Health Series

Traditional Family Medicine

Harad and Baheda

HEALTH SERIES :
TRADITIONAL FAMILY MEDICINE

Harad and Baheda

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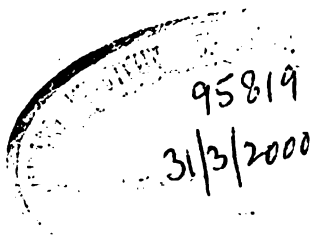

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INTRODUCTION

Harad and *baheda* or *haritaki* and *bibhitaki* in Sanskrit are botanically called *Terminalia chebula* Retz, the Black *Myrobalan* and *Terminalia belerica* Roxb, the Beleric myrobalan respectively. Both come under a large family of plants, Combretaceae under which quite a few other famous plants of India are included. Some examples are *jangli-badam, Terminalia catappa* Linn (The Country Almond), *arjuna* tree, *Terminalia arjuna* W & A., the famous hard wood tree *dhav, Anogeissus latifolia* wall (the Axle wood) and the pretty red-white Rangoon Creeper of the gardens all over India, *Quisqualis indica* Linn. The two myrobalans along with another myrobalan or the Emblic myrobalan or *amalak, Emblica officinalis* Gaertn—all the three together constitute the famous Triphalas (the triad of fruits) of Ayurveda.

A. HARAD OR HARITAKI

For a comfortable purgative action that would clean the bowels most effectively and harmlessly and also as an elixirising or a *rasayana* drug, the reputation of *haritaki* is unparalleled from times immemorial. One of the well known attributes of Gautama Buddha is *bhaishajya guru*, the Preceptor of Medication and Treatment. The statue of Buddha known by this name all over Buddhist Countries is always shown with a fruit of *haritaki* in the hand. It seems Buddha once had a severe constipative trouble for which no remedy but *haritaki* was found effective. And, it is important to note that this remedy was age old even in the times of Buddha.

There is incontrovertible historical evidence to show that the effective and unfailing medicative action of *harad* was a discovery in very ancient India going upto the Vedic times. This knowledge had also spread all the world over with India as its source. European Medicine began using this drug rather late in its history, though the Middle East had known it much earlier. The Greek comprehended the value of this fruit through the Arabic authors on medicine. Many famous men of Greece did discuss about this fruit with commendation in their works. A few of them are; the famous philosopher scientist Aristotle of 340 B.C., Dioscorides of 60 A.D., the scientist and the botanist and also Pliny, the great historian of 70 A.D. An explorer by name Linschoten from Europe

had come to India at the end of the sixteenth Century; he describes five types of *harad* as being prevalent in the medical world of India of those times. He has also given quite a few specifications of the important trade of *haritaki* fruits from India. These were dried in India and exported as such or were preserved in the form of *murabba* (wherein the whole fruit was percolated with sugar syrup) or pickles or in the midst of sugar candy and then sent abroad. Those authors also differentiated among the medical efficacies of the fruits on the basis of the many easily visible characteristics of the fruit much as modern authors do. The fruits which were darkish in colour but slightly red as well, big in size and sinking in water when floated on it were considered the best to romove *kapha* or phlegm; these would also augment the power and brilliance of intellect. The fruits preserved in honey or sugar syrup were strength giving and also purgative. Morbid swellings would get rectified by their use and utilising them for patients of advanced age was very much beneficial. These would also promote hunger to a great extent and would infact increase the digestive ability as such. This type of a tradition of recognising several different "varieties" in the fruits of *harad* continues still. Bhavamishra, a famous classical author on Ayurveda in the medieval times just when Islamic influence began spreading in India, speaks of seven distinct varieties. He includes an extensive account of *haritaki* in his well known book, Bhavaprakasha.

An Italian author Pegoletti of 1343 A.D. offers picturesque details of the India—based profitable trade in *haritaki* fruits of those times. He specifies the identifications for the best varieties. These should be big sized and darkish. The outer rind of the fruit should feel crisp to the teeth. The darker the colour and the crisper the rind, the better is the quality and the efficacy of the fruits. These were preserved in syrup even when raw in state and the hard seed or the stone as it is called inside was removed. They were advised to be stored in polished earthenware containers. The syrup was made out of *Cassia fistula* (*amolfos*) and honey or unrefined sugar. It was to be seen that the fruits were always kept immersed in syrup; for, using them in a dry state was not found helpful. He finally notes that a flourishing trade centre for *harad* fruits was the great city of Alexandria on the Nile River of Egypt, in Africa. The trade from India to outside countries via the Himalayan passes were also so flourishing that the best varieties of fruits, the biggest, the heaviest and the most efficacious were called *Kabuli harad* as Kabul was an important centre for large scale marketing of these dried fruits exported from India. It was from Kabul in Afghanistan that the supplies reached the Middle East on the one hand and China on the other. Even now this name of *Kabuli harad* persists and yunani physicians reserve it to the best of the varieties.

Haritaki is important in our national economy even now on two accounts: as an active ingredient

for innumerable ayurvedic preparations often carried out on a commercial scale and occasionally imported as well abroad, and as a valuable raw meterial for two of our industries viz tanning of the leather and the preparation of many fast dyes for cotton textiles, wool and also silken cloth.

Names

Ayurvedic literature calls this famous plant by a large number of names. A few of these names refer to the historical and mythological aspects of the plant, others allude to the recognition of varieties, while the remaining are concerned with either giving a descriptive account of the plant or the medicinal action and the value.

Some of these names are the following: *haritaki* (This term has three meanings; all, quite suitable: born in the abode of Lord Shiva, or Hara viz. the Himalayas; the rind of the ripe fruit is greenish, yellow in colour; or, that which removes all diseases), *girija* (hill born), *himaja* (Himalayan in its origin), *shakra sreshta* (created by Indra viz alluding to the story that the plant was a creation that resulted by a fall of a few drops of *amrita* or nectar from Indra - as a result of which seven varieties of *haritaki* were born), *sudhodbhava*, *amrita* and *sudha* (born from the divine nectar and nectar like in its efficacy). All of these terms are mainly mythological.

The names that signify the medicinal activities of the plant are: *abhaya* (that which offers an

absence of fear - immediate and permanent, from all types of diseases indicating that a regular using of the fruit confers complete fearlessness from diseases), *vijaya* (victorious over all diseases), *avyatha* (removing all distresses whatsoever), *pramatha* (that which churns out or eradicates a disease from its very source), *amogha* (unfailingly beneficial), *kayastha* (sustaining the body), *vayastha* (stabilising the span of life and arresting aging), *pathya* (wholesome to all the constituents of the body), *prapathya* (extremely wholesome), *devi*, *divya* (divine in nature), *pranada* (offering life), *jivya*, *jivanti*, *jivaniya*, *jivanika* (life promoting), *putana* (sanctifying), *shiva* (auspicious), *shreyasi* (conferring prosperity), *chetaki* (animating; increasing vitality), *balya* (strength giving), *jiva priya* (liked by all beings), *bhishak priya* (loved by the physicians because of its all round ability), *pachani* (digestive in action), *rohani* (helping in the regrowth of the injured regions - healing up), or, that which forms a good medium for all medication, *yoga vahi* and *triphala* (the triad of the fruits; *haritaki* being the chief of this triad).

The very list of these names is an index of the high esteem with which the medical world of Ayurveda had held this plant and its fruit. It still does so in great abundance.

Since the plant has attracted universal praise in very many other countries also it has received names in many languages of the world, other than Indian even.

A few of these names are as follows. First, we may note the names which are mainly from Indian languages.

It is called *hilikha* in Assamese; *haritaki* in Bengali; *haira* in Garhwal; *hirdo* in Gujarati; *harad, harara, pile hara* in Hindi; *alale, anile, harade, haritaki* in Kannada; *ordo* in Konkani; *divya, katukka, kayastha, putanam* in Malayalam, *habra, hirda hirada* in *Marathi; harra, herro* in Nepali; *halela, har, haraira, harara* in Punjabi; *hana, silimkung* in Sikkim; *aalu oralu* in Sinhalese; *har* in Sindh; *kadukkayi, pattiyam,* in Tamil; *haritoki, janghi horida. karedha* in Uriya.

Names of a few foreign languages are: Black myrobalan (a term that literally means a dark black unguent or an ointment from an acorn or the oak fruit. This probably refers to the much praised dark fruits of *haritaki,* looking like the acorns of oak tree of Europe and from which an ointment was made), Chebulic myrobalan; Badamieri Chebule (the Chebulic badam) in French; Rispiger myrobalanenbaum in German; and he li le in Chinese.

Occurrence and Procurement

Harad is a medium sized to occasionally lofty tree found all over the Indian Sub continent and specially in the deciduous forests where the trees shed down their leaves in particular seasons. Sometimes it forms a component of even the wet forests as well. It is quite prevalent all over Northern India reaching in the outer Himalayas

upto an altitude of 2,000 meters. In the plains of Punjab it is a rather small sized tree, the girth of the trunk of the tree reaching to 1.20 to 1.50 meters. In the deep South and where the conditions are particularly favourable, for example in the forests of Kerala specially the shola regions the tree becomes quite lofty reaching upto twenty four to thirty metres in height. It grows well in Punjab and Pakistan in the Shivalik ranges upto the altitude of 1,500 meters. Its occurence is particularly abundant in the Kangra valley of the Himalayas. In the hills of Assam as well as the plains of Bengal, Bihar as well as in most places of South India the tree grows well and quite widely. The trees along the Narmada river are specially lofty. In the drier and the rocky regions of the higher altitudes of the Himalayas as well as the Western Ghats the tree becomes small sized but on the slopes where other trees reach a lofty size, this tree also grows to a comparable height. Wherever it grows, it forms a graceful and shady tree pretty and quite imposing, when well grown.

The tree is quite prevalent in Sri Lanka, Malaysia and Myanmar.

At present the fruits are procured commercially from many Reserved Forests of the country: Balaghat, Chindwada, Betul, Jabalpur and Amaravati in Madhya Pradesh, Upper Godavari, and Vijagapatnam in Andhra Pradesh, Madurai, Vellore, Tinnevelly and Nilgiri in Tamil Nadu, Satara, Eastern Thane, Nasik and Colaba in Maharashtra, Singhbhum and Santal Pargana in

Bihar and Parlikamadi of Orissa. The net output is not commendable in quantity in the drier regions of India and also in Bengal and Assam. Elsewhere however, the crop is abundant though mostly consumed in the local regions themselves.

The entire requirement of the *harad* fruits of the country is completely met with solely by personal collection from the forests. Infact these fruits represent one of the important products of the forest wherever the trees occur. There appears to be nowhere any plantations of the *haritaki*, though this is a profitable proposition. The procurement is either from private contractors or Government sponsored Agencies. The principal utilities of the fruits are two: one in medicine and the other in industry as a rich source of tannin, for the Tanneries of the Country. Infact, one reason why tanneries were established even from the times of the British and very much encouraged in Independent India along the banks of Palar River in Tamil Nadu was the prepondarant availability of *harad* fruits from the forests of the nearby Javadi Hills. Till the invention of tanning by using chromium by the Central Leather Research Institute of India in Madras in 1960 and the consequent production of chrome leather that revolutionised leather industry in India, the fruits of *haritaki* had been the esteemed and perhaps the sole source of tanning meterial.

The processing of the fruit for marketing though simple has to be carried out carefully. For, the quality of this important forest product is mainly

decided at this level. Infact, the so called "varieties" of the fruit also stem mainly from their differential processing. The total lots of the fruits procured from the collectors or the contractors are spread out on a hard mud surface or better, a stony slab surface (as this holds the heat longer) to dry. The care needed is that for such a drying in the open sun, the fruits should lie in a single layer only. In addition they should be turned over frequently again seeing to it that this single file nature is not disturbed at all and the fruits would lie above one another shading those that are below. They should all be thoroughly dried like this in the open sun for days together, daily taking them out from the drying place at nights as they would then absorb moisture and putting them to sun again in the next morning as soon as sun starts giving his warmth. The total moisture content of the fruits should be fully removed this way. If it is so removed fully, the leathery rind of the fruit becomes finally crisp almost. Meanwhile, one should guard against rains or any fungal attack. When the fruit is fully dried, it becomes reduced to a little more than half of its original size and the surface of the rind becomes so hard that a knife cannot cut it. During this gradual drying several vertical lines appear on the surface as a result of shrinkage. Inspite of all such care, in a small percentage of the fruits,such lines of drying do not appear at all and almost the fleshy content within the outer layer becomes converted into a black powder. This however gets utilised in making writing inks though these fruits are regarded as

useless either in tanning the leather or in preparing dyestuffs. It is the sun-dried fruits that are mostly exported to Europe and America, leaving only a small percentage for national consumption, which is also quite high. That is why a commercial cultivation of this tree is a very feasible proposition.

Tannin is the important content of the fruit and as this tannin is developed within the fruit during its own biological activities, it becomes necessary to know at what season of the year, and at what stage of the fruit development the content of this material is maximum. Is there any way to increase this content per fruit either by varying the cultural conditions or the harvesting time or more radically, grafting or breeding the plants with such specific objectives as has been tried in many other crops? All of these aspects are however still matters for further research and study which however may become important any day because the demand for the fruits either from pharmacautical or industrial concerns is always there.

For actual marketing, specially for export, a system of grading is adopted. For this, generally those fruits that look fine are put under the Grade 1 and all the rest in the Grade 2 and in case no such grading is done at all the entire lot gets labelled Fair Average Quality and sent abroad. This is rather a wasteful method in these modern days of competitive trade. Quality control on which alone export becomes really acceptable is almost negligible in such a trade practice. There does exist

a good market abroad for Indian *harad* but since the quality of Indian supply is undependable, the foreign importers are often forced to look for other alternate sources of their own areas for eg. chestnut and divi divi from Venezula. It is necessary to do some valuable studies for better grading to do so for instance, on the total tannin content. Another method to ensure a better quality control is to separate the pulp of the fruit alone, remove the stone within completely and export the processed rind now. Its net tannin content is decidedly much more than what is seen in the whole fruit. This can prove a better export material of greater demand if we can guarantee the quality in advance, by further study and trials. Much research is needed in this regard. So far there is not much of an alternative to chebulic myrobalan in its special field; it is necessary that we should safe guard this treasure by all possible means, consequently.

Since the fruit collection and trade are mostly done by individual or small agencies, we do not have dependable statistics of either its total output in the country or its net consumption. Output from Tamilnadu is quite high and of all the varieties in India, *harad* from Salem district of this state is considered the best at present. But the entire output of the state is consumed by its own tanneries.

The months of November, December or January are the best months for harvesting the fruits. There

are three principal industrial uses of this fruit: in tannery, in ink making and in pigment or dye making. When importing raw materials for dye and pigment making had become difficult in India during the days of World War it was this *harad* fruit that had actually fulfilled the need. There is no reason why commercial concerns need not explore *this* potentiality of the plant.

The Plant of Haritaki

The tree of *haritaki* is medium sized or sometimes lofty but always quite graceful with a round canopy of foliage at the top. Its long branches spread around on all sides,their terminal leafy ends at the periphery of the canopy falling downwards as it were. The trunk is rather small sized against the large spread of the top though in Myanmar the trunk appears to become stouter and more straight. Usually it reaches to a height of 20-30 metres . The tree is deciduous shedding down its leaves in particular seasons of the year.

Young leaves, leaf blades, and tender shoots, all of them are covered with long, shiny and slippery, usually rust coloured sometimes silvery hairs all over. Leaves are non-hairy or nearly so, when mature. They are not closely clustered; actually they are rather distant mutually and are arranged alternately or sub oppositely on the axis of the stem. The shape of the leaf blade is elliptic oblong. The leaf is 7.20 cm by 4.8 cm in size; its tip is acute; base, rounded or heart shaped; nerves are

disposed like feathers on either side of the mid rib. There are 6-12 pairs of them and rather arching and prominent. Leaf stalks are 2.5 cm long, hairy and provided usually with two glands at the top.

In some places the shedding of the leaves commences from November onwards so that by February - March, the tree is completely leafless. Fresh leaves start appearing from March to May. They are pretty, light-green or often coppery red. Unfortunately at this stage the tree becomes susceptible to an attack of a particular insect - a bagworm moth or *Acanthosyche mooret.*

The bark of the tree falls down in scales of irregular shapes; their thickness is 65 milimeter; colour, brownish - grey and they have axially directed slits on their surface. The wood of the tree is quite hard and greyish in colour with a tinge of yellowishness with it. The central heart wood is narrow, deep blue-black like the jamun fruit, quite hard, heavy and very well durable. The wood of *harad* is heavier than that of *baheda.*

Flowers start appearing along with the new leaves of the season. They are light white in colour and are arranged in five to ten centimeter long. sometimes simple spikes but usually in short, branched panicles. These latter appear in the current branches of the year and in the axils of the upper most leaves. The flowers are hermaphordite i. e. with male and female organs occuring in the same flower. Each flower is 4 milimetre across, stalkless, dull white or yellow and has an offensive

smell. Still the flowers are highly surrounded by swarms of honey bees,usually for the whole month of May or as long as they last. The tree of *harad* is one of the best source of honey formation. Just as one attempts to secure medicated honey from neem trees nowadays by setting beehives or apiaries near the neem tree it is a good proposition to adapt this procedure for *harad* trees also.

Bracts or the leaf like structures in whose axils the flowers occur exceed the flowers in size and are hairy, prominent among the buds but they fall down very soon as the buds start blooming. Fruits start hanging down at the heads of the outwardly spreading branches. They are either solitary or in clusters from three to ten in a group. It is technically called a drupe viz a fleshy fruit with a hard stone within, inside which is the single seed like a mango for example. It is pendulous, 2-4 centimetre long, ellipsoid or obovid with a broad base, smooth, non hairy; more or less 5-ribbed, yellowish green (*harita* it is quite likely that the plants was named *haritaki* because of this colour of its most useful part, namely, fruit) when dry. Sometimes it is reddish or even darkish in shade. The stone is oblong. bony, very thick; the angles here are obscure. Fruits ripen from November to March and as soon as they mature they fall down. However, an appreciable amount of immature fruits also fall down. These are also used. The outline and the shape of the fruit vary very much. The net output of the fruit per a tree also varies very much every year. The longitudinal lines of the

fruit become stronger as it dries and it is the variations in these lines that mainly decide the varieties.

Quite usually, a type of insect makes an incision into the tender leaves of the tree and deposits its eggs there. From these cracked surfaces of insect attack a type of fluid oozes out much and the region itself swells up to something similar to a fruit. This is called the gall-nut, which itself is quite useful in many ways, as we shall see later.

