Vigneshwari B, Dixit Renu and Reddy KVV Bhaskara

Abstract
Objective: The purpose of the study is to evaluate preliminary phytochemical constituents of the Saṁvartikā (Tender leaves) of Kamala (Nelumbo nucifera Gaertn.).
Methods: The preliminary Phytoconstituents tested were Alkaloids, Carbohydrates, Reducing sugars, Proteins, Xantho proteins, Amino acids, Starch, Glycosides, Steroids, Tannins and pH value. The Physico-chemical tests were Total moisture contents, Ash value, Soluble extracts and Foreign matter. These Parameters were evaluated with standard methods of Association of official Analytical chemists.
Results: From this study it is revealed that the dried tender leaves of Nelumbo nucifera Gaertn. showed the presence of Alkaloids, Carbohydrates, Reducing sugars, Tannins and a pH value of 5.65 at 23.8°C. The Physico-chemical study reveals the presence of Moisture content 6.55%W/W, Total Ash 10.97%W/W, Acid insoluble Ash 0.098%W/W, Water Soluable Extract 15.75%, Alcohol Soluable Extract 10.56% and Foreign matter -Nil.
Conclusion: The preliminary Phytochemical and Physicochemical screening is helpful do to further pharmacological activities.

Keywords: Nelumbo nucifera, phytochemicals, saṁvartikā

Introduction
KAMALA (Nelumbo nucifera Gaertn.) is a perennial aquatic herb bearing the famous Red or Rose pink coloured flower. It is found in ponds, lakes, marshes and flooded fields. Kamala have been known by the names as Sacred lotus, Indian lotus, Asian lotus, Lotus, East Indian Lotus etc. It is extensively described in almost all classical of Āyurveda that reflects its great medicinal value, it is edible used as food and medicine. It has miraculous cooling effect, Anti-haemorrhagic property, Anti-diabetic [1], Anti-platelet, Hepto-protective and Anti-estrogenic effect. Its leaves, seeds, flowers, root contains several Alkaloids [2] and Flavonoids which are beneficial in treating different ailments. The plant as a whole is also used to treat many pathological conditions [3].

Phytochemical study
Aims and objectives: The Saṁvartikā (Tender leaves) of Nelumbo nucifera Gaertn. is subjected to Preliminary Phytochemical screening for the detection of various chemical constituents present.
**Material and Methods**

**Sample collection and preparation:** The sample drug Kamala Saṁvartika Cūrṇa (*Nelumbo nucifera Gaertn.*) were collected from the ponds in Cuddalore Dist. Tamilnadu in February 2018. Fresh Leaves were collected and rinsed with tap water for 2-3 times and shade dried and the dried parts were powdered using mechanical grinder and packed in Airtight container for further Analysis.

**Preparation of aqueous extract and laboratory analysis**

The aqueous extract of Lotus tender leaves was prepared by soaking 100 gm of dried Tender leaf powdered samples in 500ml of distilled water for 12 hrs. The filtrate of tender leaf powder is tested for the presence of various active principles namely Alkaloids, Carbohydrates etc.

**Tests for Alkaloids**

Mayer's Test: To 1 ml of the extract, 3 ml of Mayer's reagent was added, the formation of full white precipitate confirmed the presence of Alkaloids.

**Test for Carbohydrates**

Molisch Test: To 2 ml of the extract, 1 ml of α-naphthol solution and concentrated sulphuric acid through the sides of test tube were added. Purple or reddish violet colour at the junction of the two liquids revealed the presence of carbohydrates.

**Tests for reducing sugars**

Benedict’s test: Mix equal volume of Benedict’s reagent and test solution in test tube. Heat in boiling water bath for 5 min. solution appears green, yellow or red depending on amount of reducing sugar present in test solution.

**Test for proteins**

Biuret Test: To 1 ml of the extract, 1ml of 40% sodium hydroxide solution was added followed by 2 drops of 1% copper sulphate solution. Formation of a violet colour showed the presence of proteins.

