



CONTROVERSIAL IDENTITY OF ARJUNA (TERMINALIA ARJUNA (ROXB.) WIGHT & ARN) WITH SPECIAL REFERENCE TO KAKUBHA AND ARTAGALA

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ABSTRACT

India is a very vast country and hence naturally plants are known by different names in various parts of the country. Controversial plants have their roots in past. This legacy has resulted in controversies about plants in *Ayurveda*. In the present era, proper identification is a major problem faced by various *Ayurveda* fraternities. Also, there are no definite rules given for proper identification, and for a single drug, various synonyms are given which amounts to complexity in this aspect. In this article, the controversies related to *Arjuna*, have been tried to clarify. *Arjuna* in many instances has been used with *Kakubha* and *Artagala* correspondently in main classic *Ayurvedic* texts. Hence, controversy and correct identification of each plant were dealt with, with special reference to each of these three drugs. Considering the facts and information available from *Ayurvedic* texts, research papers, botanical descriptions of identical plants, and various commentaries, it was concluded that *Arjuna* is to be identified as *Terminalia arjuna* (Roxb.) Wight & Arn; *Kakubha* is to be identified as *Terminalia myriocarpa* Heurck & Muell-Arg or, as *Lactuca serriola* Linn; and *Artagala* is to be identified as a blue variety of *Saireyaka* as *Barleria strigosa* Linn. or *Xanthium strumarium* Linn.

Keywords: Controversial plants, *Ayurveda*, *Arjuna*, *Kakubha*, *Artagala*.

INTRODUCTION

India is a very vast country with different languages, climatic conditions, and different people with different dietary habits. So, naturally, plants are known by different names in various parts of the country. The proper identity of drugs should be revealed on the basis of their morphological characteristics described in *Nighantus*, therapeutic uses given in *Samhitas*, and pharmacognostical and phytochemical standards set by researchers. Classically, when it is found that different drugs having similar nomenclature are used in a single formulation then the purpose, the context, the treatise, and proper reasoning should be used for their proper usage.^[1] It is also seen that one particular name is given to many drugs while one drug is known by many names. These names are given according to specificity, morphological characters, and pharmacological properties like *rasa*, etc.^[2] The problem of identification is as old as our classics. It is said in the classics that the names of the herbs are known to the saints, forest tribes, shepherds, etc. Therefore, the local names and identification features of different plants should be obtained from them only.^[3] Moreover, *Acharya Charaka* said that the drug

should be identified by its name, appearance, and properties that the drug possesses. He added that the one who knows this all is only be said as great *Vaidya*.^[4] *Acharya Charaka* throws light on the need for identification too. He said that an unidentified plant or drug may act as poison and the drug identified by name, appearance and properties may act as nectar.^[5] There has been some controversy regarding the identity of *Arjuna* which is seen interchangeably used with the names *Kakubha* and *Artagala* in various classical texts. Hence an attempt was made to correctly identify each of these drugs.

Materials and Methods: All the relevant information was searched from classic *Ayurvedic* texts as well as articles published in various journals through PubMed, SciFi, and Scopus.

Arjuna in Vedas^[6] *Arjuna* is mentioned in *Atharvaveda*. It is said that *Kṛmi* keeps themselves away from *Arjuna*. (IV: 37:3) It is basically used as *Kṛmi nashaka* (IV: 37:34); *Vayu maṇḍala shodhaka* (IV: 37:31); *Kṣetriya roga nashaka* (II: 2:8/3); and *Bala vardhaka* (V: 28:5).

