

Chironji nut (*Buchanania lanzan*) processing, present practices and scope

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Buchanania lanzan (*Chironji*) is a tree species which belongs to the family Anacardiaceae and is commercially very useful. The fruit of *chironji* contains a hard nut that on decortication yields kernel containing about 52% oil. The kernel oil is used mostly in the cosmetic manufacturing and as a substitute for olive and almond oil while the whole kernel is used in sweet-meals as a substitute for almond kernel. Although, the *chironji* nuts and kernels have been used extensively but there is no machinery for processing of *chironji* nut. At present shelling of *chironji* nut is done manually and some time by locally made machine. This traditional process involves soaking in the water for 24 hrs, skin removal by hand rubbing followed by drying. Dried nut is broken by rubbing between a pair of stone-slab or hammer followed by separation of kernel from the hull. In some areas local artesian developed motorized machines for breaking and separating, but the machines were not specifically designed. So they are again manually separating. Therefore there is need for developing the machinery for *chironji* decorticating.

Keywords: *Chironji*, Nut processing, Practices and scope

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Buchanania lanzan (*chironji*) is a tree species which belongs to the family Anacardiaceae and is commercially very useful. This is found throughout India, Burma, and Nepal¹. The plant grows on yellow sandy-loam soil and is commonly found in the dry forests of Jharkhand, Madhya Pradesh, Chattisgarh, Varanasi and Mirzapur districts of Uttar Pradesh². *Chironji* is an almost evergreen, moderate sized tree, with straight, cylindrical trunk, up to 10-15 m height and tomentose branches. Bark is rough, dark grey or black, fissured into prominent squares, 1.25-1.75 cm thick, and is reddish inside. Its leaves are thickly coriaceous, broadly oblong with a rounded base. Flowering starts in the month of November and is small, greenish-white in color.

The fruits of *chironji* mature in 4 to 5 months and are harvested manually in the month of April and May. The green colored skins of harvested *chironji* fruits turn black on storage which has to be removed before shelling. In order to remove the skin, fruits are usually soaked overnight in plain water and rubbed between palms or with a jute sack. The water containing fine skin are decanted and washed with

fresh water to obtain cleaned nuts. The cleaned nuts are then dried in sunlight and stored for further processing, i.e. shelling. The dried nuts are shelled by rubbing with a stone-slab on a rough surface followed by manual separation of kernels. The *chironji* kernels contain about 52% oil³ which oil is used as a substitute for olive and almond oils, while the whole kernel is used in sweet-meats or as a substitute for almond kernels. *Chironji* oil is extracted from the fruits of *Buchanania lanzan* and is known as "char" in India. It has great medicinal value; especially the kernels are used as expectorant and tonic. The oil extracted from kernels is used for treating skin diseases. Although, the *chironji* nuts and kernels have been used extensively, available literature on their physical and engineering properties is very scanty (Figs 1-10).

The *chironji* nut has very good demand in foreign markets and thus, has become an important crop. Therefore, to earn foreign exchange the government and private agencies have evinced keen interest in developing this industry, both by increasing its production and processing capacity. According to currently available information on manual shelling of *chironji* nuts, only 30 - 40 % are recovered as whole

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Fig. 1-10 — (1) *Chironji* tree; (2) Manual harvesting; (3) Traditional sheller for *Chironji* kernel shelling; (4) Driving mechanism of sheller (under runner) at cottage level; (5) *Chironji* leaves with immature nuts; (6) Harvested stored nuts; (7) Cleaned nuts; (8) *Chironji* kernels; (9) Grader for grading at cottage level; (10) Manual separation of kernels form hull and brokenns

kernels and the rest are in broken forms which are sold at a much lower price. The method used for manual shelling of *chironji* is very tedious and time consuming. Therefore, there is a need to develop a *chironji* nut decorticator to save time and reduce drudgery so that its shelling efficiency is improved better quality *chironji* kernel

Plant description

Chironji is an almost evergreen, moderate sized tree, with straight, cylindrical trunk, upto 10 - 15 m and tomentose branches (Fig. 1). Bark rough dark grey or black, fissured into prominent squares, 1.25-1.75 cm thick and reddish inside. Leaf thickly coriaceous, broadly oblong, obtuse with base rounded. Flowering starts in the month of November and they are small and greenish-white. The *chironji* leaves and immature nut is illustrated in Fig.2.

Harvesting of *chironji* nuts — The plant has great medicinal value and the kernels are used as expectorant and tonic. The fruit of *Chironji* mature in 4 to 5 months and harvested manually (Fig. 3) in the months of April and May.

Traditional method of processing

De-skinning of *chironji* nuts: — The skin of the harvested green nuts turns black (Fig. 4) 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 (Fig. 5). The cleaned nuts are dried in sun for 2 to 3 days and stored for further processing i.e., shelling.

Shelling:— Shelling is the process of separating kernel from hull. For small scale (home level) the dried nuts are shelled by the prevailing method, i.e. by rubbing with a stone-slab on a rough stone surface followed by manual separation of kernels and for large scale shelling horizontal stone under runner or burr mill is used. Separated kernels are as shown in Fig. 6. The sheller is made of two stone discs of 75 - 80 mm thickness and 450 - 500 mm, the upper

disc is stationary and about 2 mm deep lines are engraved starting from centre towards periphery of lower disc and the two discs are connected through a shaft of 30 - 40 mm diameter (Fig.7). The impact and abrasive forces, which separates coat from kernel and split the kernel. The unit is connected to grader through power driven shaft such way that splitted or shelled kernals are fall on the grader. Power is transmitted to under runner through a shaft from grader which is connected to 5 HP diesel engine (Fig. 8). The efficiency of the underrunner is low and it causes more broken and powder. So there is need of *chironji* decorticator for shelling efficiently.

Grader:— The main purpose of grader is separate the kernals from the hulls and to separate the kernels of different sizes. The shelled or splitted kernels will pass through grader as shown in Fig. 9. The grader is having 3 screens of various sizes and screens are moving by oscillating motion driven by shaft. Here grader separates the shelled produce as per its opening size, but due to poor performance of underrunner, again need to separate kernels from hull and broken manually as shown in Fig. 10⁴.

Although, the *chironji* nuts and kernels have been used extensively but the printed literature on their physical and engineering properties is scarce. There is need of study to generate primary data on physical and engineering properties which could be used for developing processing machinery(s) and need to develop the machinery for *chironji* shelling. This basic information may be useful for further studies.

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