

## ORIGINAL RESEARCH ARTICLE

**Pharmacognostical and Phytochemical Evaluation of *Grewia asiatica* Linn (Tiliaceae) Fruit Pulp and Seed**Joshi Parul<sup>1</sup>, Pandya Preeti\*<sup>2</sup> and Dei Laxmi Priya<sup>3</sup><sup>1</sup>M.S.Scholar, SRPT Dept., IPGT & RA, Gujarat Ayurved University, Jamnagar, India<sup>2</sup>Ph. D. Scholar, Pharmacognosy Dept., PGT-SFC, IPGT&RA, Gujarat Ayurved University, Jamnagar, India<sup>3</sup>HOD, SRPT Dept, IPGT&RA, Gujarat Ayurved University, Jamnagar, India

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**ABSTRACT**

*Grewia asiatica* Linn (Tiliaceae) commonly known as 'Phaalsa', *Parushaka* is a reputed commercial fruit<sup>1</sup>. Literal meaning of *Parushaka* is 'that which fills up' (*piparti paalayati pitta daahaadibhyaha; poorayati va phala paake maadhooryam*)<sup>[2]</sup>, 'that which takes care of' (*pru paalan pooranayoho*). Whole plant has medicinal values<sup>[3]</sup> but fruit<sup>[4]</sup> is reputed for its antioxidant, anti-fertile<sup>[5]</sup>, anti-biotic, spasmolytic, anti-diabetic, hypotensive, cardio-protective, antifebrile, anti-Tubercular etc. properties. Review of available literature does not reveal much regarding fruit pulp and seed identification hence it was decided to investigate their Pharmacognostical and phytochemical properties; microscopic evaluation with detailed histological features involving transverse section; powder microscopy; preliminary phytochemical tests and physicochemical parameters. Important diagnostic characters like stellate and star shaped trichomes, starch grains, Aleurone grains etc. were observed. Preliminary phyto-chemical tests reveal presence of constituents like mucilage, flavonoid, alkaloid and other such compounds. Findings of the study may be useful as key for identification and standardization of this lesser used very potent fruit.

**Key words:** *Grewia asiatica* (Linn), Tiliaceae, *Parushaka*, *Phaalsa*, Pharmacognosy.**INTRODUCTION**

*Grewia asiatica* Linn (Tiliaceae) commonly known as *Phaalsa* in Gujarati<sup>[6]</sup>, *Phaalsa*, *Pharsa*, *Phulsa* in Hindi, *Parush*, *Parapar*, *Alpasthi*, *Dhanvnachhada*, *Parushaka* in Sanskrit<sup>[7]</sup>. It is a fruit found in all parts of India, specially Punjab, Bihar, Orissa, North of Bengal, Himalayan range, Maharashtra, Gujarat and South India.<sup>[8]</sup> It can grow in salty regions also and up to a height of thousand meters from sea level<sup>[9]</sup>. It grows up to a height of 15 to 20 feet as a small tree<sup>[10]</sup>. Root penetrates deep into the earth. Branches are thin and short. Skin of branches is hard and fibrous. Leaves vary in size: 2 to 5 inches long, 1.5 to 3 inches or more in breadth, alternate, cordate, oval or broadly heart shaped. There are 5 to 7 nerves which are connected by parallel venations. Leaf margin is serrate, irregularly toothed. Leaf upper surface is stellately pubescent, dark green in colour. Lower surface is tomentose, whitish green coloured with dense hair. Leaf base remains slightly slanting with two

Stipules. Petiole is short. Flower buds are broadly cylindrical or clavate, peduncles are axillary, usually many, long, slender, with bracts over them. Individual flowers are yellow in colour with five large (12 mm) sepals and five smaller (4 – 5 mm) petals. Flowers grow in clusters in leaf axilla; diameter is about 2 cms. Flowering January to February; fruiting May to June. Fruit: round like a pea, globose, 1.0 to 1.9 cm. in diameter, 0.8 to 1.6 in length, average weight is 0.5 to 2.2 gms, grow in bunches. When unripe, green with sour taste. When ripe fleshy, fibrous drupe, grayish to reddish purple; tastes sweet sour similar to grapes. Tree cultivated for edible fruits. Ripe fruits are easily perishable and so have to be marketed locally.

Whole plant is clinically important and used as spasmolytic, hypotensive, cardio-protective, antifebrile, anti-fertile, anti-oxidant, analgesic, anti-biotic, anti-Koch, anti-diphtheria, quenches

thirst of an over drunk, anti-arthritic, micro-nutrient, radio-protective etc. properties.

Pharmacognostical and phytochemical studies of fruit which are important parameters for genuinity of the plant have not been undertaken as per knowledge of the authors. This study was undertaken for detailed investigation in fresh as well as powder form for identification of various medically important constituents.

## MATERIALS AND METHODS

Ripe fruits were collected from a tree in summer season from Ahmedabad. Ripe fruits were washed tenderly in running water as they are very tender. Some of them were left for drying in shade. 40# powder was prepared and stored in a well sealed container away from light. Free hand sections were taken and observed to see their cell contents. They were stained with Phloroglucinol and Hydrochloric acid to observe lignification of cell wall<sup>[11]</sup>. Sections and diagnostic characters of the powder were drawn by using camera lucida and their separate photographs were taken. Powdered drug was treated with different reagents and each sample was examined. Preliminary qualitative tests were also performed to detect primary and secondary metabolites<sup>xiii</sup>. Powder was subjected to determine various physico-chemical constants by standard procedures<sup>xiii</sup> mentioned in the A.P.I.<sup>[12, 13]</sup>.

