Pharmacognostic investigation on aerial part of Chromolaena odorata

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ABSTRACT

Chromolaena odorata belongs to family Asteraceae is potentially distributed in Australia, Africa and Oceania, and it is also found in India. Pharmacognostical parameters for the aerial part of Chromolaena odorata were studied with the aim of drawing the pharmacopial standards for this plant. Macroscopic and microscopic studies, total ash, water soluble ash, acid insoluble ash, alcohol-soluble extractive, water-soluble extractive and moisture content on the aerial part of chromolaena odorata were conducted. Leaf Constant parameters of Chromolaena odorata were determined and reported as stomatal number, stomatal index, vein islet number, vein termination number and palisade ratio. The Macroscopic, Microscopic, and physicochemical parameters of the Chromolaena odorata were discussed in present paper.

Key words: Chromolaena odorata, pharmacognostic, phytochemical study.

INTRODUCTION

Chromolaena odorata is also called as Siam weed¹ potentially distributed in Australia, Africa & Oceania, and it is also found in India (West Bengal, Nagaland). Chromolaena odorata is a fast growing perennial and invasive weed native to South and Central America. The medicinal values² of plant lie in their component phytochemicals such as tannins, flavonoids, phenolic compounds³ and other nutrients⁴ like as amino acid, proteins, which produce a definite physiological action on the human body. Fresh leaves and extract of Chromolaena odorata are a traditional herbal treatment⁵ for burns, soft tissue repair, and other skin infection. Pharmacognostical parameter of aerial part of Chromolaena odorata helps in establishment of standardization parameter. The Macroscopic, Microscopic, and physicochemical parameters of the Chromolaena odorata were evaluated and reported.

MATERIAL AND METHODS

Fresh Leaves and stems of Chromolaena odorata were collected and authenticated by Alva’s education foundation Moodbidri. The leaves and stems were separated, dried, coarsely powdered. This powder was stored in an airtight container. Few dried leaves and stems were soaked in water for some time (till it get soften). The leaf was placed in between 2 potato slices and with the help of a sharp blade thin transverse sections were taken and placed in a watch glass; the sections were cleared by warming in chloral hydrate solution and stained with staining reagents containing a mixture of phloroglucinol and concentrated hydrochloric acid. Dilute hydrochloric acid and glycerol were used as mounting fluids for stained and unstained sections respectively. Leaf Constants values of leaf and powder characters of Leaf and stem of Chromolaena odorata were determined and reported. Physicochemical Parameter of Leaf and stem
powder were reported as total ash, water soluble ash, acid insoluble ash, alcohol-soluble extractive, water-soluble extractive and moisture content.

RESULTS

Macroscopy

The stems are circular, hairy or almost smooth and much branched. The leaves are arrowhead-shaped, 50-120 mm long and 30-70 mm wide. The base of the plant becomes hard and woody while the branch tips are soft and green. As the species name 'odorata' suggests, the green leaves emit a pungent odour with slightly bitter taste when crushed.

Microscopy

Fig. 1 and Fig. 1.1 reported the T.S of the leaf through midrib region showed upper and lower epidermis with thin cuticle. Epidermis was made up of...

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Fig. 1: T. S. of leaf

Fig: 1.1: Lamina region of T S

Fig: 1.2: T.S of the stem
Fig. 2.1: T S of stem, half portion enlarged

Fig. 3: Covering trichome

Fig. 3.1: Starch grains

Fig. 3.2: Fiber bundle

Fig. 4: Parenchyma cells

Fig. 4.1: Xylem vessels

Fig. 4.2: Fiber
of thin walled, rectangular cells. Epidermis is followed by 2-3 layers of collenchymatous tissues which were arranged compactly. The parenchymatous cell was found to be thin walled. Chromolaena leaf showed presence of vascular bundles with xylem and phloem. The Epidermis constituted with presence of multicellular trichomes and lamina region showed well developed upper and lower epidermis covered by thin cuticle. T.S. through lamina region reported the presence of palisade cell which arranged compactly.

**T S of Stem**

Figure: 2 and Figure: 2.1 showed The T.S. of stem. Epidermis was found to be with 2-3 layer of tangentionally elongated cell surrounded by cuticle. Xylem consisting xylem vessels, phloem cell, sclerenchyma tissue and well developed pith observed in the T S of stem. Chromolaena stem reported presence of vascular bundle with xylem and phloem. Epidermis also showed presence of covering trichomes.

**Powder microscopy**

Powder microscopy of the leaf exhibited covering trichomes, starch grains and fiber bundle.

**Powder microscopy of the stem**

The parenchyma cells were abundant and occurred in group. Xylem vessels were found to be in large group. Fiber was fond to be in lack amount.

<table>
<thead>
<tr>
<th>Sample Identity</th>
<th>Moisture Content %</th>
<th>Total Ash%</th>
<th>Acid Insoluble ash%</th>
<th>Water soluble ash %</th>
<th>Water soluble Extractive value%</th>
<th>Alcohol soluble Extractive value%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves and Stems</td>
<td>11</td>
<td>7</td>
<td>1.15</td>
<td>5.5</td>
<td>22.4</td>
<td>8</td>
</tr>
</tbody>
</table>

**Table 2: Leaf Constants**

<table>
<thead>
<tr>
<th>Sample Identity</th>
<th>Stomatal No.</th>
<th>Stomatal Index</th>
<th>Vein islet no.</th>
<th>Vein termination no.</th>
<th>Palisade ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves</td>
<td>200</td>
<td>15-17</td>
<td>6</td>
<td>2</td>
<td>15</td>
</tr>
</tbody>
</table>

**CONCLUSION**

The present study attempts pharmacognostic studies of leaves and stem parts of Chromolaena odorata. Macroscopic as well as microscopic studies of this crude drug are the primary steps to establish its botanical quality control before going to other studies. Hence Pharmacognostic studies of this drug play a very important role in identifying the purity and quality of crude drugs.

In the present study the arrangement of tissues in transverse section and type of cells were studied with the aid of microscope. T S of the leaf of chromolaena odorata showed the presence of collenchymatous tissues, parenchymatous cell and covering multicellular trichomes. Lamina region of leaf reported the presence of palisade cell which arranged compactly. Chromolaena stem reported presence of vascular bundle with xylem and phloem. Epidermis also showed presence of covering trichomes.

Powder microscopy of the stem exhibited parenchyma cells, Xylem vessels and Fibers. Powder microscopy of the leaf exhibited covering trichomes, starch grains and fiber bundle.
Physicochemical parameters and leaf constant studies will be useful tool along with macroscopical and microscopical characters of Chromolaena odorata.

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