The bark of the tree is six milimetre thick, dark brown in colour and displays several generally shallow, vertical cracks. The wood is very hard, brownish grey and has a greenish or yellowish (*harita*) tinge with an irregular small dark purple heart wood and is close-grained. The timber is hard, durable, pliable and takes a good polish.

"Varieties" of Harad

Depending upon the thinness of the outer rind of the fruit, the relative bulk of the pulp within, the general shape of the fruit (elongated or rather stout and somewhat spherical or rather, ovoid) and the colour of its outer surface - greenish yellow, reddish, darkish and the like and the lines on the surface, several "varieties" of chebulic myrobalan are recognised. This is so in the classical authors of Ayurveda eg. as in Rajanighantu or as in Bhavamishra, or the Greek and the Arabic authors and also in modern trade practices. Quite often these "varieties" are associated with a

corresponding difference in quality and medical efficacy. Because of this reason it is important to know these varieties and the criteria of their differentiation.

Ayurvedic authors speak of seven varieties as follows:

1. *Vijaya* (victorious, unfailing): This is the variety which grows in the Vindhya mountains. Fruit here is longish like that of *ghia* (bottle gourd or *Lagenaria vulgaris* Ser), circular, rather thinnish above and becoming gradually stouter basewards. This variety is utilised almost every where. This is the predominant type among all the seven varieties. It is easily available at all places and its medicinal application is also easy; it can be given in almost all diseases and all ages.

2. *Rohini* (restorative; helping in regeneration and healing): The fruits are rather bloated and roundish. This variety is essentially from Sindh regions where it grows well on the banks of the Indus river. It is best utilised in the form of an ointment over wounds, lesions and ulcers. The healing effected is quite commendable.

3. *Putana* (sanctifying): The rind here is quite thin. The 'stone' is also small sized. This variety grows well again in the Sindh regions. This is good for a purgative action.

4. *Amrita* (nectar like; deathless): The pulp here is massive and the variety grows in Champa region (modern Madhya Pradesh). Medicinal efficacy in

this variety is more than ordinary and it is presumably best utilised as a *rasayana* drug - invigorative and conferring a great amount of resistance to diseases.

5. *Abhaya* (conferring fearlessness from all diseasess): The variety grows in Saurashtra region of modern Gujarat State. The five vertical lines on the surface of the fruit are very prominent. This destroys eye diseases, particularly.

6. *Jivanti* (life giving): The fruit here is of a golden colour and the variety is the best for chronic diseases. Its habitat is also Saurashtra.

7. *Chetaki* (animating): This is a Himalayan variety where the fruits have three distinct lines on the surface. It is effective in all diseases.

Arabs call *harad* as *halileh*. Curiously, Kannada, a regional language of South India calls it by name *alale*. Are the two terms related and who borrowed it from whom?

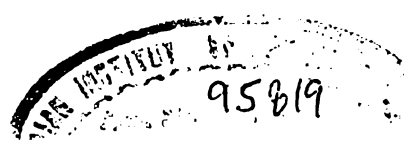
A Greek author Actuarius, describes five varieties of haritaki. The author of an Arabic work called Makhjan-ul-advia describes six of them as follows. They are based on differential stages of maturation. Two varieties are recognised in *chetaki*. A. This grows in the fringe of the Himalayas. The fruit has three lines and is so powerful a purgative that purging is believed to start even if one keeps it in the hand! B. This is also Himalayan. The fruit is dark coloured and grows long upto one inch. It is probably this variety

that is called *bala harad, java harad* or choti *harad* in the bazars.

1. Halieleh-e-jira. The first crops of the season are gathered and dried. Their size is like that of *jira* (cumin) fruit.
2. Halieleh-e-javi. The fruit is bigger and of the size of jau or barley.
3. Halileh-e-jangi. This is a still advanced stage of maturation. On drying it is of the size of grapes. The colour is black. This is from India.
4. Halileh-e-chini. Fruits have become hard here and the colour is greenish yellow.
5. Halileh-e-asphar. Fruits are more or less fully mature but still very astringent.
6. *Halileh*-e-Kabuli. This is the completely ripened fruit.

Of these six varieties, the third, the fourth and the sixth are used medicinally. The fourth and the fifth kinds are mainly used in tanning the leather.

It is interesting to note that tanning content varies along with the degree in maturation of the fruit. The Persian and the Arabic authors have considered immature fruits as good.What is in greater use in the markets nowadays is the third or Halil-e-jangi. Scholars presume this to be corresponding to vijaya variety of Ayurveda.



As it is current in modern trade practices, the term myrobalan refers to *harad* or *haritaki*. It is called chebulic myrobalan only when occasion is there to distinguish it from *baheda*, which is beleric myrobalan. But what gets sold as harad fruit in actual market really comes from three different species of *Terminalia*. They are *T. Chebula Retz* (the true *haritaki*) and two totally different species of the genus *Terminalia*, viz *T. pallida* Brandis and T. *travencorensis* W & A and T. *citrina*, Fleming.

What is seen in Indian bazars is of three "varieties". (i) The small (*halil syah*), (ii) The yellow (*halil jard*) and (iii) The big (*halil Kabuli*). Quite probably all are taken from the same tree at different stages of maturation. Those unripe fruits which are plucked out or may fall down by themselves even before 'stone' formation inside are the first variety. Those that have 'stones' but still immature are the second while those that are fully mature in all ways constitute the third.

Yunani physicians also recognise differences in activity among the three. The small is the most astringent.

There is one more assessment of "varieties" of *harad* as seen in the market samples. The reason why so many different "classifications" of "varieties" exist in the literature is because the market samples of this fruit have been always much variable and the experiences of physicians

using them have also been varying. They mostly do not come from different botanical varieties and are mainly due to different stages of plucking and changes in drying.

In general the fruits are oval in shape, about 2 inches long and of a dull yellow colour. There are four varieties: (i) *Survari harad* Fruits are large, dense, heavy about 2 inches long, yellowish brown and on cutting they show yellowish or darkish brown pulp and stone. (ii) *Rangari harad.* Fruits are smaller, less wrinkled and less furrowed, about 1 inch long, yellow and on cutting they show a yellow dried pulp and a stone. The pulp is also less astringent than the above.(iii) *Bala harad.* Fruits are smaller than in the above two, their colour is deep brown or black and the surface is highly wrinkled and dark or brown in colour. Pulp is dark and homogeneous; there is no stone within. iv) *Java harad.* Fruits are the smallest among the four varieties. Other characters are similar to *bala harad.* Quite likely, the last two "varieties" represent unripe fruits fallen by themselves or plucked from the trees, dried and sold.

Harad is a safe and gentle laxative. Unripe fruits are more purgative than the ripe which is more astringent. *Rangari harad* is alterative (i.e. brings about desirable alterations in the vital functions of the body), good for stomach and tonic. *Survari harad* is a valuable purgative, while *bala harad* is a mild and safe laxative and antibilious (acting against pitta or *bile* disturbances).

Rangari harad is particularly used in fevers, cough, asthma, urinary disease, piles, worms, rheumatism and scorpion sting. *Bala harad* is very beneficial in chronic diorrohea, and dysentery, flatulence (bloating stomach and bowles because of gas), vomiting, hiccup, colic (twisting pains of the stomach) and also enlarged spleen and liver. Ground fine with water and sugar it is used in eye diseases. *Java harad* is used more or less in the same ways. Its cold infusion is a good gargle for sore mouth and stomatitis (inflammation of mouth) and also for spongy and ulcerated gums. Ground with rose - water, it is a cooling external application to morbid swellings.

Parts of the plant used medicinally are dried fruits (whose various "varieties" we have seen above). immature fruits, and galls, and mainly the outer rind and pulp of the fruit.

Adulteration in Trade

Since *harad* is very important medicinally and as the current and the most popular practice goes, specially to treat children's disorders, the fruits have a good market value even as a home remedy. As noted above there is a considerable foreign trade also in this fruit apart from this domestic supply. Whenever a drug becomes very valuable and commands good money in this way there also arise many skilful means of adulteration in its supply. Infact to get a pure supply of any drug becomes difficult nowadays for it is either of an

interior quality or mixed with many foreign matter and often a downright fraud. Many examples of such adulteration exists: dried seeds of *papaya* being sold as black pepper (*kala mirch*) which they resemble much or coloured, scented wood fibres sold as genuine *keshar*.

It is because of such reasons, separating the genuine material from the counterfeit ones becomes an important and scientific need specially for the manufactures of medicines based on plant products. *Harad* from market is usually mixed with mud particles, sand grains) mica, and other plant material like *kuchala* (nux vomica), *asan* (another species of *Terminalia* viz *T.tomentosa*), *divi divi* (*Caesalpinia coriaria* Willd), galls and so on. A mixture with *divi divi* which is most usual can be detected by a simple procedure. Spread the powder of the material to be examined on a white paper. Even a hand lens will show out then that the *divi divi* particles are always shining while those of *harad* are not.

None would however ever think ordinarily that there can be artificial *haritaki* fruits available in the bazars. If the weight of an individual *haritaki* fruit goes beyond twenty five grams, it gets sold as individual units and not in bulk. If the weight is thirty to fifty grams, its price goes from eighty to hundred rupees. Indian Marwari Community has a custom and liking to purchase such weighty fruits for their cherished home remedy. They are always in search of such treasures. A flourishing trade for

them naturally exists in the big cities of Bombay, Calcutta and Bikaner in Rajasthan. If the fruit crosses this weight range and reaches fifty to sixty grams the price is in hundreds of rupees per fruit.When this was realised a tuber called *jalaapa* (from a plant *Ipomea jalapa* Schiede, totally unrelated) which is similar to *harad* in general shape and colour began getting sold as *harad* fruits. Its tubers normally reach a weight of fifty to sixty grams; so, this way, there was no difficulty in securing weighty *harad* fruits. This trade started in Amritsar and spread from there to Rajasthan where the demand was great. Infact this secured a respectable trade name as well and began getting called as *jalapa harad !*

The adulteration 'techniques' improved further. Some would slit open the normal fruits of *haritaki*, fill its inside with lead particles and sell as high quality material. This was the practice among the commercial cheats of Amritsar and Delhi. The cheats from Bombay excelled them in a totally clever way. They would prepare a metal mould of a big sized *harad* fruit, fill it then under pressure with the materials from genuine *harad* fruits, powders as well as pulp and finally give a touching of the genuine *harad* colour and shape on the surface. These "fruits" would easily reach sixty to hundred grams in weight!

Distinguishing between these adulterants and the genuine stuff is not difficult. The *jalapa harad* would not have the stout and straight stirations of

the true *harad* material; the striations are thin and wrinkled. On cutting open, *jalapa* would not yield any stone and seed inside; its powders taken in the mouth would stick to the sides and cause a burning sensation. The Bombay "*harad*" would loose its colour on being dropped in water and on rubbing, the powders of the "fruit" would come off; this also does not contain any seed or stones as the genuine material does.

How to recognise good harad. The fruit as we purchase from the market should be fresh, densely oily looking on the surface, spherical in outline, heavy and on placing in water should sink down. Its weight should be about four *tolas*. 'Stone' should be small sized. Charaka considers the Himalayan *harad* as the best. He further writes: there are two types of *rasayana* or elixirising drugs in the world. Those that promote vitality and those that confer resistance to disease. *Amalaka* is the best in the former category, *harad* in the latter. *Amalaka* is cold in action, *harad*, hot.

Medicinal Use of Haritaki

Harad fruits are in active medicinal use for a large number of diseases and in all states of India. Infact, there is a saying in Karnataka that an ayurvedic physician is essentially a physician of *ALALE Kayi* (the name for *harad* in that language); for, he prescribes it to all most any conceivable disease! Ayurvedic Texts do also declare that this is

found useful like a mother in all types of diseases - its one of the names is *dhatri*, the mother.

General Actions : They regard *harad* as light in digestion, hot in quality and dry in action. In general, it destroys diseases that are due to impletion or *santarpana*. Even though, an astringent taste is predominent, in post-digestive effect or *vipaka* it is sweet or *madhura*. Its tastes are five; virility, hot; post-digestive effect, sweet and it counteracts all the three vitiations of *vata*, *pitta* and *kapha*. Among the six *rasas* available, all excepting salt is present in *harad* fruit. Infact, the ayurvedic authors go to the extent of locating these five *rasas* differentially in the various regions of the fruit. For instance, Bhava mishra, regards the stone of the fruit astringent, marrow or flesh as sweet; rind as bitter; fibres as acidic and the stalk as pungent. He further presumes that its sweetness, bitterness and astringency enable the fruit to act against aggravations of *pitta*; its bitterness, pungency and astringency enable it to pacify *kapha doshas* and its acidity enables it to counteract *vata doshas*.

This author writes extensively on *haritaki*. He recognises differentiations in action depending upon the way in which it is used. If it is chewed and eaten, it stimulates digestive fire viz digestive ability. If ground on stone and then consumed, it will purify impurities (*mala*) of the body. If eaten after cooking it in warm steam it obstructs *mala*. If

roasted and eaten, it can destroy the effects of the aggravations of all the three *doshas*, *vata*, *pitta* and *kapha*. If eaten along with meals, it will develop intellect, strength and sensory abilities, destroy all the three *doshas* and remove the impurities of the body. The same fruit, if eaten after meals, it will quickly take away all the blemishes of the food and the drink and also the ill effects that may arise due to all the three *doshas*. If eaten with *saindhav* salt, it acts against Kapha, with sugar, against *pitta* and with jaggery against all diseases.

Kaiyadeva, another reputed author on Ayurveda recognises differences in action based on variations in the habitats of the tree, such as growing in regions near water or in the plains of the jungles or on mountains. The best in quality are those from the mountains; next comes the tree growing in the plains and the tree of the watery regions is of the last rank.

Harad is used along with the fruits of *baheda* (*Terminalia belerica* Roxb) and *amalak* (*Emblica officinalis* Gaertn) as *triphala* (the triad of fruits) extensively in almost all diseases. In the medications of ayurveda, *harad* forms an ingredient in most of its valuable drug recipes. Vaidya monorama, a well known classic on ayurveda extols that there is no drug more useful than *harad*. There is infact a saying that for those who do not have a mother, *harad* should be regarded as their mother. This particularly refers to the need of using this fruit for removing all

afflictions that arise in infants who are fed with milk other than that from the mother.

The fruit is beneficial if taken before meals, along with the meals or after the meals, or when the food is digested or when it remains undigested totally or partially—or in other words, at all stages of its passage within the body. The fruit protects a person like his own mother. "It is likely that a mother will get angry with her son, but the fruit of *harad* once eaten will not aggravate any vitiation" so declares a Sanskrit saying. As regards its role in children, the fruit of *harad* is always wholesome just as *ber* or jujube is always unwholesome. Among the list of his wholesome substances, Charaka regards *haritaki* as the best. Because of many such reasons as well as actual use over countless generations, *harad* has become now an almost invariable and highly important ingredient of many house-hold remedies.

Another important field of action apart from its beneficiary effect in digestive function is the role of *haritaki* as a *rasayana* or an elixirising drug. This fruit augments general strength, arrests the deleterious effects of aging and increases the span of life or *ayu*. It is extenisively used for these purposes. Charaka mentions a set of ten medicines each for stabilising intellect (*prajna sthapaka*) and arresting aging (*vayasthapaka*). *Haritaki* finds an honoured place in both the lists. A powder prepared out of this fruit roasted in ghee and taken along with ghee and followed with good food will

ensure commendable vigour and strength in both the body and the mind. An important connotation of the term *rasayana* is worth while to be stressed here. *Rasa* also means the assimilable essence of all the food we take. A body will remain hale, healthy and vigorous only when this essence is distributed well and all over. It is this that brings about health and augments its disease resistance capacity as well as abilities for restorative reactions and in countering all deleterious effects including that of aging. This is the full implication of the term *rasayana*. *Haritaki* is one of the best *rasayana* drugs of ayurveda carrying out all of these functions. However there is a definite procedure of taking such elixirising drugs and this has to be followed meticulously if one desires to derive all the benefits extolled in the literature for them. One chief criterion is that the person should have good and wholesome conductance in his life, in food, behaviour and mentality. Elixirs will show their best results only when taken by such persons.

The principal action of *haritaki* in the body is to expel all foreign material in every organ and thus cleanse it and regulate its activity. This may be stomach, blood, brain, heart or urinogenital system and so on. Everywhere its action is the same: cleanse and set right. It is because of this uniqueness of ability, ayurvedic physicians extol it so much. Modern Medicine has not utilised this great treasure till now with all the respect it richly deserves. But ayurvedic physicians have used it

since thousands of years with success and continue to do so even now. This is not merely as a momentary cure for any ailment but more as an elixir that would rectify and improve all the vital functions of the patient in the meanwhile, apart from correcting the specific ailment for which it was initially taken. There is a tradition in India to start giving *harad* to very young infants even to clear their bowles. Besides rectifying the momentary need this practice lays down in fact foundations for a life time capacity of reistance to disease, for the growing individual and that too at a very formative phase of his life.

After entering the stomach, *haritaki* removes the loose faecal matter (*dast*) and along with it all the foreign matter collected therein. Hunger is powerfully kindled. Irregular formation of faeces due to indigestion or constipation will stop henceforth and the natural rhythm of the ailmentary functioning gets fully restored. Among the fruits of the world that are wholly wholesome and do not create any adverse reactions or harm whatsoever are the following three as our anceint experts have found out: *haritaki, bibhitaki (baheda)* and *amalaki (emblic myrobalan)*. The three together form the famous triphala, the triad of fruits. All together or every one of them individually find numerous and successful medicinal applications.They have been used to cure almost all diseases. Among these three again, the use of *haritaki* is the widest.

Quite often *harad* is called a *yogavahi* and a *rasayana*. *Yogavahi* is any substance which when taken with another, increases the efficacy of the latter and facilitates easy absorption of it by the body. The usefulness of such a role in medicine is quite crucial. *Rasayana* is that substance which is good for all people at all stages and all times, and which counteracts disease and confers disease resistance capacity to all organs of the body, increases their vitality and assures a long and healthy life.

Haritaki is excellent on both of these counts.

Some specific medications using *haritaki* can now be mentioned. They are as given below:

(1) As a Remedy Against Many Diseases

Cut the fruit of *harad* into many small pieces and add *munakka* (dried black grapes) after removing their seeds. Pound the two together and make it into a mass. Prepare a small ball out of this mass, of the size of *baheda* fruit. Take this as a habit every morning. This destroys *pitta dosha* in general.

