PHARMACOGNOSTICAL STUDY OF TWO VARIETIES OF PARPATAKA (OLDENLANDIA CORYMBOSA & FUMARIA INDICA)

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ABSTRACT

Parpataka is a plant often used in different medical conditions mostly pyrexia. Researches have also proved its antipyretic potential. It has a variety of botanical sources all classically called Parpataka because they have the same pharmacological actions. Although the actions of these source plants are widely known yet pharmacognostical study of their root, stem, leaves, flowers and fruits are not available till date. Panchanga of Parpataka is often used in folklore medicine. The present study was designed to evaluate the pharmacognostical study of two varieties of parpataka so as to identify their similar and differentiating features. Macroscopic, microscopic and histochemical study of fresh samples of root, stem, leaf, flower and fruit of Parpataka was carried out to establish the correct pharmacognosy of the two samples.

Keywords: Pyrexia, anti-pyretic, panchanga

INTRODUCTION

Fever or pyrexia is a common condition faced by people worldwide. Derived from the Greek word “pyretos” meaning fire / febrile response, it is a frequent medical sign that describes an increase in internal body temperature to levels above normal. It is most accurately described as a temporary elevation¹,⁴,⁸,²⁵ in body’s thermoregulatory set point¹⁴ usually by about 1-2°C. In ayurveda fever is commonly known as jwara²,¹⁰. Although many drugs for treating pyrexia are available in modern medical science⁵,⁷,¹⁵,¹⁶,¹⁹, still Medical fraternity has always been trying to search newer, easily available and cost effective drugs for treatment of various diseases. Parpataka in this context has been found to be very useful in treating various ailments⁹,¹¹,²⁵,²⁶ mainly jwara¹³. In this context the very first step consists of identifying the drugs correctly which shall be used for treatment purpose. A study was conducted to experimentally evaluate the comparative efficacy of two varieties of parpataka as an anti-pyretic or jwaraghna drug. The pharmacognostical study was carried out initially to establish the correct identity of the trial drugs.

Aims & Objectives:

To standardize two varieties of Parpataka Fumaria indica and Oldenlandia corymbosa by conducting pharmacognostic study including macroscopic, microscopic and phytochemical studies of the plant parts.

Materials & Methods:

3.1 Collection & Identification
The botanical identity of the trial drugs was confirmed by the botanist in the department of pharmacognosy of Ayurvedic College. The drugs were collected in person to make sure of their identity.

**Pharmacognostical Study**: This has been carried under the following steps-
1. Macroscopic study
2. Microscopic study

**Oldenlandia corymbosa Linn**:

- **Macroscopic study**\(^3,4,6,12\): It includes the identity, characters, colour, odour and taste of the whole plant.

- **Characters of root**: Long cylindrical with slender fibrous secondary roots arising from it. Colour- Creamish white, Odour- None. Taste-Bitter, Fracture-Brittle

- **Microscopic study**: T.S is almost circular in outline with major central portion covered with vascular strands. A layer of epiblema followed by 6-7 layers of dead cork cells in mature root form the outer covering. Cork cells are brown in colour not differentiated from phellogen. Below the cork, a zone of cortex composed of 8-10 layers of parenchymatous cells is found. Starch grains and colouring matter are scattered in the cortex. Cortex is followed by a layer of endodermis separating the phloem from the cortex. The biggest portion is covered by xylem elements present as a central core.

- **Characters of leaf**: Subsessile, linear or linear lanceolate, acute, with recurved scabrous margins, stipules short, membranous with few short bristles. Colour-Green, Odour-Characteristic, Taste-Bitter

- **Microscopic study**: The section is dorsiventral in nature where 3/4\(^{th}\) of the lamina is covered by two layers of palisade cells. Detailed section shows one layer each of upper and lower epidermis. Epidermal cells on both the sides are rectangular in shape and covered with cuticle. Unicellular trichomes are found on upper epidermis. Just below the upper epidermis two layers of palisade parenchyma are found extending up to midrib. Above the lower epidermis 3 to 5 layers of spongy parenchyma cells interfered with vascular bundles are present. Chlorophyll pigments are distributed throughout the mesophyll cells. In the midrib region collateral type of vascular bundles are seen.

**Characters of Flower** – Bisexual, usually actinomorphic, white, solitary, or in axillary pairs, on filiform pedicels, usually 2-3 on
the top of a slender axillary, solitary peduncle.

**Characters of fruit:** Capsules, globose, top rather flat, glabrous.

**Microscopic study:**
The detailed study shows the epicarp composed of a layer of epidermis followed by three to 4 layers of hypodermis. The number of layers increases below the ridge. Underneath the epicarp 4-8 layers of mesocarp composed of parenchyma cells tangentially elongated in nature are found. 2-4 layers of endocarp cells separate the seed from rest of the fruit.

**Characters of Seeds:** Minute, many, pale brown, smooth or angular, albumen fleshy

**Fumaria indica Pugsley**

**Macroscopic study**\(^\text{17,18,20,21}\):

**Characters of root:** Long cylindrical with many side branches arising from it. Colour-Cream, Odour-None, Taste-Bitter and slightly acrid, Fracture-Brittle

**Microscopic study:** The outline of the section is circular in shape. The outermost layer is of the epidermis followed by layer of cortex. Medullary rays are observed radiating outwards opposite two xylem poles. The secondary wood elements are arranged in radiating rows embedded in the parenchyma. Phloem is laid outside the xylem, and is composed of the sieve tubes, companion cells and phloem parenchyma followed towards the periphery by a few layers of cork cells.

