A RESEARCH ARTICLE ON PARVAL (TRICHOSANthes dioica ROXB.) WITH SPECIAL SIGNIFICANCE ON EVALUATION OF PHYSICOCHEMICAL PROPERTIES.

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ABSTRACT

Medicinal plants constitute as a main factor in our traditional system of Indian medicine. Almost 70-80% of the rural population in India is depending upon medicinal herbs & our indigenous system of medicine for primary health care. One of such herbs is *Trichosanthes dioica* Roxb. This is called as pointed guard in English. It is a perennial herb belonging to the family cucurbitaceae. This deciduous climber grows widely in Indian subcontinent. Traditionally, the plant is used in India for its various medicinal properties. In order to have proper results in any type of research activity and also to use as effective medicine, raw material used should be of perfect parameters as described in API. Here, main objective of the study is to evaluate the physicochemical properties of *Trichosanthes dioica* Roxb, as standard parameters of *parval* are not mentioned in API. This article comprises of Ayurvedic properties of *parval* & evaluation of its physicochemical properties by study performed at research laboratory of Shree Ayurved Mahavidyalaya, Nagpur.

Keywords: Parval, Trichosanthes dioica Roxb., physicochemical properties.

1. INTRODUCTION

*Trichosanthes dioica* Roxb is a dioe-cious climber with perennial root stock distributed widely in tropical Asia & Australia. It belongs to the family cucurbitaceae. It is known by a name of *parval, palwal, parmal, patol, patola* in various parts of India & Bangladesh.1 It is extensively cultivated mainly as vegetable over warmer region of India, particularly in Bihar, West Bengal, Assam & Uttar Pradesh for its fruit.2 Various recipes are made from edible parts of the plant like leaves & fruit.3 In Charak Samhita leaves and fruits of *parval* are used for treating alcoholism4 and jaundice. Extract drawn from the leaves of *Trichosanthes dioica* Roxb. is used as a tonic, in edema5, alopecia, febrifuge and in sub-acute cases of enlargement of liver.6 As mentioned in Ayurvedic sciences, leaves of the plant have anti-pyretic, diuretic, cardio-tonic, laxative, anti-ulcer, etc. properties. The multiple chemical constituents present in *parval* are tannins, saponins, alkaloids, vitamin A, vitamin C, mixture of novel peptides, proteins tetra and pentacyclic triterpenes.7 Leaves of the plant contains rich number of bioactive compounds which possess various medicinal properties such as blood sugar lowering effect in experimental rat models, mild diabetic human subject, antifungal activity and antibacterial activity. Utilization of herbs having antimicrobial properties in day to day practice is common now.8 However, for any medicinal preparation standard physicochemical parameters like foreign matter content, total ash, water soluble ash, alcohol soluble ash must be of perfect value. For most of the drugs the values for reference are available from Ayurvedic Pharmacopoeia of India. But as the drug *parval* is not men-
tioned in it, need of the study arise. Standardization of the drug provides the assessment of quality & purity of drug and physicochemical analysis is an important part of it. That’s why the present study is carried out to set the range of values for above mentioned parameters. Drug collection was done from region of Nagpur and study was performed at research laboratory of Shree Ayurved Mahavidyalaya, Nagpur.

2. MATERIALS AND METHODS

2.1. Objectives
- To study the physicochemical properties of *Trichosanthes dioica* Roxb.
- To set the standard values of parameters like foreign matter content, total ash, water soluble ash, alcohol soluble ash for *Trichosanthes dioica* Roxb.

2.2. Material

2.2.1. Plant Identification

*Trichosanthes dioica* Roxb. was identified on the basis of its Morphology and family characters of the plant.

2.2.2. Plant collection

Plant was collected from forest area around Nagpur according to *dravya sangraha kaal* mentioned in *Charaka* and according to the Guidelines on Good Field Collection Practices for Indian Medicinal Plants. Complete intact leaves were collected without doing any harm to the leaves. Then this sample was cleaned with water and dried shade to avoid direct sunlight.

2.2.3. Plant profile

**A. Botanical summary**

*Parval* belongs to the-
- **Kingdom:** Plantae
- **Division:** Magnoliphyta
- **Class:** Magnolipsida
- **Order:** Cucurbitaceae
- **Genus:** Trichosanthes
- **Species:** T. dioica

B. Some microscopic characters of leaves of *Trichosanthes dioica* Roxb.

Plant parameters and description of leaves are illustrated in Table No. 1.

2.3. Location of study

Study was done at Research laboratory & Department of Dravyaguna of Shree Ayurved Mahavidyalaya, Nagpur.

2.4. Methods (Authentication & Standardization)

Field collected sample of *parval* (*Trichosanthes dioica* Roxb) was authenticated from taxonomist, Department of Botany of well-known research institute. The authenticity of the samples was confirmed by comparing their characters with standard herbarium sample available at the Botany department with the help of Subject experts. One of the major sections in Standardization of the drug is physicochemical analysis. So, an attempt is made in this study to do the evaluation and set the standard range for reference.

