Pharmacognostic study and phytochemical screening of leaf of *Adhatoda vasica* (Acanthaceae)

Santosh Kumar Singh, Jay Ram Patel, Prashant Kumar Dubey, Arvind Dangi

Abstract

*Adhatoda vasica* commonly known as vasaka or also known as Roosh near to rural place Papaura, District Rewa (M.P.) India. In the pharmacognostic study of vasaka (leafs) was carried out the some major pharmacognostic study includes macroscopy, microscopy, phytochemical screening, highest values were found with the extraction of water and ethanol, phytochemical screening were confirmed by the presence of Tannins, Alkaloids, Saponins, Steroids, Flavonoids, Glycosides, Carbohydrates.

Keywords: Adhatoda vasica, Phytochemical screening, Pharmacognostic, etc.

1. Introduction

*Adhatoda vasica*, also known as malabar nut tree is part of the Acanthaceae plant family. It is a small evergreen, sub-herbaceous bush which grows commonly in open plains, especially in the lower Himalayas (up to 1300 meters above sea level), India, Sri Lanka, Burma and Malaysia [1]. The Vasaka plant perennial, evergreen and highly branched with unpleasant smell and bitter taste, the plant lives for multiple seasons and retains its leaves throughout the year. It is a shrub 1.0 m to 2.5 m in height, with opposite ascending branches [2]. It is a highly reputed plant used in Ayurvedic system of medicine for the treatment of various ailments of respiratory systems like bronchitis, asthma and it is also used in the treatment of malaria, dysentery and diarrhea [3] and has many other medicinal applications (2-4), it shows potent anti-inflammatory activity [4] and *Adhatoda vasica* was traditionally used by midwives at the time of delivery because of its uterotonic activity. Due to its anti-implantation activity, adhatoda should not be used while pregnant [5].

*Adhatoda vasica* Linn. Also has anti-inflammatory, analgesic, diarrhoea, dysentery, antioxidant, hepatoprotective, Sedative, antispasmodic, antihelmintic properties [6], Antimicrobial activity [7], Antidiabetic activity [8], Wound healing effect [9], Infertility [10], Anti-ulcer [11], Antibacterial [12], Antihistaminic effect, moderate hypotensive activity, thrombopoietic activity [13]. Cardiac depressant, uterotonic and abortifacient. The leaves are found to activate the digestive enzyme trypsin. An extract of the leaves showed significant antifungal activity against ringworm [14].

2. Material and Methods

2.1 Plant collection

Leaves of *Adhatoda vasica* were collected from Papaura, District Rewa, Madhya Pradesh, India. In May 2014, it was authenticated by Dr. J. R. Patel (Professor). Dept. of Pharmacognosy, KDF College of Pharmacy, RKDF University, Bhopal, Madhya Pradesh, India. The leaves were sun dried and make a powders were analyzed for following Pharmacognostic study and Phytochemical screening.

2.2 Pharmacognostic studies

2.2.1 Macroscopic

Morphological studies of leaves such as color, size, odor, taste, surface characteristic and fracture were given in Evans.

2.2.2 Microscopy

A transverse section of fresh leaf of *Adhatoda vasica* was taken and cleaned. A drop of
concentrated hydrochloric acid and phloroglucinol was used to
detect the lignified cells in the cross sections and in the powder
drugs. That was mounted slides in glycerine and studied under
microscope.

2.2.3 Quantitative Evaluation
The moisture content of the vasaka powder was determined by
the loss on drying method. The ash value and the acid
insoluble ash value were determined using a method described
in the British Pharmacopoeia. The extractive petroleum ether,
diethyl ether, chloroform, 99% ethanol, methanol, hydro
alcoholic and aqueous values were determined using methods
described in Brain and Turner.

2.2.4 Phytochemical Screening
Preliminary phytochemical screening was performed in the
extract of Adhatoda vasica in the presence of Alkaloids,
Glycoside, Tannins, Flavonoids, Saponin and Reducing sugar
groups.

3. Result and Discussion
3.1 Macroscopic character
Leaf are pale green, fruity in odor, bitter taste, oblong shape,
8.0-14.2 cm length and 4-5 cm width.

3.2 Microscopic character
Transverse section of leaf showed xylem, phloem, Lamina,
collenchymas, epidermis, Palisade, Spongy, Mesophyll,
abaxial surface (figure 1) and Prismatic form of calcium oxalate
crystal present in Mesophyll, Palisade ratio 5-6, 5-8.5,
Stomatal index 10.8- 14.2-18.1 for lower surface.

3.3 Physiochemical Studies
The moisture content was 10.2% (leaves). The other
physiochemical parameters includes quality, purity and also
help in evaluating the crude drugs, and the total ash value was
13.3% w/w, acid insoluble ash value was 1.0% w/w and water
soluble ash value was 3.5% w/w (leaves) which are not more
than respectively. This includes the presence of total foreign
inorganic matter. While the study of extractive values can
provide suitable standards determine the quality of plant
material in future investigations or application (Table 1 & 2).

3.4 Phytochemical Screening
Preliminary phytochemical screening was performed in the
extract of Adhatoda vasica in the presence of Saponin,
Alkaloids, Tannins, Flavonoids, Steroids, Carbohydrates,
Vitamin C, Cardiac Glycoside and Reducing sugar groups
(Table 3).

Table 3: Phytochemical screening of various extract of Vasaka

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Types of extract</th>
<th>Types of extract</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Methanol</td>
<td>Hydroalcoholic</td>
</tr>
<tr>
<td>1</td>
<td>Saponin</td>
<td>++</td>
</tr>
<tr>
<td>2</td>
<td>Alkaloids</td>
<td>++</td>
</tr>
<tr>
<td>3</td>
<td>Tannins</td>
<td>++</td>
</tr>
<tr>
<td>4</td>
<td>Flavonoids</td>
<td>++</td>
</tr>
<tr>
<td>5</td>
<td>Steroids</td>
<td>++</td>
</tr>
<tr>
<td>6</td>
<td>Carbohydrates</td>
<td>+</td>
</tr>
<tr>
<td>7</td>
<td>Vitamin C</td>
<td>+</td>
</tr>
<tr>
<td>8</td>
<td>Cardiac Glycoside</td>
<td>+</td>
</tr>
<tr>
<td>9</td>
<td>Reducing sugar</td>
<td>+</td>
</tr>
</tbody>
</table>

+++ Present (clearly visible), ++ Present (dark), = Absent

Fig 1: Microscopic Characters: T.S. of Adhatoda vasica leaf

4. Conclusion
The pharmacognostic studies of the leaves of vasaca were used
in this morphological study of vasaca are unable to identify the
crude drug. The information obtained from preliminary
phytochemical screening will be use full in finding out the
reality of the drugs, Ash values, extracting adulteration.

5. Acknowledgement
The author would like thanks to respected principal Dr. J.R.
Patel, RKDF College of Pharmacy, Bhopal, Madhya Pradesh,
for providing the facilities for this significant work and author
also take this blessed opportunity to acknowledge my heartfelt
gratitude to my beloved parents and wife for their constant
support and encouragement.

6. References
1. Shahriar M. Phytochemical screenings and Thrombolytic
activity of the leaf extracts of Adhatoda vasica. The
experiment. International Journal of science and
2. Arabind KVK, Garg RK, Singh L, Chauhan SS.


