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QUALITATIVE STANDARDS OF TERMINALIA ARJUNA ROXB AND ITS AYURVEDIC IMPORTANCE

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ABSTRACT

Medicinal plant have been a main source of therapeutic agent from ancient time to cure diseases. *Terminalia arjuna (Roxb.)* is one of the most accepted and beneficial medicinal plant in indigenous system of medicine for the treatment of various critical diseases. Specially it improves the strength of heart muscles fibres and regulates heart beats by increasing force of contraction. In present study bark of *Arjun* has been taken for pharmacognostic and physicochemical study in terms of macroscopic study, microscopic study, foreign matter, loss on drying, ash value, acid insoluble ash, water soluble ash. This study help in evaluation of *Terminalia arjuna* in *Ayurvedic* point of view.

KEYWORDS:- *Arjun* bark, pharmacognostic, physicochemical study.

INTRODUCTION

Ayurveda deals with drug of plant, animal, metal and mineral in origin, where maximum drugs are of plant origin.[1] *Arjun*, one of the classical drug with Latin name *Terminalia arjuna* has been used by the *Ayurvedic* physicians, for the management of different disease conditions. *Terminalia arjuna*, commonly known as *Arjun*, belonging to the family of *combretaceae*. It is deciduous tree found throughout India. The thick, white to pinkish grey bark has been used in India's native *Ayurvedic* medicine for their three centuries, primarily as a cardiac tonic. Its bark decoction is being used in angina pain, hypertension, congestive heart failure and dyslipidaemia. That's why it is getting popularized in developing as well as in developed countries owing to its low cost natural origin and no side effects. In olden times, *Vaidya's* used to treat patients on individual basis and prepare medicine according to the need of the patient but, the situation has changed now, *Ayurvedic* and herbal medicine are being

manufactured on the large scale in pharmaceutical units, where manufactures come across many problems such as availability of good quality raw material, good methodology. In present time merchants for their personal benefits make the adulteration, so the detail study of *Arjuna* is important to use it in any *Ayurvedic* formulations.

Botanical description[2]

Latin name- *Terminalia arjuna Roxb*.

Family- *Combretaceae* (*Haritakikula*)

Scientific classification-

Kingdom	:	Plantae
Sub kingdom	:	Tracheobionta
Division.	:	Magnoliophyta
Sub division.	:	Spermatophyte
Class.	:	Magnoliopsida
Order.	:	Myrtales
Family.	:	Combretaceae
Genus.	:	Terminalia
Species.	:	Arjuna

Gana[3] *– Charka* - *Kashayaskandha, udardaprashamana*.
Sushruta - Nyagrodhadi, *shalasaradi*.
Vagbhata - *Viratarvadi, Nyagrodhadi, Asanadigana*.

Sanskrit synonyms[4]

1. *Arjuna* – useful in cardiac disease.
2. *Nadisarja* – is a tree like *sarja* which grows in vicinity of water streams.
3. *Kakubha* - has spreading branches.
4. *Sarpana* - branches are spreading.
5. *Dhavala* - it has White outer bark
6. *Swetavaha* – due to white bark.
7. *Madhugandhiprasunka* – flowers with honey like aroma.
8. *Indradru* – It is a potent drug.
9. *Viravrksa* – It is very curative drug
10. *Hrdrogavairi* – useful in cardiac disorders.
11. *Svasanesvara* – useful in dyspnoea.

Regional names[5,6]

Marathi	-	*Arjuna*, *sadara*
Hindi	–	*Arjuna*, kahu, kahua.
Assam	–	*Arjun*
Gujarati	–	Sadado, sajada
Bengali	–	Orjun
Panjabi	–	Arjun, jarma.
Oriya	–	Arjuno, hanhal
English	-	Arjuna
Urdu	–	Arjun
Tamil	–	Belma, marudam pattai.
Telugu	–	Tallamaddi
Kannad	–	Maddi, neermatti.
Malayalam	–	Vellamaruta, Pulla masuta.