Besides, this proves an effective remedy that will easily ward of the following diseases: *afara* (swelling of the stomach, caused by indigestion and accumulation of gases on an eating of a surfeit of food), anorexia (tastelessness in the tongue that often accompanies as an after effect of many serious afflictions), splenic enlargement, coughing, anaemia (pallor due to scanty blood), jaundice,

typhoid fever, disease of the heart, blood and skin as well as urino genital disorders. *Harad* acts here almost as a prophylactic (i.e. preventive) measure.

Another belief of ayurvedic physicians is that the fruit of *haritaki* treated (*bhavana*) with sugar is unfailingly beneficial in the following diseases: anorexia, indigestion, *afara*, shooting pains of the stomach, acidity of stomach and acidic belching (*amlapitta*), hiccup, loose motion, feeling of frequent thirst, feeling of heat and burning in the body, fever, dizzyness of the head, anaemia, alcoholism (i.e. the ill effects of drinking too much liquor, *madatyaya*), haemorrhage or blood flow in any region of the body (*rakta pitta*) or plethora, coughing, asthma, urino genital disorders and disease of skin and the eyes.

(2) A Seasonal Regimen for Rasayana Effect

A persistent claim made by the classical authors and very well proved by many trials in modern times is as regards a seasonal utilisation of *haritaki*. The advice is prescribed for all those persons who desire to derive the best elixirising or *rasayana* effect from this noteworthy drug. They should eat the fruit with different substances varying along with the seasons as follows: along with *saindhav* salt in rainy season (*varsha*), with sugar in autumn (*sharad*), with fresh ginger in the early half of winter (*hemanta*), with *pippali* in the latter half (or *shishira*), with honey in spring (*vasanta*) and with jaggery in summer (*grishma*).

One fruit of *haritaki* is to be eaten every day in the morning in this manner.

This regimen when followed for a year regularly is believed to be capable of destroying all kinds of diseases. The remarkable restorative and the elixirsing effect as well as the development of a disease resistance ability have been quite frequently observed to be all true in many individual cases following this regimen. The proportion of jaggery should be equal to that of the fruit while that of sugar should be half. The mixture with salt should be taken along with water and all the rest along with milk.

(3) In the Disease of the Stomach

Charaka advises it to be beneficial to administer the powder of *haritaki* along with cow's urine in stomach disorders. There is a variation in the number of the *harad* fruits to be used in this way ranging from ten to even thousand! An advisable modernistic version in this direction is to commence treatment with one fruit to start with and then increase it by one every day till ten days. After this, continue till 900 fruits are reached in ninety days. Afterwards, reduce the number of the fruits by one every day. Such a regimen of administration has been tried by some modern ayurvedic physicians with no harmful effects. However it is evident that a desirable standardisation of such quantitative consumption is yet to be settled in modern times. Charaka's

opinion was probabaly that a patient of stomach disorder should totally consume 1,000 fruits of *haritaki*, the daily dosage depending upon the strength of the patient and also the severity of the disorder.

(4) In Indigestion and Emesis or Vomiting and Hiccup

If the food eaten does not get digested properly (i.e. there is *amajima*, a persistent presence of undigested food in the alimentary tract), it has been found useful if *harad* is eaten daily with jaggery. By taking its ground fruit along with jaggery, dry ginger or *saindhav* salt, the digestive capacity of the stomach is highly stimulated.

Take six *tolas* of *harad*, four *tolas* of *pippali*, twelve grams each of *gaja pippali*, *chitrak*, asafoetida (*hing*) and *saindhav* salt. Powder them all together and store.

By taking this powder, digestive fires are stimulated, the digestive juices are secreted in adequate quantities and hunger is augmented. Improvement in health is noticably great.

A more powerful recipe to increase the hunger very much is: take ten grams of *saindhav* salt, twenty five grams of *ajvayan*, thirty six grams of *chitrak*, forty eight grams of pippali, sixty grams of dry ginger and one hundred and eighty grams of the pulp of *harad* fruit. Power them all together and store. Consuming this powder will kindle literally a raging fire of digestivity.

To stop vomiting, the power of *harad* is licked along with honey.

Drinking the powder of *harad* in hot water will stop hiccups.

Mix 1-1/2 *tolas** of the powder of the big sized *harad* fruits in water, prepare a decoction by evaporating this water to its one fourth quantity on a low fire. Filter this decoction and add 4 *ratti* of dry ginger and 2 *mashas* of *saindhav* salt. This will produce a good motion. This is good for obstructed motion, indigestion, new dysentery and new griping in the stomach (*petchis*) and piles. Because of *harad*, during this motion, there will be no nausea, no filling up of mouth with water, no pain in the stomach, no violence in the bowels and the digestive ability is just augmented well. That is why *hairtaki* is considered the best among the purgatives. But if there is an obstruction in motion during new fever, *harad* should *not* be employed. For it has a constrictive effect at the end of the purging action and this is better avoided.

(5) In Amatisara

In this condition as well as fresh griping of the stomach, a preparation of 4 *mashas* of *harad*, 1 *masha* of dry ginger and 3 *mashas* each of sugar and honey is beneficial. As a result, the obstructed

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* Modern equivalents of their traditional units are : 1 *ratti* = 1 *gunza* (a seed of *Abrus precatorius*) 8 *gunzas* = 1 *masha*; 10 mashas = 1 *tola*; 24 tolas = 1 *ser*; 1 *tola* = 10 grams.

faecal matter gets expelled comfortably, the intestinal violence pacified and the relief is quick and certain. If however, there is too much heat in the intestine and too much thirst felt by the patient, give him a drink of the *phanta* (cold infusion) of *saunf*. This will help in removing the obstruction and quieten the violence.

(6) In Itching and the Minor Skin Troubles

Fry *harad* in oil and apply this oil for massaging, keep doing so to get relieved from eczema. Itching, boils and eruptions and abcesses react well for *bala harad* employed in this manner.

(7) In Shooting - pains

In such pains that are caused by the bile disorders (*pitta shula*) a simple remedy is to eat the powders of *harad* fruit along with jaggery and ghee.

Cook the fruit of *hairtaki* in cow's urine. Dry it fully, powder and mix *loha bhasma* along with it. This is a sure remedy for all types of shooting pains.

(8) In Splenic Enlargements

Sushruta advises the use of *harad* along with jaggery here.

Kashyapa advises giving *harad* (powder) mixed with jaggery in consumption cases and this is to be followed with an after drink or *anupana* of milk.

Powdered *harad* is given with *vid* salt. Though it takes much time to get the enlargement reduced, the health of the patient improves remarkably in the meanwhile.

(9) In Anulomana or Regulation

Anulomana means sending or putting in the right direction, carrying off by the right channels, viz purging.

Harad is considered as the best among the *anulomana* drugs or the purgatives, safest, unfailing and unaccompanied with any untoward effects or complications. Ripe fruits are given to set right *pitta* and *kapha* aggravations by purging. The effect is not accompanied with any rise in temperature or any type of agitation and is very quick. Persons complaining from chronic constipation as well as aggravated *pitta dosha* and therefore demanding of gentle but effective purgatives would find the fruit most beneficial.

Taking a *murabba* (a sugary preserve or marmalade) of this fruit before sleeping at night is very much advised for these patients.

Chronic constipation is cured by taking the fruit daily with jaggery. Its powders mixed with aromatic substances like *saunf*, *jeera* and *dania* is a pleasant purgative, or a pinch of this powder followed by a cup of warm milk or water before going to bed at night would very well do. Another pleasant way for the same purpose is: take three and a half to seven gram of the *harad* powder

prepare its decoction with a little bit of *saunf*, add a spoonful of honey or unrefined sugar and drink at bed time. For persons with tender bowels, six to twelve grams of *haritaki khand* at bed time along with a glass of warm milk or water is the best. Those who have stools that are hard, dry and in the form of pellets like that of the goat are advised to take cold decoction of *amlaka* (emblic myrobalan) mixed with three grams of *harad*, half a gram of *nausadar* and one gram of *tutaki* every morning for some days.

For kings and royal persons, for those whose constitution is very tender, for the weak and for those who hate taking medicines, *haritaki* is particularly advised as the most comfortable purgative.

Bhavamishra affirms that he has seen a variety of *harad* called *chetaki* by eating which or by smelling or by touching or by even seeing, alimentary regulation (*anulomana*) will come about and purgative result is effected!

Young fruits of *harad* are softly purgative. They destory morbid gases and are strength giving and hence excellent in habitual constipation, better than *cascara sagrada* of the Modern Medicine. They are not elixirising like the older fruits; their action being almost limited to alimentary system only. Using them with salt is specially salutary. The bigger fruits are particularly useful in all problems of indigestion. Dysentery, looseness of the bowels, tenesmus (painful and ineffectual

straining to relieve the bowels), excess of glutinous matter (*av*) in the bowles and the purge - all of these find a remedy in this fruit.

(10) In Dysentery and Diarrhoea

Harad is considered effective in these conditions because of its astringent and palliative activity. It may be given alone or along with some aromatic substance for this purpose. Bhavamishra gives a caution here. This should not be given in *amatisara*, dysentery due to indigestion, for its astringent action will obstruct *mala* as well as the vitiations. As such, many undesirable and serious complications would ensure. It is best given when *mala* has started coming by itself or is coming out with difficulty. Then a purging will occur comfortably removing both the *mala* and the vitiations, the violence of the dysentery will quieten down, the body will feel light and hunger gets increased almost pleasantly. In *pakvatisara*, or dysentery, following digestion, *harad* powder is advised along with the warm water. Pills of twenty five centigram *harad* powder are given with benefit in all types of dysentery, diarrhoea, highly chronic dysentery and also choleric dysentery. In such cases of violent dysentery where the patient is purging repeatedly in little quantities but accompanied with much pain, administering the powder of *harad* with an equal quantity of *pippali* powder in warm water gives a surprisingly quick and beneficial result.

(11) In Piles

A patient of piles often complains of hard viscera and severe constipation. Vagbhata considered it most propitious to give him *harad* fruits cooked in cow's urine and along with jaggery. The procedure is as follows. Keep the fruits soaked overnight in the cow's urine. Give them next day morning along with jaggery, or, with a *lassi* of *harad* powder as *anupana* or the after drink. If the piles are internal, the patient should eat the fruit with jaggery in the morning. In bleeding piles taking the fruit with jaggery after meals daily will be quite beneficial or, its decoction is also advised. Fry the fruits in ghee, dry and powder. Add *pippali* powder in equal measure and an adequate quantity of jaggery. You have a very efficient and easily prepared medicine for piles. For external piles, washing the growth with a decoction of *harad* will be effective because of the latter astringency. But this is to be done *after* passing the stools. If the pain of the piles is too severe, washing with a cold decoction of *harad* repeatedly will be useful. Or an external application of the ground fruits is also advisable. Giving *harad* with *saindhav* salt is good in piles.

A patient of piles usually has a persistent complaint of consumption. *Harad* is a very good medicine for them. Such a patient should take at night before going to bed the powder of *choti harad* fried in castor oil along with butter milk and sugar. Bowels will clear comfortably and no pain will be experienced at the outgrowths, during motion.

Taking the powders of *harad* fried in castor oil along with *pippali* and *saindhav* salt clears the bowels well, strengthen the intestine and the *vatic* troubles of the stomach get regulated fully.

(12) In Coughs

The distress of cough gets reduced by taking the powders of *harad* and *baheda* along with honey. Digestive power is also increased thereby.

Some patients, specially of asthma are prone to get severe attacks of coughing and this may start suddenly even as they walk about. This is not merely distressful but also makes them extremely weak and worn out.

Such persons are well advised to take to use *harad* fruits. At least the severity would be got reduced there-by.

(13) In Bleeding Nose

Stir well the powder of *harad* fruit in bamboo water and then dry. Do this many times and to such a highly treated (*bhavana*) powder add a little *pippali* powder and let the patient lick this preparation along with honey. Even uncontrollable cases of bleeding react well to this treatment. This is an advice from Harita.

Harad is excellent in preventing haemorrhage (or blood flow) anywhere in the body.

(14) In Thirst Accompanying Fever

In *sannipata jvara*, patients frequently suffer from irresistible thirst. Licking the *harad* powder along with oil, ghee and honey will be effective for them; the violence of thirst will vanish. Charaka includes *haritaki* in his ten famous drugs (*dashemani*) for fever. He also includes it among the ten famous drugs for removing cough (Kasahara).

A smoking-in of one *harad* fruit through the *chilam* or the hubble bubble will stop the asthmatic violence.

(15) In Alcholism

A patient of the ill effects of too much liquour (*madatyaya*) is well advised to drink a decoction of *harad* mixed with milk. For him 4 *rattis* of *khurasani ajvain* 2 times a day will give good sleep and the efficacy of *harad* is increased.

Taking of *jayaphal* (*Myristica fragrans*) leads to intoxication.

Bhavamishra recommends *haritaki* as the best in overcoming this affliction.

(16) In Urinary Disorders

Harita recommends taking *harad* powder along with honey in all kinds of disorders in urinary functions. There are two other recommendations by our ancient acharayas of a similar nature. In cases of urination with difficulty or dysurias and

when sperms come along with urine or spermatorrhoea (*shukra meha*) Charaka advises a drinking of *harad* powder with *lassi* (sweetened butter milk). The fruit is to be cooked in cow's milk, ground and consumed as Vagbhata recommends.

(17) In Gout (vata rakta)

Adminster *harad* and jaggery. By eating one to two fruits with jaggery to be followed by an after drink (*anupana*) of the decoction of *guduchi* (*Tinospora cordifolia* Miers), even an advanced gout that has spread upto the knee will become pacified and will come under control.

(18) In Elephantiasis

This is a disease caused by a microscopic organism *Filaria bancrofti* spread through Filaria mosquito. The malady is quite prevalent in most coastal areas of South India specially and there are certain regions where the incidence of the affection is so heavy that they are called Packets of Filaria. Characteristically it results in abnormal swellings of the leg beginning from the feet. But it may affect other regions as well, for eg. scrotum. There are not many drugs for this repulsive disease.

Soak *choti harad* fruits in cow's urine for 7 days, changing the urine every day. Dry them then in shade, grind, mix *saindhav* salt and store in a bottle. Taking 2 to 4 *mashas* daily at night will reduce the scrotal enlargement within 3-4 months.

If there is a morbid swelling over the scrotum, constant external enlargement application of *harad* ground in cow's urine or water would also be beneficial.

Harad fruits are considered useful here. They are ground with water into a thin mass and given as a drink in cow's urine.

(19) In Skin Diseases

Charaka includes this fruit in his famous ten lists of drugs for skin diseases. This is given either as a local application externally or orally within, in the form of a decoction or eaten along with food in various forms.

This helps in removing the internal vitiations of the body in general and blood in particular as a result of which the skin disease has become manifested on the outside.

(20) In Wounds and Lesions

The fruit is rich in gallic acid. As such, it is very beneficially used as an ointment or a thin paste over even very old wounds and all types of lesions.

A gargling of its luke warm decoction is good for inflammations in the mouth.

Dried pulp of the fruit is to be burned into an ash and this ash mixed with butter or vasilin makes up a very excellent ointment for all cases of external application.

(21) In Diseases of Mouth and Throat

Young children and adolescent boys are prone to suffer from repeated attacks of apthae (red roundish inflammations on the inside of the bucal cavity, or *mukha pak*). These recur almost every season.

Gargling of *harad* decoction three times a day will prove effective for them. In diseases of throat, this decoction is drunk with honey.

For the wounds in the throat region, this is a good washing medium.

Old people in Sikkim chew the pieces of *harad* along with *kath* as a strengthening substance to the teeth. Fine powder of the fruit constitutes a healthy tooth powder that will be curative to bleeding gums as well as teeth with carries.

(22) In Eye Diseases

Soak the powdered fruit over night in water. Cleaning the eyes next day in the morning with this water is extremely cooling and beneficial. Washing the eyes daily with its thin cold decoction will remove the burnings at the eyes.

Harad fruit is fried in ghee and made into an ointment for application at the sides of the eyes in many other diseases.

A Miscellany

Many people have a tendency to sweat too much, or when they once catch a cold and the

nose starts running, phlegm continues to linger for a long time even though its violence is over; or, even for a small injury, pus starts getting formed there.

For all these persons, using *harad* will be very profitable. They can take it in any form they desire. Effect will be beneficial. Irregularities will get reduced and the relief is certain.

Sift the powder of *harad* in a piece of cloth, massage with it all over the body and then take bath. Extensive sweating will stop.

If you are a smoker, give it up during this period at least. Do not take too hot foods and drinks; these will aggravate the situation.

An Important Caution

Though *haritaki* is so useful in many ways, the following persons are advised not to use it at all; it is contraindicated for them: a patient of indigestion; one who consumes dry food; one who has become weak due to sex, wine or any poison; one who is highly fatigued due to physical labour, over exertion or a long journey; a highly bilious person (i.e with *pitta* tendencies) or one who has lost blood recently due to haemorrhage and a pregnant woman.

Besides, the use of *haritaki* is contraindicated in the following diseases also: fresh fever, *hanusthambha* (lock jaw), *gala graha*, and *mukha shotha* (morbid swellings at the mouth).

Yunani Opinion

Yunani system of Medicine also regards *harad* (called *halil*) in high esteem. It distinguishes among its three "varieties" as regards their actions and uses as follows: (i) *halil syah*. This is of first degree cold and second degree dry. It strengthens the mind, dries up the liquids in the body, promotes the power of the bowels and purifies blood. It is employed in improving intellect and memory, and particularly acts as a beneficial in melancholia (obsessive sadness) and also in augmenting the acuity of the sensibilities. This is very salutary in all complaints of hard bowels and upset stomachs. To stop dysentery this is fried with ghee or almond oil, dried, powdered and given. Besides stopping dysentery it also strengthens stomach and intestines. The dosage is 5 to 7 , *mashas*.

(ii) *Halil-e-jard* . This is also first degree cold and second degree dry. It is salutary to brain and eye and stimulative, astringent and purging to *pitta*. This is used in many ways in mental diseases such as delusion, confusion and epilepsy. Because of its astringency and salutary nature to the eyes (*chakshushya*), it is rubbed with honey on a slab and then applied at the corners of the eyes. This is beneficial in weakness of vision, oozing at the eyes and the redness of the eyes. Its stimulative nature renders it effective in digestive dysfunctions. Because of its action on *pitta*, it is used in several disorders of *pitta* such as acidity of the stomach. It is to be noted however that its *phanta* or cold infusion is more powerful than the decoction. Its

murabba is given to strengthen brain as well as stomach and also to remove a constipative seizure (*kabjiat*). Dosage is 5 to 7 *mashas*. (iii) *halile-e-Kabuli*. This is purging to all the three vitiations. This is employed in overcoming confusion in the mind, clarifying and strengthening of mental abilities and in purifying blood. In olden days it was this type of *harad* that had a flourishing trade in the markets of Toran, Khurosan, Iran and the like and this supply reached them via Kabul in Afghanistan. That is why it became called the Kabul "variety". This is the best among the three. (iv) The fourth "variety" called The yellow is probably not used in medicine; it is a raw material for manufacturing pigments.