3. RESULT & DISCUSSION

**Physicochemical analysis of parval leaves**

3.1. Foreign Matter

The sample must be free from visible signs of contamination, i.e., insects, mould, sand other animal contamination and also from animal excreta, fungus and dust. However, no poisonous, dangerous or otherwise harmful foreign matter or residue should be allowed.

**Sample 1**

Weight of sample taken (W1) – 100 gm
Weight after sorting of sample (W2) - 99.32 gm
Weight of foreign matter (W3) - 0.68 gm
Calculations

\[(W_1 - W_2) \div W_1 \times 100\]
\[= (100 - 99.32) \div 100 \times 100 = 0.68\% \text{ w/w.}\]

Sample 2

Weight of sample taken (W1) – 100 gm
Weight after sorting of sample (W2) - 99.25 gm
Weight of foreign matter (W3) - 0.75 gm

Calculations

\[(W_1 - W_2) \div W_1 \times 100\]
\[= (100 - 99.25) \div 100 \times 100 = 0.75\% \text{ w/w.}\]

Sample 3

Weight of sample taken (W1) – 100 gm
Weight after sorting of sample (W2) - 99.42 gm
Weight of foreign matter (W3) - 0.58 gm

Calculations

\[(W_1 - W_2) \div W_1 \times 100\]
\[= (100 - 99.42) \div 100 \times 100 = 0.58\% \text{ w/w.}\]

All calculated values are given in Table No. 3.

4.2. Total Ash Value

The total ash obtained by taking accurately weighted 2gm of the dried plant material was taken in a tarred silica dish and was ignited with a flame of Bunsen burner for about one hour. The sample was kept in muffle furnace at 550°C ± 20°C till grey ash was formed. It was then cooled in desiccators and weighed.

Sample 1

Weight of empty crucible (W1) - 19.07 gm
Weight of crucible with sample (W2) - 21.07 gm
Weight of crucible after heating (W3) - 19.85 gm

Calculations

\[(W_1 - W_3) \div (W_2 - W_1) \times 100\]
Total Ash value = 39%

Sample 2

Weight of empty crucible (W1) - 12.44 gm
Weight of crucible with sample (W2) - 14.84 gm
Weight of crucible after heating (W3) - 13.24 gm

Calculations

\[(W_1 - W_3) \div (W_2 - W_1) \times 100\]
Total Ash value = 40%

Sample 3

Weight of empty crucible (W1) - 19.18 gm
Weight of crucible with sample (W2) - 21.18 gm
Weight of crucible after heating (W3) - 20.08 gm

Calculations

\[(W_1 - W_3) \div (W_2 - W_1) \times 100\]
Total Ash value = 45%

All calculated values are given in Table No. 3.

4.3. Acid Insoluble Ash

The total ash was moistened with 25 ml dilute HCL and evaporated to dryness after which it was kept in an electric air oven maintained at 135°C ± 2°C for 3hrs. It was then allowed to cool, and was filtered through Whatman filter paper no. 41. The residue washed with hot water. The filter paper and the residue were put in a dish and ignited in a muffle furnace at 550°C ± 20°C for 1 hr. After cooling in desiccators & weighing procedure was repeated till the difference between two successive weights was found to be less than 1mg.

All calculated values are given in Table No. 3.

4.4. Water soluble extractive

Accurately weighted 2.5 gm of powder was placed in glass-stoppered conical flask. 50 ml of water is added in it. The flask was shaken frequently for 6 hours & then allowed to stand for 18 hrs. The contents were filtered rapidly to avoid loss of solvent. The 5 ml of filtrate was transferred to a previously weighted clean petri dish & evaporated to dryness on a water bath. After evaporation the extract was dried at 105°C for 6 hrs and kept in desiccators for cooling. The beaker was weighted and percent extractable matter in water was calculated.

Sample 1
Morankar VV, Landge ST. Research Article.

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Peer Reviewed                         ISSN: 2582-2748                        Indexed journal

W1 - 43.6271 gm
W2 - 43.6951 gm

**Calculation**

Weight of residue \((W2-W1)\times 10 \times 100 \div \text{Weight of sample}\)

Water soluble extractive value = 27.20%

**Sample 2**

W1 – 44.5864 gm
W2 - 44.6574 gm

**Calculation**

Weight of residue \((W2-W1)\times 10 \times 100 \div \text{Weight of sample}\)

Water soluble extractive value = 28.40%

**Sample 2**

W1 – 44.8235 gm
W2 - 44.8965 gm

**Calculation**

Weight of residue \((W2-W1)\times 10 \times 100 \div \text{Weight of sample}\)

Water soluble extractive value = 29.20%

All calculated values are given in Table No. 3.

