

Original Research Article

Traditional Methods of Harvesting and Processing of Makhana (*Euryale ferox* Salisb.) Adopted in Araria District of Bihar

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ABSTRACT

The study deals with the traditional knowledge and skill pertaining to harvesting and processing of makhana (*Euryale ferox* Salisb.), an important aquatic cash crop. Basically three types of people's group involved in makhana harvesting and processing, i). makhana seed collector, ii) processor, and iii) tradesman, which are locally termed as mallah/adivasi, sahni, and vyapari. The methods of collection of black makhana nuts, and its processing are low cost traditional methods but are highly labour intensive. Series of concentrated efforts and skills are involved from harvesting hard black nuts to processing of soft white puff makhana. Each activity adopted by fisher community of district Araria, Bihar has been discussed in detail.

Keywords

Makhana, *Euryale ferox* Salisb, Araria District of Bihar

Introduction

Among the different crops, makhana or fox nut (*Euryale ferox* Salisb., Nymphaeaceae) is one of the underutilised aquatic food crops next to deep water rice and water chest nut. It is mainly cultivated as source of starch and protein (Puste 2004). Makhana, *Euryale ferox* salisb is considered an important aquatic cash crop in India (Jha 1991). The plant is native to south East Asia with prevalence to tropics to sub tropics accomplished with humid to sub humid environment. It occurs in wild form in Japan, Korea, Bangladesh and Russia (Sahnkar *et al.*, 2010). In India, its cultivation is more pronounced in north eastern particularly in north east of Bihar, where 80% of India's total production occurs (Misra, 1998). It is grown during warmer part of the year, particularly in hot sub humid seasons in

wetlands having water depth 0.5-3.0 m or even more (Pramanik, 2013). The plant grows in fallow wetlands of standing shallow water of about 2.5 m depth and has rhizomatous stem. It prefers tropical and subtropical climate, temperature between 20⁰C-35⁰C, humidity between 50-90%, and rainfall between 100-250 cm. it falls under one of the superior food qualities, which is reflected in its high amino acid index (89-93%) and arginine+lysine/proline ratio (4.74-7.6) (Nath, 1985). It has prominent place in Indian dietary chart with medicinal values for respiratory, circulatory, digestive, renal and reproductive diseases (Jha, 2003). Makhana is used as tonic and treatment of leucorrhoea and good immunostimulant (Puri *et al.*, 2000).

Materials and Methods

A case study approach involving methods of observation, interaction, interview along with individual and group discussion of fisher community of Araria, bihar was adopted for documentation. Araria is primarily a rural district; comprises of two subdivision and nine blocks, 93% of total population lives in the rural areas (713 villages) (census 2001). The major makhana culturing blocks are i) Forbesganj ii) Raniganj iii) Narpatganj and iv) jokihat. The makhana plant is either transplanted in pond in January – February or self-grown in ponds through left out seed during harvesting. The growing period of makhana is from March to August month. Flowering starts in the month of april followed by fruiting. There are several makhana seeds in one fruit, which released out after maturation of fruit. The immature makhana seed are whitish in colour and float for several days in ponds, before settling down in bottom. Harvesting of seeds from bottom starts in month of September and continues till December - January. The nuts then are sundried, roasted and immediately thrashed by a wooden hammer. The hard black covering of nut gets broken and makhana seed expanded as soon as thrashed, resulting into round white puff makhana. The tradesman now collect the makhana from the house of several processor at a varying rate between 1800 to 3000 n rupees epr quintal.

The collection of makhana seed is done by trend local tribal labours, which are called as adivasi. The harvesting of makhana seeds from bottom of the pond starts in the early morning and continues upto evening. The collected makhana seeds are locally termed as giri. The adivasi, makhana seed collectors are paid on the basis of weight of collected makhana giri in the evening. Four to five people together collect seeds from the bottom at a time, they fix a bamboo pole, locally known as kaara, in one place and cover up to

4-5 meter radius around it during collection. They dived in the bottom together and drag the makhana seeds towards the base of bamboo from different directions. All the seeds around the bamboo base are collected within 1.0-1.5 hour depending upon the quantity of seed lying at the ground. A single labour usually collect around 10-15 kilogram of wet makhana seed daily and they are paid on daily basis depending upon the basis of weight of collected makhana seeds. The rate of payment of Adivasi varies between 200-300 rupees per kilogram of seed.