Morphology[7,8]

Habitat - The tree is large about 20-25 m in height, evergreen with a spreading crown and having drooping branches, new leaves appear in hot season (February to April). This tree is exotic in India. In India it is found in Uttar Pradesh, South Bihar, Madhya Pradesh, Delhi and Deccan region near ponds, rivers and bank of streams.

Cultivation – *Terminalia arjuna* grown manually through ripe seeds, coppicing, pollarding, root suckers, stumps and air layering. It grows slowly in the initial phase but later on grows fast. It attains 2-3 meters height in three years.

Bark - The outer surface of the bark appeared smooth, pale greenish yellow while the inner surface is finely longitudinally striated and pinkish in colour. Bark has pieces that are flat, curved and recorded in shape.

Leaves – Sub opposite, hard, coriaceous, oblong or elliptical, 10 to 20 cm long and 3 to 5 cm broad. Veins conspicuous on the lower surface, one or two glands on the outer surface nearer to the petioles.

Flowers – Yellow white, borne in shortly panicle spikes. Flowers occurs in March – June. Inflorescence terminal or axillary spikes.

Fruits - 2.5 to 5 cm long, ovoid. Oblong, with 5-7equal, hard, coriaceous, thick narrow wings. Fruits occur in September to November.

Major chemical constituents - In bark : B- sitosterol, ellagic acid, arjunic acid, glycosides, Arjunetin, frideline, tannins 20-25%, Calcium 0.33%, Magnesium 0.075%and Aluminium 0.076%. In fruit: 7-20% tannin.

Properties

Rasa **=** *Kashaya*,

Vipaka **=** *Katu*,

Virya **=** *Sheeta*,

Guna **=** *Rooksha, laghu*.

Prabhav **=** *Hridya*.

Doshaghnata **–** *Kaphaghna* being *kashaya*, *laghu* & *rooksha*, and *Pittaghna* being *sheeta*. *Vatavaradhana* due to *sheeta*, *laghu* and *rooksha guna*.

Useful part – Bark

Local use - *Raktastambhana*, *sandhaniya*, and *vranaropana* due to its *kashaya rasa*, used as haemostatic and also used in *asthibhangna* (fracture).

Internal use - In many disease such as *Medoroga* (obesity), *kaphaja prameha*, diabetes, *Mutraghat* (urinary disorders), *pittaja prameha*, *mukharoga* (mouth disease), *bhagna* (fracture), mainly in *hridroga* (heart disorders), and in dyspnoea.

Dose

Churna (Powder) = 3-6 gm.

Svarasa (Juice) = 10-20ml

Kwatha (Decoction) = 50-100ml

Important preparation - *Arjunarista*, *Arjuna ghrta*, *parthadyarista*, *Arjunaksheerapaka*, *kakubhadi churna*, etc.

Pharmacological study

a) **Macroscopic characters**[9] **–** Bark available in pieces, flat, curved, recurved, channelled to half quilled, 0.2- 1.5 cm thick, market samples up to 10cm in length and up to 7 cm in

width, outer surface somewhat smooth and grey, inner surface somewhat fibrous and pinkish, transversely cut smoothened bark shows pinkish surface, fracture, short inner and laminated in outer part, taste, bitter and astringent.

b) **Microscopic characters –** In transverse section of *Terminalia arjuna,* mature bark shows cork consisting of 9-10 layers of tangentially elongated cells a few outer layers filled with brown colouring matter, cork cambium and secondary cortex not distinct and medullary rays observed traversing almost up to outer bark; secondary phloem occupies a wide zone, consisting of sieve tubes, companion cells, phloem parenchyma and phloem fibres, traversed by phloem rays, usually uniseriate but biseriate rays occasionally seen; in the middle and outer phloem region, sieve tubes get collapsed and form ceratenchyma; phloem fibres distributed in rows and present in groups of 2- 10; rosette crystals of calcium oxalate measuring 80 – 180u in dia., calcium oxalate crystals occur in great abundance throughout the phloem region. They occur either in clusters or sphaerulites. Cluster crystals also occur in crystal fibre, which is a vertical row of isodiametric parenchymatous cells all containing calcium oxalate crystals. The sphaerulite crystals are found in tangential rows and scattered in the phloem parenchyma.[10]

