PRELIMINARY PHYTOCHEMICAL SCREENING OF THE EXTRACTS OF BAUHINIA RACEMOSA LINN.

Akelesh T.¹, Gopal V.², G. Jeyabalani¹, Sam Johnson Udaya Chander J.³, Manavalan R.³ and Venkatanarayan R.³

¹Sunrise University, Alwar, Rajasthan.
²College of Pharmacy, Mother Theresa Postgraduate and Research Institute of Health Sciences, Puducherry.
³RVS College of Pharmaceutical Sciences, Sulur, Coimbatore.

ABSTRACT

Bauhinia racemosa Linn. (Caesalpinaceae) is an ornamental plant found throughout subtropical, India, North and South America, Nepal, Australia, Africa and United Kingdom. The plant is commonly known as Mandarai in Tamil and Khairwal in Hindi. Numerous types of biological activities are attributed to bauhinia species. B. racemosa is the most important species used to treat many ailments in traditional system of medicine. There are a few reports for the use of this plant for its anti diarrhoeal, anticancer and thyroid gland stimulating properties.

The aim of the present investigation has been to study the important pharmacognostical characteristics of the leaves of Bauhinia racemosa in both whole and powdered form. Results of the phytochemical analysis indicated the presence of tannins, alkaloids, saponins, terpenoids, glycosides, flavanoids and steroids.

KEYWORDS: Bauhinia racemosa, Phytochemical, Pharmacognostical.

INTRODUCTION

Bauhinia racemosa Linn. (Caesalpinaceae) is an ornamental plant found throughout subtropical, India, North and South America, Nepal, Australia, Africa and United Kingdom. The plant is commonly known as Mandarai in Tamil and Khairwal in Hindi.¹ Numerous types of biological activities are attributed to bauhinia species. B. racemosa is the most important species used to treat many ailments in traditional system of medicine.²-⁵
B. racemosa is a small crooked tree with dark scabrous bark, containing numerous drooping branches. The trees typically reach a height of 6–12 m and their branches spread 3–6 m outwards. The leaves are broader than long, having size 2-5 cm by 2.5- 6.3 cm, divided a little less than half way down into two rounded lobes. The upper surface of leaf being green and glabrous, rigidly coriaceous, slightly cordate, clothed more or less densely beneath with grey pubescence and base is usually cordate. The five-petaled flowers are 7.5– 12.5 cm diameter, generally in shades of red, pink, purple, orange, or yellow, and are often fragrant.

The tree begins flowering in late winter and often continues to flower into early summer. The flowers are in short peduncle, lax, terminal and leaf-opposed racemes. The calyx being pubescent, contain very short tube, limbs are of 6-8 mm long and the petals are narrowly oblanceolate, acute, 10-15 mm long. The flowers contain 10 fertile stamens with densely hairy filaments at the base and ovary is pubescent with sessile stigma. The pods are stalked, 15-25 in number having size of 1.3-2.2 cm, blunt at the apex and tapering to the base, somewhat falcate, glabrous, turgid, scarcely veined. Each pod contains 12-20 dark reddish brown, oblong, compressed, rounded at the apex, seeds. The bark of B. racemosa is bluish black, rough, pinkish red inside, which turns brown.

It is also reported for its anti diarrhoeal, anticancer and thyroid gland stimulating properties. The aim of the present investigation has been to study the important pharmacognostical characteristics of the leaves of Bauhinia racemosa in both whole and powdered form.[6-8]

**Figure 1: Photograph of Bauhinia Racemosa Linn. Leaves.**

**MATERIALS AND METHODS**

**Collection of plant material**

The plant specimen was collected from natural habitat of Sulur, Coimbatore. The taxonomic identification of the plant was authenticated by Dr.M.Palanisamy, Scientist “D” in-charge,

Prior to all analysis, all the raw materials were cleaned to remove any foreign materials and dust. The samples were subjected to organoleptic, microscopic and phytochemical study so as to generate inputs that can be considered for laying down standards in respect of this plant. The leaves were dried in shade, powdered in an electric grinder, passed through 100 mesh sieves and stored in an airtight container for physicochemical and phytochemical screening.

**Plant extraction procedure**

The dried plant material was pulverized into fine powder using a grinder (mixer). About 50 g of powdered material was extracted in soxhlet extraction apparatus with 250 ml of alcohol. The extracts obtained with alcohol were filtered through Whatman filter paper No. 1 and the solvents were evaporated (at 40°C) with the help of heating mantle. Sticky greenish-brown substances were obtained and stored in refrigerator for prior to use. Some of the extracts of each solvent were used for the qualitative phytochemical screening for the identification of the various classes of active chemical constituents, using standard prescribed methods. The positive tests were noted as present (+) and absent (-).

The ash values, alcohol soluble and water soluble extractives values and loss on drying of leaves were determined as per the Indian Pharmacopoeia methods. The angle of repose of powder was determined by the funnel method. The accurately weighed powder was taken in a funnel. The height of the funnel was adjusted in such a way that the tip of the funnel just touched the apex of the heap of the powders. The powder was allowed to flow through the funnel freely onto the surface. The diameter of the powder cone was measured and angle of repose was calculated using the following equation, \( \tan q = \frac{h}{r} \), Where \( h \) and \( r \) are the height and radius of the powder cone.

The extract of the plant was subjected to various chemical tests for the identification of various active constituents.

**Physicochemical parameters**

**Total ash**

2 g of the powdered drug was accurately weighed in a silica crucible which was previously ignited and weighed. The powdered drug was spread as a fine layer on the bottom
of the crucible. Crucible was incinerated at a temperature not exceeding 450°C until free from carbon. The crucible was cooled and weighed. The procedure was repeated to get a constant weight. The percentage of total ash was calculated with reference to their air dried drug.