The collected seeds are picked up in a crescent shaped bamboo container (Fig.1) locally called as 'Gaja'. A single Gajamay contain about 2-5 kg of makhana seeds. The Gaja containing makhana seeds are swung repeatedly to clean the seeds in water the mud, stein & other debris get dissolved in water & only Fresh makhana seeds on Figure 1 left out. Generally snails come in along with seeds which later aerie cleaned off by hand choosing. Cleaned seeds are then camped out at kept in aluminium utensils locally called as tasla. The carrying capacity each tasla is around 20-25 kilogram seeds. The seed collector then gets their wages from growers or growers cum harvesters.

Post harvest of Makhana

The collected seeds are brought in the house and kept as such overnight, next day, the seeds are cleaned with clear water for mud and other debris. After cleaning, the female and children of the family spread the seeds for sun drying on a bamboo or plastic mat (Fig. 2). They also handpicked the snails & other debris from the seed. The seeds are sundried for 6-7 hrs.

Gradation

All the sundried seeds are graded by putting them in rectangular sieving devices locally

known a jharna (Fig. 3). The sieving devices are made up of thin iron plate of 1160cm² bounded by 6 cm wooden frame from all side. There are 10 sieving devices depending upon their sieve size varying from 140 mm² to 40 mm². The gradation process starts from larger one to smallest one. All the graded makhana seeds the put into the wooden circular baskets (Fig. 4). The whole process of gradation starts in late evening around 7pm.

Frying

The graded seeds are then fried on same night otherwise the quality of puffed makhana will be spoiled. Frying is done by household ladies and children in late evening hours. About 500 grams of makhana nuts are fried in single frying operation and carried out in a earthen pot. The oven is made up of clayey mud material containing local grasses called as 'khar' in varying proportions. The fuel used in oven is the plant derivatives such as dried plant stems or waste of wooden saw mill. The frying of nuts takes place around five minutes & are continuously stirred with the help of aluminium or steel frying stick, known as 'cholni'. The fried nuts are stored in oval earthen pot and covered with the jute material known as 'bora'.

The fried nuts are again fried after 60 hours to obtain the edible puffed makhana locally known as 'lava'. This time around 200 gms of fried nuts are again put into heated earthen pot which are wide open and smaller in size during frying first person generally ladies takes out 5-10 nuts and hand over to second person preferably male (Fig. 5). The male takes nut in the left palm and immediately thrashes it on a wooden plate by a rectangular wooden hammer (Fig. 5).

The heated black makhana nut gets expanded

as soon as thrashed and outer hard coat itself is removed due to expansion. The white puffed makhana gets expanded 3 times more than the earlier nuts size.

Storing

The puffed makhana are stored in the larger circular bamboo made baskets. The baskets are regularly stirred so that the hard part of nuts gets rubbed against each other and removed away through the hole of baskets. Later generally the puffed makhana are stored in jute bags and one jute bags with full capacity weigh around 15-18 kilograms of makhana.

Trading

The processing of makhana is also carried out on daily wages basis whereas the owner of makhana seeds (nuts) paid the wages on weight basis. Generally, 3000 to 4000 rupees varies per quintal for processing of makhana nuts on hiring basis

The Vyapari community frequently visit the processor house and bought all the ready puffed makhana. The rate varies daily depending upon the availability of quantity of puffed makhana in the processors locality. The rate generally varies between 18000 rupees to 25000 rupees per quintal. There is locally a wooden made weighing equipment hanging with rope is placed in locality where weighing is carried out. The processors are immediately paid their full payment of white puffed makhana. It is reported that makhana was cultivated in 20,000 ha of ponds & waterlogged areas in the state, but it fell to 13000 hectares of panels & waterlogged woes by 2012-13 in Bihar, The annual average makhana production in the state is around 25,000 ton.

Fig.1



Fig. 2



Fig. 3



Fig. 3



Fig. 4



Fig. 5



Fig. 6





Fishermen community going for makhana collection



Makhana whole plant



Typical makhana field of Araria district

The average productivity of ponds is around 1.5 MT makhana seeds per hectare. Bihar, alone contributes over 90 per cent of total world makhana production. The net average annual income of a makhana farmer ranges from 35,000 to 50,000 rupees per hectare. The estimated value of production at farmers end is Rs 250 crore and it generates revenue of Rs 500 crore at trading level. The annual average production of makhana is 50,000 tonnes. India export makhana to the Middle East around, the United States and some European countries.

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