Other Uses of Haritaki

This famous plant of Ayurveda has many other uses apart from its medicinal value. A few of them are given below. They are mainly in tanning the leather and manufacturing dyes.

Extracts of Harad: This is the only extract commercially manufactured in India, as it finds a market in tanning industry. Though tanners do not secure here as much tannin as they expect and as they do get when they make use of the fruits instead of the extracts there does exist a considerable amount of demand for this extract itself in our country. Reasons for such a non preference of the extract is two fold. Firstly its colour is not good. Secondly, because of the containers used in their manufacturing, the acid

contents get reduced and the capacity of bringing about the special feel of the final leather—the "bloom making" (for which tanning is mainly under taken) is also lessened. If better fruits are selected for preparing the extracts, the quality may improve. But the cost of production may also increase.

Tanning: Converting raw animal hides into valuable leathers is a complex biochemical process that has been the prerogative of the vegetable substance tannin from very ancient times. A major use of *harad* is as a raw material in this tanning industry. Still, *harad* is not a very powerful astringent actually and its tannin also does not penetrate the hide very quickly. Hence, using it alone is not very satisfactory. But when this is used along with other leavening and acidifying substances, its effect is most praise worthy and unparalleled almost. It renders the leather remarkably pliable and gives a very high quality feel; the latter is due to the presence of a great percentage of an acid called ellagic acid in the fruit. The dollar earning Leather Industry of South India which commenced from the British Period even (the process itself being called the East India Process) is wholly due to this speciality. Ten to 175 grams of *harad* powder is needed to prepare one kilogram of leather in general

Dyeing: There is quite an abundant use of *harad* fruits in dyeing industry to prepare several pigment materials. The rind of the fruit is powdered and soaked in water. If cloth is boiled in

this, a brownish colour will result. If alum is added with this, the dye will be bright yellow. Adding any iron salt (ferrous sulphate) can procure varied shades of black. To secure a density in the colour add a little jaggery and the pieces of the dry fruit of *Diospyros embryopteris* Pers (*tinduka* or *tainda* - Wild mangosteen) along with the iron salt. If the ferrous sulphate and *harad* are employed, in a specific proportion that will yield a khakhi colour. Harad is well used in South India in this way to colour leather, cotton and wool. But the more important role of this fruit is to render whatever base colour that is used (red, blue, yellow and so on) dense and shining, thus improving their quality and fineness. Just as in tanning the leather, *harad* is more precious to turn out a high class and very quality richness of colour. It is because of this reason, the fruit forms an extremely valuable raw material for dyeing industry in general all over India.

Ink Manufacturing: A country ink is made out of *harad* fruits along with a few metallic salts. For this purpose, such of the fruits which have become rather blakish and powdery below the rind are used; these are not put into any medicinal application or in tanning. Their use is solely in ink manufacturing, but there again, they yield a quality product of writing material.

Gall Nuts: As noted above, fruit like growths are formed frequently in this tree as a result of an infection by an insect. These form the gall nuts. The galls of *harad* also yield good quality writing

ink much as do the galls of the oak tree in Europe. A very high class and fast yellow dye is prepared from employing these galls along the Coramandal Coast. Tannin content is rich in the galls and as such they are used in tanning industry as well as in fixing the colours and more particularly the various shades of it.

The bark of the tree finds some application in softening or arching the leather. It is used in securing black or khaki colour and in Bengal and Manipur, it is used in dyeing bamboo handicrafts. The shade of colour that the bark gives is quite similar to what one obtains by using *babul*. The wood of the tree is quite durable and takes a very nice polish. It forms a good timber for furniture as well as many household and agricultural wooden implements. The tree also produces a gum which finds a market along with those from many other trees such as *kikar* or *babul*, *mahua*, *bakayan* etc. This has some use in dye making as well as in tanning.

Chemistry

Harad contains astringent principles, 45 per cent of tannin (tannic acid), a large amount of gallic acid, lucilage (a brownish, yellow colouring matter) and chebulinic acid which splits on heating into tannic and gallic acids.

The special substances here are the chebulic acid the myrobalenene. Most of the tannin is of the kind called pyrogalol tannin. Very importantly the

percentage of gallotonnic acid has been seen to vary from six to thirty per cent in accordance with the maturation stage of the fruits. Tannic acid is mostly in the pulp of the fruits; the purgative principle also resides here. There is a greenish oily resin in the fruits; this is the myrobalenene. The percentage of tannin in gall fruits is about 13.1. There is no tannin in the stone, but this contains an important oil, which can be put to many uses, though not medicinal.

Most bazar samples of the fruit yield 30 to 40 per cent of tannic acid. Good varieties may go upto 50 per cent. The role of *harad* fruit in tannery is not always for tanning; it is often very important in leavening the leather (*khamir uthana*) or to increase the weight of the leather, the feel and most importantly the luxurious quality.

The bark of the tree is also a good source of tannin. In the Burmese *Terminalias* (called Panga tree), leaves, branches, barks of the branches as well as the main trunk-all of these are rich sources of tannin, but not the fruit.

Special Recipes and Yogas

1. **A methodology for securing the *rasayana* effect**

Taking *harad* as per prescribed methodologies of the Texts and daily will arrest old age and increase the span of life. But this effect can be secured in the fullest measure only for those who are

continent, take wholesome food, carry out physical exercises and do not hate any one either in mind or speech.

Mix the powder of *harad* in ghee and coat this on the inside of an iron vessel. Keep this so over night and remove it out the next day morning. Take this in with ghee or honey. This measure will strengthen the body, ward of the diseases and increase the life span. The seasonal regimen as already noted above is a certain and time proven procedure to secure the benefits of *haritaki* in full.

Triphala is a powder prepared from equal quantities of the pulp of three fruits, *harad*, *baheda* and *amalaka*. By taking this with an equal quantity of ghee one can avoid bilious complaints, phlegmatic troubles, urinary disorders and digestive dysfunction. This will also increase the lustre of the eyes and the whole body becomes strong and sturdy thereby. Taking habitually *harad*, *amalaka*, *chitraka root* and *pippal* in equal proportion and in a powdered form will remove skin diseases, aggravations of *pitta* and *kapha*, urinary disorders and coryza (running of the nose). This amply increases the digestive power and will also render the body strong and disease free. This medicine is particularly useful to all those persons in whom *kapha* and *meda* (fat) are predominate.

2. Triphala Preparations

Triphala churna is a famous powder for many purposes. As a decoction (1 in 16) it is a well reco-

mmended dressing lotion for all surgical wounds.This is also used in combination with many other drugs. Two such examples are: (1) 1 ounce each of *triphala* and long pepper, 4 drachms each of cinnamomum, cassia and cordamom, and 5 ounce of *Balsamodendron mukul* are to be powdered together. Dosage is 1 to 2 drachms. This is useful in rheumatism of the loins and sacrum. (ii) *Triphala* 8 parts, cinnamomum and cassia 6 parts, *voleriana* 6, long pepper 4, nutmeg 6, salt 6, cubeb 8, olibanum gum 8, and pistasia 4 parts are to be mixed and made into a paste. Dosage is 1/2 to drachms. This is useful in correcting loss of memory, giddiness and fainting.

The following are a few famous compound preparations (yogas) with *haritaki* as the chief ingredient. Some of these are actually being prepared in Ayurvedic pharmaceuticals on a large scale in our country and they also have an export market in some cases.

1. *Abhaya vati.* Take *harad*, black pepper, *pippali* and *suhaga* in equal quantity. Mix with it pure *jaya phal* equal in amount to the net quantity of all the four. Pound this in the milk of *sehund* and prepare pills of 30 miligrams.

Dose is 2 pills. Grind one *harad* fruit in rice water or hot water and take 2 pills of this *vati* along with it. Purging will continue as long as the patient continues to take hot water. Once he takes cold water, this purging will stop immediately.

This is advised in chronic fever, stomach diseases, splenic troubles and particularly *vatodara*. This is also beneficial in indigestion, jaundice and anaemia.

2. *Kamsa haritaki*: 2.374 litres of *dasha mula quatha*, 100 *harad* fruits 5 kilograms of jaggery are to be made into an *avaleha* or an electuary. Add 12 grams each of the powders of ginger, pepper, *pippali*, *dalchini*, cardamom and *tejpat*, during the formation of the electuary. When it cools down add 375 grams of honey and a pinch of *yavakshara*.

Dose: Eat one *harad* and lick 12 grams of this *avaleh*.

This is advised for cough, anameia, *amla pitta* (acidity) and diseases of the liver and the spleen.

3. *Dasha mula haritaki*: Cook *harad* fruits in 2.204 litres of *dashamula quatha*. When this gets thickened, add 5 kilograms of jaggery and ginger, and 185 grams of pepper and *pippali* and also 375 grams of honey.

Dose: Six to twelve grams.

This is advised for morbid swellings, stomach diseases, coughs and anaemia.

4. *Abhayarishta*: Take 10 grams of *harad*, 5 kilogram of *vayavidanga*, 1 kilogram of *mahua* flowers, and cook them in 195 litres of water till the latter gets reduced to 50 litres. Filter and add 10 kilogram jaggery and the following: *gokharu*, *nishoth*, corainder, *indrayan*, *chavya*, *saunf*,

ginger, *dantimul* - each 190 grams. Keep the container closed. For maturation of the *arishta* it takes a month. Use the medicine only after this full maturation has come about.

Dose: 6 to 12 milli litres.

This is prescribed for piles (which it cures quickly), obstructed bowels and many stomach diseases.

5. *Maha abhayarishta*: 200 fruits of *harad* and *dasha mula*, *danti mula*, kernel of the seeds of *karanja*, *asan*, *apamarga*, *deva daru*, *kutaja* (bark), *daru haridra*, *rasna*, *shyonaka* (bark), *chitrak* (root), *varun* (bark) - altogether of 2.500 kilograms are to be cooked in 200 litres of water to prepare 40 litres of the decoction finally. Filter and add 10 grams of jaggery to the finished product. Keep it in the pot and add black pepper, *vayavidang*, *bharangi* and *indra yav* altogether 375 grams and 1.536 kilograms of *pippali*. Add honey also, 1.536 kilograms. Maturation period for *arishta* is again one month. Use the medicine only then.

Dose: six to twelve millilitres.

This is advised for the diseases of *kapha* and tuberculosis.

6. *Haritaki Prayoga*: Soak 100 *harad* fruits in butter milk. Remove the stone inside after the pulp becomes soft enough. Take 96 grams each of ginger, black pepper, *pippali*, *pippali mula*, *yava kshara*, *chavya*, *chitraka*, all the 5 varieties of the

salts, *ajwan*, *ajmoda*, *hing* and *lavang*. Give them together a treatment (*bhavana*) with lime juice and *churka* for three days. Fill this up in the same vessel containing the *harad* fruits prepared as above. Store this for adequate time and then use.

Dose: 1 or 2 fruits daily.

This is prescribed for indigestion, cholera, splenic diseases and shooting pains.

7. *Haritaki Khand*: Take 24 grams each of the powders of *triphala*, *motha*, *saunf*, *dalchini*, small cardamum, *tej pat*, *naga keshar*, *ajwain*, *trikatu*, *dhaniya* and *lavang*; take 190 grams of *nistoth* and *sanay*, 750 milligram of *harad* and 3.059 kilogram of unrefined sugar.

Prepare the syrup and *khand* as usual on fire, cool and store.

Dose: six grams.

After drink or *anupan*: hot milk or water.

This is advised for *amla pitta*, shooting pains, piles, griping and pain in the loins.

8. *Pathyadi quatha*: (i). Take 2 *tolas* of *harad*, pulp of amaltas (*Cassia fistula* L), root of *Pycrorrhiza kuroa*, root of turpeth (*Ipomea turpethum*) and *amalaka*. Prepare a decoction.

Dose: 2 to 3 ounces.

This is a purgative recommended by many ancient writers. Senna and rhubart are added nowadays.

(ii) Take the three myrobalans, *chiratta* and *guduchi* in equal proportions and prepare a decoction.

Dose: One to two ounces.

This is an alterative drug recommended for bringing about many desirable changes in the vital functions of the body. It is also useful in dyspepesia (indigestion), feverishness and hemicrania (headache on one side).

9. Some yunani preparations

(i) From Haz-ul-gurba.

(a) Take 30 *mashas* each of *post halila Kabli* (rind of fully mature *harad*), rind of *baheda*, *amalaki*, *vaya vidanga*, 3 *mashas* of white turpeth; 9 *mashas* of *kist mulkh* and salt, and honey in sufficient quantity. Make a confection.

Dose: Ten *mashas*.

This is for removing intestinal worms.

(b) Take 12 *mashas* of small black myrobalans, 8 *mashas* of black pepper and 1 *masha* of green sulphate. Make pills in the juice of lemon.

Dose: One pill of the size of a wild plum, twice daily for forty days.

This is commended for syphilis.

(ii) *Ithrphal*: Take all the three myrobalans (*harad* being of the unripe and the small variety) in equal parts, powder, grease it with almond oil, add

honey and prepare a confection - or a sweet preparation.

Dose: One *tola* at bed time, two hours after the meals.

This is used in reheumatism, constipation, heaviness of head, nasal catarrh and sciatica. This has been also tried and found useful in chronic constipation.

B. BAHEDA OR BIBHITAKI

The acquaintance of *baheda* to Indian intellectual world is undoubtedly as old as vedas. There is a clear reference for this plant in Rig Veda. It seems that a game of betting was being played in those days with *baheda* as the dice of great preference. One of the player in this reference in Rigveda challenges his opponent in the following words; "I have secured the dice for my play from a bibhitaki plant that would make the opponent heart tremble, a tree which has grown luxuriously in an open space, branching extensively all around. This tree has intoxicated me. It keeps me alert as if I have drunk a preparation of *soma* from the Munjavan mountains". A passage from Chandogya upanishad also contains a reference to the fruit of this plant. The upanishad declares that exalted mind experiences speech and name with as much explicit clarity as a hand would experience two fruits of *amalaka* or two fruits of *jujube* (ber) or two fruits of *baheda* placed on it. The author of

Mahabharata, Srimat Dvaipayana Vyasa asserts that if one worships the Goddess with the flowers of *bibhitaki* he will turn insane. Because of its bad smell, the flowers were banned for being used in worship or any other auspicious function.

Association of this tree has always been with something sinister and untoward. Its name *bibhitaki* itself means something nauseating, repulsive and obnoxious. Another name for this plant is *bhutavasa*, the abode of devils.

References for this plant occur in Mahabharata as well as in the Puranas. Brihadashva enumerates the following three notable trees that one meets along the forest pathway to Damayanthi. These three are the famous *triphala* plants: *haritaki*, *bibhitaki* and *amalaki*.

It is important to note that even in the times of Charaka and Sushruta though *bibhitaki* was used in many medicative preparations, it was never used all by itself i.e. it never formed a single drug administration. This continues to be the situation even now. Rarely, if ever, is it used all alone. Most usually it forms an ingredient along with *haritaki*. But, as an adjunct component in this manner, the plant is quite famous, well known, popular and widely utilised.

Names

There are many names for this plant in Sanskrit. As usual these names themselves constitute an index of its estimation by the

ayurvedic scholars. They connote mythology, cultural practices, place of occurence and medicinal properties. A few of these names are as below.

Name indicative of the source: *vindhya jata*, growing in the Vindhya mountains (unlike *haritaki*, which is essentially Himalayan).

Names, indicative of its popular estimation: *kalki*, *kalkivriksha*, *kali druma* (the tree associated with Kali. This also alludes to the story of Nala and Damayanti. When Nala desired to curse Kali who was in the body of Bahuka, driving his chariot, it seems Kali got frieghtened and hid himself behind a *bibhitaki* tree); *kaliyugalaya* (a tree which Kali the Lord of the present age Kaliyug has chosen as his abode), *bhutavasa* (the residence of devils), *bibhitaki* (frieghtening or obnoxious, since this happens to be the abode of Kali) and *dharma dveshi*, *dharmaghna* (hating dharma or destructive of *dharma*, as it forms the dice and encourages the vice of betting).

Names that are botanically descriptive: *tila pushpa* (flowers small like those of sesame), *mala* (foul; bearing foul smelling flowers), *vasantarta* (grieved because of spring; the connotation of this meaning to the plant however is not clear), *romaharshana* (horripilating; referring to the velvety and sticky hairs on the surface of the fruit), *aksha* (the fruits of *baheda* when full grown are mostly of uniform size and weight very much like the seeds of *Abrus precatorius* (*gunja*) which are

used as a well known unit of measuring weight, as one seed is one *ratti*. Similarly these fruits of *baheda* were also used as a unit of measure called *karsha* or one *aksha* which is equivalent to twelve grams), *karsha phala* (a fruit that yields *karshas*), *madhu bija* (bearing fruits whose seeds are sweet), *taila phala* (fruit, yielding oil in the kernel of the seeds) and *bahedaka* (quite likely to be a Sanskritised version of the vernacular name *baheda*).

Names indicating medicinal value: *vibhitaka* (the fear of disease gets relieved by the use of this plant), *bahu virya* (virile in many ways), *tusha* (one which delights - as it removes diseases), *mala* (causing a purgative action; an *anulomana* drug), *kasaghna* (destructive of cough), *vishaghna* (counteracting poison), *anilaghnaka* (destroying *vata doshas*) and *varnya* (pigment yielding).

The plant has many names in our several regional languages also.

In Assamese, it is *bauri, hulluch*; Bengali, *bahera, boyra*; Gujarati, *bahedamunjahad* (from Munjavan mountains?), *bahedo, berosag*; Hindi *bahera, baheda, sagona*; Malayalam, *tanni, tusham*; Marathi, *bahera, baheda, sagwan, vavara*; Nepali, *barra*; Punjab, *bahera, balela*; Kannada, *tare kay, santi, vibhitaka*; Tamil, *tanri, vibidagam, akkam, sadagam*; Telugu, *bhutavasamu, tandra, vibhitakamu*; Urdu, *bahera*; and Uriya, *bahada*.

It is called *batiluz, beleyaluw, balilaz* in Arabic; *balele, belayaleh* in Persian and *balu, bulu gah* in Sinhalese.

