

SCIENTIFIC EVALUATION OF PRITHVI MAHABHUTA DOMINANT CHARACTERS IN UDUMBARA (FICUS GLOMERATA ROXB.) THROUGH PHARMACOGNOCY AND PHARMACEUTICAL CHEMISTRY

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ABSTRACT

Ficus glomerata Roxb commonly called as “Fig tree” is traditionally popular for its medicinal properties. It grows abundantly in all parts of India. *Udumbara* is used since the times of Vedas in spiritual practices. Used extensively in Ayurveda to treat bleeding disorder, Leucorrhoea, Menorrhagia, fractured bones, complexion enhancer and wound healing. In present study *Udumbara* was selected as a *Parthiva* dominant drug according to its *Rasa panchaka*, after that it was assessed by pharmacognostical and pharmaceutical study and result also shows that *Udumbara* is having dominance of *Prithvi mahabhuta*.

KEYWORDS: *Udumbara*, *Prithvi mahabhuta*, Pharmacognosy.

INTRODUCTION

Udumbara is well known drug for its use since ancient times. *Ficus glomerata* Roxb. commonly called as “Fig tree” is traditionally popular for its medicinal properties. Plant used as a source of medicine throughout the world. *F. glomerata* commonly known as *Gular* or *Udumbara*, found in all parts of India. It is found in moist localities like sides of ravine, along banks of streams and also on rocky slopes. *Atharvaveda* considers this as a divine plant and much used in religious sacrifice.

It is believed that sacred fire produced by *Udumbara* wood generates prosperity, welfare, wealth, glory and energy. *Udumbara* mentioned as the donor of various things of daily usage and destroyer of enemies.^[1]

Acharya Charaka mentioned the properties of *Udumbara* as *Guru*, *Sheeta* and *Vishtambhi* (antagonist to motion) and causes stoutening effect in body.^[2] *Kaiyadeva Nighantu* also describes the property of *Udumbara* as *Sheeta*, *Madhura*, *Guru* and increases *Kapha*^[3]. In *Madanaadi Nighantu* properties of *Udumbara* are mentioned as *Kashaya Rasa*, *Snigdha*, taking much time in digestion and increases *Kapha Dosha*.^[4]

Acharya Vagbhatta describes *Udumbara* as *Ruksha*, *Sheeta*, *Guru* and absorbefacient in nature.^[5]

Acharya Charaka has classified *Udumbara* under *Mutra Sangrahaniya Varga* and *Kashaya Skandha*. He mentioned this drug at 35 places in *Charaka Samhita*. *Acharya Sushruta* classified *Udumbara* in *Nyagrodhadigana* and mentioned this drug at eleven places whereas *Vagbhatta* mentioned it at about sixteen places.^[6,7]

India has a rich source of plant biodiversity possessing tremendous medicinal properties. *Ficus glomerata* Roxb. is a popular medicinal plant in India, which has long been used extensively in Ayurveda to treat bleeding disorder, Leucorrhoea, Menorrhagia, fractured bones, complexion enhancer and wound healing because of its *Kashaya Rasa*, *Sheeta*, *Ruksha* and *Vishtambhi Guna* due to *Prithvi Mahabhuta*. *F. glomerata* extracts have also been reported to possess significant medicinal and pharmacological properties like anti-microbial, anti-cancer and anti-oxidant activity.^[8]

Ayurvedic properties

Rasa: *Kashaya* (bark), *Madhura*, *Kashaya* (fruit)

Guna: *Ruksha*, *Guru*, *Shushka*

Veerya: *Sheeta*

Vipaka: *Katu* (bark), *Madhura* (fruit)

Chemical Constituents

Bark- Tannins, ceryl behanate, lupeol, lupeol acetate, α & β - amyryl, gluanol acetate, β -sitosterol, stigmasterol and a ketone. Gluanol acetate and β -sitosterol, cycloartenol, euphorbol, hexacosanoate, triacetate, taraxerone, tetratriterpene, glauano-lacetate, racemosic

acid, glauanol, glucose, hentriacon-tane have also been isolated (Sati et al., 1989).^[9] An alkaloid, dumurin has been isolated from the stem bark.

Different varieties of *Udumbara*

Dalhana mentioned **two** varieties

1. *Udumbara* – *Ficus glomerata* (also known as *Ficus Racemosa*) and
2. *Kasthodumbara/ Kakodumbara* (*Ficus Hispida*)

Rajanighantu mention **three** varieties

1. *Udumbara*,
2. *Nayodumbara* and
3. *Phalgu* (*Anjeer/Ficus carica*)

Parts used: Bark, Fruit, Latex.

AIMS AND OBJECTIVES

1. *Mahabhautika* dominance assessment through classics.
2. Assessment of *Mahabhautika* dominance in *Udumbara* by pharmacognostical and pharmaceutical study.

