Pharmacognostic studies on stem bark of Bauhinia racemosa Lam.

Vadnere Gautam Prakash*, Singhai Abhay K* , Hundiwale J.C
a. *Prof.(Dr.) Smt.S.S.Patil College of Pharmacy, Chopda-425 127 (MS), India.
b. Prof.(Dr.) Department of Pharmaceutical Sciences, Dr. H.S.Gour University, Sagar-470 003 (MP), India.
c. Prof.(Dr.) Smt.S.S.Patil College of Pharmacy, Chopda-425 127 (MS), India.

Received on:10-11-2011; Revised: 15-12-2011; Accepted on:12-01-2012

ABSTRACT

The plant Bauhinia racemosa Lam. (Caesalpiniaeae) commonly known as Apta in Indian system of medicines widely distributed throughout India, Ceylon, China and Timor. The stem bark is astringent and used traditionally in skin diseases, tumours, diseases of blood, chronic dysentery and diarrhoea. The stem bark reported to possess antioxidant, hepatoprotective, cancer treating and antimicrobial activity. It also found to possess anti-inflammatory, analgesic and antipyretic activities. The roots of plant have found to consists of new tetracyclic 2,2-dimethylchroman derivative, de-o-methylracemosol compound (Compound-3). Also the various extracts of Bauhinia racemosa Lamk. roots belonging to family Caesalpiniaeae were found to contain 1,7,8,12b-tetrahydro-2,2,4-trimethyl-2H-benzo[6,7]cyclohepta[1,2,3-de][11]benzopyran-5,10,11-triol. Earlier investigations on this species have resulted in isolation of two compounds from the heartwood, a new dibenzoepin derivative, pacharin (Compound-1) and a novel tetracyclic phenol, racemosol (Compound-2). Besides this Stillene (Resveratrol) was also isolated from heartwood of this plant. For confirming the identity of the specific species, it is necessary to study the morphoanatomical and microdiagnostic features. The gross morphohistological diagnostic features and physical standards reported for stem bark might be further useful for compiling the monograph of Bauhinia racemosa Lam.

Key words:Bauhinia racemosa, stem bark, morphology and microscopy

INTRODUCTION

The plant Bauhinia racemosa Lam. (Caesalpiniaeae) commonly known as Apta in Indian system of medicines widely distributed throughout India, Ceylon, China and Timor. The stem bark is astringent and used traditionally in skin diseases, tumours, diseases of blood, chronic dysentery and diarrhoea. The stem bark reported to possess antioxidant, hepatoprotective, cancer treating and antimicrobial activity. It also found to possess anti-inflammatory, analgesic and antipyretic activities. The roots of plant have found to consists of new tetracyclic 2,2-dimethylchroman derivative, de-o-methylracemosol compound (Compound-3). Also the various extracts of Bauhinia racemosa Lamk. roots belonging to family Caesalpiniaeae were found to contain 1,7,8,12b-tetrahydro-2,2,4-trimethyl-2H-benzo[6,7]cyclohepta[1,2,3-de][11]benzopyran-5,10,11-triol. Earlier investigations on this species have resulted in isolation of two compounds from the heartwood, a new dibenzoepin derivative, pacharin (Compound-1) and a novel tetracyclic phenol, racemosol (Compound-2). Besides this Stillene (Resveratrol) was also isolated from heartwood of this plant. For confirming the identity of the specific species, it is necessary to study the morphoanatomical and microdiagnostic features.
Powder Characteristic:
Fine powder of stem bark was boiled with soda lime solution for 10 minutes. It was filtered, washed with water and mounted in glycerin water and observed under microscope. Photographs as shown in plate 2 C, D and E.

Table 1: Proximate analysis of stem bark of Bauhinia racemosa Lam.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Parameters</th>
<th>Results (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Total ash</td>
<td>21.40</td>
</tr>
<tr>
<td>2</td>
<td>Acid insoluble ash</td>
<td>06.65</td>
</tr>
<tr>
<td>3</td>
<td>Water soluble ash</td>
<td>03.65</td>
</tr>
<tr>
<td>4</td>
<td>Alcohol soluble extractive value</td>
<td>12.00</td>
</tr>
<tr>
<td>5</td>
<td>Water soluble extractive value</td>
<td>19.76</td>
</tr>
<tr>
<td>6</td>
<td>Loss on drying</td>
<td>07.90</td>
</tr>
</tbody>
</table>

Ash value [9]:
About 2g of the air dried powdered drug was accurately weighed into the thin, flat previously ignited porcelain dish or tarred silica crucible. The material was spread in even layer and ignited it by gradually increasing the heat to 500-600°C until all carbon was burnt off. It was cooled in desiccator and weighed. As per I.P. 96 water soluble and acid insoluble ash was determined from total ash. Percentage yield of each values are mentioned in Table 1.