**Characters of stem:** Suberect or diffuse, scarcely scandent, glabrous Colour-Light green, Odour-Characteristic, Taste-Bitter and acrid, Fracture-Brittle

**Microscopic study:**

The outline of the section is angular in shape with fairly prominent angles under which the collenchyma lies. The T.S shows a layer of epidermal cells enveloping the section. Cells are oval to polygonal in shape with fringed wall externally. Epidermis is single layer of oblong rectangular cells. Cortex narrow composed of 3-4 layers of chlorenchymatous cells. Vascular bundles are collateral, endarch and open. The xylem is composed of vessels, tracheids, fibres and xylem parenchyma.

**Characters of leaf:** Multifid, more or less glaucous, leaflets 2-4 pinnatisect, segments long, linear or linear oblong, flat, acute .Colour-Green, Odour-Characteristic, Taste-Bitter

**Microscopic study:** T.S of the leaf shows distinct bifacial structure. There is a layer of epidermis covering both the upper and lower layers. The epidermal cells are oblong to rectangular in shape. Stomata are anomocytic. Mesophyll cells in the lamina are composed of 1-2 layers of palisade cells followed by few layers of spongy cells. There more number of stomata on the upper surface.

**Characters of flower:** – 5-6 mm. long, rose coloured, superior petal obtuse, rarely purplish, more or less upward reflexed, lower petal with spreading margins, obtuse spathulate, inner petals black purple at the apex, curved.

**Characters of Fruit:** About 2.5mm Broad, sub-rotund, quadrate, subtruncate abruptly narrowed below, slightly compressed but much keeled, especially towards the apex, rugose when dry.

**Microscopic study:** T.S. is almost oval in shape. The detailed section shows the epi-
dermis covering the epicarp. The wide zone of mesocarp is composed of parenchymatous cells interfered with vascular bundles, mostly composed of annular vessels. Endocarp separates the rest of the fruit from the seed.

**Characters of Seed:** 1 seeded

**5. Phytochemical Study:** Consists of Phytochemical investigation\(^{22,23}\) of crude extracts.- Alkaloids, Carbohydrates, Flavonoids, Glycosides, Proteins, Saponin, Steroids

**QUALITATIVE TESTS:**

1) **Test for alkaloids** –
   a) Mayer’s test: Mayer’s reagent was added to the acidic test solution. Cream coloured precipitate was formed. b) Wagner’s test: Wagner’s reagent was added to the acidic test solution. Brown coloured precipitate was formed.

2) **Test for Carbohydrates:**
   a) Molisch’s test: Small quantity of extract was taken in a test tube, and a few drops of Molisch’s reagent and 2 ml of conc. H\(_2\)SO\(_4\) were added slowly along the sides of the test tube. A purple ring was formed at the junction of the 2 liquids. b) Benedict’s test: To the test solution Benedict’s reagent was added and boiled on water bath. Reddish brown precipitate was formed.

3) **Test for Flavanoids:**
   a) Ferric chloride test: Few drops of Ferric chloride solution were added to the test solution. Intense green colour appeared. b) Alkaline reagent test: NaOH solution was added to the test solution. Mixture shows increase in the intensity of yellow colour, which becomes colourless on addition of few drops of dilute acids.

4) **Test for Glycosides:**
   a) Keller-killiani test: To the test solution, few drops of Ferric chloride solution was added and mixed well. Then conc. H\(_2\)SO\(_4\) was added slowly. Two layers are formed. The upper layer was bluish and the lower layer was reddish brown in colour.
   b) Bromine water test: Test solution was dissolved in Bromine water gives yellow precipitate.

5) **Test for Proteins:**
   a) Xanthoproteic test: Test solution was treated with conc. HNO\(_3\). On boiling, gave yellow precipitate.
   b) Ninhydrin test: Test solution when treated with Ninhydrin reagent gives blue coloured precipitate.

6) **Test for Saponins:**
   a) Foam test: Small quantity of extract was treated with 5 ml of water and shaken well. It shows formation of froth, stable for about 15 minutes.

7) **Test for steroids:**
   a) Salkowaski test: To the test solution, few drops of conc. H\(_2\)SO\(_4\) were added, shaken well for some time, allowed to stand. The Lower layer colour turns red, indicating the presence of steroid.
   b) Liberman Buchart test: A few drops of Acetic anhydride was added to test solution, then conc. H\(_2\)SO\(_4\) was added along the sides of the test tube. A brown ring was formed at the junction of the 2 liquids and the upper test tube.

**DISCUSSION**

The macroscopic study of the plants establish Oldenlandia corymbosa as a small herb with Long cylindrical slender fibrous secondary roots, Erect, terete stem, Subsessile, linear or linear lanceolate leaves, Bisexual, usually actinomorphic, white flowers, Cap-
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sules, - Minute, many, pale brown, smooth seeds. Fumaria indica is also a herb with cream coloured long cylindrical root, subrect or diffuse green coloured stem, multifid leaves, rose coloured (pink) flowers and quadrate, subtruncate fruit with 1 seed. Phytochemical analysis showed presence of alkaloids, carbohydrates, flavanoids, glycosides, proteins, saponins and steroids.

CONCLUSION
Microscopy of different plant parts of both plants revealed different distinct features characteristic of the particular plant. The chemical analysis demonstrated the presence of varied chemical compounds in the two plant parts.

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Source of support: Nil
Conflict of interest: None Declared