Pharmacognostic and Phytochemical Evaluation of Roots of *Atlantia monophylla* DC (Family: Rutaceae)

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**ABSTRACT**

*Atlantia monophylla* DC is commonly known as Makadlimbu in Marathi. The roots possess antispasmodic, stimulant and antirheumatism property. It is reported to have significant activity against immature stages of mosquito and non-target organisms. The isolation and structure determination of three limonoids from the plant is also reported. The investigation was carried out to study the pharmacognostic characteristics of the plant material. The various parameters like morphology, microscopy, physicochemical profile and the salient diagnostic features were studied along with TLC studies.

**Key words:** Makadlimbu, *Atlantia monophylla* DC, pharmacognostic evaluation

**INTRODUCTION**

*Atlantia monophylla* DC belonging to Rutaceae is a shrub or treelet about 6 m. tall, with short sharp spines. It is a thorny shrub found in peninsular India, Orissa, Assam and Meghalaya and in the Andamans. It is also occasionally cultivated in gardens. The roots possess antispasmodic, stimulant and antirheumatism property. It is called as Makadlimbu in Marathi. It is distributed in Konkan region and Western Ghats. It is reported to have significant activity against immature stages of mosquito and non-target organisms. The isolation and structure determination of three limonoids from the plant is also reported.

**Experimental:**

**MATERIALS AND METHOD**

**Plant Material**

*Atlantia monophylla* DC plant was located in the local area of Tirupati, Dist. Chittoor, A.P., India. Roots of the plant were collected, thoroughly washed with water and then dried. The Plants were collected and authenticated by a Botanist and Taxonomist Dr. K. Madhava Chety, Dept. of Botany, S.V. University, Tirupati.

**Drying and size reduction of plant :**

The collected plant roots were shed dried for 30 days. The dried plant material was further crushed to powder and the powder was stored in air tight container for further analysis.

**Preparation of Extract:**

The drug powder was subjected to maceration with ethanol for three weeks with intermittent stirring. The filtrate was collected and concentrated and the filtrate was evaporated to dryness. The % yield of the ethanolic extract was found to be 5.78 %w/w. 20 gms of the Ethanolic Extract of *Atlantia monophylla* DC. was fractionated by using solvents like Pet. Ether (40-60), Chloroform and Methanol. The percentage yield was found to be Pet. Ether Fracion16.75%, Chloroform Fraction 21.15% and Methanolic Fraction18.50%.

**Microscopy and Powder Microscopy :**

Transverse sections (T.S.) of the roots of the plant materials was taken using a rotary microtome and stained with different staining reagents. Microphotographs of the sections were made using Motic Image Plus microscopic unit.

**Determination of physicochemical parameters :**

The dried plant material was subjected for determination of physicochemical parameters such as total ash value, acid insoluble ash value, water soluble ash value, moisture content, foreign organic matter, crude fibre, alcohol soluble extractive and water soluble extractive.

**Preliminary phytochemical analysis :**

Preliminary qualitative phytochemical analysis of all the ethanolic extract was carried out by employing standard conventional protocols.

**RESULTS AND DISCUSSION.**

**Pharmacognostic study of roots of *Atlantia monophylla* DC**

**Morphological evaluation:**

Morphological evaluation for the appearance, organoleptic characters was done in which the color of the roots of *Atlantia monophylla* DC

Colour : Outer – Yellowish Brown

Inner - Yellow

Odour : Characteristic

Taste : Tasteless

Size : Length - 5-7 cm

Width – 18-21 mm

Fracture: Fibrous Bark, Splintery Wood

**Microscopic Characters of the roots**

Secondary xylem is a broad zone made up of xylem parenchyma, vessels and fibers. Vessels are thick walled with bordered pits and are present in groups of 2-7. Medullary rays uni-biseriate and distinct. Secondary growth annulations are observed.

**Powder Study of the roots**

Powder was yellowish green in color with numerous fragments of fibers, broken vessels, round to oval starch grains and few stone cells.

**Physicochemical Parameters**

The total ash value, acid insoluble ash value and water soluble ash value were found to be 6%, 1% and 2.8%w/w respectively. Ash value is useful in determining authenticity and purity of drug and also these values are important quantitative standards. Foreign organic matter in the powdered plant material was found to be not more than 1%, which is fare within the limits. Alcohol soluble and water soluble extractive values were found to be 4% and 2.8% respectively. The percent yields of different extracts are given in Table-1. The percent yields of pet.ether, chloroform, methanol were found to be 16.75%, 21.15% and 18.5% respectively. The results of preliminary phytochemical analysis of different extracts are given in Table-2.

**TLC studies:**

The extract of *Atlantia monophylla* DC root was subjected to thin layer chromatographic studies, to find out the probable number of compounds present.
in them. A number of developing solvent systems were tried, but the satisfactory resolution was obtained in the solvent systems mentioned in Table 3. After development of plates, they were air-dried and numbers of spots were noted & Rf values were calculated. Spots were visualized by spraying with various spraying reagents to find different compounds present in the extract.

**CONCLUSION**

*Atlantia monophylla* DC root powder was subjected for preliminary Pharmacognostic standardization including phytochemical screening. The present investigation adds to the existing knowledge of *Atlantia monophylla* DC and will be quite useful for development of a formulation for treating various ailments.

**REFERENCES:**


**Table 1. Physicochemical properties of *Atlantia monophylla* DC**

<table>
<thead>
<tr>
<th>Sr. no</th>
<th>Parameters</th>
<th>Values % w/w</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Total ash value</td>
<td>6%</td>
</tr>
<tr>
<td>2</td>
<td>Acid insoluble ash</td>
<td>1%</td>
</tr>
<tr>
<td>3</td>
<td>Water soluble ash</td>
<td>2.80%</td>
</tr>
<tr>
<td>4</td>
<td>Moisture content</td>
<td>4.90%</td>
</tr>
<tr>
<td>5</td>
<td>Foreign organic matter</td>
<td>1%</td>
</tr>
<tr>
<td>6</td>
<td>Alcohol soluble extractive</td>
<td>4%</td>
</tr>
<tr>
<td>7</td>
<td>Pet Ether soluble extractive</td>
<td>1.75%</td>
</tr>
<tr>
<td>8</td>
<td>Chloroform Extractive value</td>
<td>1%</td>
</tr>
</tbody>
</table>

**Table 2. Preliminary phytochemical analysis of extract of *Atlantia monophylla* DC**

<table>
<thead>
<tr>
<th>Phytoconstituents</th>
<th>Extract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaloids</td>
<td>+</td>
</tr>
<tr>
<td>Flavonoids</td>
<td>+</td>
</tr>
<tr>
<td>Tannins</td>
<td>+</td>
</tr>
<tr>
<td>Amino acids</td>
<td>-</td>
</tr>
<tr>
<td>Glycosides</td>
<td>-</td>
</tr>
<tr>
<td>Steroids</td>
<td>+</td>
</tr>
<tr>
<td>Saponins</td>
<td>-</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>+</td>
</tr>
</tbody>
</table>

+ = Present, - = Absent.

**Table-3. TLC Method Development of the Ethanolic Extract of *Atlantia monophylla* DC**

<table>
<thead>
<tr>
<th>Solvent System</th>
<th>Visualization</th>
<th>No. of spots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloroform : Methanol : Diethylamine 5% H₂SO₄</td>
<td>366nm UV</td>
<td>6</td>
</tr>
</tbody>
</table>

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