Table 01: *Arjuna, Kakubha and Artagala in Samhitas*^{[7][8][9][10]}

References	Name and Synonyms	Useful part/ preparation and Mahakashaya	Indications
C.S.Su.3/5	Arjuna	Churna/ Pradeha	Tvak roga
C.S.Su.4/43	Arjuna	Udardaprashamana Mahakashaya	Udardaprashamana
C.S.Su.5/73	Kakubha	Shaka	Dantadhavana
C.S.Ci.3/258	Kakubha	Candanadi Taila	Daha and Jvara
C.S.Ci.4/75	Dhananjaya	Kiratiktadi Churna	Raktapitta
C.S.Ci.6/27	Arjuna	Kvatha	Kaphaja Prameha
C.S.Ci.6/31	Arjuna	Kvatha	Pittaja Prameha
C.S.Ci.6/38	Arjuna	Trikantakadhya Ghrta	Kaphaja and Vataja Prameha
C.S.Ci.7/129	Kakubha	Tvak	Kushta
C.S.Ci.8/129	Arjuna	Yuşa	Rajyakṣama and Atisara
C.S.Ci.14/214	Kakubha	Kvatha	Arsha
C.S.Ci.23/100	Kakubha	Churna	Kṛmi
C.S.Ci.23/204	Arjuna	Kvatha	Kiṭa and Luta damsha, Vrana
C.S.Ci.25/113	Kakubha	Churna	Tvak Sanjanana
C.S.Ci.29/143	Kakubha	Puṣpa/ Kalka Pralepa	Vata Rakta
C.S.Ci.30/92	Arjuna	Puṣyanuga churna	Yoni and Rajodoṣa
Su.S.Su.14/36	Arjuna	Churna	Raktatipravritti
Su.S.Su.38/10-11	Kakubha	Nyagrodhadigana	Pittahara, Sandhaniya

<i>Su.S.Śā.2/8-9</i>	<i>Arjuna</i>	<i>Ghrta</i>	<i>Kuṇapagandhadi shukra Dosha</i>
<i>Su.S.Ci.2/65</i>	<i>Arjuna</i>	<i>Taila</i>	<i>Vrana ropaka</i>
<i>Su.S.Ci.3/6</i>	<i>Kakubha</i>	<i>Tvak</i>	<i>Bhagna</i>
<i>Su.S.Ci.9/7</i>	<i>Kakubha</i>	<i>Ghrta</i>	<i>Pittaja Kuṣṭha</i>
<i>Su.S.Ci.11/8</i>	<i>Kakubha</i>	<i>Kvatha</i>	<i>Shukrameha</i>
<i>Su.S.Ci.15/23</i>	<i>Kakubha</i>	<i>Tvak</i>	<i>Sutika vedana</i>
<i>Su.S.Ci.25/28</i>	<i>Arjuna</i>	<i>Nilataila</i>	<i>Palitya</i>
<i>Su.S.Ci.25/32</i>	<i>Arjuna</i>	<i>Saireyakadi Taila</i>	<i>Blackening of hair</i>
<i>Su.S.Ka.6/3</i>	<i>Arjuna, Kakubha</i>	<i>Kṣaragada</i>	<i>Sarpadamsha</i>
<i>Su.S.Ka.6/22</i>	<i>Partha</i>	<i>Mahasugandhi Agada</i>	<i>Sarpaviṣa</i>
<i>Su.S. Utt.12/11</i>	<i>Arjuna</i>	<i>Kalka</i>	<i>Raktabhiṣyanda</i>
<i>Su.S. Utt.39/252</i>	<i>Arjuna</i>	<i>Kṣira Vrkshadi Taila</i>	<i>Jirna Jvara</i>
<i>Su.S. Utt.45/36</i>	<i>Arjuna</i>	<i>Phaṇṭa</i>	<i>Raktapitta</i>
<i>Su.S.Su.38/10-11</i>	<i>Artagala</i>	<i>Varunadi Gaṇa</i>	<i>Kaphamedohara, shirahshula, Gulma, Abhyantara Vidradhi</i>
<i>Su.S.Su.39/7</i>	<i>Artagala</i>	<i>Vata Samshamana Varga</i>	-
<i>Su.S.Ci.7/6</i>	<i>Artagala</i>	<i>Pashaṇabhedadi Gaṇa</i>	<i>Vatashmari</i>
<i>Su.S. Utt.9/19</i>	<i>Artagala</i>	<i>Ghrta</i>	<i>Vataja Abhiṣyanda</i>

