of Dussehra (Figure 1). An act known as exchanging gold-pointing to the special significance of the plant on that particular day. This is also why the tree is often referred to as Sonapatti (literal translation: leaves of gold) in Hindi national language of India.
The leaves are used in the production of beedi, a thin Indian cigarette. The plant Bauhinia racemosa Lam. belongs to the Caesalpiniaceae Family. It is popularly known as Sittacha (Tamil) and occurs frequently in India, Ceylon, China, and Timor. The stem bark of the plant is an astringent and is used in the treatment of headache, fever, skin diseases, tumors, blood diseases, dysentery, and diarrhea [1].

Chemical constituents such as β-sitosterol and β-amyrin [2] probably responsible for the popular use of the plant were isolated from the stem bark of this plant. Beside these compounds, at least five flavonols (kaempferol and quercetin) and two coumarins (scopoletin and scopolin) were also isolated from the leaves of the plant [3]. Stilbene (resveratrol) was isolated from the heartwood of Bauhinia racemosa [4].

Pharmacological studies of the plant have revealed that the ethanol extract of Bauhinia racemosa leaves shows analgesic, antipyretic, anti-inflammatory, and antispasmodic activities [5], as well as antimicrobial activity [6]. The fresh flower buds of the plant showed antitumor activity [7]. Cytotoxicity against CA-9 KB in cell culture, as well as hypotensive and hypothermic activities has been reported from the hydro alcoholic extract of Bauhinia Racemosa [8]. Previous results from laboratory have also demonstrated the antioxidant and hepatoprotective effects [9], as well as the antitumor and antioxidant status of Bauhinia racemosa against Ehrlich ascites carcinoma in Swiss albino mice [10].

Material and Methods

Collection of plant material

The leaves of Bauhinia racemosa was collected in and around Rampur, UP region, were identified in Department of Pharmacy, Teerthankar Mahaveer University, Moradabad (UP). A voucher specimen (BPH 851) was deposited in the department after confirmation of authenticity from taxonomist of Hindu college, Moradabad, UP, India.

Morphological evaluation

The plant was morphologically examined for shape of leaves, apex, base, margin etc and also for organoleptic evaluations such as color, odor, taste, shape and size.

Microscopic evaluation

T.S. of boiled leaves in water was prepared and mounted in glycerin on glass slide for identification of internal structures like vascular bundles, pith, cortex and other parts using with Safranin solution.

Powder analysis

The powder drug was separately boiled with phloroglucinol (5%), alcoholic KOH (5%) & Chloral hydrate solution (5%) and separately mounted in glycerin to determine the presence of lignified cells, calcium oxalate crystals and starch grains as a part of quantitative microscopy. The common structures present in all three slides reported as final powder analysis.

Proximate analysis

Exactly 1 gm of drug powder material was used for total ash value determination by keeping in Muffle Furnace at 400°C temperature. The powder drug was used to determine total ash, water soluble ash, acid insoluble ash, loss on drying and moisture content was also determined. Same ash was used for determination of water soluble and acid insoluble ash using standard procedures.

Successive solvent extraction

Extractive values by successive solvent extraction method were determined [11]. The powder of dried leaves was subjected to continuous soxhlet extraction with various organic solvents such as petroleum ether (60-80), chloroform, benzene, methanol and ethanol respectively [12].

Preliminary phytochemical studies

After concentration and drying of each extract in vacuum desicator identification of phytoconstituents was carried out using thin layer chromatography method by different detecting reagent [13].

Results and Discussion

The morphological studies revealed the shape of leaves of Bauhinia racemosa Lam. occurs in entire condition with secondary and tertiary leaves attached. The shape of the leaf is more or less cylindrical, slightly tapering with branching on all sides. Colour dull greenish with rough surface.

In transverse section of midrib of leaves of Bauhinia racemosa Lam showed that epidermis is made up of thin walled, rectangular cells. Epidermis is followed by 3-4 layers of collenchymatous tissues which are arranged compactly and this is followed by parenchymatous cells which are thin walled and 3-4 layered. Some of the cells show abundant solitary calcium oxalate crystals. 4-5 layers of band of sclerenchymatous tissues are present prominently above the vascular bundle. Vascular bundles are prominent; xylem and phloem are well developed. Two small accessory vascular bundles are present in the cortical tissue near the wings (Figure 2).

Figure 2. T S of Bauhinia Racemosa leaf.

Powder analysis of leaves of Bauhinia racemosa Lam showed that presence of parenchyma cells with calcium oxalate crystals, vessels with helical to spiral thickenings, abundant crystals which are solitary and prism shaped, epidermal cells with anomocytic stomata (Figure 3).
Successive solvent extraction values in various organic solvent were observed as petroleum ether 4.27%, benzene 5.30%, chloroform 4.30%, acetone 4.50%, and methanol 6.80% as shown in table 1.

Table 1. Successive solvent extraction of leaf of Bauhinia racemosa.

<table>
<thead>
<tr>
<th>Solvents Used</th>
<th>Colour &amp; Consistency</th>
<th>Average extractive values in % w/w on dry weight basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petroleum Ether 40-60</td>
<td>Blackish brown sticky mass</td>
<td>4.27</td>
</tr>
<tr>
<td>Benzene</td>
<td>Blackish green sticky mass</td>
<td>5.3</td>
</tr>
<tr>
<td>Chloroform</td>
<td>Brownish green sticky mass</td>
<td>4.3</td>
</tr>
<tr>
<td>Acetone</td>
<td>Brownish dry mass</td>
<td>4.5</td>
</tr>
<tr>
<td>Methanol</td>
<td>Greenish viscous mass</td>
<td>6.8</td>
</tr>
<tr>
<td>Ethanol</td>
<td>Light greenish oily mass</td>
<td>3.1</td>
</tr>
</tbody>
</table>

Figure 3. Powder analysis of Bauhinia racemosa leaf.

The proximate analysis revealed that total ash 23%, water soluble ash 10.50%, acid insoluble ash 1.5%, loss on drying 0.16%, moisture content 2%, values were observed (Table 3).

Table 3. Proximate analysis of leaf of Bauhinia racemosa.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Parameters</th>
<th>Values obtained w/w on dry weight basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ash value</td>
<td>23%</td>
</tr>
<tr>
<td>2</td>
<td>Water soluble ash</td>
<td>10.5%</td>
</tr>
<tr>
<td>3</td>
<td>Acid Insoluble ash</td>
<td>1.5%</td>
</tr>
<tr>
<td>4</td>
<td>Loss on drying</td>
<td>0.16%</td>
</tr>
<tr>
<td>5</td>
<td>Moisture content</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

Conclusion

Bauhinia racemosa, commonly known as the Sonapatti leaf tree is no doubt that used as potent medicinal plant in India & World most evolved species. The plant makes the unique traits make as perfect remedy for survival in some important disease or disorders. These leaves are proud family of plant that will continue to grow, flourish and be respected by humans due to religious importance also as Lord Rama kept his weapons on it before going to forest for 14 years in Hindu mythological treaty Ramayana. More research should be done with latest technology to help learn to effectively treat the negative side effects of anti-tumor activity.

Present study reveals some microscopic, physico-chemical parameters along with extractive values for authentication purpose. As these parameters vary due to atmospheric conditions but still we found them in between range of official standards given in authority’s books.

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References