4.5. **Alcohol soluble extractive**

Accurately weighted 1.25 gm of powder material was placed in glass-stoppered conical flask. To it 25 ml of ethanol was added. The flask was shaken frequently for 6 hrs then allowed standing for eighteen hours. The contents were filtered rapidly to avoid loss of solvent. The filtrate was transferred to a previously weighted clean beaker & evaporated to dryness on a water bath. After evaporation the extract was dried at 105°C for 6 hrs and kept in desiccators for cooling. The beaker was weighted and percent extractable matter in water was calculated.

**Sample 1**

W1 - 44.5710 gm
W2 - 44.5896 gm

**Calculation**

Weight of residue \((W2-W1)\times 10 \times 100 \div \text{Weight of sample}\)

Alcohol soluble extractive value = 14.88%

**Sample 2**

W1 – 43.8393 gm
W2 – 43.8567 gm

**Calculation**

Weight of residue \((W2-W1)\times 10 \times 100 \div \text{Weight of sample}\)

Alcohol soluble extractive value = 13.92%

Alcohol soluble extractive value=13.92%

**Sample 3**

W1 – 42.4408 gm
W2 – 42.4589 gm

**Calculation**

Weight of residue \((W2-W1)\times 10 \times 100 \div \text{Weight of sample}\)

Alcohol soluble extractive value = 14.48%

All calculated values are given in Table No. 3.

For including in any Ayurvedic formulation each drug in it must be standardized to obtain the utmost results. Results obtained are mentioned in the Table No. 3 Calculating physico-chemical analysis of all three sample values, range of individual parameters for **parval** was set as other drugs mentioned in API.

4. **CONCLUSION**

**Trichosanthes dioica** Roxb. is a perennial herb distributed in tropical Asia known by a common name of **parval**. The study gave the standard range of parameters for the leaves of **Trichosanthes dioica** Roxb. The analytical values of Sample 1, Sample 2 and Sample 3 were nearly same.

**REFERENCES**

TABLES

Table No.1. Some microscopic characters of leaves of *Trichosanthes dioica* Roxb.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Parameters</th>
<th>Description of leaves</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Colour</td>
<td>Green</td>
</tr>
<tr>
<td>2</td>
<td>Odour</td>
<td>Odourless</td>
</tr>
<tr>
<td>3</td>
<td>Taste</td>
<td>Characteristic</td>
</tr>
<tr>
<td>4</td>
<td>Length</td>
<td>7-12cm</td>
</tr>
<tr>
<td>5</td>
<td>Width</td>
<td>4-6cm</td>
</tr>
<tr>
<td>6</td>
<td>Texture</td>
<td>Rigid</td>
</tr>
<tr>
<td>7</td>
<td>Surface</td>
<td>Rough</td>
</tr>
<tr>
<td>8</td>
<td>Apex</td>
<td>recurved and blunt</td>
</tr>
<tr>
<td>9</td>
<td>Base</td>
<td>Symmetrical</td>
</tr>
<tr>
<td>10</td>
<td>Venation</td>
<td>Cordate</td>
</tr>
<tr>
<td>11</td>
<td>Shape of lamina</td>
<td>heart shaped, unlobed</td>
</tr>
<tr>
<td>12</td>
<td>Margin</td>
<td>Entire</td>
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Cite this article as:
Table No. 2. Pharmacological properties of Parval.

<table>
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<tr>
<th>Drug</th>
<th>Rasa</th>
<th>Veerya</th>
<th>Vipaka</th>
<th>Karma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parval</td>
<td>Tikta</td>
<td>Ushna</td>
<td>Katu</td>
<td>Tridoshashamak</td>
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Table No. 3. Results (Physicochemical Analytical values of Parval).

<table>
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<th>Sample1</th>
<th>Sample2</th>
<th>Sample3</th>
<th>Range</th>
</tr>
</thead>
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<tr>
<td>Foreign matter</td>
<td>0.68% w/w</td>
<td>0.75% w/w</td>
<td>0.58% w/w</td>
<td>Not more than 0.80% w/w</td>
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<tr>
<td>Total ash</td>
<td>39%</td>
<td>40%</td>
<td>45%</td>
<td>Not more than 50%</td>
</tr>
<tr>
<td>Acid insoluble ash</td>
<td>2.53%</td>
<td>3.12%</td>
<td>2.20%</td>
<td>Not more than 4%</td>
</tr>
<tr>
<td>Water soluble extractive value</td>
<td>27.20%</td>
<td>28.40%</td>
<td>29.20%</td>
<td>Not more than 35%</td>
</tr>
<tr>
<td>Alcohol soluble extractive value</td>
<td>14.88%</td>
<td>13.92%</td>
<td>14.48%</td>
<td>Not more than 20%</td>
</tr>
</tbody>
</table>

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