MATERIALS AND METHODS

Collection of Raw drugs

Raw drug was collected from the pharmacy department, I.P.G.T. & R.A., Gujarat Ayurveda University, Jamnagar. The botanical name & part used are given in table 1.

Table 1: Botanical Name & Part Used.

Sanskrit name	Botanical name	Part used
<i>Udumbara</i>	<i>Ficus glomerata</i>	Bark

Pharmacognostical evaluation

The raw drug was identified and authenticated by the Pharmacognosy laboratory, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar. The identification was carried out based on morphological features, organoleptic characters and powder microscopy of the drug.

The initial purpose of study was to confirm the authenticity of the drug. First studied the dried powder under the Carl Zeiss Trinocular microscope attached with camera with and without staining. Microphotographs were also taken under the microscope.^[10]

Physicochemical parameters

The drug was analyzed by using qualitative and quantitative parameters at Pharmaceutical Chemistry Laboratory of I.P.G.T. &R.A., Gujarat Ayurved University, Jamnagar.^[11]

HPTLC

Extracts of drugs were spotted on pre-coated silica gel GF 60254 aluminium plates as 5mm bands, 5mm apart and 1cm from the edge of the plates, by means of a Camag Linomate V sample applicator fitted with a 100 µL Hamilton syringe. Toluene (7 ml), Ethyl acetate (2 ml), Acetic acid (1 ml) was used as the mobile phase. After development, Densitometric scanning was performed with a Camag T.L.C. scanner III in reflectance absorbance mode at 254 nm and 366 nm under control of win CATS software (V 1.2.1 Camag). The slit dimensions were 6 mm x 0.45 mm and the scanning speed was 20 mm s⁻¹.

OBSERVATIONS AND RESULTS

Pharmacognostical Evaluation

Organoleptic characters

The colour, odour, taste etc. of the powders were recorded and placed in Table 2.

Table 2: Organoleptic Features of Bark powder.

Colour	Odour	Taste	Touch
Brown	Characteristic	Astringent	Fine course powder

Microscopic Evaluation of *Udumbara Twaka* powder

The diagnostic characters observed under the microscope are Rhomboidal crystal, Tannin content, Simple fibers, Cluster crystal, Cork in surface, Cork in tangential view, Crystal fiber, Fragment of cystolith, Pitted stone cell, Prismatic crystal, Lignified fibers, Lignified stone cell and Simple starch grains (Microphotographs Plate 1. 1-13).

Physico-chemical parameters

Drug was evaluated for various physicochemical parameters like loss on drying, water soluble extract, alcohol soluble extract, total ash value, pH value. The results are placed at Table 3.

HPTLC

Methanol extracts of drugs were spotted on pre-coated silica gel at 254 nm and 366 nm. Results are depicted in the Table 4 and Plate 2.

Table 3: Physico chemical parameters of *Udumbara Twaka*.

No.	Physico-chemical parameter	Result
1	Loss on drying	2.5 % w/w
2	Ash value	2.75 % w/w
3	Water soluble extract	11% w/w
4	Methanol soluble extract	16.4% w/w
5	pH value (5% solution in Water)	6.5

Table 4: Results of HPTLC of *Udumbara Twaka*.

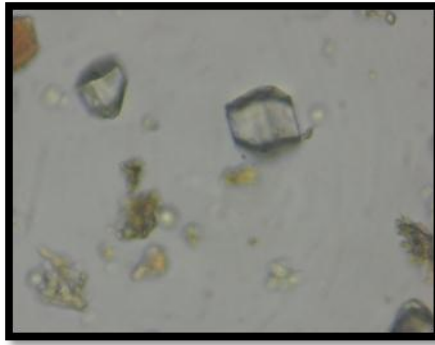
Track	Solvent system	Observation under UV radiation			
		254 nm		366 nm	
		No. of spots	Rf value	No. of spots	Rf value
Udumbara Twaka Churna	Toluene (7ml) : Ethyl acetate (2ml): Acetic acid (1ml)	10	0.01, 0.18, 0.28, 0.36, 0.45, 0.59, 0.62, 0.75, 0.86, 0.94	8	0.01, 0.18, 0.28, 0.36, 0.45, 0.59, 0.62, 0.94