Table 02: Arjuna in Nighantus

Nighaṇṭu	Varga/Gaṇa	Synonyms	Description
<i>Amara Kośa</i> ^[11] (5 th Century AD)	<i>Vanauśadhivarga</i>	<i>Nadisarga, Virataru, Indradu & Kakubha</i>	(A.K.2/4/45)
<i>Saushruta Nighantu</i> ^[12] (6-7 th Century AD)	<i>Sālsārādigaṇa</i>	(New ones) <i>Kīrīta, Madhugandhikapuṣpa & Phalagaṇa</i>	(S.Ni. Salsaradigaṇa/68)
<i>Siddha Sara Nighantu</i> ^[13] (7 th Century AD)	<i>Arjuna- Saladigaṇa Partha- Nyagrodhadi Gaṇa</i>		(S.S.Ni.2/23-33) (S.S.Ni.2/3-4)
<i>Paryaya Ratna Mala</i> ^[14] (9 th Century AD)		<i>Dhanvi, Nadija, Paṇḍava, shulka (New Ones)</i>	(P.R.M.16/18)
<i>Dhanvantari Nighantu</i> ^[15] (10-12 th Century AD)	<i>Amradi Varga</i>	(New ones) <i>Kiriti, Citrayodhi, Virantaka, Paṇḍya</i>	(Dha. Ni. Amradi Varga/108-09) It is Kashya and Ushna. It is Kaphahara and Pittahara and helps to heal wounds. It aggravates Vata.
<i>Ṣoḍhala Nighantu</i> ^[16] (12 th Century AD)	<i>Amradi Varga</i>	(New One) <i>Citrayodhi</i>	It is useful in <i>Kṣata, Vataroga, Bhagna, Raktastambhana</i> as well as <i>Balya</i> . (So.Ni. Nama Samgraha/16) (So.Ni. Amradi Varga/604) (So.Ni. Guna Samgraha/513)
<i>Siddha Mantra Prakasha</i> ^[17] (13 th Century AD)		(New ones) <i>Karanja, Kampillaka, Bala</i>	(S.M.P.;103)

<i>Madanapala Nighantu</i> ^[18] (14th Century AD)	Vaṭadi Varga	(New ones) Syannada, Manju, Rathadruma	<i>Kakubha</i> is said to be <i>Shitala</i> and useful in <i>Bhagna</i> , <i>Kshata</i> , <i>Kshaya</i> , <i>Visha</i> and <i>Raktavikara</i> . (M.P.N. Vaṭadi Varga/ 26-27)
<i>Haritakyadi Nighantu</i> ^[19] (14th Century AD)	Vaṭadi Varga	(New one) – <i>Viravr̥ksha</i> , <i>Veera</i> , <i>Dhavala</i>	<i>Kakubha</i> is told as <i>Hridya</i> , <i>Kashaya</i> , <i>Sheetala</i> , <i>Kapha-Pittahara</i> and which cures <i>Meda</i> , <i>Meha</i> , <i>Vrana</i> , etc. (H.Ni. Vaṭadi Varga/26-27)
<i>Kaiyadeva Nighantu</i> ^[20] (15th Century AD)	Arjuna Ārtagala Both in Auṣadhi Varga	(New ones) <i>Arjuna- Dhurtabhuruha</i> , <i>Madh-ugandhiprasunaka Artagala</i> (New ones)- <i>Duṣpragharsha</i> , <i>Svvdutiktaphala</i> , <i>Argata</i>	Opinion of <i>Madanapala Nighantu</i> is followed here for <i>Arjuna</i> . <i>Artagala</i> is said to be <i>Kashya</i> , <i>Tikta</i> and useful in <i>Vraṇa-shodhanaropana</i> . (K.Ni.1/819-821) (K.Ni.1/487-488)
<i>Bhavaprakasha Nighantu</i> ^{[21][23]} (16th Century AD)	<i>Arjuna- Vaṭadi Varga Artagala-</i> (As a synonym of <i>Nila Sahacara</i>)- <i>Puṣpa Varga</i>	Similar Synonyms for <i>Arjuna</i> . <i>Nila Sahacara- Baṇa</i> , <i>Dasi</i> , <i>Artagala</i>	<i>Arjuna</i> is said to be <i>sitala</i> , <i>Kashaya</i> , <i>Hridya</i> , and <i>Kaphapittahara</i> . <i>Sahacara</i> is <i>Tikta</i> , <i>Madhura</i> , <i>Anamla</i> and <i>Snigdha</i> . (B.P.Ni. Vaṭadi Varga/26-27) (B.P.Ni. Puṣpa Varga/52-53)
<i>Raja Nighantu</i> ^[22] (17th Century AD)	Prabhadradi Varga	(New ones) <i>Shambara</i> , <i>Gaṇḍivi</i> , <i>Shivamallaka</i> , <i>Savyasaci</i> , <i>Karnari</i> , <i>Kaunteya</i> , <i>Indrasunu</i> , <i>Viradra</i> , <i>Krishnasarathi</i> , <i>Prithaja</i> , <i>Phalaguna</i> , <i>Dhaniī</i>	Similar properties are mentioned above. (R.N. Prabhadradi Varga/ 116-118)
<i>Nighantu Adarsha</i> ^[24] (20th Century AD)	Haritakyadi Varga		Classical uses of <i>Arjuna</i> are mentioned in it as well as the controversy of <i>Arjuna</i> , <i>Kakubha</i> , and <i>Artagala</i> is elaborated.
<i>Priya Nighantu</i> ^[25] (20th Century AD)	Haritakyadi Varga		It has straight branches with white bark, that's why it is called <i>Arjuna</i> . It is of <i>Sita Virya</i> , <i>Kashaya</i> and best <i>Hridya</i> . (P.Ni. Haritakyadi Varga/125-126)

