A Monographic Profile of Halela Zard – An Official Unani Drug

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Abstract

erminalia chebula Retz. is widely used as drug in Unani, Ayurvedic and Siddha System of medicine. The drug is an excellent antioxidant, astringent, laxative, diuretic and antacid. In Ayurvedic System of Medicine *Terminalia chebula* Retz. is one of the major ingredients of well known formulation "Trifala churna". The present studies deal with detailed pharmacognostic studies and review the related medicinal aspects of drug.

Key Words – *Terminalia chebula* Retz., Drug Standardization, Quality Specifications.

Introduction

The pericarp of mature fruits *of Terminalia chebula* Retz. (Family-Combretaceae) is commonly known as Halela Zard in Unani System of Medicine and widely used in the preparation of many formulations like Itrifal Kishneezi, Itrifal Zamani, Itrifal-e-Ustukhuddus, Itrifal-e-Shahtra etc. The plant is found throughout the greater part of India, Barman and Ceylon. The popular and Sanskrit name of the drug (*Terminalia chebula* Retz.), *Haritaki* is rich with meaning, referring to the yellowish dye (harita) that is contains, as well as indicating that it grows in abode of the God Shiva (Himalayas). There is a legend, that when God Indra was drinking Amruta a drop of it fell down on the earth. From that one drop seven types of Haritaki were produced. There are various varieties of *Terminalia* are described depending on colour, shape as well as harvested of the fruit. At present time, two varieties only are recognized, large ripe fruit is *haritaki,* and unripe dried fruit is *jangi haritaki* is the vernacular. *Terminalia chebula* (black myrobalan) one of the most valuable Indian tanning materials. The fruit is dry and heating; laxative, stomachic, tonic and alternative.

Methodology

Drug samples were collected from different places with a view to find out any significant difference present within the same species. For studying powder, Jackson and Snowdon (1992) was followed. To determine physico-chemical constants, Indian Pharmacopoeia (Anonymous, 1966) was consulted and for fluorescence study schedules mentioned by Trease and Evans (1972) were followed. Colours were named by consulting Rayner (1970). Standard

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prescribed procedures for histochemical studies (Johanson, 1940; Youngken, 1951; Cromwell, 1955; Trease and Evans, 1978), organic group detection (Robinson, 1963); U.V. Spectrophotometry (Willard *et al*., 1965) and Chromatography (Shellard, 1968; Stahl, 1969; Smith and Feinberg, 1972) were adopted. The informatics is complied by reviewing the available literature.

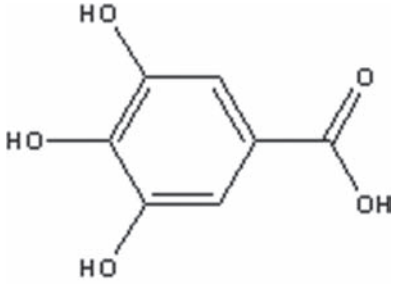
Systematics

Terminalia chebula Retz. (family : Combretaceae) is a moderate sized or large deciduous tree attaining a height of up 30 m. with a cylindrical bole, rounded crown and spreading branches. Leaves7-20 cm by 4-8 cm in height, ovate or elliptic, glabrous above with a yellowish pubescence, margin entire, acute, alternate; petioles 2.5 cm. long, pubescent, usually with two glands near the top. Flowers are monoecious, sessile, dull white to yellow, with a strong unpleasant odour, borne in terminal spikes, usually in short panicles. Fruit is glabrous, ellipsoid to ovoid drupes, more or less 5-ribbed, when dry yellowish green; containing single angled, bony and very thick stone. *Terminalia chebula* Retz. is found throughout the greater part of deciduous forest of the Indian subcontinent, Burma and Ceylon, up to 5,000 ft. in the outer Himalayan and up to 6,000 ft. in Travancore. A large, deciduous tree, commonly found in North India from Kumaon to West Bengal. It is found also in Maharashtra, Tamil Nadu and above the Ghats in Kanara in South India.

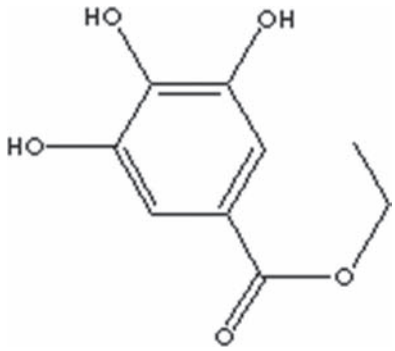
The plant is known by different vernacular names e.g. Haritaki (Bengali), Haritaki (Gujarati), Harra, Har, Harara, Harad (Hindi), Katukka (Malayalam), Habra, Hirada, Hirda (Marathi), Katukkay, Amagola, Arabi, Aridadi, Attan, Kadu (Tamil), Karakkaya, Karaka, Nallakaraka, Resaki (Telugu), Haejarad (Urdu) and Chebulic myrobalan, Black Myrobalan (English), etc.