DISCUSSION

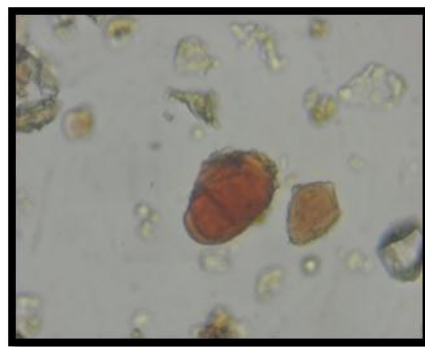
Acharya Charaka, Sushruta and Vagbhatta all had described the properties of *Pancha Bhautika Dravyas* by their *Guna* and *Karma*, out of them the *Dravyas* (drugs), which are predominant in properties of heavy, coarse, hard, dull, stable, non-slimy, solid, gross, gruff are *Parthiva* (constituted predominantly by *Prthivi mahabhuta*). They exert actions like development, compactness, heaviness and firmness. *Acharya Sushruta* also described that *Parthiva dravyas* are mostly *Madhura* and *Kashaya* in *Rasa* and are having downward movement instinctively. *Ayurveda sutra* also mentioned that *Kashaya Rasa* is originates from *Prithvi Mahabhuta*^[12]

Udumbara also possess *Kashaya Rasa, Guru, Ruksha guna* and *Sheeta veerya*. So, by seeing their *Rasa Panchaka Udumbara* was selected as a *Parthiva Dravya* and after that, pharmacognostical & pharmaceutical study were also supported the *Prithvi* dominance of *Udumbara*. In powder microscopy of *Udumbara Twaka*, there are many structures which are hard, dense, compactly arranged and give physical strength like Rhomboidal crystal, Cluster crystal, Crystal fiber, Fragment of cystolith, Pitted stone cell, Prismatic crystal, Lignified fibers, Lignified stone cell etc. these characters are strongly dominated by *Prithvi mahabhuta*.

Plate 1: Microphotographs of Udumbara twaka churna.



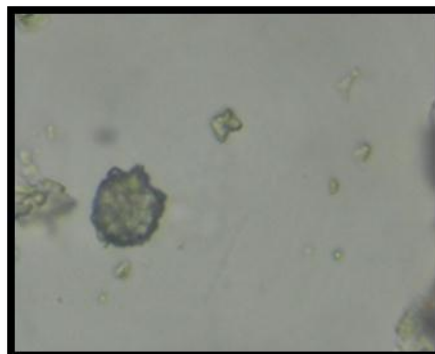
Rhomboidal crystal.