Botanical description of plants considered as *Arjuna*, *Kakubha*, and *Artagala*

Arjuna is a very reputed drug for all types of heart diseases, and it is used by many Vaidyas of India in their medicines. In *Nighantu*, *Samgraha's* attempt was made to determine the identity of *Ayurvedic drugs*. The author has given the names in various languages including the scientific name in latin. He has shown here that *Arjuna* means white and *Sterculia urens* Roxb. is white, should be accepted as *Arjuna*. Another species named *Terminalia glabra* is accepted as *Arjuna* in Gujarat. In markets also the bark of *Terminalia tomentosa* W. & A. is available as *Arjuna*. There is yet no uniformity of opinion amongst

Vaidyas about the correct identification of *Arjuna* as there are others who still regard *Lagestroemia flos reginae* Retz. as *Arjuna* in some parts. Modern botanical writers have identified *Arjuna* as *Terminalia arjuna* W. & A. ^[35] *Dalhana* has equated *Artagala* with *Kakubha* in some references, which is ordinarily a synonym of *Arjuna*. But *Kakubha* and *Arjuna* are mentioned together in *Ksharagada* (*Su.S.Ka.6/3*) but both are separate drugs according to *Susruta*. *Acharya P.V. Sharma* has suggested *Terminalia myriocarpa* Heurch & Mucell. -Arg. or *Lactuea serriola* Linn., an allied species to the *Kakubha*. *Artagala* as mentioned by *Acharya Dalhana* is a synonym of *Kakubha* and its identity is consistent with *Lactuca serriola* Linn. Also, *Artagala* is accepted as a synonym of

Nila Sahacara or the blue variety of *Saireyaka* and is identified as *Barleria strigosa* Willd.^[36]

***Terminalia arjuna* W.&A. (Fam. Combretaceae)**

It is a large tree with a huge often buttressed trunk and spreading branches. It is found throughout India. The bark is smooth pinkish white, the inner surface is reddish, and flakes off in large flat pieces. Leaves are 10-15 × 4-7 cm oblong with 6-10 mm long petiole having two glands near its apex. Flowers are yellowish white in short axillary spikes or terminal panicles. Fruits are 2.5-5 cm long, ovoid or ovoid-oblong drupes, with five hard coriaceous projecting wings.

***Terminalia tomentosa* W.&A. (Fam. Combretaceae)**

These are deciduous trees, upto 30 m high; bark 15-20 mm thick, surface grey-black, very rough, deeply vertically fissured, horizontally cracked, forming tessellated, thick flakes; and blaze red. Leaves are simple, opposite to subopposite, exstipulate; petiole 10-20 mm long, stout, grooved above, glabrous; midrib with 2 stalked glands near the base beneath. It is casually known as the Crocodile Bark tree due to its characteristic bark pattern.