Extractive Values [10]:
The dried powder was extracted with alcohol 90% and water. The percentage extractive values are mentioned in Table 1.

Table 2: Preliminary phytochemical screening of the extracts of stem bark of Bauhinia racemosa Lam.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Chemical groups</th>
<th>PEBR</th>
<th>EEBR</th>
<th>AEBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yield</td>
<td>0.61%</td>
<td>25.55%</td>
<td>9.6%</td>
</tr>
<tr>
<td>2</td>
<td>Carbohydrates</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Steroids/ Terpenoids</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Flavonoids</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>5</td>
<td>Alkaloids</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Tannins</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Phenols</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Glycoside</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

Phytochemical evaluation of PEBR, EEBR and AEBR [11, 12, 13]:
500mg of the dried PEBR, EEBR and AEBR was reconstituted in 10ml of petroleum ether, ethanol and water respectively and it was used for preliminary phytochemical testing for the presence of different chemical groups of compounds as mentioned in Table 2.

HPTLC Profile of (EEBR) ethanol extract of stem bark of Bauhinia racemosa Lam.: Ethanolic extract of 200 mg was dissolved in 10 ml of ethanol and sample of 10 µl and 20 µl volumes were prepared. 1 mg of ß-sitosterol was dissolved in 1 ml of chloroform and solution transferred into a small sample vial. This was used as reference solution. Precoated TLC plates of Silica gel G 60 F 254 (E. Merck), 20 x 10 cm in size were used as stationary phase. Sample solutions of 10 µl and 20 µl volumes while standard (reference) solution of 5 µl was applied each as 6 mm band length. The application position was 8 mm from lower edge of plate using the 100 µl syringe on CAMAG LINOMATE V automatic sample applicator. Toluene: Ethyl acetate: Formic acid in proportion (50:15:5) was used as mobile phase. Plates were scanned at 540 nm using scanner-3 (CAMAG). Plates were derivatized in sulphuric acid reagent (5 ml sulphuric acid in 95 ml of cold methanol) using CAMAG-chromatogram device. The profile obtained was photo documented at various wavelengths of 254nm, 366 nm, visible before derivatization and after derivatization as shown in Plate 3.
RESULTS AND DISCUSSION:

Detail pharmacognostic evaluation were includes macroscopy, microscopy, powdered drug analysis, physicochemical evaluation.

Macroscopy

The dried pieces of bark measures about 0.5 to 2 cm in thickness. Organoleptic features of fresh bark primarily confirms the color as grayish brown externally and creamy internally, having characteristic odor. Bark appears in the form of curved, quill and channeled with fracture short outside and fibrous within as mentioned in literature.

Microscopy

The microscopical examination of stem bark of plant have shown few layers of flat thin walled cork cells with yellowish brown content. Cortex formed with several layers of elongated parenchymatous cells containing reddish brown matter and few starch grains. The transverse section has shown secondary phloem consisting of several elements like sieve tubes, lignified phloem fibers, parenchyma and medullary ray’s cells. The sieve tubes are compact cellulosic vessels having narrow companion cells. The phloem fibres are numerous, fusiform and lignified sometimes occur in group of cells. The medullary rays are radially elongated and uniseriate extended to cortex consisting of bluish starch grains. The microscopical observation of powdered stem bark of Bauhinia racemosa have shown presence of cluster of simple and minute starch grains in iodine solution (Plate 1), while the phloroglucinol with concentrated hydrochloric acid stained slide shown striated wall, lignified phloem fiber. It also revealed the presence of polygonal cells with reddish brown matter (Plate 1).

Physicochemical evaluation

Physicochemical parameters such as total ash, acid insoluble and water soluble ash, alcohol soluble and water soluble extractive values, moisture content were found to be 21.4 %w/w, 6.65 %w/w, 3.65 %w/w, 12 %w/w, 19.76 %w/w and 7.9 %w/w respectively. The petroleum extract has semi solid and sticky consistency, dark brown colour with pleasant odour. The ethanol extract has semi solid consistency, dark red colour with agreeable alcoholic odour. While the aqeous extract also has semi solid nature, black colour with disagreeable odour. The yields of each extracts were 0.61% w/w, 25.55% w/w and 9.60% w/w respectively. The preliminary qualitative screening of petroleum ether vessels has shown presence of carbohydrate and steroid. The ethanol extract has shown presence of some major secondary metabolites such as alkaloids, tannins, flavonoids, saponins, terpe-

REFERENCES:

T.S. Pacharin: A new dibenzo (2,3-6,7) oxepin derivative from Bauhinia racemosa Lamk. Tetrahedron 40; 1984: 4245-52.

Source of support: Nil, Conflict of interest: None Declared