Avicenna a botanist and a herbalist of the dark ages of Europe calls it by the name *belelegi* after the Arabic *balilaz* and the Persian *balil* or *balila*. The Botanical name *belerica* comes from this Arabic-Persian version both of which are finally traceable to *bibhitaka*, the obnoxious and the evil tree of Sanskrit authors.

The Plant

The tree is quite common in the jungles of India, Sri Lanka and Myanmar. It grows mainly in the plains but is also quite prevalent in the low hills upto 914 metres altitude and not beyond. It does not occur in the dry, arid and nonfertile areas of Sindh, Rajasthan or South Punjab. It is present in considerable density in the low slopes of the Himalayas in the terrains and along with the teak jungles of Uttar Pradesh. The trees are very much abundant in the Shivalik Ranges and Peshavar along the banks of the Indus River and Morang Ranges and Gorakhpur Forests in the East. In general, it occurs all over India in the wetter areas. The tree is quite common in Sri Lanka, Malacca, Java and Malayasia.

The tree of *Terminalia belerica* is easily identified in the jungles even from a distance.

Fully grown tree is quite beautiful. It is usually found growing in the midst of many other trees, its

common associate trees are *sagaun, sal* and *asan.* It grows to a height of twenty six to thirty six metres with a straight and stout trunk upto even five metres in height and then expands into a rich dense canopy, often propping itself on the neighbouring trees of the forest. The tree is deciduous shedding its whole foliage seasonally. Leaves are gathered about at the extremities of the branches. They are leathery, 10-20 by 7.55 cm in dimension; shape is broadly elliptic or obovate (the broader end being at the base), rounded or rarely some what acute or shortly acuminate (the tip drawn out like a short tail). Both surface of the leaves are minutely hairy (puberulous) when young, but hairless later on. Margin is entire; main nerves are 6-8 pairs, spreading and prominent. Flowers are small, pale greenish yellow, numerous and with an offensive odour. They are clustered in axillary slender spikes; those in upper part are male and shortly stalked while those in the lower part are bisexual and stalkless. Bracts, or the leaf like structures associated with the flowers are small and they fall down quite soon. Calyx is hairy, inside of it is wooly and shows long brown hairs. Young ovary is always tomentose or richly and softly hairy. Fruit is a drupe like the chebulic myrobalan, 12-25 mm in diameter, ovoid, grey, but suddenly narrowing into a very short stalk, velvety and provided with obscurely 5 angled surface when dried. All mature fruits are more or less of the same size, shape and weight, unlike that we see in *harad.* It is because of this reason the fruits were once used as units of

measurement of weight *karsha phala*. Each fruit weighs a *tola*.

When mature the leaves are not hairy at all and are also provided with characteristic punctate (with clear) spots on the upper side. These punctations are more prominent in *baheda* than in other species of *Terminalia*.

The bark is bluish grey and exhibits fine vertical cracks. The wood of the tree is yellowish grey, hard and does not show any differentiation of a heart wood at the centre and a sap wood around it. The bark usually falls down in the form of scales that are of 1 cm long.

Small branches, the calyx as well as the ovary are all characteristically covered on the outside with dense copper sulfate like soft hairs. The fall of the leaves occurs in February-March. Copper or leather coloured fresh leaves sprout forth from April onwards. The spikes with white flowers having a greenish shade burst forth among the new shoots. From them a honey like acute smell spreads out, which becomes periodically quite violent. The obnoxiousness of the plant becomes complete now, though it is preciously this smell that attracts a cloud of honey bees continuously.

Fruits mature by November to February and fall down in winter or summer. The fruit has a dry flesh and contains a single stone within, which is hard, tough, woody, slightly yellow and provided with 5 clear longitudinal lines over itself. Inside is the big oily kernel of the seed which shows three clear

longitudinal lines. The unripe fruits fall down in plenty during the rains and get eaten by squirrels and other animals because of the oil within. The fruits are liable to attacks by insects or other means, so that quite frequently there will be a total loss of crop in some years.

The parts of the plant that are useful are: whole fruits, pulp of the fruits only, the kernel (*giri*) of the seed and the bark of the tree trunk, specially. Both the fruit products (viz whole fruits and the pulp alone) are equally well used in Medicine. What is procured from the market is usually spoilt; though it may look very healthy on the external appearance, on cutting it open, very likely, the whole central mass would have become black and powdery. Such fruits are wholly useless. The fruit for medicinal purpose should be fresh, not insect eaten, big in size, and its colour is to be shining greenish yellow. They are best plucked directly from the trees. November to February are the most suited times for harvesting the fruits. After plucking, they should be fully dried carefully and stored. Then only does the fruit become fit for being used in medicine.

Medicinal Uses

General medicinal importance of *baheda* is as follows. It is light for digestion, hot in quality, dry in effect, acute (*tikshna*) in action and brings about a destruction of *kapha* and *pitta* or phlegmatic and bilious vitiations. The presence of astringent taste is

stressed by all authors. However some regard that there are three separate tastes and not only one in its fruit: bitter, pungent and astringent. Others like Dhanvantari consider it to be having only two tastes: astringent and bitter. Its post assimilatory effect (*vipaka*) is sweet though it is also regarded as being bitter as well.

The bark is useful in anaemia and leucoderma. The fruit which is the most important part of the plant is bitter, pungent and acrid. It is digestible, laxative and destructive of round worms. The seed is acrid, intoxicating and useful in thirst, vomiting, bronchitis and corneal ulcers of the eyes. It relieves *vata* aggravations. Yunani physicians consider fruit as bitter, astringent, tonic and useful in dyspepsia (or indigestion), bilious headache (or headache due to *pitta*), diarrhoea and piles. They regard it in addition to be a brain tonic.

The gum produced on the surface of the tree is believed to be demulcent i.e. soothing and alleviating to irritation and also a purgative.

An ayurvedic description of the tree runs as follows "*Bibhitaka* is a great tree with minute flowers; it is hill or mountain born with leaves similar to those of banyan and fruits that are round, and the fruits are borne during the season of spring." This is a description given by Shiva dutta.

Baheda can penetrate even hard faecal matter in the body and regulate the alimentary functioning. It has a good effect in setting right coughing and is

found to be beneficial in the upset voice as well as in curing many diseases of the mouth. It is wholesome to the eyes and as such useful in many diseases of the eyes. It prevents untimely greying of the hairs, acts as a general tonic for their health and specially their rich growth. It is germicidal i.e. killing to the germs. Vagbhata goes to the extent of stating that its total quality is almost like that of *amalaka* - Emblic myrobalan though slightly inferior. The gum produced by the trunks of the tree forms the base of a good ointment and is also purgative. Yunani physicians consider the fruit as rather heavy, strength giving, digestive, purgative and found useful in morbid swellings of the eye wherein it forms a valuable ointment. It is first degree cold and second degree hot.

The kernel of the stone or the seed is the other part of the plant apart from the fruit that also forms a medicinally valuable product. This is regarded as light in action, astringent and intoxicating in nature. It quenches thirst, prevents emesis or vomiting and destroys aggravation of *vata* and *kapha*. It has been seen to be remedial in the diseases of the eyes and the nose and destruction of the germs. It regulates the disorders of semen and found to be most salutary to hairs and their dense, healthy growth. A collyrium made out of it has been found to be useful in cataract of the eyes.

There is a great popular and traditional belief that the kernel of the *baheda* fruit is poisonous. Some presume that it is only the bigger sized fruits that are tonic and not the younger and the small

sized ones. But others assert that both of these kinds are *not* found to have any poisonous effect but if one drinks water soon after consuming this fruit, one is likely to experience a giddiness and a sense of intoxication. There is much controversy as to whether such or any other poisonous effect exists at all and is the poison ever fatal. Recent and occasional experimental verifications have not given any conclusive and uniform result. Opinion still remains much divided in this regard just as different ayurvedic authors profess variously. Some regard that it is a fish killer but even here such an effect has not been observed to be happening in India. However there is no doubt that the seed kernel does have a narcotic property though not a poisonous action. It induces torpor (sleep or a "deadness"). The part preferred in medicine is not the seed but the pulp of the fruit.

As an ingredient along with the other two myrobalans, the emblic and the chebulic, this plant has been used in many diseases and in various pharmaceutical forms. In Punjab, ripe fruits are mainly given in oedematous swellings, piles, skin diseases and occasionally in fevers.

Baheda has been found to have beneficial effect in the following dysfunctions and diseases of the body.

(1) In Respiratory Disorders

The efficacy of *baheda* has been well proven in the diseases of mouth, the buccal cavity as a whole

and the respiratory system in general. A reputed author of the medieval India Lolimabaraja by name goes to the extent of asserting that if you keep a fruit of *baheda* in the mouth, your troubles of coughing and difficulty in breathing will just disappear; he gives a new name to the plant, *ravana putra* - Ravana's son. The fruit of *baheda* roasted in fire, cooled, and kept in the mouth and then slowly sucked in with the saliva will be found quite beneficial in the wounds and lesions of the throat and tonsilites (or *kantha rohini*). Pills are made out of equal quantities of *baheda*, rind of the pomegranate fruit, *yavakshar* and *pippali* along with jaggery. These are placed in the mouth and the juice is slowly sucked in. This is seen to be curative in oedema or swellings inside the throat and the larynx or the voice box. Pills are made similarly by using the pulp of the fruit of *baheda*, salt and *pippali*. Sucking them slowly in the mouth proves remedial in reducing the regours of chest pain, wounds and lesions of the throat and hoarseness of voice and is specially useful after too much straining of the latter. Another simple recipe as a household remedy is to prepare a powder of *saindhav* salt and *baheda* together, mix this well with butter and keep licking this mixture at intervals. One more procedure is to besmear the fruits of *baheda* with ghee, place them in a firstful of dry hay and bake them with the help of cowdung cakes. Cough will disappear if one such fruit is kept in the mouth and its juice is slowly sucked in. Take six to twelve grams of the powder of *baheda*, mix it

with an adequate quantity of honey and keep sucking this in, slowly in the mouth. This will destroy cough, asthmatic bouts and severe hiccups. Prepare a fine powder of equal quantities of *baheda*, *atis*, *pippali* and *bharangi* and dry ginger. This is called *vibhitakadi churna*. Keep taking this powder with hot water or a little quantity of wine. This procedure will prove useful in cough, asthmatic attack and *apatanaka* (sposmode contraction). Using *baheda* alone in various forms has been seen to be beneficial in all types of respiratory disturbances and asthmatic troubles.

Cook the fruit of *baheda* in goat's milk, keep its rind in the mouth and suck. This will relieve all troubles of coughing. Sharangadhara prescribes that the fruits are to be fried in ghee and then covered with a paste of wheat flour and slightly roasted on fire. The rinds of the fruit thus prepared can be kept as lozenges in the mouth, their juice slowly sucked in to secure relief in sore-throat, cough and catarrh.

(2) In the Diseases of the Alimentary Canal

In Konkan region of Maharashtra the leaves of *baheda* are used in curing indigestion. A powder is prepared of equal quantities of the *baheda* fruits and *ashwagandha* (*Withania somnifera* Dun) and this is mixed with jaggery and stored. Taking this with hot water is a good cure for gas troubles. A simple preparation to induce emesis or vomiting as it becomes necessary in many cases of indigestion

or an overfilled belly is to use the pills made out of *munakka* (dry black grapes), cardamom powder and the pulp of the *baheda* fruit. Prepare a powder of charred *baheda* fruits, add a little salt. Taking this has a quick astringent effect on the intestine and is therefore very useful in cases of severe dysentery. In liver diseases and the disease of many other vital parts a type of slag (*mandura*) is used by ayurvedic physicians. For purifying this slag, it is heated again and again on a fire using the sticks of *baheda* tree as the fuel. Every time after heating it well, it is dipped in cow's urine, cooled and again heated as before. Such a treatment or *bhavana* is repeated eight times.

The kernel of the seed is pasted with a few grains of black pepper and a little molasses from date palm (*kharjura-guda*). This paste is taken once a day for 3,7 or 21 days according to the severity of the disease. Bael water is given as food during this period. This is a procedure advised in severe dysentery and diarhhoea.

(3) In Urinary Diseases

Sushruta recommends using *baheda* fruits in urinary disorders. He states that the pulp of these fruits are to be ground with wine and this is then to be taken in order to get rid of urinary stones as well as many other dysfunctions of urination. Some studies indicate a diruetic property (i.e a capacity for inducing profuse urination) in the barks of this tree also.

(4) In the Diseases of the Eye

Baheda is utilised as an astringent drug in many disease of the eye. Washing the eyes with a cold decoction of this fruit will keep the eyes clean and clear. An ointment prepared from the powders of dried mature fruits and honey is applied with beneficial results in cases of painful eyes or swollen eyes. The kernel of the fruit, black pepper, the pulp of *amalaka*, *nila motha* and *mulhathi* are taken together, ground in water and made into small discs (*vartis*). These are dried in shade. A colyrium of it is applied over the eyes when there is an ailment of haziness of vision. A colyrium of the pulp of a well grown fruit of *baheda* rubbed with woman's milk on a grind stone and applied daily at night over the eyes is beneficial in many eye diseases. This pulp is ground very fine along with honey and is applied over the eyes in cataract conditions.

(5) In Oedematous and Glandular Swellings

An external application of *baheda* is taken recourse to in various types of morbid swellings on the body. The kernel of the fruit is ground with water and applied on the regions concerned with quite a beneficial result. Massaging in the rheumatic arthritis with an oil of the kernel of this fruit will remove the swellings as well as the pains of the joints. An application of the pulp of the fruit has been seen to be particularly beneficial in all kinds of morbid swellings. This has three desirable effects: removal of the pain, lessening the oedema and quenching of the excusive thirst that such patients are prone to suffer from.

In glandular swellings associated with erysepelas (*visarpa*, that are seen to spread out in all ways), an oil cake (*kalka*) of *baheda* is warmed and anointed over the affected regions; the results are satisfactory. Vagbhata also recommends using *baheda* for such erysepelas swellings of the glandular type.

In cases of burnt wounds or scalded flesh and skin, the pulp of the *baheda* fruit ground and applied as a paste or an ointment would reduce the burning and the distress considerably.

(6) In Children's Diseases

If the kernel of the fruits of *baheda* are submitted to an oil press, some quantity of oil gets extracted. This is presumed to be useful in children's ailments. Apart from being a medicine, it is a pleasant edible material also. In Madhya Pradesh it is actually used as a ghee by the poor. The *baheda* crop is abundant there and cheap. Remember that *baheda* is a *vindhyajata*, a tree of the Vindhya mountains.

An oil preparation made out of cooking *baheda*, *vacha*, *kushta*, *hartal* and *manah shila* together is dropped in the ears of the children when there is an oozing of pus from within. The oozing will stop, almost immediately.

(7) In Other Diseases

Baheda has been found to be useful in the diseases of all the five constituents of the body viz

rasa (assimilable essence of the food), blood, flesh, bone marrow and fat. An oil cake (or *kalka*) prepared by grinding the bark of the tree is given in loss of blood or scantiness of blood or anaemia, and also in leucoderma. In Konkan area the kernel of the fruit is eaten along with betel leaf. Eating this daily is presumed to promote libido or the urge of sex. A little bit of marking nut kernel is also added with this. The procedure is also presumed to be beneficial in dyspepsia or indigestion.

In Punjab, this is mainly utilised in cases of dropsy (fluid and gas filled morbid swellings of the body), piles, diarrohea and leprosy and also fever, occasionally. It is considered astringent when fully ripe or dried but purgative when half ripe. Along with honey it is used in opthalmic troubles.

Both *Charaka* and Sushruta have grouped *bibhitaka* under their *taila yoni phala varga* or oil yielding fruits. Sushruta opines that this oil is best in making the hair, jet-black. It is also recommended in treating burn injuries where it is more commonly employed in the form of its oil cake and as a poulitice.

As a constituent of *triphala churna* it is prescribed in diseases of the liver, gastro intestinal tract and in quite a large number of other diseases, as well.

A very striking usefulness of this *triphala churna* is the following. This was the personal experience of a famous ayurvedic physician of the yester years (Dr. A. Lakshmipathi). He cleaned and dusted a

sharp cut made on him by a dirty razor with the fine *triphala churna*, soon after removing the bandage he had tied there to check the blood flow. The healing he obtained thereby with such a simple application and the regeneration of the injured tissue he could observe were so perfect, completely pain less, with no pus formation and much better than what he could expect from any other treatment. There was no pain at the spot, a thick cap of scar tissue had formed there which came away after two and a half day leaving a clean and healthy line marking the site of the cut. A similar efficient regeneration was also seen in healing the wound of an operation of phimosis (narrowing the aperture of the orifice of the prepuse skin at the head of the penis). The bleeding stopped in about ten minutes. a thick scar tissue had formed by that time effectively capping the whole site. In about six days after the operation the cut margins of the skin fold had healed well.

In all fresh wounds immediate dusting with *triphala churna* without washing is of great utility in making the wound heal up most quickly. For wounds suspected to be due to syphilis one part of *rasa karpuram* mixed with eight parts of *triphala churna* is employed.

Other Uses of Baheda

Besides the medicinal values some of which have been noted above, this ancient famous plant of *bibhitaka* has many other uses. A few of these are mentioned here.

(1) As An Animal Feed: The tree yields an abundance of fruits and a lot of them fall down on the ground. These rich oily and fleshy fruits are eaten with relish immediately by a variety of animals, monkeys, squirrels, pigs, deer, sheep, goats and so on. Once they fall to the ground, these fleshy fruits rarely remain on it for any considerable length of time. It is quite common to see heaps of light yellow stones of the fruits at frequent intervals on the plains of the jungles. These represent the remains of what the deer have consumed. In winter it is equally common to see clusters of broken branches of this tree scattered in the jungle floor. These are the results of the monkeys who have broken them while they are after these delicious and much sought after fruits.

As such this tree is one of the most ideal trees of India worth being cultivated on a large scale by the authorities in charge of our Zoos, National Parks and Animla Sanctuaries. It may be recalled that the tree grows in all parts of India excepting in the dry, arid regions of Rajasthan.

Being such a reslished feed is advantageous to the plant. For, its propagation gets facilitated thereby and occurs naturally and easily over a wide area.

In the Kangra valley where the trees grow very abundantly, their leaves have proved a very well liked and beneficial feed to the milking cows.