***Sterculia urens* Roxb. (Fam. Malvaceae)**

It is a deciduous tree, upto 15 m high, bark 10-12 mm, white or greenish-grey, smooth, exfoliating in large, thin, papery flakes; blaze red; exudation yellowish-white, sticky; branches horizontal; branchlets pubescent. Leaves simple, palmately 3-5 lobed, alternate, clustered at the tips of branchlets, stipules free. Fruit is an aggregate of 4-6 follicles, red, densely pubescent, mixed with stinging hairs: seeds 3-6, brown or black, oblong.

***Terminalia myriocarpa* Heurch & Mucell. -Arg (Fam. Combretaceae)**

It is a tree, up to 20 m tall; its bark is brownish black, longitudinally peeling; branches are spreading, forming tiers. Leaves are simple, alternate & crowded into pseudo whorls at apices of branchlets. Flowers are fragrant with five lobes and are exserted. Fruit is red or blackish green when ripe, ellipsoid, and slightly to strongly compressed.

***Lactuca serriola* Linn. (Fam. Asteraceae)**

Lactuca serriola Linn. also called prickly lettuce, compass plant has a spineless reddish stem, containing a milky latex, growing up to 2 metres, and has a fetid odour. The leaves get progressively smaller as they reach their top. They are oblong or lanceolate, often pinnately lobed, and (especially for the lower leaves), waxy grey-green. Fine spines are present along the veins and leaf edges. The undersides have whitish veins. The bracts are also often tinged purple. The achenes are grey, tipped with bristles. The pappus is white with equal-length hairs.

***Barleria strigosa* Willd. (Fam. Acanthaceae)**

It grows upto 80 cm in height. Stems are coarsely fulvous strigose and subterete. The petiole is brownish yellowish strigose and 0.7–2.5cm. The leaf blade is ovate to elliptic, both surfaces are fulvous strigose along veins with 5.5–15 x 2.2–5.5 cm dimension. Flowers are in terminal dense spikes. The capsule is ellipsoid, glabrous, 1.4–1.8 x 0.5 cm, shining, and four-seeded. It occurs naturally in the foothills of the Himalayas.

DISCUSSION

It seems from the above-mentioned description that *Arjuna* and *Kakubha* are separately used in *Charak Samhita*. Description of *Arjuna* in *Susruta Samhita* appears in *Salasaradigana* as well as among *Sarasava* in *Charak Samhita*. It seems *Arjuna* is a tree with *Sara* and is *Kapha-medodhatu Shoshaka*. *Kakubha* is mentioned in *Nyagrodhadigana* by *Acharya Susruta* and that's why it is *Pittahara & Sandhaniya*. Also, in one instance while describing *Ksharagada*, both *Arjuna* and *Kakubha* are specified separately. Hence up to that time, these may be two separate plants. It also seems that by the time of *Acharya Vagbhata*, *Kakubha* became to be used as an alternative to *Arjuna* and also used interchangeably. Description of *Artagala* does not occur in *Charak Samhita*. In *Susruta Samhita*, it appears in *Varunadi Gana & Vata Samshamana Varga*. It appears by this description that *Artagala* is a different species than *Arjuna* and *Kakubha*. It is found to be useful in *Vatashmari*, *Svarabheda*, *Netra rogas*, etc. By the time of *Nighantus*, *Kakubha* became a synonym of *Arjuna* and *Artagala*.