**Acid insoluble ash**
The ash obtained in the determination of total ash was boiled for 5 min with 25 ml of dilute HCl. The insoluble matter was collected on an ashless filter paper and washed with hot water. The insoluble ash was transferred to a preweighed silica crucible and then ignited, cooled and weighed. The procedure was repeated to get a constant weight.

**Water soluble ash**[15]
The water insoluble matter was collected on an ashless filter paper and ignited in an electric furnace at 450°C in silica crucible until it reaches a constant value. The weight of insoluble matter was subtracted from the weight of total ash to indicate the weight of water soluble ash.

**Water soluble extractive value**[16]
1gm of dried coarsely powered drug was macerated with 100ml of distilled water in a flask for twenty four hours shaking intermittently. The solution was filtered and 25 ml of the filtrate was evaporated in a shallow dish. It was dried and weighed. The percentage of water soluble extractive was calculated with reference to the dried drugs.

**Alcohol soluble extractive value**[16]
About 10gm of coarsely powdered drug was accurately weighed in a conical flask. 300ml of water was added and weighed. It was shaken well and allowed to stand for 1 hour. It was refluxed for 6 hours, cooled and weighed. The extracted powder was dried in an oven. The content of extractable matter was calculated.

**Loss on drying**[17]
The powdered drug sample was placed on a tarred evaporating dish at 105°C for 6 h and weighed. The drying was continued until two successive readings matched each other or the difference between two successive weighing was not more than 0.25% of constant weight.
Acid value
The sample was boiled with ethanol, then allowed to cool and 2 drops of phenolphthalein indicator was added. The resulting solution was titrated against 0.1 mol NaOH until a pink colour is obtained.

Iodine value
Sample was weighed and carbon tetrachloride was added. Iodine monochloride and acetic Acid solution was then added and allowed to stand in the dark for 30 min. After 30 minutes, (10%) potassium iodide and water was added. The mixture was then titrated with 0.1 mol thiosulphate solution using starch as indicator added towards the end of the titration. A blank determination was also performed.

Saponification value
Sample was weighed into a conical flask and alcoholic potassium hydroxide was added. The flask was heated for an hour with frequent shaking. 1% phenolphthalein indicator was added and the hot excess alkali was titrated against 0.5 mol hydrochloric acid until the solution become colorless. A blank titration was also done.

Phytochemical analysis
Tannins
Ferric chloride Test
1ml of the sample taken and a few drops of 0.1% ferric chloride was added and observed for brownish green or blue, black colouration.

Alkaloids
Dragendorff’s Test
To the sample, few drops of Dragendorff’s reagent was added and observed for orange red colour.

Saponins
To the extract 5ml of distilled water was added and shaken vigorously. It was observed for soaking appearance which indicates the presence of saponins.
Terpenoids
Salkowski test
To the sample 2ml chloroform was added with few drops of conc. sulphuric acid. The mixture was shaken well. Appearance of reddish brown colour at lower layer indicates presence of steroids and that of yellow colour shows the presence of terpenoids.

Glycosides
Spot test
A small quantity of the extract was pressed between two filter papers. Oil stain on the paper indicates the presence of fixed oil.

Flavonoids
Ammonia solution Test
To the extract, 5ml of dilute ammonia solution was added, followed by addition of concentrated sulphuric acid along the sides of the tube. Appearance of yellow colour indicates the presence of flavonoids.

Steroids
Sulfuric acid Test
To the extract, 10% conc. sulphuric acid was added and observed for green colour.

RESULTS AND DISCUSSION
The extracts of leaves of B.racemosa was extensively studied for physicochemical parameters and phyto constituents. Physicochemical parameters included determination for Total ash, Acid insoluble ash, Water soluble ash, Water soluble extractive value, Alcohol soluble extractive value, Loss on drying, Acid value, Iodine value and Saponification value. Phytochemical analysis revealed the presence of tannins, alkaloids, saponins, terpenoids, glycosides, flavanoids and steroids.

The physicochemical parameters of the extract is shown in table no.1.

Table 1: Physicochemical parameters of B. racemosa.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Total ash(%)</td>
<td>2.32±0.45</td>
</tr>
<tr>
<td>2.</td>
<td>Acid insoluble ash(%)</td>
<td>1.50±0.13</td>
</tr>
<tr>
<td>3.</td>
<td>Water soluble ash(%)</td>
<td>03.66±0.11</td>
</tr>
<tr>
<td>4.</td>
<td>Water soluble extractive value</td>
<td>11.90±0.34</td>
</tr>
</tbody>
</table>
The presence of phytochemical constituents of *B. racemosa* is shown in table no.2.

**Table 2: Phytochemical analysis of Alcoholic extract of *B. racemosa*.**

<table>
<thead>
<tr>
<th>S.No</th>
<th>Phytochemical constituents</th>
<th><em>B. racemosa</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tannins</td>
<td>+++</td>
</tr>
<tr>
<td>2.</td>
<td>Alkaloids</td>
<td>+++</td>
</tr>
<tr>
<td>3.</td>
<td>Saponins</td>
<td>+</td>
</tr>
<tr>
<td>4.</td>
<td>Terpenoids</td>
<td>++</td>
</tr>
<tr>
<td>5.</td>
<td>Glycosides</td>
<td>+++</td>
</tr>
<tr>
<td>6.</td>
<td>Flavonoids</td>
<td>+++</td>
</tr>
<tr>
<td>7.</td>
<td>Steroids</td>
<td>-</td>
</tr>
</tbody>
</table>

**CONCLUSION**

The present study states that the leaf extract of *B. racemosa* contains a medicinally important bioactive constituent which justifies the use of the plant for treatment of various ailments. Further purification, identification and characterisation of the phytochemical constituents would form a part of our future study.

**REFERENCES**