(2) In Leather Industry: The fruit has some use in giving the flexibility to the leather and also in dyeing and preparing pigment material. Though it is much inferior to *harad* in both of these aspects, it can definitely play the role of a stand-by. In Java this is actively used in rendering the animal hide into valuable and flexible leather. By adding a metallic compound (iron sulphate) along with *baheda* a darkening of the leather colour is obtained. In quite a few places *baheda* is used in place of *harad* for tanning similarly. In Virbhum region of Bengal, its leaves are also used and sometimes even the bark.

(3) In Ink Manfacturing: A country writing ink is prepared in both India and Java by using the fruits of *baheda*. For this, fresh fruits are used. Adding iron sulphate has been seen to improve the quality of this ink.

A little more care, study and research may result in manufacturing very high quality ink that can be exploited by Artists, specially the commercial Artists with *baheda* as the raw material.

(4) In Dyeing Industry: The colour obtainable by using *baheda* fruits is not very satisfactory. That is why this is used to colour the threads of cheaper quality yarn or cordage in Java. Still in India the use of *baheda* in dyeing textiles is on a very large scale. If used alone it will dye the cloth yellowish or brownish yellow. If used along with other dyeing materials it will render the cloth dark brown or black. For dyeing purposes it is only the pulp of the

fruit that is used and the stone is discarded. This is pounded fine. One hundred and fifty grams of the pulp is kept in one litre of water and twelve grams of the rind of pomegrante is also added. This net bulk is kept soaking overnight and then boiled. This much is enough for dyeing one square metre of cloth. When it simmers for three times it is removed from the fire, cooled and filtered through a thick, coarse cloth. The cloth to be died is to be washed well and left for drying. When it is half dry, it is dipped in water containing twelve grams of alum. It is such a well washed cloth that is then placed in the water containing *baheda* prepared as above, and kept moving till a uniform colouring comes up all over the body of the cloth. When the colouring is dense to the required degree, the cloth is removed and dried well. This is to be washed again thoroughly so that the smell of the dye disappears. Such a procedure will secure a muffy yellow colour to the cloth chosen.

Majeeth (*Rubia cordifolia* Linn) is the plant most used for getting a high clean yellow or yellowish red colour on cloth. *Baheda* is usually utilised along with it. In some places in India this is however used quite profusely and all by itself.

(5) The Gum: The tree produces an abundant amount of gum. But this is not of much use as it is not water soluble. The gum is tasteless and very much resembles the gum from *kikar* for outward appearance. It is produced in great quantities in the jungles of Midnapur. The gum gets collected over

the bark in pieces of nearly one inch length and in round perpendicular drops, resembling the colour of inferior *kikar* gum, brownish white. The gum spreads out or puffs up in water but does not dissolve. It gets sold however in the bazars along with the gums of other trees.

(6) The Wood: The wood of the tree is of an inferior quality. It is sometimes used in building construction. The wood is not durable and is easily liable for an insect attack as well. But, it is a very good tree for fuel wood and specially for preparing char-coal. When the wood is soaked in water it becomes utilisable for making packing cases, boxes and boats. Such a soaking makes it more durable. In Madhya Pradesh it is preferred for constructing carts, and ploughs. In South India, this is much used for packing cases, vessles for measuring grains, wooden trays, basins and boats.

(7) As Excellent Avenue Tree: The tree is extremely ideal as an avenue tree, the only draw back is some of the superstitious beliefs associated with this tree. As it is supposed to be an abode of evil spirits, the dense shade of the tree is unnecessarily avoided. Even the wood is avoided for building construction mainly in the belief that it is inauspicious.

However the tree is very much worth being cultivated as an avenue tree. It is quite impressive, beautiful, shady and has a straight bole and a dense, extensive canopy. Such avenues have infact

been tried with success in some of our cities, including Delhi.

(8) As An Indicator of Water Source: Recall that the tree grows preferably in wet places all over India except in the very arid regions. There is an interesting association that Varahamihira, a very reputed ancient Indian author on astrology and horlogy records in his famous book Brihatsamhita. If you turn south of a *bibhitaki* tree, you would get at a little distance an underground water source of nearly of 1 and half a man's height and on the western direction the amount of the water procurable is at a depth of nearly four men. The tree is thus a sure indicator of a nearby water table.

(9) As An Export Material: The fruits of *baheda* are gathered in great lots in the jungles of our country. In fact this forms an important forest produce. From the forests of Najibabad and Garhwal they are exported to foreign markets as a tanning and dyeing material.

Chemistry

The fruit contains two portions: the outer rind or the pulp which occupies 75% of the fruit and the inner region which forms the remaining twentifive per cent. In the outer region, it contains 6.70 per cent of galotannic acid, and in the inner part, 1.2 per cent of tannic acid.

A comparison of the pulp and the stone is as follows.

	Pulp	*Stone*
Moisture content	8.00	11.38
Ash	4.28	4.38
Petroleum ether extract	0.12	29.82
Ether extract	0.41	0.61
Alchoholic extract	6.42	0.61
Water extract	38.56	25.26

In the petroleum extract of the rind a greenish yellow oil is available. In the ether extract, there are a colouring substance, resin, a little amount of gallic acid and an oil.

In the petroleum ether extract of the stone there is an oil that is yellowish, thin and tasty. Ether extract also contains an oil.

In the seed, 30.44 percentage is oil. If this is extracted and kept, it gets divided into two portions: an yellowish green liquid and a white fatty, ghee like, rather viscous substance. It is the oil that is used in medicine and the fatty portion forms the poor man's butter.

Cultivation and Role in Rural Economy

Baheda is one of the very promising trees of India that can be put to a varied type of uses in improving the economy of our rural population. It is a much serviceable wood for many agricultural implements.

There is a great need to promote the cultivation of this tree on a large scale. At present the only main source is from the trees that grow on their own in our forests. As the tree is useful in many ways and it also grows well in most soil and with least difficulty, active cultivation on a wide range is much desirable. Much scientific studies have also been undertaken in this regard because of this reason from our sylviculturists viz experts who study cultivation aspects of forest trees.

The sprouting power of the seeds of *baheda* is greater than what is seen in the other members of its genus viz *Terminalia* and definitely much more than what has been observed in *harad* which is quite low in this regard. In nature, it is the whole fruits or the stones that are the chief propagators; the seeds have to come out after the decay or a breakage of the thick coverings that had surrounded them. For plantation purposes one can sow mature fruits or better, the seeds alone in nurseries. They are mostly sown in this way in the months of March or April. They are then covered with soil and given water regularly. Germination would occur after two months. These are then transplanted in the first rainy season, during a monsoon weather.

Once the transplantation is done, the striking of the root takes place at a quick rate. Within a year the main root goes quite deep. For the first two years the saplings are healthy and vigorous in the dense shade of other trees. Afterwards however they need direct sun without which they may not grow

further properly. A danger for the nursery of *baheda* plants is the hoar frost that falls for instance in the nurseries of Dehra-Dun. Once it starts growing well and escapes such hazards of hoar frost, the tree remains healthy and sturdy, throughout.

A very noteworthy aspect of the cultivation and the upkeep of this tree is as follows.

Though *baheda* is essentially a tree of wet places, its capacity to resist draught conditions is just remarkable. In the extreme dry weathers of 1907-1908 of the *sal forests* of Avadh areas, the associated *baheda* trees alone remained unaffected. Even during the terrible famine of 1899 to 1900 when almost all trees had suffered from drought, *baheda* trees were noticed to have remained as before.

THE TERMINALIAS

Harad and *baheda* or *haritaki* and *bibhitaki* are included in Ayurveda under a medicinally famous group of plants referred by all the ayurvedic authors as *haritakyadi varga* or the group of plants commencing from *haritaki*. They are mostly trees and their general properties are as follows.

Botanically these two plants are included in the genus *Terminalia* coming under the family Combretaceae. The genus *Terminalia* itself is widely represented in India and includes many species of plants in turn and these are often well known and

well used medicinally or in many other ways. We shall have an idea of some of these plants now. The family of Combretaceae as a whole includes plants which are resiniferous (resin producing) and astringent. They are mostly trees and their bark has a cardio (heart) tonic property. The fruit is purgative and a destroyer of phlegm.

Some of the common plants of this family that have medicinal value are given in the list below along with their names in Hindi, Sanskrit and Latin, where available.

Terminalias

Hindi	*Sanskrit*	*English*	*Botanical*
1. *Deshi badam*	*Tapasa vriksha*	Country almond	Terminalia *catapa* Linn.
2. *Arjun*	*Arjuna, virataru*	Arjun	*Terminalia arjuna* W & A
3. *Kinjala*			*Terminalia paniculata* Roth
4. *Linpin* (a Burmese name)			*Terminalia pyrofolia* Kurz.
5. *Sadada*	*Saradru*	Black Murdah	*Terminalia tomentosa* Bedd.
6.			*Terminalia palida* Brands.
7.		Citrine myrobalan	*Terminalia citrina* Fleming

(Contd.)

8.	*Terminalia bialata* Stued.
9.	*Terminalia coriacea* W & A
10.	*Terminalia oliveri.*
11.	*Terminalia myriocarpa* H & Muell.

These eleven trees belong to the genus *Terminalia.* As seen in this list many of them do *not* have any name either in Hindi or Sanskrit. But they are all present in India and they *do* have local regional language names and also find applications for various medicinal purposes.

The following are the other medicinal plants of the Family Combretaceae, with their names of Hindi, Sanskrit, English and Botanical terminology.

Other Genera of the Family

Hindi	*Sanskrit*	*English*	*Latin*
1. *Ukshi*			*Calycopteris floribunda* Lam.
2. *Dhav*	*Dhav*	Axle wood	*Angoeissus latifolia* Wall
3. *Jhumkha Vel*		Rangoon creeper	*Quiscalis indica* L

Of these, *dhava* is a big sized tree, the other two are weak stemmed climbers.

The Genus Terminalia

As shown in the list, members of this genus *Terminalia* constitute the greater percentage of the plants of this family that happen to be of medicinal value. They are therefore worthy of a greater attention. We have seen so far only the two most famous members of this genus viz *haritaki* and *bibhitaki*. We shall acquaint ourselves now with the other species. The genus *Termainalia* is named so because the leaves of these trees are essentially clustered at the terminal ends of the lateral branches of the tree. All the species of this genus are lofty and characteristic trees of the forests of India. Leaves often have glands on the stalk or at the base of the midrib, beneath.

Since we are dealing here with a large number of species belonging to a single genus, it is desirable to have a key to help in the identification of them differentially and also to stress the correct botanical way of fixing their diagnostic characteristics explictly. The following key will be helpful in this regard.

An Identificatory Key for the Several Species of the Genus Terminalia

A. Fruits are more or less fleshy. They are not winged i.e their surface does not show any wing like expansions, but they are often projected into angles or ridges.

I. Spikes (i.e. elongated clusters of stalkless flowers) are simple and unbranched.

Leaves are alternate and clustered at the ends of the branches.

Flowers at the top of the spike are male.

1. Petiole or the leaf stalk has glands. Base of the leaf blade is heart shaped. *T. catapa*

2. Petiole does not have the glands. Petiole is 4.5 - 10 cm long *T. belerica.*

II. Spikes are branched into panicles (except in T. palida).

Leaves are softly grey or almost silvery tomentose (hairy)

1. Leaves are shiny *T. palida.*

2. Leaves are non shiny

Petiole has glands.

Fruit is more or less distinctly 5 angled

The fruit is obovoid with a wedge shaped base, sometimes ovoid or nearly round, 2.5 - 4 cm long. *T. chebula*

The fruit is narrow, lance like and 5 cm long. *T. citrina.*

B. Fruits are dry with 2 equal sized wings.

I. Fruits have wings that are 7.5 to 10 cm broad. *T.biolate*

II. Fruits have wings that are 2.5 - 5 cm broad.
T.pyrifolia

C. Fruits have five equal acute wings.

1. Leaves are not broadly ovate

a. Fruits have short hard angles as wings, usually notched near the top. There are lines on the wing which are oblique and curving upwards. Leaves are oblong or elliptic and crenulate or minutely curled at the margin, bark is smooth,
T.arjuna.

b. Fruit has long thin papery wings, usually rounded at the top and with no notch. Lines on the wings are straight and horizontal.

1. Fruit is softly and minutely yellowish brown, velvety. The leaves beneath are also similar and so are the twigs and the inflorescences or the flower culsters. Fruit, including the wing is about 4 cm in diameter. *T.coriacea.*

2. Fruit is not having any hairs at all, large, usually about 5 cm in diameter. Calyx is softly hairy, the hairs being yellowish brown. This is so with the undeside of the leaf, the twigs and the inflorsecence. The glands near the base of the midrib of the leaves are large and are themselves having stalks. Flower clusters are dense panicles.
T. tomentosa.

II. Leaves are broadly ovate, 4-8 cm long. Wings of the fruit are narrow, 18 mm long and 12 mm broad. *T.oliveri.*

D. Fruit has 3 very unequal wings. Flowers are irregular

I. Front ridge of the ovary (the inner most structure of the flower that contains seeds and later grows into the fruit) grows out into a wing 18.25 cm in breadth and persists in the fruit.

T.paniculata

II. The two lateral angles of the fruit are expanded into wings. *T.myriocarpa.*

It may be seen from this key that the chief characters for variation among the several species of the genus are concerned with the quite obvious and easily observable features of the plant viz the details of hairs on the body of the plant, the shape and features of the leaves, flower clusters and very diagnotically of the fruits. This is what makes the key of very practical value even for lay persons in the botanical identification. The fruits of this genus fall into two categories: fleshy and edible and therefore propagated by means of animals (these are merely ridged or lined at the surface and not winged) and the dry and the non edible ones which however have wings or flat ridges helping in wind dispersal.

The relevance and reasons for studying other species of any medicinally highly useful plants like *haritaki* are the following. The medicinal value of any plant comes from the peculiar chemical and

other structural materials that its useful part produces. These chemicals are produced by the living plant as a routine bye-product of its normal synthetic or degradative processes as the case may be. This is directly related to the way in which that particular plant has developed in the course of its evolution to start with. All the different species of a single genus are presumed to be having a common evolution. Or, in other words, all of these species are related evolutionally. As such they are very much likely to be similar in their biosynthetic capabilities; we can hopefully expect similar or closely related products and corollarily similar or related medicinal activities. That is the reason why it is always advisible to study all the plants that are closely related by evolution to one particular plant we may select at any given time. These other plants do often provide us with substances that are useful alternatives, substitutes or even improvements over the one which we have selected. In other words, we can easily expect similar or related or even better properties in the other members of the genus Terminalia as compared to *haritaki* and *bibhitaki*. That way such related species of any medicinal plant always constitute potentially very valuable field for further study and research.

We shall therefore study these other species of Terminalia. Quite often and interestingly some of them do get the name of *haritaki* or a "variety" of it in many local languages.

Of these other species of Terminalia, *T.arjuna* occupies the most prominent place. *Terminalia*

arjuna is a very well known plant named after the Pandava hero, Arjuna. The barks of all the species of the genus *Terminalia* are in general mildly diuretic or fairly potent cardiac stimulants. Quite often they have both of these valuable capabilities- of promoting profuse urination and being stimulative and toning to the muscles of the heart. But all the eleven species mentioned in the list do have valuable medicinal properties well recognised in many cases or not so well known but quite important. They also enter into many home remedies or tribal health measures and in any way do represent an important data not to be neglected at all. As stated above we have seen only two of them so far viz *T.chebula* and *T.belerica* or *harad* and *baheda*. We shall see the others now.

1. *Terminalia arjuna* W & A.

Names

There are many names in Sanskrit for this famous plant, quite significant and picturesque. Some of them are: *arjuna, chitrayodhi, dhananjaya, dhanvi, vitataru* (all, after the Pandava hero), *dhavala* (white, because its trunk is white), *gandiri, indra druma* (Indra's tree; quite lofty and impressive), *kakubha*, (extensively spreading) and *nadisarja* (as it grows along the river banks).

Its names in regional languages are also many and a majority of them are based on the Sanskrit term "Arjuna". It is called *orjun* in Assamese; *arjun*,

kahu in Bengali; *arjunsa dada, arjunasadra, dhaula sadro, sadado* in Gujarati; *anjan, arjan, arjun, kahu, koha* in Hindi; *anjan, arjun, sadura, sanmadat* in Marathi; *arjuna, bilimatti* (the white matti, a well known timber tree), *holematti, nirmatti,* (the *matti* that grows along the rivers or the course of water), *kakubha* in Kannada; *arjan, jumla* in Punjabi; *athumarude, kulamarudu, nir marudu, vellai marudu* (the two terms meaning respectively, the *marudu* of the water-course or that which is white), in *Tamil; kakubham, eru maddi, tittu maddi* in Telugu; *arjun* in Urdu and *orjuno, projonya sahajo* (natural to heavy rains area) in Uriya.

It is called white Murdah in English evidently after its Tamil Name.

Botanical Description

This is an imposingly large tree provided with huge often butressed (secondarily supported with plank like formations at the base) trunk and long branches that spread all around horizontally. The bark is smooth and flakes of in large flat peels. Leaves are nearly opposite to one another, 10-15 cm by 4.7 cm in dimensions, oblong or elliptic oblong in shape. The tip is obtuse or subacute. The blade of the leaf is pale dull green, above, and pale brown beneath. The margin is curly or serrate (i.e. teethed closely) at the upper regions or sometimes throughout; the base is rounded or heart shaped, often unequal on either side of the midrib. Leaf stalk has prominent glands at the top just below the blade. The fruit is a drupe as in *harad,* but

ovoid or ovoid-oblong, fibrous and woody, non hairy and dark brown. There are five hard projecting wings striated with many curved veins.

The bark of the tree is smooth and pinkish grey in colour. Sapwood (i.e. the outer option of the trunk) is reddish white, while the central heart wood is brown with darker coloured streaks breaking the uniformity. The surface of the tree trunk is darkish white and has a rough bark from where many branches spread out.

The tree grows all over India from sub Himalayan ranges to nearly all over, excluding the dry and arid regions such as Rajasthan.

An ayurvedic description of the tree is given by Shivadatta as follows: "It is a tree where the leaves are mostly crowded at the ends of the branches, a lofty tree, rather milky, astringent, yellowish, huge and with fruits similar to *bibhitaka* (and called *karsha phola*), similar in general appearance to *kapitana* (*Albizzia prosera*, another lofty tree of the forests) and is found "in forests and hills".

The most useful part of the plant is the tree-bark.

Medicinal Properties

General aspects: The bark is acrid (bitingly pungent) and sweet in taste; tonic and anty dysenteric. It is destructive of *kapha* aggravation and pacificatory to *pitta* aggravations. It removes thirst and fatigue and is found useful in urinary and heart diseases. It strengthens the heart, being

a good heart tonic. It is regarded infact as very salutary to heart and its various ailments. It checks excessive perspiration and asthmatic attacks. It is of great service in leucoderma, tumours and anaemia.