gala became a synonym of *Nila Sahacara*. According to Acharya Dalhana Kakubha has been mentioned as a synonym of *Arjuna* in most instances. But at one instance while commenting on *Ksharagada* (Su.S.Ka.6/3), he mentions it to be a shrub with aromatic roots. At one instance, he mentions *Artagala* as *Nila Sahacara* (Su. Utt.17/51). Now one species of the above plant, *Lactuca indica* is used as a salad in the eastern part of the country. So, *Artagala* described by Acharya Dalhana could be this plant only. Otherwise, *Artagala* is accepted as a synonym of *Nila Sahacara* or the blue variety of *Saireyaka* and is identified as *Barleria strigosa* (Fam. Acanthaceae). He describes *Artagala* as a synonym of *Kakubha* and gives its description as the drug which was famous as a synonym of *Kakubha* & was famous by name of “Kavaha”, “Kouha” or “Kukhaka” in eastern regions, had aromatic roots, was a shrub, had thorns, spiny and hairy fruits and grows in places with plenty of water. (Su. Su.38/10-11) (Su. Su.39/7) (Su. Ci.7/6) (Su. Utt.9/19). Acharya PV Sharma states that *Arjuna* is to be inferred as *Terminalia arjuna* delineating its concordance with *Asana* as mentioned in *Sarasava* by Ācārya Caraka & *Salasaradigana* by Acharya *Susruta* as a tree having *Sara*. He considers *Kakubha* to be *Terminalia myriocarpa* as it is mentioned in *Nyagrodhadigana* by Acharya *Susruta* and thereby is a huge tree. Other similarities he draws are growing in the eastern region of India, is famous as “*Panisa-ja*”, is similar to *Arjuna*, and its bark is used in cardiac ailments.^[26] While reading commentary on *Bhavaprakasha Nighantu* by Dr. KC Chunekar, we come across the reference that there is yet no uniformity of opinion amongst Vaidyas about the correct identification of *Arjuna* as there are others who still regard *Lagerstroemia flos-regina* (Lythraceae) as *Arjuna* in some parts and there exists a difference among the modern investigators and Vaidyas for its therapeutic efficacy. He considers *Terminalia arjuna* (Combretaceae) as *Arjuna*. He thinks that a genuine *Arjuna* is yet to be determined. He considers *Artagala* as *Xanthium strumarium*.^[26] According to him, there is a large number of drugs such as *Terminalia arjuna*, *Terminalia glabra*, *Terminalia tomentosa*, and *Stre-*

culia urens which are used as *Arjuna* by Vaidyas of Gujarat. According to him *Terminalia arjuna* and *Streculia urens* can both be *Arjuna*. Also, he states that in some parts of the country, *Jarul* (*Lagerstroemia flos-regina*) is being used as *Arjuna*. He also adds that *Arjuna* which is indicated by *Vrnda* and *Cakra-datta* may be *Terminalia tomentosa*, as it has very potent cardio-tonic action.^[27] As mentioned earlier, *Arjuna* can be *Terminalia arjuna*, *Terminalia tomentosa* or *Streculia urens*. According to a study^[28] conducted for correct identification of *Arjuna*, the following things were concluded: *Streculia urens* is a botanically completely different plant from the other two species. All three had *Kashaya rasa* with no significant change between their wild and cultivated varieties in organoleptic parameters. All the species had whitish outer bark which resembles the synonyms “*Dhavala*” & “*Arjuna*”, but the bark of *S. urens* has been reported whiter. *T. arjuna* is common throughout the Indian peninsula along rivers, streams, ravines, and dry water courses resembling the synonym “*Nadisarja*”. And completely conflicting, *S. urens* is usually found in dry, deciduous forests as a xerophytic species. As per botanical and pharmacognostical views, all three varieties differ from each other, but no change is found in wild and cultivated species. In the phytochemical study, *S. urens* cultivated variety had fewer minerals as compared to others. The wild variety of *T. arjuna* and cultivated variety of *T. tomentosa* showed more water and methanol solubility. The pH of all extracts was almost equal. In a qualitative analysis of tannin and carbohydrates, all plant extracts gave positive results, but on TLC, it was found that *S. urens* had a low percentage of tannin as compared to others. The Ayurvedic Pharmacopoeia of India considers *T. arjuna* as *Arjuna*.^[29]

CONCLUSION

There are a number of speculations and controversies regarding the identification of *Arjuna* which is seen to be used a number of times in classic *Ayurvedic* texts interchangeably with names like *Kakubha* and *Artagala*. *Arjuna* is well identified as *Terminalia arjuna* (Roxb.) Wight & Arn. *Kakubha* is to be identi-

fied as *Terminalia myriocarpa* Heurck & Muell-Arg. or, as *Lactuca serriola* Linn. *Artagala* is to be identified as a blue variety of *Saireyaka* as *Barleria strigosa* Linn. or *Xanthium strumarium* Linn.

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