Chemical Constituents

So many numbers of glycosides isolated from *Terminalia*, including the triterpenes arjunglucoside I, arjungenin add chebulosides I & II. Other constituents include acoumarin conjugated with gallic acid called chebuli, as well as other constituents include amino acid, fructose, succinic acid, and beta sitosterol. Other phenolic compounds ellagic acid, 2, 4- chebulyl-β-D-glucopyranose, chebulinic acid, ethyl gallate, punicalagin, terflavin A, terchebin, luteolin and tannic acid (Dermaderosia & Beuller, 2002; Coldecott & Tierra, 2006).



Gallic acid



Ethyl gallate

Pharmacology

Halela Zard has been used as an aphrodisiac, diuretic and for earaches. It work best when blood supply to the heart is compromised as in ischemic heart disease or angina and also reduce cholesterol levels. It increasing awareness, and has a nourishing restorative effect on the central nervous system. *Terminalia* has diuretic and digestive properties, its improves digestion, promotes the absorption of nutrients and regulates colon function, so it is excellent to improve digestion, remove waste and impurities from the body, and stimulate the regeneration of tissues. It also plays a role as an anti-antherogenic, antifungal, antiviral and antiseptic activities (Dermaderosia & Beuller, 2002).

Therapeutic and non-therapeutic Uses

The pericarp of mature fruits of Halela Zard is laxative, stomachic, tonic and alternative. It used in fever, typhoid, cough, asthma, urinary diseases, piles, intestinal worms, chronic diarrohea, costiveness, expectorant, anthelmintic, antidysenteric, flatulence, sore throat, thirst, vomiting, hiccup, heart disease, bladder , vesicular calculi, bleeding piles, enlarged spleen and lever, acsites, eye diseases, skin diseases etc (Duke *et al.,* 2002).

The pericarp of mature fruits of Halela Zard has been used as an aphrodisiac, diuretic, and for earaches. In Indian medicine it used to treat digestive problems, also used in mouthwash/gargle, a fruit powdered used as dentifrice and used in carious teeth, bleeding and ulceration of gum. As an alternative tonic for promoting strength, preventing the effect of age and prolonging life. A decoction of the fruit is a good astringent wash.

The fruit is also used as a dye and tanning material, with iron salts it is employed in making country ink, and mixed with ferruginous mud it makes a black paste employed by harness and shoe makers as well as by dyers.

Classical Formulations

Unani System of Medicine

Itrifal Kishneezi, Itrifal Zamani, Itrifal-e-Ustukhuddus, Itrifal-e-Shahtra, Itrifal-e-Sagheer, Itrifal Mulaivin, Itrifal-e-Kabir, Majoon-e-Kundur, Majoon-e-eKhabs-ul-Hadeed, Kohal-ul-Jawahir (UPI Vol.I)

Ayurvedic System of Medicine

Abhyarishtam, Triphaladichurnam, Agastyarasayananm, Dashamula-haritaki, Haritaki churna, Chandrodaya vati, Triphalaadya ghrita II, Dhanvantara ghrta, Amrita Bhallatak avaleha, Agastya Haritaki Rasayana, Citraka haritaki, Brahma Rasayana, Triphalaadya tail, Achaia liana, Danti haritaki, Abhaya lavana, Pathyadi lepa etc. (API Vol. I I&II).

Siddha System of Medicine

Carapunka Vilvati Ilakam,Karunai Ilakam, Manturati Ataik Kutinir, Pavanakkatukkai, Talicati Curanam, Tiripalaic Curanam (SPI Vol. I).

Adulterations and Substitutes

Terminelia citrine is the adulterant of Halela Zard. Small pieces of Baheda (*Terminelia bellerica*) fruits were also commonly mixed in this species. The sole objective of the traders to mix cheap, similar looking material in hard fruits is to enhance the volume of fruit.

