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General characteristics and Qualitative phytochemical screening of *Artocarpus lakoocha* fruit.

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ABSTRACT

Artocarpus lakoocha Roxb., belongs to family Moraceae, is a valuable tropical tree species native to India and used for fruit, fodder, furniture, timber, and feed. Farmers plant this species as a source of green fodder. It is considered one of the most important milk producing forages. In the present study, we analyzed the general characteristics of the fruits of *A. lakoocha* and its qualitative phytochemical screening. For the study, fruit collection was done from Allahabad district which lies between 24°47' and 25 °47'N latitude and 81°9' and 82°21'E longitude at an elevation of 98m amsl. After cleaning the fruits, observations on fruit morphological parameters were taken with respect to fruit length, width and weight. The fruits are irregularly rounded. The 100 Fruit weight mostly fall in the range of 15.9-17.6 kg. The number of seeds per fruit varies accordingly, but usually there are 22-73 seeds in one fruit. Fruit length varied from 6.8 to 14.4 mm and fruit thickness from 9.05 to 13.65 mm. Young fruits are green, turning yellow at the time of maturity and then later brown. Qualitative Phytochemical analysis of fruits extracts of *A. lakoocha* was carried out by standard methods. In brief, the phytochemicals such as tannins, alkaloids, saponins, flavanoids, terpenoids and phenols/polyphenols were qualitatively determined in its fruits.

Keywords: fruit, fodder, phytochemicals, threatened, conservation

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1. Introduction

Artocarpus lakoocha is popularly known as “monkey jack” or “*lakuchi*” in India, “*badahar*” in Nepal, “*tampang*” in Malaya, and “*lokhat*” in Thailand. A native of the humid sub-Himalayan regions of India, it grows up to 1,200 m altitude. The lakoocha trees grow 6 to 9 m tall with large, leathery and deciduous leaves. It is a tropical evergreen tree species of the Moraceae family (Joshee *et al.* 2002). It is distributed throughout the Indian subcontinent and southeast Asia. The tree is valued for its wood; its fruit is edible and is believed to have medicinal value. It is native to India and used for fruit, furniture, timber, and feed. The lakoocha fruits are generally eaten fresh.

Male and female flowers in separate spherical heads, Fruits 5-10cm in diameter, irregularly lobed. One of the most valued fodder trees. *Artocarpus lakoocha* is a perennial tree found on west coast from Kokan southwards to Kerala and Tamil Nadu (P. Gautam and R. Patel 2014). *Artocarpus* species is popularly used in Ranchi district of the state of Jharkhand. *A. lakoocha* is cultivated throughout India as a shade or ornamental tree. The bark of the plant is dark brown, exfoliating in small round woody peels, reddish inside, white latex, milky juice. *Artocarpus* species display high levels of genetic variability, both between and within species. This is evident from the wide range of locally distributed *Artocarpus* genotypes. Breadfruit cultivars are triploid and seedless. Lakoocha seedling trees take five years to come into bearing. The orange-yellow male flowers and reddish female flowers of lakoocha are borne separately on the same trees. Wild edible fruits play a significant role in rural areas by providing nutrient supplementary diet and generating side income to the poor people.

Uses

Reviews of the records in both, traditional and scientific literature indicate that *A. lakoocha* Roxb has many medicinal uses. It has many pharmacological activities such as anti-inflammatory, antiviral, anticancer and anti-HIV. The native of Jharkhand use many species like *Sida*, *Artocarpus* etc. for their wound healing properties. The seed and bark of the plant are reported to be effective in the treatment of stomach and liver disease.

Artocarpus lakoocha is a valuable tree species native to India and used for fruit, furniture, timber, and feed. The lakoocha fruits are generally eaten fresh. The edible fruit pulp is believed to act as a tonic for the liver. Raw fruits and male flower spike (acidic and astringent) are utilized in pickles and chutney (sauce). The lakoocha tree is also valued for feed and timber. The hardwood sold as *lakuch*, is comparable to famous teak wood. Lakoocha which is durable outdoors as well as under water is used for construction, furniture, boat making, and cabinet work. Tree bark containing 8.5% tannin is chewed like betel nut, and is also used to treat skin ailments. It yields a durable fiber good for cordage. The wood and roots yield a lavish color dye. Lakoocha seeds and milky latex are purgative. The seed and bark of the plant are reported to be effective in the treatment of stomach and liver disease.

2. Materials and Methods

In the present study a series of experiments, conducted at, Center For Social Forestry & Eco-Rehabilitation, Allahabad.

Fruit collection

For the study, fruit collection was done from Allahabad district which lies between 24°47' and 25 °47'N latitude and 81°9' and 82°21'E longitude at an elevation of 98m amsl. Fruits of *Artocarpus lakoocha* were collected in the month of July from minimum two to three selected plants of each sources and packed in marked polythene bags and brought to CSFER, Allahabad. Diseased or damaged fruits were discarded. All unwanted material or diseased fruits or other impurities were discarded.

Fruit/Seed Morphological Parameters

After cleaning the fruits, observations on fruit/seed morphological parameters were taken with respect to fruit/seed length, fruit/seed width and fruit/seed weight. Different observations were recorded as described below. Length (mm): Length of four replicates consisting of 10 randomly selected undamaged fruits/seeds was measured upto two decimal places using digital vernier calliper (Model: Absolute digimatic (mitutovo)).

