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Chironji (*Buchanania lanzan* Spreng.): A Vulnerable Multipurpose Tree Species

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ABSTRACT

Chironji (*Buchanania lanzan* Spreng.) is a member of the family Anacardiaceae and it is originated in the Indian sub-continent, is an excellent multipurpose tree species. Traditional indigenous knowledge reveals the immense value of almost all parts of the plant i.e. roots, leaves, fruits, seeds and gum for various medicinal uses. Chironji (*Buchanania lanzan*) is an important non-wood tree species found in deciduous forests throughout the greater part of India. It is a multipurpose tree and very important plant for rural and tribal economy. It is used as a fuel, fodder, alternative host for *Kusmi* lac insect, and also used in cosmetic items and soaps. Seeds/ kernel are nutritional, palatable and used as a substitute of almonds in confectionery. It is widely used by Indian tribes for treating various diseases. Three major chemical constituents of potent medicinal value, namely celidoniol, vomicine, epinitol have been characterized from an organic extract of leaves. Such extracts mainly exhibit antidiabetic, anti hyperlipidemic, antioxidant, anti-inflammatory, wound healing, antidiarrheal, antivenom activity including a host of other curative properties. Very recently, unique biomaterials and biofilms are being extracted from seeds, which promise to become a major contributor in pharmaceutical industry.

Keywords: Deciduous forests, Biomaterials, Nutritional, Tribal community.

Introduction

Chironji was first reported by Francis Hamilton in 1798 belongs to family Anacardiacae. It has diverse common names depending upon the region, Charoli (Gujarat), Chawar, Achar, Cuddapah almond (Bengali), Piyal (Assam) Charu (Oriya), and Char (Telugu). Chironji is a medium-size tree, and grows up to 40-50 ft. with a straight trunk. The trees are found up to an altitude of 900 meters above mean sea level.

Trees have the alternate bearing nature as present in the mango which flowers from January to March and fruits ripen in the month of April-June. The leaves are 6-10 inches long, with oblong, obtuse, flowers whitish green, sessile, fruit drupe, green when immature and dark black at the ripened stage. Fruits are juicy with moderate sweet and acidic pulp generally collected at the green stage to extract the kernels. Chironji is one of the most common dry fruits in India which contains a high

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calorific value and sweetish in flavour. It used frequently as snacks and as an ingredient in several traditional sweets of India. On average, 40–50 kg of fresh fruits are produced per tree, which remains 8–10 kg on drying, resulting in 1–1.5 kg of finished product per tree. The price of the dry seed of Chironji is about 1200-1500 per kilogram. Seven species of *Buchanania* have been reported in India of which two *B. lanzan* and *B. axillaries* produce edible fruits. *B. lanceolata* is an endangered species. It is found in the ever green forests of Kerala. *B. platyneura* is found in Andaman only. Other species of the genus are *B. lucida, B. glabra, B.accuminata.* It is reported that the fruits of *B. platyneura* are also edible. The *B. exillaris* are reported to be dwarf in size and produces excellent quality of kernel.

Distribution

The species is a native of the Indian sub-continent and is found in the tropical deciduous forests of north, western and central India. The species is closely associated with Sal (*Shorea robusta*), Teak (*Tectona grandis*) and *Anogeissus* species. *Buchanania lanzan* Spreng is most important and widely distributed species in India. It is a main species of Southern and northern tropical dry deciduous and Northern dry mixed deciduous forest type widely distributed in the state of Madhya Pradesh, Chhattisgarh, Jharkhand, South east Uttar Pradesh and part of Gujarat, Rajasthan, Orissa, Andhra Pradesh Karnataka and Maharashtra. It is an important tree species of Vindhyan Zone (Mirzapur and Sonbhadra districts) and Budelkhand region of Uttar Pradesh. Due to negligence, poor attention and heavy biotic pressure, several tree species in different parts of India are depleting very fast and leading towards extinction. *Buchanaia lanzan* (Chironji) is one of them, which is depleting with a very fast rate and presently categorized under the threatened species. In the absence of conservation measures, it may extinct in the near future. Therefore, conservation and sustainable use of this type of species is an important necessity for ecologically sustainable development, food security and development of socio-economically poor communities of the nation.

Present status in India

Information regarding the area and production of this fruit in India is not available because it is not grown on plantation scale and limitation in forest areas. Chironji is not cultivated as regular plantation. It is found growing as stray plantation in natural habitat. However, its regular plantation is seen under some botanical garden. Exact statistics as regard to area is not available. The production in India is mainly concentrated in the drier states and the produce is collected by the villagers and sold in the local market. It

cultivation may spread to semi-arid areas, resource poor areas and wastelands.

Soil

Chironji is a hardy plant and thrives well on rocky, gravelly red soils and also on saline and sodic soils but does not survive under water logged conditions. It grows in pockets of soil between crevices of barren rock and degraded rocky areas including salt-affected soils. For better growth and productivity, well-drained deep loam soil is ideal and it prefers tropical and subtropical climate and withstands drought admirably.

Traditional uses

Traditional indigenous knowledge reveals the immense value of almost all parts of the plant like roots, leaves, fruits, seeds and gum for various medicinal uses.

The roots: Are acrid, astringent, cooling, depurative and constipating and are useful in treatment of diarrhea. Extract of the root is also used as an expectorant and for curing biliousness and blood diseases.