Regulatory Status

An official drug in –

i. Ayurvedic Pharmacopoeia of India, Part I, Vol. I.

ii. Ayurvedic Formulary of India, Part I & II.

iii. Indian Pharmacopoeia, 2010.

iv. Unani Pharmacopoeia of India Part, I & Vol. I.

v. National Formulary of Unani Medicine, Part I, Vol.V.

vi. Siddha Pharmacopoeia of India, Part I, Vol. I.

vii. Siddha Formulary of India, Part-I.

Observations

I. Organoleptic Characteristics

Entire Drug- The pericarp of mature fruits is yellowish brown, ovoid 20-35 long, 13-25 mm wide wrinkled and ribbed longitudinally (Fig. 1 B,C).

Powdered Drug – The powder is brown in colour; taste, astringent, (Fig. 1 D).

II. Micro-morphological Characteristics

Powdered Drug - The epicarp single layer epidermal cells; mesocarp, 2-3 layers of collenchymas. The parenchymatous cells containg simple rounded or oval starch grains.Fibers with peg like out growth and simple pitted walls; sclereids are various shapes and sizes, mostly elongated. The crystals of calcium oxalate also present in powder (Fig. 2).

III. Histochemistry

Micro – Chemical Tests and Behaviour of specific reagents towards Plant/Drug Tissues – Observations and results pertaining to micro-chemical tests and behaviour of specific reagent towards plant tissues are presented in Table-1.

Table 1 : Micro-chemical Tests and behaviour of specific reagents towards plant tissues and cells contents.

Sl. No.	Reagent	Test for	Inference	Histological zone/ cell contents responded.
1.	Dragendorff's reagent	Alkaloid	_	Not Responded
2.	Marme's reagent	Alkaloid	_	Not Responded
3.	Wagner's reagent	Alkaloid	_	Not Responded
4.	Potassium hydroxide solution (5% w/v)	Anthocynin	_	Not Responded
5.	Sulphuric acid (66% v/v)	Anthocynin	_	Not Responded
6.	Acetic acid	Calcium oxalate	+	Calcium oxalate crystals in mesocarp region
7.	Potassium hydroxide solution (5% v/v) + Hydrochloric acid	Calcium oxalate	+	Same as above
8.	Sulphuric acid	Calcium oxalate	+	Same as above
9.	Kedde reagent	Cardiac glycoside	_	Not Responded

Sl. No.	Reagent	Test for	Inference	Histological zone/ cell contents responded.
10.	Iodine Solution followed by Sulphuric acid	Cellulose	_	Not Responded
11.	Sudan III	Fixed oil and fats	+	Mesocarp cells
12.	Chlor-zinc-Iodine Solution	Latex	_	Not Responded
13.	Aniline sulphate Solution followed by Sulphuric acid	Lignin	+	Sclereids from mesocarp
14.	Phloroglucinol HCl	Lignin	+	Same as above
15.	Lugol's solution	Protein	_	Not Responded
16.	Millon's reagent	Protein	_	Not Responded
17.	Picric acid	Protein	_	Not Responded
18.	Heating with KOH (5% w/v) + H_2SO_4	Suberin	_	Not Responded
19.	Sudan III	Suberin	_	Not Responded
20.	Weak Iodine solution	Starch	+	Starch grains in mesocarp cells
21.	Potassium hydroxide solution (5% w/v)	Starch	+	Same as above
22.	Sulphuric acid	Starch	+	Same as above

Indications: '-' Absence and '+' presence of constituent.

Organic Groups of Chemical Constituents – The extracts of the drug were tested for presence of different organic groups and results are presented in Table – 2.

Table 2 : Major Group of Organic Chemical Constituents of Drug.

Sl. No.	Organic Groups of Chemical Constituents	Reagents / Tests	Inference
1.	Alkaloid	Dragendorff's and Mayer's reagents	_
2.	Anthraquinone	Borntrager reaction	+
3.	Coumarin	Alcoholic potassium hydroxide	+
4.	Flavonoid	Shinoda reaction	+
5.	Glycoside	Mollisch's test	+

6.	Protein	Xanthoprotein test	_
7.	Resin	Ferric chloride regent	+
8.	Saponin	Libermann-Burchard reaction	_
9.	Steroid	Salkowski reaction	_
10.	Tannin	Gelation test	+

IV. Identity, Purity & Strength

Physico-Chemical Constants – The analytical values in respect of physico-chemical constant of drug were established and results are reported in Table-3.