## RESULTS

### MACROSCOPY:

Fruits: grow in bunches from leaf axilla, ripen in summer and act as nature's boon against scorching summer heat. Round pea like fruit is green when unripe and tastes sour. When ripe, it is a fleshy fibrous drupe, grayish to reddish purple in colour. Outer tomentose surface has black circular depressed spots with large stellate covering

trichomes<sup>[14]</sup>. Outer surface is covered by small stellate covering trichomes. Ripe fruit tastes typical sour and sweet, a taste people enjoy as Sherbet during summer heat.

Seeds: 1 or 2 pointed at one end and have a groove. There are 1 to 2 chambers. Endosperm is oily. Seed coat is stony hard.

### Organoleptic characters:

Coarse slightly sticky, grayish to reddish purple powder with typical sour sweet taste and smell of *Phaalsa*.

Diagnostic characters of powder observed under microscope showed: prismatic crystals, rosette crystals, parenchymal cells; from the mesocarp cells: crystal fibre, spiral vessels.

Epidermis: Epidermal cells, Stillet and Star shaped hairs, Stillet type of Trichomes were found.

On Iodine staining: Starch grains and Aleurone grains were found.

**MICROSCOPIC CHARACTERS:** as observed in the study:

- 1) Crystal fibers
- 2) Pigmented parenchyma cells
- 3) Rosette crystals
- 4) Spiral vessels
- 5) Starch grains
- 6) Stellate trichomes

### PHYSICO – CHEMICAL PARAMETERS:

Various physico-chemical tests were performed as per the standard procedure mentioned in Ayurvedic Pharmacopoeia of India. Results are:

S. No	Physico – chemical parameters	Results
1	Ash value	2.24
2	Loss on drying	1.90
3	Alcohol soluble extractive	56.80% w/w
4	Water soluble extractive	56.29% w/w
5	pH value	5.5

Moisture content was 7.39% w/w, Total ash 3.61% w/w.

### PRELIMINARY QUALITATIVE ANALYSIS RESULTS:

Material	Test / Reagent	Functional group	Observation	Result
Alcoholic Extract of Dried fruit powder	Dragendroff's reagent	Alkaloids	Orange Brown ppt.	+ve
	Wagner's reagent	Alkaloids	Reddish brown ppt.	+ve
	5% fecl <sub>3</sub>	Tannin & Phenolic Compd.	Deep blue black colour	+ve
	Gelatin solution	Tannin & Phenolic Compd.	White ppt.	+ve
	Biuret reagent	Protein	No colour change	+ve
	Molisch's test	Carbohydrate	Violet ring observed at the junction	+ve
	Fehling's test	Carbohydrate	First yellow, then brick red ppt. observed	+ve
	Salkowoki	Steroids	Greenish yellow fluorescence	+ve
	Liebermann-buchard	Steroids	First red, then blue and finally green colour appears	+ve
	Lead Acetate	Flavonoids	Yellow ppt.	+ve
	Biuret test	Protein	Pink colour appears	+ve
	Solution+ NH <sub>4</sub> OH + Cad. Chloride	Vit. C (Ascorbic acid)	Gelatinous ppt.	+ve
	Solution + 2% w/v 2,6 dichlorophene lindophenol	Citric acid	Decolourised	+ve

**DISCUSSION**

The *Grewia asiatica* Linn. (*Phaalsa*) fruit was studied for organoleptic characters, microscopical characters and subjected to Physico-chemical analysis for identification, further study and utility. Pharmacognostical and Phytochemical evaluation technique were utilized for the present study, which provides scientific data that will be useful in the assessment of identification and authentication of the drug. Morphologically, the fruit is reddish purple colored pulpy drupe<sup>xvii</sup>. Not much weight variations were found between the fresh fruits. The pH value shows it is slightly acidic in nature which is also supported by preliminary phytochemical data<sup>xviii, xix</sup> the presence of Vitamin C and citric acid. Qualitative examination also reveals the presence of Alkaloids, Sugars, Tannin & Phenolic compound, Steroids, Flavonoids. Drug is soluble both in water and alcohol, due to the respective soluble metabolites. Prismatic crystals, Rosette crystals, Parenchymal cells, Crystal fibre, Spiral vessels, Epidermal cells, Stellate hairs, Starch grains, Aleurone grains located serve as an important microscopic diagnostic characters.

**CONCLUSION**

Pharmacognostical & Phytochemical evaluation of *Grewia asiatica* Linn (*Parushaka*) plant provides scientific data that will be useful in the assessment of preliminary identification and authentication of the drug. Prismatic crystals, Rosette crystals, Parenchymal cells, Crystal fibre, Spiral vessels, epidermal cells, Stellate hairs, Starch grains, Aleurone grains serve as an important microscopic diagnostic characters and results of phytochemical study also reveals that it may be the constituents like, sugars, flavonoids, citric acid and vitamin C.

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