Popular Article

TRADITIONAL WAY OF MAKHANA *(Euryle ferox salisb)* CULTIVATION AND HARVESTING

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ABSTRACT
Makhana is a kind of an aquatic crop generally grown in stagnant water bodies like ponds. It is rich in carbohydrate, protein and minerals content and low in fat content. The cultivation as well as harvesting is pain taking and drudgerious operation which is done by skilful workers of *Mallah* community. This article aimed to provide information about the traditional way of cultivation and harvesting of makhana in ponds in India.

INTRODUCTION

Makhana *(Euryle ferox salisb)* also known as gorgon nut or fox nut is a kind of seed produced from an aquatic crop of the family-Nymphaeaceae. It is normally grown in stagnant water bodies like ponds (Fig. 1). The Makhana plant grows in water, producing bright purple flowers (Fig. 2). A single Makhana plant produces equal number of 8-9 leaves and flower arranged alternately, intermingled together that seems just like an octopus. Each flower after fruiting produces 8-13 seeds and a single plant produces about 100 seeds. The leaves are large and round about 1-2 m in diameter, with a leaf stalk attached in the centre of the lower surface. The upper surface of leaf is green while underside is purple in colour and float on water. The surfaces are covered with sharp prickles/thorns. The roots are long, fleshy and fibrous in nature and generally in 2-3 clusters with number of air pockets and the seeds are round and lumpy of about 0.5-1.5 cm in diameter. In a pond system, there are about 10,000 plants/ha and the seed yield in traditional system was around 1.8-2.0 t/ha. About, 80% of total Makhana comes from Darbhanga, Madhubani, Purnia and Katihar district of Bihar. The area under Makhana cultivation is about 13,000 ha.

Makhana is a good source of carbohydrate, protein and minerals. The raw Makhana contains 76.9% carbohydrate, 12.8% moisture, 9.7% protein, 0.9% phosphorous, 0.5% minerals, 0.1% fat, 0.02% calcium and 0.0014% iron whereas, popped Makhana contains 84.9% carbohydrate, 4% moisture, 9.5% protein and 0.5% fat. It also has some medicinal value and recommended for treatment regarding respiratory, circulatory,

digestive, excretory and reproductive systems. The calorific value of raw and popped Makhana is 362 and 328 kcal/100g, respectively.

Constraints to Makhana cultivation are like No ownership of the pond, highly skilled operation, lack of credit facility, lack of scientific knowledge of cultivation, lack of improved variety, short lease period and labour intensive process. Also, Makhana is an important source of income for Mallah community, but not much attention towards the improvement of livelihoods of this community has been given and their socio economic situation is still very grim. Majority of cultivators don't own ponds and so they don't get proper returns.

Cultivation Practices

The traditional system 10% of the seeds germinated from the leftover seed of previous crop in the same pond. In the month of March, the Makhana plant comes out to upper surface of the pond. Normally, 1x1 m row to row and plant to plant distance was maintained by thinning off extra plants. Young and healthy plants were collected from nearby by pond and transplanted at in interval of 1x1 m spacing in the month of March-April. After 2-3 months of transplanting, bright purple flower starts appearing in the pond surface. The flower changed to fruit and burst after 35-40 days of flowering and the soft pulpy seeds white in colour float on water surface for 2-3 days (Fig. 3) and then settle down in the bottom of the pond.

Harvesting

Harvesting refers to collection of scattered Makhana seeds from the bottom surface of the pond. Harvesting of Makhana involves a lot of drudgery. A diver has to go deep into the bottom surface of pond and hold his breath for longer time as one can. Normally, the breathe last for 1.5-2 min and in that short time the diver has to go down and work which includes awkward postures. During this operation, mud enters into the diver's ear, eye, nose and mouth. The divers also get skin diseases due to this problem. The collection of seeds in pond system is done in the month of August-October by divers of *"Mallah"* community in the morning around 6.00 – 11.00 am.

First of all, the leaves and plants are cut with knife from the top surface of the pond. After 4-5 days all plant parts starts to decay and get decompose in the pond, and then only the divers get inside the pond. The collection of seeds in traditional system was done in the month of August-October. In pond, one bamboo pole locally called *"Kaara"* was fixed in the pond and the divers goes to the bottom surface, lie down and drags the mud near the pole with both palms. Like this the diver covers a radius of his height around the periphery of the pole. A heap of mud is formed near the base of bamboo pole which is later sieved with locally made bamboo screen called *"Ganjaa"*. The raw Makhana seed is black in colour (Fig. 4). The collected seeds in *"Ganjaa"* are then carried through the water surface where the seeds get cleaned (Fig. 5 & 6). During this operation many a times divers get injured due to the presence of sharp thrones of Makhana present in the pond. About 50-60% of the cost goes in paying the labour charges as a particular community is involved in collecting the seed and no other harvesting machine is available till now. The charges of collecting seed increases with the number of times of harvesting. Normally, in a pond 2-3 times harvesting is done. Initially its starts

with Rs. 15-20/kg for the first harvest, Rs. 30-40/kg for second harvest and Rs. 50-60/kg for third harvest and so on. The increase in cost is due to the fact that as the collection of seed decreases as the harvesting times increases.

Fig. 1. Makhana plant

Fig. 2. Makhana flower and fruit

Fig. 3. Makhana seed floating on water (before harvest)

Fig. 4. Raw Makhana seed (after harvest)

Fig. 5. Ganjaa for Makhana harvesting

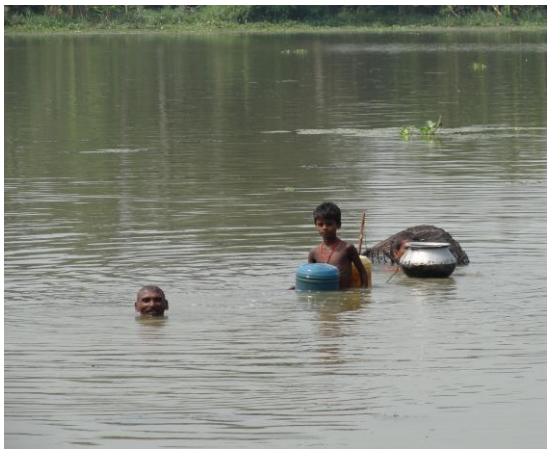

Fig. 6. Traditional way of Makhana harvesting

CONCLUSION

The harvesting or collection of scattered Makhana seeds from the bottom surface of the pond is very tedious and painful activity which involves a lot of drudgery. A diver has to go deep into the bottom surface of pond to collected seeds where mud enters into the ears, eyes, nose and mouth which lead to skin diseases. Therefore, some kind of diving suit to be supplement to the divers involved in Makhana seeds so that they can be inside the water for longer duration and to reduce the drudgery involved in the harvesting of seeds from ponds.

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