Table 3 : Analytical Values of Physico-chemical Constants-

Sl. No.	Physico-Chemical Constants	Analytical values
	Moisture content, % w/w	12.0
	pH	7.2
	Total Ash, % w/w	6.0
	Acid insoluble ash, % w/w	5.0
	Alcohol soluble extractive % w/w	35.0
	Water soluble extractive % w/w	52.0
	Essential oil, %, v/w	_

V. Fluorescence & Spectroscopy

Fluorescence Characteristic of Powdered drug under Ultra-Violet Light – Powdered drug was screened for fluorescence characteristic with or without chemical treatment. The observations pertaining to their colour in daylight and under ultra-violet light were noticed and are presented in Table-4.

Table 4 : Fluorescence Characteristic of Powdered Drug under Ultra-Violet Light.

Sl. No.	Treatments	Terminalia chebula Retz.	
		Colour in day light	Nature of colour in fluorescence
1.	Powder as such	Dark khaki	Dark brown
2.	Powder with		
	Carbon tetra chloride	Brown	Brown
	Ethyl acetate	Brown	Dark brown

Sl. No.	Treatments	Terminalia chebula Retz.	
	Hydrochloric acid	Brown	Brown
	Nitric acid + water	Brown	Reddish brown
	Sodium hydroxide + methanol	Dark brown	Dark brown
	Sodium hydroxide + water	Dark brown	Dark brown
	Sulphuric acid + water	Brown	Brown
	Buffer- pH 5	Brown	Brown
	Buffer- pH 7	Brown	Reddish brown
	Buffer- pH 9	Brown	Reddish brown

Ultra-Violet Spectroscopy – The data related to Ultra-Violet Spectrophotometric characteristics as computed in Table-5.

Table 5 : Ultra-Violet Spectrophotometer characteristic of drugs.

Sl. No.	Specifications	Data
1.	Tincture dilution ml/ml	1
2.	Maximum absorption peak	1.359 1.209 2.884
3.	l Maxima at, nm	275.05 266.90 221.80

VI. Chromatographic profile

Thin-Layer Chromatography – Best separation for TLC fingerprinting were obtained by using different layers and solvent systems. Inferences are shown in Table–6.

Table 6: TLC fingerprinting data

Drug	Mobile Phase/ Solvent System	Derivatizing Reagents	Visualizations	No. of Spots	Rf Values of bands
Terminalia Chebula Retz.	Toluene: Ethyl acetate (9:1) v/v	Anisaldehyde-Sulphuric Acid	Under UV 254 nm	3	0.09, 0.16 and 0.22 (all grey)
			Under UV 366 nm	4	0.09 (blue), 0.22 (red), 0.25 (red) and 0.40 (red)

Table 7 : Regulatory Specifications for fruits of *E. officinalis* Gaertn. in different regulatory compendium.

Quality Specification	Ayurvedica Pharmacopoeia of India (API)	Unani Pharmacopoeia of India (UPI)	Siddha Pharmacopoeia of India (SPI)	India Pharmacopoeia 2007, 2010
Official Title	Haritaki	Halela Zard	Katukkai	Haritaki, Haritaki Extract
Botanical Species	Terminalia chebula Retz.	Terminalia chebula Retz.	Terminalia chebula Retz.	Terminalia chebula Retz.
Morphological part/Official part	Pericarp of mature fruits	Pericarp of mature fruits	Pericarp of mature fruits	Pericarp of mature fruits
Description	I. Macroscopic II. Microscopic III. Powder	I. Macroscopic II. Microscopic III. Powder	I. Macroscopic II. Microscopic III. Powder	I. Macroscopical II. Microscopical
Identity, Purity & Strength				
Foreign Matter	1.0 %, Not more than	1.0 %, Not more than	1.0 %, Not more than	2.0 %, Not more than
Total Ash	5.0 % Not more than	5.0 % Not more than	5.0 % Not more than	6.0 % Not more than
Acid insoluble ash	5.0 % ,Not more than	5.0 % ,Not more than	0.5% ,Not more than	3.0 %, Not more than
Alcohol soluble extractive	40.0% ,Not less than	40.0% ,Not less than	40.0% ,Not less than	35.0% ,Not less than
Water soluble Extractive	60.0%, Not less than	60.0%, Not less than	60.0%, Not less than	_
Heavy metals	_	_	_	Compliance with prescribed limit
Loss of drying	_	_	_	12.0% ,Not less than
Microbial contamination	_	_	_	Compliance with prescribed limit
Thin layer chromatography	_	_	TLC profile	TLC profile

(A) Fruiting Plant

(B) Fruits

(C) Dried Fruits (Magnified)

(D) Fruit Powdered

Fig. 1 : Halela Zard (*Terminalia chebula* Retz.)