**Xantho-protein Test**

To 1 ml of the extract, 1ml of concentrated nitric acid was added. A white precipitate is formed, it is boiled and cooled. 20% of sodium hydroxide or ammonia is subsequently added; orange colour indicated the presence of aromatic amino acids.

**Test for Amino-acids**

Ninhydrin test: Heat 3ml test solution and 3 drops 5% Ninhydrin solution in boiling water bath 10 minutes purple or bluish colour appears.

**Test for Starch**

Iodine test: Mix 3ml of test solution and few drops of dilute iodine solution. Blue colour appears, it disappears on boiling and reappears on cooling.

**Test for Tannins**

To 1 ml of the extract, ferric chloride was added, formation of a dark blue or greenish black colour product showed the presence of tannin.

**Tests for steroids**

Salkowski Test: Dissolve the extract in chloroform and equal volume of concentrate sulphuric acid. Shake well. chloroform layer appears red and acid layer appears greenish yellow represented the steroid components in the tested extract.

**Tests for Glycosides**

Keller Killiani test: The extract is dissolved in a mixture of 1% Ferric sulphate solution in 5% glacial acetic acid. Add one or two drop of concentrated sulphuric acid. A blue colour develops due to the presence of deoxy sugars.

**Results and Discussion**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Phytochemical</th>
<th>Test name</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Alkaloids</td>
<td>Mayer's Test</td>
<td>Present</td>
</tr>
<tr>
<td>II</td>
<td>Carbohydrates</td>
<td>Molisch Test</td>
<td>Present</td>
</tr>
<tr>
<td>III</td>
<td>Reducing Sugars</td>
<td>Benedicts Test</td>
<td>Present</td>
</tr>
<tr>
<td>IV</td>
<td>Proteins</td>
<td>Biuret Test</td>
<td>Absent</td>
</tr>
<tr>
<td>V</td>
<td>Xantho proteins</td>
<td>Xantho protein test</td>
<td>Absent</td>
</tr>
<tr>
<td>VI</td>
<td>Amino acids</td>
<td>Ninhydrin Test</td>
<td>Absent</td>
</tr>
<tr>
<td>VII</td>
<td>Starch</td>
<td>Iodine test</td>
<td></td>
</tr>
<tr>
<td>VIII</td>
<td>Tannins</td>
<td>Ferric chloride test</td>
<td>Present</td>
</tr>
<tr>
<td>IX</td>
<td>Steroids</td>
<td>Salkowski reaction</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Glycosides</td>
<td>Keller – killiani test</td>
<td>Absent</td>
</tr>
<tr>
<td>XI</td>
<td></td>
<td>Ph</td>
<td>5.65 at 23.8°C</td>
</tr>
</tbody>
</table>

Along with these Flavonoids are also present in Lotus leaves [4]. pH of Kamala Saṁvartika Cūrṇa: 5.65 at 23.8 °C

**Physicochemical study identity, purity and strength**

**AIM**

To study the Identity, Purity and Strength of dried Tender leaves of *Nelumbo nucifera* Gaertn.

**Objectives**

Physicochemical studies such as Moisture content, Total ash, Foreign matter, Acid insoluble ash, Water solubles extract, Alcohol soluble extract were determined according to WHO guidelines on quality control methods for medicinal plants [5].

**Materials and Methods**

**Methodology**

1. **Loss on drying / Moisture content:** 10 gm of trail drug samples are placed after accurately weighing it in a tarred evaporating dish. After placing the above said amount of sample in a tarred evaporating dish is dried at 105° C for 5 hours and it is weighed. After drying tarred evaporating dish was allowed to cool in desiccators for 30 minutes and then weighed the remnant material.

\[
\text{The } \% \text{ of Loss on drying} = \frac{\text{Difference in weight after heating}}{\text{Weight of sample taken}} \times 100
\]

2. **Determination of ash values of a crude drug**

**Ash values**

- Used to determine quality and purity of a crude drug
- Ash contains inorganic radicals like phosphates, carbonates and silicates of sodium, potassium, magnesium, calcium etc.