Width (mm): Widths of 10 undamaged fruits/seeds were measured with digital electronic Vernier Calliper

Weight (g): Fruit weight of single fruit randomly selected samples, using electronic balance

Chemical Analysis

The seeds of *Artocarpus lakoocha* were decorticated and kernels and seed coat were air dried and coarsely powdered. The powdered materials were subjected to preliminary Phytochemical screening for qualitative and quantitative detection of phytoconstituents.

Qualitative Phytochemical Examination

The powdered samples of *A. lakoocha* kernels and seed coat were subjected to qualitative evaluations for the presence and/or absence of different categories of chemical constituents (Patil *et al.*, 2001). Dried powdered material was extracted with solvents of elutropic series and tested qualitatively with special reagents that produce characteristic colours changes with different categories of chemical constituents. The method used for test for alkaloids (Danial, 1991). Test for Flavonoids (Feigl, 1966). Test for Steroids (Shriner *et al.*, 1964). Test for Saponins (Brain and Turner, 1975). Test for Carbohydrates (Shriner *et al.*, 1964). Test for Proteins (Shriner *et al.*, 1964). Test for Free Amino Acids (FAA) (Shriner *et al.*, 1964). All the qualitative tests were replicated three times. The method used for Quantitative Analysis, for determination of Total Flavonoids (Boham, 1974). Determination of Total Saponin, the method used was that of Obadoni and Ochuko (2001).

3. Results and Discussion

General characteristics of *Artocarpus lakoocha* fruit and seed: In the present study, we analyzed the characteristics of the fruits/seed of *A. lakoocha*. There was significant difference among seed sources for fruit and seed traits. The fruits are irregularly rounded, the size differs but the

diameter varies. The 100 Fruit weight is very variable but most fall in the range of 15.9-17.6 kg. The number of seeds per fruit varies accordingly, but usually there are 22-73 seeds in one fruit. Fruit length varied from 6.8 to 14.4 mm and fruit thickness from 9.05 to 13.65 mm, seed length varied from 9.43 to 15.99 mm and seed width from 6.24 to 13.29 mm respectively. The 100 seed weight varied from 25.3 to 21.4 grams. (Table 1). It is evident that seed with

maximum weights, possessed heavier fruit, higher seed length and width.

Phytochemical Analysis of Extracts:

Qualitative Phytochemical analysis of fruits extracts of *A. lakoocha* was carried out by standard methods. In brief, the phytochemicals such as tannins, alkaloids, saponins, flavanoids, terpenoids and phenols/polyphenols were qualitatively determined as following (Table 2)

Table 1: Impact of Alderin on haematological parameters in blood of the fish *Cirrhinus mrigala*.

S.NO	Fruit length (mm)	Fruit Thickness (mm)	100 Fruit Weight (kg)	No. of Seeds/ Fruit	Seed Length (mm)	Seed width (mm)	Seed Thickness (mm)	100 Seed Weight (g)
Mean ± SD	9.44 ± 2.34	11.53 ± 1.19	16.76 ± 0.44	35.45 ± 13.11	14.48 ± 1.39	9.82 ± 2.13	6.46 ± 1.50	23.44±1.23
Range	6.8-14.4	9.05-13.65	15.9-17.6	22 - 73	9.43-15.99	6.24-13.29	3.49-9.12	25.3-21.4
CV	24.80	10.33	2.60	36.98	9.62	21.64	23.28	5.20

Table 2: Qualitative analysis of extracts of *A. lakoocha*

TEST	Petroleum Ether Extract	Acetone Extract	Methanol Extract
Detection of alkaloid			
1.Dregendroff's Test	+ve	+ve	+ve
2.Wagner's Test	+ve	+ve	+ve
Detection of Phenolic's			
1.Ferric chloride Test	-ve	+ve	+ve
2.Zn/HCl Reduction	-ve	+ve	+ve
Test For Tannins			
	-ve	+ve	+ve
Test For Flavanoids			
	-ve	+ve	+ve
Detection of carbohydrates			
1.Molish's Test	+ve	+ve	+ve
Detection Of Glycosides			
	-ve	-ve	-ve
Detection of proteins			
1.Biuret Test	-ve	-ve	-ve
OIL DETECTION			
1. Spot Test	+ve	+ve	+ve

The qualitative analysis of the extracts from the fruits of *A. lakoocha* showed the presence of phytochemical constituents such as alkaloids, flavonoids, oils, carbohydrates and tanins as is clear from the Table 2.

4. Conclusion

The presence of flavonoids in the plant indicates that this plant may have anti-oxidant properties and are free-radical scavengers. Phenolic compounds are commonly found in both edible and nonedible plants, and they have been reported to have multiple biological effects, including antioxidant activity. Crude extracts of fruits rich in phenolics are increasingly of interest in the food industry because they retard oxidative degradation of lipids and thereby improve the quality and nutritional value of food. It emerged from the present study that a large variability exists in the Fruit/Seed characteristics and Qualitative phytochemical screening of *Artocarpus lakoocha* fruit collected from Uttar Pradesh particularly for fruit/seed length, fruit/seed width and fruit/seed weight. Fruit weight

is very variable and the number of seeds per fruit varies accordingly. The variability of different characters could be utilized for selection of geno-types suitable for the plantation and utilization. Despite a valuable and threatened fodder plant, *A. lakoocha* is not cultivated on a large scale in its native habitat. For conservation of *A. lakoocha* locals should be motivated and provided with all the facilities required to cultivate *A. lakoocha*. Domestication of this underutilized plant will not only reduce pressure on natural population but it will also save the plant from extinction.

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