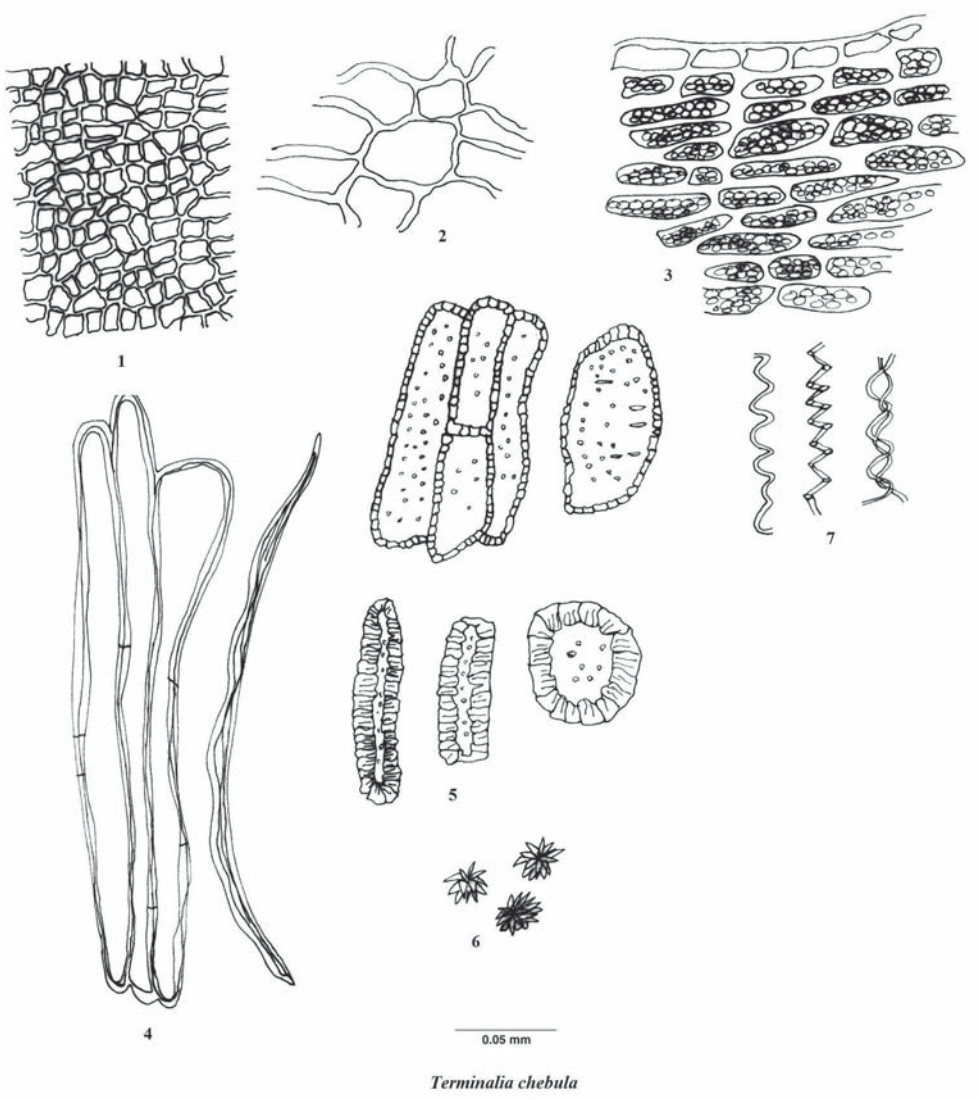


Fig. 2 : 1. Epicarp cells, 2. Mesocarp cells, 3. Parenchymatous cells containing starch grains, 4. Fibers cells, 5. Stone cells, 6. Crystals of calcium oxalate, 7. Xylem vessels.

Discussion

The fruits of *Terminalia chebula* Retz. are used in a number of Unani classical and patent and propertiery formulations and also most commonly used as a spice. Pharmacopoeia provides its specification in respect of macro-morphology, micro-morphology, physico-chemical constants (total ash value, alcohol insoluble, water soluble extractive and alcohol soluble extractive), assay (essential oil limits) and Thin layer chromatography. In the present study pharmacognostic standardization of pericarp of mature fruit of *Terminalia chebula* Retz. is carried out which can be employed in quality control of *Terminalia chebula* Retz. used either as drug or spice or as other commodity in

commerce. The monographic profile on *Terminalia chebula* Retz. also reviews the information on different aspects of drug.

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