**A. Determination of total Ash value**

- Weigh and ignite flat, thin, porcelain dish or a tarred silica crucible
- Weigh about 2g of the powdered drug into the dish
A. Determination of Alcohol soluble Extractives
- Weigh about 5g of the powdered drug in a weighing bottle and transfer it to a dry 250ml conical flask.
- Fill a 100ml graduated flask to the delivery mark with the solvent (90% alcohol). Wash out the weighing bottle and pour the washings, together with the remainder of the solvent into the conical flask.
- Cork the flask and set aside for 24hrs, shaking frequently.
- Filter into 50ml cylinder. When sufficient filtrate has collected, transfer 25ml of the filtrate to a weighed, thin porcelain dish, as used for the ash values determinations.
- Evaporate to dryness on a water bath and complete the drying in an oven at 100 °C.
- Cool in a desiccator and weigh.
- Calculate the percentage w/w of an extractive with reference to the air dried drug.

B. Determination of water soluble extractives
- Weigh about 5g of the powdered drug in a weighing bottle and transfer it to a dry 250ml conical flask.
- Fill a 100ml graduated flask to the delivery mark with the solvent (90% Chloroform water). Wash out the weighing bottle and pour the washings, together with the remainder of the solvent into the conical flask.
- Cork the flask and set aside for 24hrs, shaking frequently.
- Filter into 50ml cylinder. When sufficient filtrate has collected, transfer 25ml of the filtrate to a weighed, thin porcelain dish, as used for the ash values determinations.
- Evaporate to dryness on a water bath and complete the drying in an oven at 100 °C.
- Cool in a desiccator and weigh.
- Calculate the percentage w/w of an extractive with reference to the air dried drug.

Results

Table 1: Results of Identity, Purity and Strength of Tender leaves of *Nelumbo nucifera* Gaetn.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Kamala Saṁvartikā Patra</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture Content</td>
<td>6.55% w/w</td>
</tr>
<tr>
<td>Total ash</td>
<td>10.97% w/w</td>
</tr>
<tr>
<td>Acid insoluble Ash</td>
<td>0.098% w/w</td>
</tr>
<tr>
<td>Water soluble Extract</td>
<td>15.75% w/w</td>
</tr>
<tr>
<td>Alcohol soluble Extract</td>
<td>10.56% w/w</td>
</tr>
<tr>
<td>Foreign Matter</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Conclusion

The Saṁvartikā (Tender leaves) was subjected to preliminary Phytochemical and Physicochemical Analysis. The extractive values are being useful for the further extraction of phytoconstituents from the plant. The Alcoholic soluble extractive indicates the presence of polar constituents like Phenols, Flavonoids etc. The Total ash is particularly important in the evaluation of purity of drugs i.e. the presence or absences of foreign matter such as metallic salts or silica. The total Ash of Saṁvartikā tender Kamala leaf is 10.97% W/W this may be due to presence of Calcium oxalate crystals and the metallic salts like Sodium, Potassium, Calcium, Magnesium, Chloride, Copper and Silver in PPM units. It was found that the leaf extract of *Nelumbo nucifera* Gaetn. Shows the presence of Alkaloids, Carbohydrates, Reducing sugars and Tannins which are beneficial in treating many ailments [6].

Acknowledgement

Authors are thankful to Department of Ayush, State drug testing laboratory, dr. B.R.K.R. Govt. Ayurvedic college, Hyderabad-500038. For providing facilities for the successful completion of the study.

References

6. A Study of Samvartika (Tender leaves) of Kamala (Nelumbo nucifera Gaertn.) W.S.R. To Mutrakricchra. – by Dr. B. Vigneshwari, P.G Scholar, Guided by Dr. Renu Dixit, Professor, Department of Dravya Guna, S.V. Ayurvedic college, Tirupati.