Yunani physicians also regard the bark as bitter and expectorant (i.e. helping in expelling phlegm). It helps in biliousness (bile disorders) and in gleet (discharge from a mucous membrane) and urinary disorders.

There are numerous references to this plant in our ayurvedic Texts. We give below some selected notes from a few famous authors.

Charaka

1. In *rakta pitta* or plethora (where spontaneous bleeding occurs in many regions of the body, e.g., nose, rectum etc.). Soak the barks of *arjuna* over night in water, filter this water next day morning and drink it mixed with honey. Bleeding will stop. Fresh extract, decoction or *kalka* (a ground paste) of the bark along with honey will also be useful similarly.

2. In bandaging over wounds. The leaves of *arjuna* are beneficial in this procedure of curing.

3. In piles. Sprinkling the painful out growths of piles with a decoction or fresh extract of the leaves will relieve the pain and cool down the area.

4. *In kushta.* Bathing, drinking, external application and the like-in all these methods of

curing *kushta* or the skin diseases the bark of *arjuna* is to be used very much like *khadira* or *Acacia catechu* willd.

Sushruta

1. *In raktapitta.* Drinking cold decoction of the *arjuna* bark along with honey is useful.

2. *In shukra meha* (or spermatorrhoea, where sperm discharge takes place along with urination). Decoction of *arjuna* bark along with *shweta chandana* (*Santalum album* Linn) is wholesome.

Vagbhata

1. *In mutraghata* (obstructed urine). Drinking decoction of the *arjuna* bark is beneficial.

2. *In dead foetus.* A cotton swab soaked in the decoction of the *arjuna* and *shirisha* (*Albizzia lebbeck*, Berth) is to be kept at the vaginal orifice.

3. *In vyanga* (disfiguring marks or freckles on the skin). Rub the bark of *arjuna* with milk on a grind stone and then apply it over the spots.

4. *In heart disease.* Powdered bark with milk and treacle water or as a ghee (*ghrita*) is useful.

Vrinda

1. *In the diseases of the heart.* Taking a ghee prepared from the bark of *arjuna* will be very beneficial in all diseases of the heart.

2. *For a long span of life.* Take one fourth of a *tola* of the powder of *arjuna* bark, (morning and evening regularly) along with ghee, jaggery or milk. This will ward of diseases of the heart,chronic fever,plethora and the like and confer a long span of life.

3. *In fracture of bones.* Drinking the powder of *arjuna* bark along with milk is beneficial.

4. *In raktastisara* (dysentery accompanied with bleeding). Decoction of the bark of *arjuna* adding honey into it is curative.

5. *In udavarta* (morbid retention of faeces). Drinking a decoction of this bark is advisible.

Chakra datta

1. *To promote strength.* One should take the powder of *arjuna* bark daily along with milk. This is a very excellent *rasayana* or elixirising drug to increase vigour and all round strength.

2. Two *tolas* of the bark, 4 ounces of cows milk, and 12 ounces of water are to be boiled till water evaporates. This is good for all heart diseases.

Bhava Prakasha

1. *In cough associated with tuberculosis.* Take the dry powder of *arjuna* bark and submit it (*bhavana*) twenty one times of being treated with freshly extracted juice of *vasa* (*Adhatoda vasica Nees*). Dry it finally and this is to be administred to the patient with honey or ghee. All types of cunsumptive cough will disappear thereby.

2 *In udavarta due to mutraghata.* Decoction of the *arjuna* bark is to be drunk.

Harita

1. *In urinary discharge* accompanied with pus. Drinking *arjuna* bark decoction is beneficial.

Vangasena

1. *In grahani* (constipation). *Bhringaraja* (*Eclipta alba Hassk*) and the alkali (*kshara*) prepared from *arjuna* bark are to be taken in along with vinegar in the morning. This is beneficial in dysentery as well.

2. *In heart diseases.* A drink is to be made with the powder of *arjuna* bark, oil, ghee, jaggery and wheat flour. This is to be drunk followed with a cup of milk. This will destroy all diseases of the heart.

Modern practices: The bark of the *arjuna* tree has been well employed in modern practices also. It is seen to be astringent, strength giving and toning as well as stimulative to the heart.

This has been found to be particularly beneficial in the healing of the wounds, joining of the fractural bones and removing the distresses of sprains in any regions of the body. It is prophylactically (i.e. preventively) used in urinary gravels and urinary stones.

Its role in controlling bleeding and dysentery is also commendable.

The following decoction is highly recommended in heart diseases, complicated with endocorditis

(inflammotion of the inner layer of the heart), mitral regurgitation (defects in one of the heart valves) pericarditis (inflammation of the covering layer of the heart) and angina (pain in the chest and arms due to the reduced blood supply to the heart itself).

Take 1/4 *tola* of the thick bark of *arjuna*, 2 *tolas* of cane sugar and 8 ounces of boiled milk. Pound the bark very well, mix it with milk and sugar and give it to the patient every morning on an empty stomach. This is to continue for a considerably long time. Regular use for an year will entirely remove all the distressing symptoms and the patient will be thoroughly free from any ailments.

With milk or treacle or water, it is given for patients of fractures and contusions (internal jammings and injuries) with extensive ecchymosis, (multiple small sized blood clotting below the skin) because this promotes union of fractured ends.

Arjunarishta is a famous ayurvedic proprietary preparation or *yoga*. This is how it is prepared. The following materials are to be taken together: 400 *tolas* of the inner bark of *arjuna* tree, 200 *tolas* of *munakka* (dried black grapes) and 100 *tolas* of *datura* flowers. This net mixture is to be boiled in one and a half *man* (40 *sers*) of water. When the quantity of the water gets reduced to twelve and half *sers*, it is to be removed from the fire, cooled and filtered. Now five *sers* of jaggery and one *ser* of the flowers of *dhava* are added. Fill an earthenware vessel with this entire material, close the vessel with an earthen lid and keep it for a whole month. It

is to be used only after this period, first filtering it again.

The dosage is one to four *tolas* with an equal quantity of water.

This is recommended as an excellent drug for heart diseases and the diseases of the lungs.

Ayurvedic physicians use the *arjuna* bark to remove the vitiations of all the three viz *vata*, *pitta* and *kapha*. They also recommend it for all kinds of cardiac (heart) failure and dropsy (morbid liquid collection). Even allopathic practitioners prescribe *arjuna* bark preparations as a cardiac tonic. Liquid extracts of the bark are available in the Indian Drug Marketing concerns.

The bark of the *arjuna* tree is destructive of *pitta* and poison (*vishaghna*). Regarding its role in heart diseases, modern studies have shown that it no doubt has a salutary effect on heart; but it also increases the blood pressure to some extent. But the important aspect is, its use even for a long time is *not* accompanied with any other deleterious effect as it happens when digitalin, another plant product (from Digitalis) commonly used nowadays for heart diseases is employed.

If fresh barks are ground fine and tied over swollen eyes as a poultice, the oedema (or the morbid sweeling) disappears quite quickly. A decoction of the bark is used to wash ulcers and chancres (gangrenous or rotting wounds).

Chemistry

An analysis of the bark of *arjuna* shows that it contains tannin including gluco tannic acid (15 per cent), a colouring matter, a glucosidal body and ash (34 per cent) which contains potassium, pure calcium carbonates and traces of alkaline chlorides.

The root contains sugar, tannin, colouring matter, a glucoside body and carbonates of calcium and sodium along with traces of chlorides of alkali metals. The total tannin content of the root is 12 per cent and that of the ash is 30 per cent.

Another analysis of bark revealed unusually large quantities of calcium salts with small amounts of aluminium and magnesium salts, about 12 per cent of tannins, and organic acid with a high melting point; an organic ester and some colouring matter and sugar.

Many authorities attribute the cardiac effect of the bark to the bark of another closely related species viz *Terminalia tomentosa* rather than to *T.arjuna*. The barks of both the species however are so similar in appearance that the mistake is not merely understandable but pardonable also. In fact it very often happens that the pink coloured barks of *T.arjuna*, *T.coriacea*, *T.palida*, *T.paniculata* and *T.tomentosa* are so similar and are therefore mistaken for one another. They are all exhibited and sold indiscriminately as *arjuna* bark.

We shall now consider the remaining species of the genus *Terminalia*.

2. *Terminalia catapa Linn*

Names

The plant has but a few names in Sanskrit. They are: *ingudi* and *tapasa vriksha* (though both of these terms are also applied to other plants as well for eg. *Balanites aegyptiaca* linn of a totally different family), *taillaphala* (*yielding an oily fruit*) and *kshudra badama* (the inferior almond). Of these, it is the last which is its best known and the most suited name. Its names in English as well as regional languages are mostly based on this term.

In English it is called country Badam, Indian Almond, Malay Almond.

It is named *badam, bangla badam* in Bengali; *badam lili, deshi badam, lili,* or *nili badam* in Gujarati; *badam, hindi badam, jangli badam* in Hindi; *badami, kadu badam, olegra,* in Kannada; *kuru, nattu badam, talitanna* in Malayalam; *bengali badam, tirani badam, jangli badama,* in Marathi; *amandi, nattu vadumai, pinga, siruppinga* in Tamil; *badamu, ingudi, natubadami, tapasa taruvu* in Telugu; and *bodamo, desiyobadamo,* in Oriya.

Its specific name in Latin is from its name in Malay i.e. *Katappa, Ketapang.*

Botanical Description

The plant is indigenous or native to the Andamans and the other adjacent islands of the archepelago and the coastal forests of Malaysia. But

it is extensively planted all over India quite often in house gardens even.

It is a rather small sized tree growing to about 25 metres in height. Branches are characteristically placed in horizontal whorls. Leaves are simple, large and alternate on the stem. They occur clustered towards the ends of the branches (as in other Terminalias). Their stalk is very short. The blade is obvate but with a very narrow base and 15-25 cm in dimensions. The leaves are deciduous i.e. the whole foliage falls down in cold seasons. They are usually softly hairy when young, hairy or wholly hairless when old. Characteristically they have two glandular depressions near the base of the midrib on the under side, though these may be often obscure or even not present at all.

The flowers are clustered in spikes which are solitary, simple or unbranched, grey or with picturesquely rust coloured hairs all over. Flowers at the ends are male and those below are bisexual. Fruit is green to start with and later turns coppery brown or slaty or bluish brown. It is fleshy, fibrous and a drupe with a hard stone within which occurs the edible seeds, the *badam*.

The most distinguishing feature is the very short leaf stalk and the very narrow but heart shaped base of the leaf blade. Leaves turn deep red before falling giving the whole tree a striking appearance at that time. The wood is red and hard; the outer sap wood is light coloured.

The plant is cultivated all over India but occurs in a wild state in the low lands of the Trans Gangetic Peninsula.

Medicinal Properties

Seeds contain 50 per cent of an oil resembling almond oil in flavour and mildness. It is infact used as a substitute for almond oil. It is better than almond oil and more importantly it does not get spoiled for days together. When kept for a long time it deposits stearine in large quantities. It is dull yellow in colour, odourless and very much like the almond oil. It is composed of stearine and oleine. Both the bark and the leaves of the tree contain a considerable amount of tannin.

Ayurveda regards its fruit as bitter, sweet and astringent in taste. It is cooling and obstructive to the bowels (*mala rodhaka*), aphrodisiac (or stimulating the urge of sex) and destructive of the *pitta dosha* or bilious troubles. It is capable of warding of bronchitis or the inflammation of the bronchii of the lungs.

The oil of the Country Almond is very good for massaging. This increases the lustre of the skin. The oil is good as a hair tonic also, it renders the hair firm and well nourished. But nutritionally, apart for the hairs, this oil is inferior to almond oil.

The bark of the tree is astringent and healing. Its decoction is used in syphilis and leucorrhoea or the whites in women. Washing the wounds and ulcers with this oil heals them well and fills them up. It

yields a black pigment which is used sometimes to colour teeth. Sometimes, the upper layer of the skin or the epidermis in the region of the mouth develops a tendency to peel of. Gargling with its decoction is beneficial in such a condition. The bark is midly diuretic but a fairly potent cardio tonic.

In South India, the juice of the young leaves is utilised to prepare an ointment meant for scabies, leprosy and other afflictions of the skin. Internally it is also taken in as a cure to headaches as well as colicy pains (twisting pains at the stomach).

The astringent root bark of the plant is given in dysentery and diarrhoea in French Guiana, now Surinam in the north coast of South America. The stem bark is regarded as a cure for bilious fevers. The leaves are much used to prepare maturant and emolient properties viz properties that hasten the maturation of the wounds and the abscessus and aid in softening them as well. In La Reunion of the West Indies, the leaves as well as the bark are used as astringent and healing drugs.

3. *Terminalia citrina* Fleming.

Names

This does not have any name in Sanskrit.

It is called Citrine Myrobalan in English.

It has names only in a few of our regional languages. These are: *hilika, silika, silikka* in Assamese.; *haritaki, harra* in Bengali, *hortaki* in

Cochar District, and *hariha*, *harira* in North West Pakistan.

Botanical Description

This is a tree reaching to a height of 25 metres. The leaves are more or less opposite, 7-16 cms in dimensions and are very thickly coriaceous or leathery. Their shape is elliptic or elliptic lanceolate. When mature, they are shining and hairless. But in between the nerves of the blade on the underside close minute white hairs occur. Leaf stalk is 12 milimeter long and usually displays 2 glands at the top or the base of the leaf beneath. Flowers are clustered in spikes - i.e elongated, pointed and with stalkless flowers. Flowers are all bisexual. Fruit is a drupe as in the other Terminalias, nearly 5 centimetres in length, oblong-lanceolate (lance like) in shape and has five angles when it is fresh.

The points of distinction between this plant and *T.chebula* or *haritaki* are the following. It has a straighter stem, a brighter foliage and a narrower fruit.

The bark is light grey and peels of in few large flakes.

The wood is grey with a central heart wood, small in size, irregular in shape and occasionally totally absent. The wood structure is much similar to what is seen in *haritaki* to which this plant is closely related botanically. But the pores here are much smaller and the concentric rings are much more marked and prominently visible.

The tree is an inhabitant of Assam, Bangladesh, Tennaserim (in Myanmar), Nicobar islands and Malay Peninsula.

Medicinal Properties

The fruit has the same properties as that of *Terminalia chebula* or *haritaki*.

As such it can very well be utilised for all the numerous medicinal purposes for which its more famous relative viz *T.chebula* is employed. We can infact consider this plant as a valuable additional drug material that can be very well exploited in as many ways as *harad* if not more. The plant is thus a promising natural resource calling for greater attention than has been so far bestowed upon.

The bark of the tree is both diuretic and cardiotonic.

4. *Terminalia tomentosa* (densely but softly hairy) W & A.

Names

This plant unlike *T.citrina* above is well known to Sanskrit authors who call it by several names. A few of them are: *dharaphala* (referring to the fruits that occur in rows), krishnatvak (bark is black as opposed to *dhavala* or white which is what characterises *T.arjuna* to which the plant seems much related just as *T.citrina* is related to *T.chebula*), *nissara phalaka, sajada, saradru, shyama saraka, vira vrikshaka* (something similar

to the heroes tree or vira taru, a common name for *T.arjuna*, which it resembles much), *vanaja vriksha* (a tree of the forest).

It has names in many of our regional languages also. They are: *saj, shaj,* in Almora; *amari* in Assamese, *asan, ashan, piashal, ushan* in Bengali; *asin* in Gharwal; *aine, hadri, sadada, sadra, sajada* in Gujarati; *ain, asan, kauha* (a term applied for T.arjuna also in Hindi), *sadri, saj, sein* in Hindi; *aini, matti, kari matti* in Kannada; *karimarudu, marutu, tempavu* in Malayala; *aruchanam, kagubam* (a name for *T. arjuna* also), *kalimarudu, karuppu marudu, pudavum* in Tamil; *maddi, nalla maddi* in Telugu; *kolasshahajo, pondosahajo, shajo* in Uriya.

In English it is called Black Murdah, which is a straight adaptation of its names in Malayalam i.e *kari marutu* and Tamil *kari marudu*.

Botanical Description

This is a large tree of our forests. The twigs are characteristically villous or softly hairy; this is what the specific name *tomentosa* connotes. Leaves are leathery, villous on the under surface, 18 by 8 cms in dimensions, elliptic-oblong in shape. The apex is obtuse or even emarginate (i.e. notched in), the base is rounded or heart shaped. Nerves on the leaf blade are many and they are prominently parallel. There is a pair of glands at the base of the midrib and these are long and stalked. Flowers are arranged in spike like clusters, but these spikes are not simple. Instead they are densely branched into panicles.

They are also highly villous. Fruit is a drupe as in the other *Terminalias* but very large in size; they are however non hairy, usually of 5cm in diameter including the five equal wings on it.

This tree is common throughout in India especially in the forests and jungles. It does not occur in the arid Rajasthan.

Medicinal Properties

The parts used are gum, bark and ash.

The bark contains 64.0 per cent of insoluble matter, 4.4 % of non-tannin extractive matter, 20.2% of tannin and 6.7% of ash. The bark containing 20% of moisture should therefore be having 65.6 % of tannin, which is quite high.

The bark is bitter in taste and stypitic or contractive in action and therefore healing in its effect. It prevents bleeding and is thus useful in all cases of haemorrhage. This is useful in ulcers, *vata* aggravations and joining of the fractures much as are the barks of *T.arjuna*. A decoction of the bark is given internally in atonic (where the tone of the intestinal muscles is lost) diarrhoea in a dosage of 2 ounces and locally as an application to weak, indolent (i.e. not much reactive and therefore not vigorously healing) ulcers. The bark has a diuretic activity as well as a cardiotonic efficacy. It is also antiseptic, bactericidal (killing to bacteria), demulcent (cooling) and astringent.

Ash yielded in the calcareous matter inside the trunk of this tree is used by the chewers of betelnut, very much like katha or *acacia catechu*.

Gum from the bark yields a fragrant substance. This is actually used as a cosmetic and an incense. The terms *maddi* or *marudu* in the names for this plant in the regional languages indicates this incense nature of the gum of this plant.

Here is a tree which is very much similar and closely related to the famous Arjuna tree of *T.arjuna*. It resembles the latter in leaf, flowers and fruit. The bark of this tree and that of *arjuna* are often sold together in the market though apparently distinguishable by its blackishness as opposed to the while of *arjuna*. At some quarters it is believed that the important medicinal activity of toning up the heart muscles is actually present in the barks of *T.tomentosa* rather than in those of *T.arjuna*.