Physicochemical study[11,12]

a) **Foreign matter –** The sample shall be free from visible signs of mold growth, silica, stone, rodent, insects or any other noxious foreign matter. For this take 100gm of *Arjun* powder and spread in a thin layer in suitable dish or tray. Examine in a day light with unaided eye. Transfer suspected particles, if any to a petridish and examine with 10x lens in day light.

b) **Loss on drying (determination of moisture content) –** It helps to determine the amount of volatile matter, for substances appearing to contain water as the only volatile constituent. For this 2gm of Powdered (*Terminalia arjuna*) drug was taken in tarred china dish. Dried in the oven at 100ºC or 105ºC, cooled in a desiccator and watch. After that the loss was recorded as moisture. The procedure was continued for at least two common readings.

c) **Total Ash value –** It is the residue remaining after incineration. For this 2gm of Powdered (*Terminalia arjuna*) drug was taken in tarred china dish. After than it was subjected to muffle Furness at 450ºC temp. The weight was taken after red hot and cooling at each two hours constant readings.

d) **Acid insoluble ash –** It is the part of the total ash which is insoluble in diluted

hydrochloric acid. For this 2gm of Powdered (*Terminalia arjuna*) drug was taken and mixed 25 ml of hydrochloric acid (HCL). Total ash was boiled for 5 min. and diluted was 25 ml of hydrochloric acid (HCL). Insoluble matter was collected on ash less filter paper (Grade 4T SD'S clear drop, 90mm code- F0401C10, Circuler-100). Filter paper washed with hot water. Crucible was ignited and cools after than keep in dessicator. Residue was weighed and calculated acid insoluble ash of drug.

e) **Water insoluble ash -** 2gm of Powdered (*Terminalia arjuna*) drug was taken in silica crucible and added 25 ml water. The mixture was boiled. After that insoluble matter was filtered on ash less filter paper (Grade 4T SD'S clear drop, 90mm code- F0401C10, Circuler-100). The residue was ignited in crucible and cool. The residue was weighed and calculates water insoluble ash.

RESULT AND DISCUSSION

Pharmacognostic characters of the bark of *Terminalia arjuna*[13]

Macroscopic characters	**Bark of Terminalia arjuna**
Touch	Smooth externally
Colour	Pinkish
Taste	Kashaya, Bitter
Odour	Nothing special
Length	10 - 12 cm.
Width	7 - 9 cm.
Thickness	0.2 – 1.5 cm.

Microscopic characters Cork cells big	**Radius 13-15-17 µ**
small	Radius 5-7µ
Calcium oxalate clusters	22-34-43µ in diameter
Calcium oxalate sphaerulites	140-250µ in diameter
Phloem fibres	350-750-1100×10-15-21µ
Starch	Single or compound grains With 2-7 components
Crude fibre	10.67

Determination of proximate analysis for bark of *Terminalia arjuna*

Test for extraneous material Sample 1, Sample 2, Sample 3, Inference in %

Foreign matter	**0.926**	**0.926**	**0.926**	**Not more than 2.0**
Sand & Silica	Absent	Absent	Absent	Should be Absent
Insect infestation	Absent	Absent	Absent	Should be Absent
Rodent contamination	Absent	Absent	Absent	Should be Absent

Physicochemical analysis

Tests Sample 1, Sample 2, Sample 3 Inference

Total ash content	**15.762**	**16.367**	**16.534**	**Not more than 25.0**
Acid insoluble ash	1.452	0.9568	0.9367	Not more than 2.0
Moisture content	5.653	6.778	5.874	Not more than 8.0

From the above methods we found all value of *Arjuna* bark powder. Ash value, acid insoluble ash, water insoluble ash, all these value are useful in determining authenticity and purity of sample and these are important qualitative standards.

CONCLUSION

Ayurvedic *classic* have given the concept of qualitative examinations of drug and its techniques. For the great success we need to follow these all things. In this study we find that qualitative standards of *Terminalia arjuna* and its *Ayurvedic* importance.

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