The leaf juice: Is used as expectorant, aphrodisiac, purgative, blood purifier, thirst-quencher and cures digestive disorders. It contains 2.64% tannins (0.35% gallo-tannins), triterpenoids, saponins, flavonoids and reducing sugars. Powdered or crushed leaves are applied to wounds.

The Chironji seeds/kernels: Are nutritional, palatable and used as a substitute for almonds in confectionery. The seeds possess 3.0% moisture and are rich in lipid/fat (59.0%), protein (19.0– 21.6%), starch/carbohydrate (12.1%), fibre (3.8%), minerals like calcium (279.0 mg), phosphorus (528.0 mg), iron (8.5 mg) and vitamins like thiamine (0.69 mg), ascorbic acid/vitamin C (5.0mg), riboflavin (0.53 mg), niacin (1.50 mg) and also contain 34-47% fatty oil which is used as a substitute for olive and almond oils.

The calorific value of kernel: Is 650 k-cal/100g. Kernel lipids comprised mainly of neutral lipids (90.4%), consist mostly of triacylglycerol (82.2%), free fatty acids (7.8%) and small amount of diacylglycerols, monoacylglycerols and sterols. Ointment made from its kernels is used to relieve itch and prickly heat.

The oil: Extracted from kernels is known as "char" and used for curing skin diseases and removing spots/blemishes from the face. The oil is also applied externally on glandular swellings of the neck singly, as also in combination with other herbal oils.

Chironji seeds: The seeds are used for preparing a traditional sweet dish known as Chironji ki burfi, halwa and kheer. Average annual seed collection is 300 to 1200 quintals in Madhya Pradesh alone. It is an income generating produce for the forest dependent communities. On an average, 40–50 kg fresh fruits are produced per tree, which come down

to 8–10 kg on drying, yielding 1.0–1.5 kg of finished produce per tree.

The fruits: Are laxative and are used to relieve thirst, body-burning, fever, cough and asthma.

Bark yields: Tannin (up to 13%) which is used in the tannin industries. The tribes of Southern Bihar blend the powder of the stem bark and *Syzygium cumini* (Myrtaceae) together and the same is given to treat infantile diarrhea.

The gum: Oozed from the cut-bark is soluble in water and used internally for treatment of intercostals pain and diarrhea. The gum is mixed with goat`s milk for effective and curative results in intercostals pains, being analgesic. Some tribal communities of Andhra Pradesh consume a blend of the gum dissolved in cow`s milk for treating rheumatic pains. It is believed that the production and collection of about 175 metric tons of char gum is from Mandla, Dindori, Umaria, Shahdol, Katni and Chhindwara districts of Madhya Pradesh (India). The gum is generally used for adulteration of guggul (*Commiphora wightii*) by adding some perfume/scent. In the tobacco industry it is used for the refinement. The superior quality gum is used in soft drinks and edibles for colouring.

The timber of Chironji: It is slightly resistant to termite and is utilized for making furniture, boxes and crates, desks, fine furniture, match boxes, moulding, packing cases, stools, tables and agricultural implements. The tribal communities of Sonbhadra District, one of the most backward districts of Uttar Pradesh and a part of the Vindhyan zone, earn money by collecting gum and lac by rearing kusumi strain of lac on the Chironji trees.

Mineral availability in seeds of Chironji (g/100g)

S. No.	Components	Proximal value (%)
1	Ash	2.20
2	Crude Fat	38
3	Total Protein	43.24
4	Total Carbohydrate	12.96
5	Moisture	3.8
6	Total Crude Fiber	18.50
7	Energy Value (k cal)	228.97
8	Phosphorus	5.93
9	Strontium	0.68
10	Zinc	3.32
11	Aluminium	0.3
12	Boron	0.6
13	Calcium	70
14	Copper	1.15
15	Iron	4.8
16	Magnesium	275

Plant propagation

Seed propagation and Raising of seedlings

Chironji plants are generally propagated by seed giving a long gestation period (15-20 years) and large variability. Percent germination in freshly extracted seeds is poor because of hard seed coat on the kernels. Seed germination of 83.00% within 18 days could be achieved with satisfactory

seedling growth by mechanically damaging the stony endocarp before sowing in the month of June. Seed treatment with sulphuric acid (5-7%) found very suitable for promotion of seed germination in Chironji. Seeds can be sown on raised beds or in polythene bags about 30 cm deep during June-July and it germinates within 25-35 days. The seedlings become ready for grafting after one year from the date of sowing.

Vegetative propagation: Vegetative propagation methods like chip budding and softwood grafting are also standardized and reported in Chironji. But these are less effective due to loss availability of rootstocks and dependency on seasonal conditions. Moreover, propagation through root cutting is a very slow process.

Traditional method of processing

De-skinning of Chironji nuts: The skin of the harvested green nuts turns black on storage which has to be removed before shelling. The nuts are usually soaked overnight in water and rubbed with palms for small scale processing and with the jute sack for large scale processing. The water containing fine skin is decanted. The nuts are washed with fresh water to obtain clean nuts. The cleaned nuts are dried in sun for 2 to 3 days and stored for further processing i.e., shelling.

Shelling: It is the process of separating kernel from hull. For small scale processing, the dried nuts are rubbed using stone slab on a rough stone surface. The kernels are then manually separated. However, for large scale shelling horizontal stone under runner or burr mill is used. The impact and abrasive forces separate coat from kernel and split the kernel.

Grader: This is done to separate kernels from hulls and also to separate kernels of different sizes. The shelled or splitted kernels are passed through a grader. The graders are fit ted with three oscillating screens of various sizes. The grader separates the produce as per its opening size.