The two principle actions of the bark are: preventing blood flow and joining the bone fractures.

5. *Terminalia paniculata* Roth.

Names

The plant was probably unknown to Sanskrit authors. There is no name for it in Sanskrit.

However quite a few regional languages recognise this plant. It is called *pillai marudu* in Tamil, as

opposed to *kali marudu* which refers to *T.tomentosa*. These two plants *pillai marudu* and *kali marudu* are very popular timber plants in Tamil Nadu even today. Its other names are as follows. It is called as *kindal, kinjal*, in Bombay and Marathi; *qutnzol* in Konkani; *honagalu, honalu, hulive, maruva, matti* in Kannada; *marutu, permarutu, pullamarutu, pumarutu, ven marudu* in Malayalam; *ilai kkadukay, marudu, pey kkadukkayi* (which means a ghost *haritaki*, viz its resemblance to *haritaki* is stressed here), *pillai marudu, pumarudu* in Tamil; and *nimiri, pulamaddi, putamanu* in Telugu.

It can be seen thus that it is essentially the Southern languages that had a name for this plant and resemblance of this plant to *haritaki* or *harad* or *T.chebula* is often stressed by some of these names.

In English this is called a Flowering Murdah, which is a straight-translation of the *pumarudu* of Malayalam and *pumarudu* of Tamil.

The tree is essentially a plant of the peninsular India, the Western region from Bombay through Canara, and Malabar to Travancore upto 2,000 feet in Coorg, Nilgiris, Annamalai Hills, Cuddapa and Bellary of Andhra Pradesh.

Medicinal Properties

Rural people use the juice of the fresh flowers rubbed with the root of *Cocculus villosus* (*forid bel* in Hindi and related to *guduchi*) as a remedy for cholera and in cases of poisoning with opium. For

this purpose 4 *tolas* of the juice along with an equal quantity of guava bark juice is given frequently.

In parotitis, (inflammation of the parotid solivary glands) the juice is applied with ghee and rock salt.

The bark has both diuretic and cardiotonic properties resembling the barks of *T.arjuna* as well as *T.paniculata.*

6. *Terminalia pyrifolia* Kurz.

Names

This has no names either in Sanskrit or our regional languages.

It is a tree from Burma (Myanmar) but found occasionally in India. It is called Leinpen in Burmese.

Botanical Description

This is a large deciduous tree of the forests of Burma. It is often stunted and is not having any hairs excepting at the spikes or the flower clusters. Leaves are crowded towards the ends of the branches as in the other Terminalias. They are oblong lanceolate or broadly lanceolate, glabrous (hairless, smooth), 5-10 centimeter long, leathery and narrowing towards the stalk. The stalks do not have any glands. Flowers are clustered in spikes but the spikes are simple, unbranched and slender. Fruit has 2 wings; it is 2.5-5cm broad, the seed containing portion shows a keeled (i.e a jointed) nature at one side.

This is a native of Tennaseium and Pegu region of Burma.

Medicinal Property

The bark is a fairly potent cardiac stimulant, much like *T.tomentosa* and *T.arjuna.* It can therefore be used similarly.

7. T. biolata.

Names

This also has no names in Sanskrit and most of our regional languages.

It is a tree of the Andamans and Burma.

Its name in Andamans in Chugalam. In English it is called White Chugalam. Its name in Burmese is Leinben.

Botanical Description

This is a large tree. Leaves are alternate and crowded at the ends of the branches. They are oblanceolate (i.e lance like in the reverse, basc being pointed) in shape narrowed to a very leaf stalk. They are completely hairless and smooth. The leaf is 15-23 cm long while the stalk is 7-10 cm long. Flowers are clustered in spikes which are simple, hairy and are as long as the leaves. The flowers at the ends of the spikes are male, the lower ones are bisexual. Fruit has wings and is 7.10 cm broad.

This is almost resticted to Andaman Islands in India.

Medicinal Property

The bark here also is a fairly potent cardiac stimulant. It can therefore be very well employed much like the barks of *arjuna* or *T.arjuna* and *T.tomentosa.*

8. *Terminalla oliveri Brands*

Names

There are no names in either Sanskrit or our regional languages.

It is almost wholly a tree of Burma though it may occur occasionally in the forests of Khasi and Jayantia hills, bordering Burma. Its Burmese names is Than.

Botanical Description

This is a moderate sized glabours (i.e. smooth, non hairy) tree with irregularly shaped, often chanelled stems. Leaves are nearly opposite and broadly ovate. Leaf blade is 4-8 cm long, with 5-8 pairs of secondary nerves. Leaf stalk is 6 milimetre long. Flowers are small and arranged in slender terminal panicles. Fruit has 5 wings and they are narrow, membranous and 18 mms long and 12 mms broad.

This is a tree of the upper Burma forests.

Medicinal Property

The bark has diuretic as well as cardiotonic properties much like *T.arjuna* and *T.tomentosa.*

9. *Terminalia myriocarpa* (with many fruits) Heurck & Muell.

Names

No name occurs in Sanskrit and most regional languages.

It is called *hollock, jhalna* in Hindi, *sungloch* in Lepcha (Bhutan), *pani saj* (*saj* of the water course) in Nepali.

Botanical Description

This is a very large evergreen tree. Young shoots are covered with rust coloured profusion of hairs. Leaf has a rounded base; it is elliptic oblong in shape and the blade is 10.30 cm long. The secondary nerves are numerous and parallel. Leaf stalk is thick, 6-8 mm long with 1 or 2 prominent, cylindrical glands at the top. Flower are small and clustered in long slender spikes which in turn are much branched in terminal panicles. Fruits are 4 mm long, exceedingly numerous, (hence called myrio corpa) minutely villous and 3 cornered. The 2 lateral wings are expanded into wings which are 6 mm wide and provided with minute projections. The third angle is acute and hardy winged.

This is a tree of Eastern Himalayas from Nepal eastwards upto 5,000 ft. in Bhutan, Assam.

Medicinal Property

The bark is mildly diuretic and a fairly potent cardiac stimulant quite like *T.arjuna* and *T.tomentosa.*

10. *Terminalia coriacea* (the leathery) W & A.

Names

This has no names in Sanskrit or any northern regional languages.

In Kannada, it is called *banapu* (the flower of the forest); in Tamil, *anaimkkavum, sadagam.*

In English it is known as Leathery Murdah.

Botanical Description

This is a large tree in suitable localities. Otherwise it is small sized and often stunted, leaves are nearly opposite, elliptic ovate or elliptic oblong. The apex is obtuse but often emarginate or notched in. Base is cardate or heart shaped but the two halves of it on either side of the mid rib are unequal. Leaf is leathery and has 2 glands at the base of the midrib beneath. It is softly and minutely yellowish brown-velvety beneath. Flowers are small but in terminal profuse panciles of spikes. The spikes themselves are yellowish brown and velvety. The flowers are stalkless, bisexual, crowded, small, dull yellow, and with a hoary (i.e. densely hairy) outside. Fruit including the 5 wings are almost 4 cm in diameter. This is also minutely velvety and yellowish brown in colour.

This is a tree of the South Indian forests going upto 4,500 ft. in the Western Ghats, Hills of Tamil Nadu and the forests of Malabar.

Medicinal Property

The bark of this plant is also a fairly potent cardiac stimulant.

11. *Terminalia pallida Brandis.*

Names

This plant has also no names in Sanskrit or any northern regional languages.

In Tamil it is called *vellai kkadukay* (which means a *haritaki* or *harad* which is white in colour and not of the typical yellowish green shade); in Telugu, it is *tella karaka* (light coloured *haritaki*) and *velama karaka.*

Botanical Description

This is a small sized evergreen tree unlike many other *Terminalias* which are deciduous and shed down their leaves seasonally. Leaves are clustered at the ends of the branches. They are alternate, shining, thick and ovate in shape. The base is rounded or thin while the apex is acute or emarginate (viz notched in). Leaf stalk is short and orange coloured. Flowers are clustered in simple spikes and are non hairy. Fruit is obovate in shape, very faintly 5 ridged when dry, smooth and non hairy and it has a very narrow base.

This is also a tree of the Southern peninsular India, common all over Tamil Nadu and Andhra Pradesh going up to an altitude of 2,000 ft., in the Eastern Ghats mainly.

Medicinal Property

The bark has mild diuretic properties.

All the plants that we have so far seen belong to only one genus viz *Terminalia* belonging to the family Combretaceae. Of all these, the most famous is *haritaki* whose many points of excellence are highly praised in the vast literature on Ayurveda. An interesting efficacy of the plant not so far mentioned is as follows. An anceint book on Music called Gitalankara by Bharata advises the following recipe for the musicians to render their throat mellifluous. "He should eat *haritaki*, *bibhitaki* and *amalaka* or *triphala* in the night along with salt. Early in the morning next day before sun rise he should eat another dose of a drug containing *khadira* (*Acacia catchu*) along with nutmace and camphor. If he does so, his singling will be like that of Tumburu himself".

But this family includes two other plants of medicinal value viz *Anogeissus latfolia* Wall or *dhava* which is quite a well reputed Ayurvedic plant and *Calycopteris floribunda* Lamk which is less famous though valuable in its own way. We shall have a brief acquaintance with these two plants now.

(a) Anogeissus Latifolia Wall

Names

The plant has many names in Sanskrit. They are: *baka, dhava, dhavala, gaura pandura, pandutaru* (all meaning white); *dhrida taru, sthira* (a hardy tree); *dhurandhara, shakatakhya* (a tree whose wood is used for making yokes and carts), *kashaya* (an astringent tree), *madhura tvacha* (bark, sweetish); *nanditaru; pitaphal* (bearing yellow fruits); *pishachavrikha* (a tree where goblins reside); *shushkanga, shushka vriksha* (a dry tree)

It is called *dhaoya* in Bengali, *dhaura* in Gharwal, *dabria, dhavdo* in Gujarati, *bakla, banki, dhaura, dohu* in Hindi; *dindiga, bejjalu,* in Kannada; *malakanniram, vellanava; daura, dhavda* in Marathi; *namai, vellangai,* in Tamil, *shirimanu, vellam* in Telugu; *bakla* in Urdu and *dhou, dhonda* in Uriya.

In English, the plant is called the Button tree, Axle wood.

Botanical Description

This is an erect tree often reaching a height of 18-21 meters. Its bark is smooth, and light coloured; most names of this plant refer to this lightness of colouration of the tree surface viz *dhava* or white. The same colour characterises its long spreading branches. More importantly, straight crevices characterise the surface of the tree, along which thin flakes of bark are seen to be peeling of. The

colour lower down in the fold of this peel is green but the innermost bark is white and fibrous. Young parts of the tree are striking in their appearance because of a dense cover of silky hairs. Leaves are 6.3-10 by 3.5 cm in dimensions. They are alternate mostly or nearly opposite sometimes. They are non hairy when fully grown, pale dull and glassy green and sport a prominent pink midrib. Flowers are stalkless and they are clustered in short dense head like inflerescences. Fruits are small, shining and yellow in colour, several fruits occur together in a rounded head. They are winged along the two longer sides and possess a prominent beak like structure made out of the persistent calyx. Every fruit has only one seed within.

The tree is quite a common component of the forests and jungles throughout the greater part of India and Sri Lanka, specially in the drier regions.

Medicinal Properties

Dhava is well referred in many of the famous Ayurvedic classics as noted below.

Charaka A paste prepared out of the central wood (*sara*) of *dhava* and *khadira* (*Acacia catecful*) is advised as being beneficial in leprosy.

The bark of *dhava* is to be rubbed or ground with water and applied in the painful and spreading eruption of *visarpa* or erysepelas.

Sushruta In the abscesses within the ear and specially where pus is oozing out of the ear, place a

few drops of the juice of *dhava* (wood) or an oil made out of this juice.

Vagbhata The inner portion of the wood of *dhava* is to be mixed with honey and kept overnight in a metallic, preferably an iron vessel. This is to be drunk in the morning with milk. This is a good *rasayana* or an elixir.

Charaka classifies *dhava* as one of the *kashaya skandhas* viz astringent barks. He recommends its use along with other astringent substances in order to facilitate healing, specially so in piles. It is also recommended for use again along with other simple useful drugs in the afflictions of *kushta* as well as difficulties in urination. Sushruta extols upon the capacity of this plant in the quick healing of the wounds.

The root of this plant is pungent and acrid (i.e. biting) in taste. It is stomachic (good for stomach) but increases biliousness. The bark is also pungent, acrid and sweet (*madhura twak*). It is cooling and improves taste in food as well as general appetite. It causes biliousness or *pitta dosha* but removes *kapha* and *vata* aggravations. It has been found to be useful in anaemias, irregularities in urinary discharge and piles. It is a recommended drug for application in skin diseases and erysepelas. The juice of the leaves is given in purulent discharges of the ear as Sushruta recommends. The fruit is acrid in taste but dry in property but has an agreeable flavour. It cures the aggravations of *kapha* and *pitta*.

Yunani physicians consider the bark as bitter and astringent to the bowles. They also regard it as useful in liver complaints, chronic diarrohea, opthalmia (eye diseases) and eyesores. According to them, the three important medicinal actions of the drug are: stopping of blood flow, a general cooling down and a bringing about of dryness (or *rukshana*). It is because of its astringent property and the capacity to stop blood flow, a patient of bleeding piles is advised to sit in a basin containing a cold decoction of *dhava* till he becomes relieved of its restlessness. Simultaneously the powder of the wood is also administered orally. The same procedure is advised in patients where the rectum has become prolapsed. In conditions where uterine bleeding or flow occurs, *dhava* is advised along with other drugs or by itself. Because of its cooling and drying actions, *dhava* is advised in patients of burn cases, and in scalded regions.

Ayurvedic physicians consider the flowers of this plant as bitter and astringent in taste, light in digestion and of a cold potency. It helps in joining up the tissues, healing of the wounds, and also in diarrhoea and dysentery. The flowers are advised in rectifying excessive menstrual flow, and chronic indigestion. An interesting use of the flowers is that an addition of a few flowers of this plant gives a very attractive colour to *asavas* or spirituous preparations in ayurvedic medicine. Flowers are also utilised to prepare a colyrium (*anjana*) for the eyes.

The tree produces a gum which is used in confectionery or in preparation of sweet meats.

Among the Munda tribes of Chota Nagpur the bark forms an ingredient of an effective expectorant drug to expel out hardened phlegm obstructing the wind pipe or the trachea. The wood of *dhava* is very hard. As such it is a highly praised fuel wood. The bark contains a great percentage of tannin; hence it is a good material specially for dye making. In Panchamahal district of Gujarat another allied species viz *Anogiessus acuminata* is available abundantly. This can form a good substitute for *A.latifolia.*

(b) Calycopteris floribunda Lam

Names

This does not have any name in Sanskrit.

It is an Indo Malayan plant found in Southern India, Malaysia and Burma. This is a well extolled medicinal plant in Cambodia.

It is called *khsuos* in Cambodia, *marasutthu balli* (a tree encircling creeper), *kuppasa, hanjarike, kucchu* in Kannada; *ukshi* in Marathi; *minnar kodi* in Tamil, *gadda puttike, tellavadala* in Telugu and *dhonoh, kukundia* in Uriya.

Botanical Description

This is an irregularly climbing shrub. Young branches have rust coloured cover of minute hairs.

Leaves are opposite, ovate or lance like in shape. Both surfaces of the leaf have rusty hairs, specially the lower. Flowers are stalkless, yellowish green and arranged in terminal branched pancles. Fruit is 8 mm long, oblong or ellipsoid and has five ribs on its sides. The fruit is having a crown made up of the persistent lobes of the calyx.

This is an inhabitant of Western Peninsular India, Orissa, Assam, Chittagong, Upper and Lower Burma as well as Malaysia.

Medicinal Properties

The leaves are regarded as being laxative and anthelmintic (i.e. killing to helminthic worms). The juice is given in purperal fever (the fever associated with child birth). It is also applied over the body as a diaphoretic viz to induce profuse sweating.

The leaves are bitter and astringent in taste. They are chewed and the juice is swallowed in, as a remedy for colic or twisting pains in the stomach. The root is ground to a paste and along with the fresh juice of a common weed *Croton oblongifolius* applied to the bites of the highly poisonous snake, the Russel's viper. In jaundice, the fruit and various spices-all of equal parts are made into a compound powder and taken in orally. The advised dosage is two *mashas*. The fruit along with the root of *Grewia pilosa* (*falsa* in Hindi) is rubbed into a paste with honey and applied to heal ulcers.

In Cambodia the stems and leaves are considered tonic and a purificatory drug. They are administered in the form of an infusion during the first fortnight following delivery.

A PROSPECTIVE SUGGESTION

The three important plants we have discussed in some detail above are: *Terminalia chebula* or *harad*, *T.belerica* or *baheda* and *T.arjuna*. Everyone of them has proved to be an uniquely potent medicine in its respective field. *Harad* is a good and safe regulator of digestive disorders, *baheda* is a reputed drug for correcting respiratory upsettings while *arjuna* is a recognised drug for heart diseases often regarded as much better than even digitalin, the choice drug of Modern Medicine in heart troubles. Besides, *harad* and *baheda* are useful materials for tanning purposes and in preparing dyes.

The brief survey of the other members of the genus *Terminalia* reveals the following.

The rich flora of our country shows the occurence of many other *Terminalias* that can very well be exploited further with hopes of all success. Some of them can be additional materials for what *haritaki* and *bibhitaki* serve now while others can act as alternatives or additional to the cardiotonic action that the *arjuna* bark is reputed for. Folklore medicine and our different regional languages have recognised this aspect; the latter call these other species *Terminalia* as but "varieties" of *harad* or

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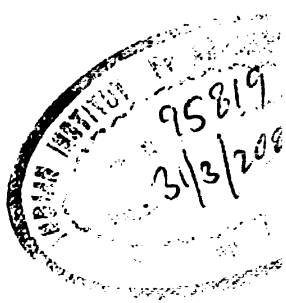

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Rs. 25 each

* Harad and Baheda
* Gourds and Pumpkins
* Amalka and Bhumi Amalka
* Onion and Garlic
* Neem and its relatives
* Banyan and Peepul
* Khas, Kesar, Nagakesar and Khaskhas
* Coconut, Supari, Kikar and Catha
* Bael, Wood Apple, Lemons and Castor
* Giner and Turmeric
* Salts, Sugar, Jaggery and Honey
* Spices
* Isabgol, Gokhru and Brahmi
* Seasoning Herbs
* Fragrant Herbs
* Milk and Milk products
* Leafy Vegetables
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