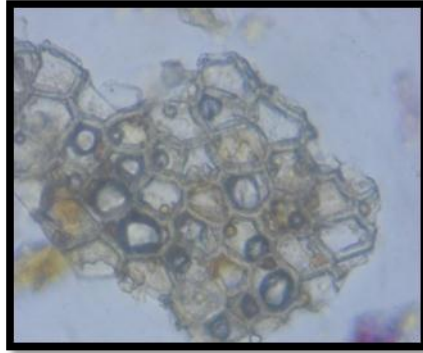
Tannin content



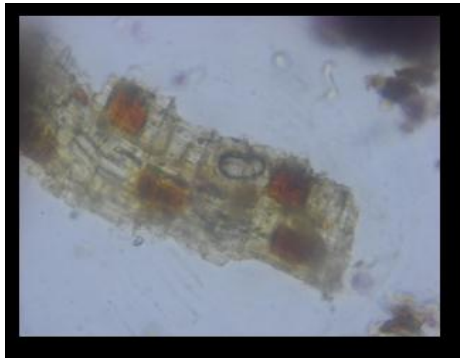
Simple fiber



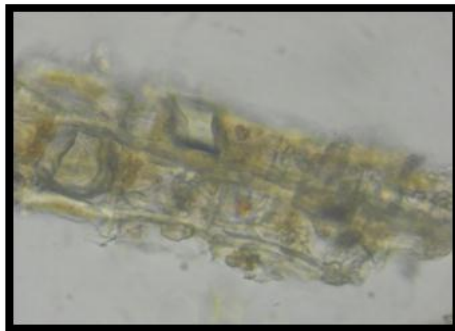
Cluster crystal



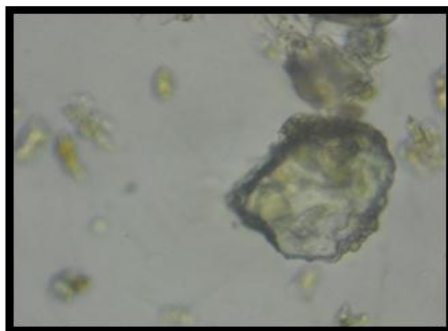
Cork in surface view



Cork in tangential view



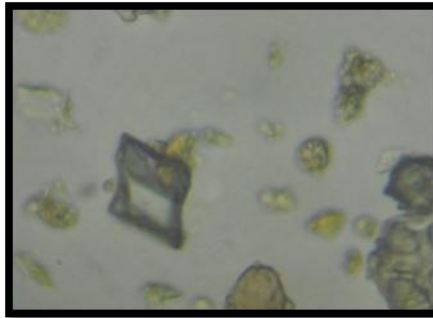
crystal fiber



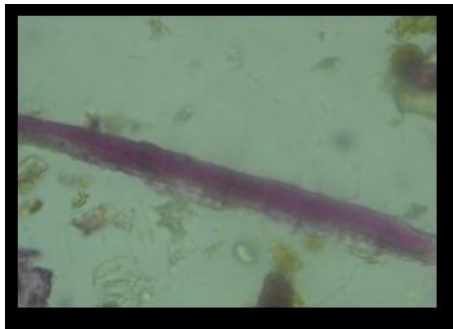
Fragment of cystolith



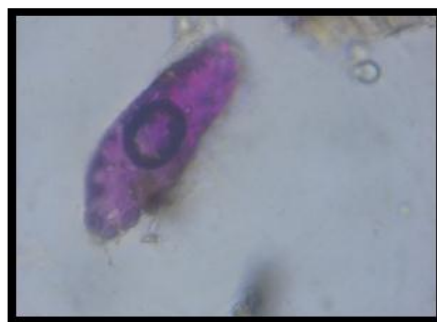
Pitted stone cell



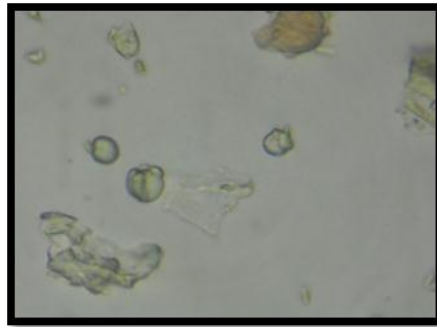
Prismatic crystal



Lignified fibres



Lignified stone cell



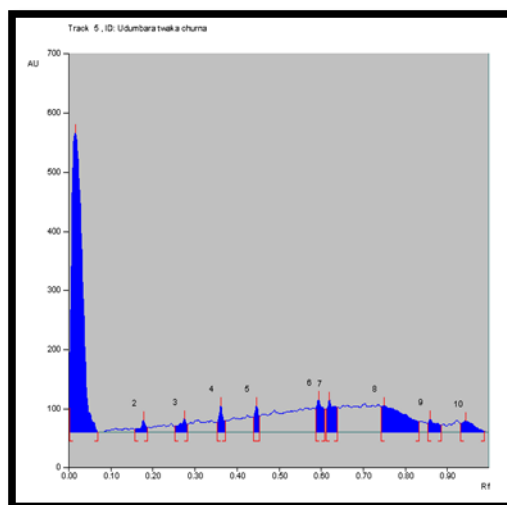
Simple starch grains

Stone cells (called stone cells because of their hardness) giving rise to a gritty texture. Stone cells solidify tissues.^[13] Stone cells are a type of sclereid with a thick secondary wall and an irregular shape. Sclereids originate from parenchyma cells by continued thickening and lignifications of the wall.

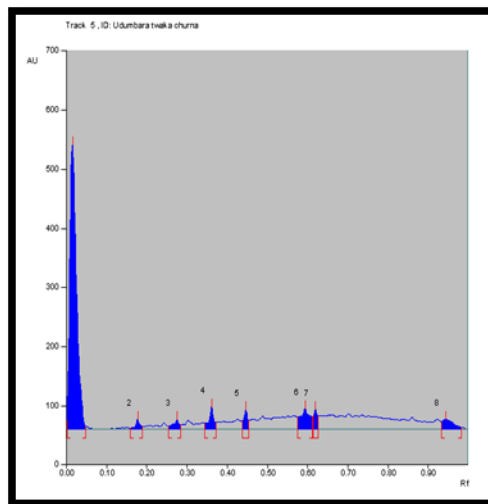
Cork cells usually formed from Phellogen. Cork cells are usually tightly packed, dead and filled with air.^[14] These features can be correlated with *Kathina*, *Murta* and *Sthula swaroop* of *Prithvi Mahabhuta*.

In physico-chemical parameters loss on drying in *Udumbara* is 2.5%w/w, this shows that on drying, loss is less because of dryness due to *Khara* and *Kathina guna* of *Prithvi mahabhuta*.

Plate 2: Densitogram of *Udumbara Twaka Churna*.



At 254nm



At 366 nm

CONCLUSION

The *Prithvi Mahabhuta* is responsible for giving structure, shape and strength by their Sthula, Sthira, Kathina, Sandra etc Guna and Sanghaata, Upachaya, Sthairya etc Karma. These Guna and Karma also assessed in Udumbara by Pharmacognostical and Pharmaceutical study and thus dominance of Prithvi mahabhuta was assessed. The present study could be used as a tool for further detailed analysis to standardize the crude drugs.

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