

Makhana Culture and Its Nutritional Value in Human Health

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Abstract

Makhana (*Euryale ferox* Salisb.) or foxnut is an aquatic food crop, which is normally grown in ponds. The importance of this crop is increasing day by day due to its high carbohydrate and protein, low-fat content, and also due to its religious offerings. Makhana makes it an alternative crop for sustainable agricultural systems for marginal farmers by providing livelihood generation. Makhana is used in the preparation of several delicious and rich sweet dishes like Makhana kheer, Makhana vermicelli Makhana halva, etc.

Keywords: Fish, Makhana, Culture, Nutritional value.

Introduction

Makhana (*Euryale ferox* Salisb.), also known as foxnut or gorgon nut is a seed produced from an aquatic crop that belongs to the Nymphaeaceae family. It is generally cultivated in stagnant water bodies like ponds, low depressions, lakes, etc. It is also known as the "meal of god" in India, where it is commonly served as "prasad" during religious rituals. It is primarily grown in lowland ponds in Bihar, Orissa, Assam, and West Bengal. (Kumar *et al.*, 2011a, 2011b). Its cultivation is more evident in India's north-eastern region, particularly in the northeast of Bihar, where 80 percent of the country's entire production occurs (Misra 1998).

Cultivation of Makhana is the only source of income for the Mallah community, but not much attention has been given to the upliftment of this community. The majority of them don't own ponds so they don't get proper returns. Attention needs to be given to the improvement in the harvesting practice of Makhana to reduce drudgery and improve their livelihoods as it is generally done by skilled workers from the Mallah community, who are doing the operation from generation to generation (Khadatkar *et al.*, 2015).

Culture

Generally, the Makhana plant grows in stagnant water bodies of 0.2–2.0m depth like ponds, lakes, etc (Khadatkar *et al.*, 2019). During October and November, the pond is cleansed of weeds and water hyacinth. The cultivation starts with germination of the Makhana plants 10% of the leftover seed of the previous crop and about 80 kg of seeds are normally broadcasted in one ha of the pond for direct sowing. The blooming occurs in December-January, and the Makhana plant emerges to the upper surface of the pond in March. abnormally, 1×1m spacing (row to row and plant to plant) is maintained by thinning off extra plants, and young plants are transplanted at an interval of 1×1m spacing for filling the extents in the month of March-April (Kumar *et al.*, 2011a, 2011b).

A single Makhana plant produces about 8–9 leaves as well as flowers situated alternately and combined. The color of Makhana flowers is bright purple which later changes to fruit. The fruit then bursts inside the water after 30–45 days of flowering. The fresh seeds float on the water surface for 2–3 days before settling down to the bottom surface, where the red arils of fresh seeds get seasoned or decomposed and turned into a hard black color ball at the time of harvesting. Each flower after fruiting produces 8–13 seeds and a single plant produces about 100 seeds (Khadatkar *et al.*, 2015). In a pond, there are about 10,000 plants/ha and the seed yield in the traditional system was around 1.8–2.0 t/ha (Kumar *et al.*, 2011a, 2011b; Khadatkar *et al.*, 2015).

Postharvest technology

Makhana seeds were harvested with the help of a sieve-like container called Polo. In general, postharvest technology involves sun drying, size grading, preheating & tempering, roasting & popping, polishing, grading & packaging (Jha and Prasad, 2003).

Nutritive value of Makhana

Makhana seeds are very popular across the country for their diverse uses including processed seeds as fast food due to their high nutritive value, medicinal, industrial, and religious use (Arora and Pandey 1996). Makhana contains high-quality easily digestible 11.16 % protein. Makhana contains the least fat and is good from a health point of view. Makhana is an excellent source of quality about 75.04 % carbohydrates. Makhana is not a very good source of dietary fiber and it lowers blood cholesterol levels (Singh *et al.*, 2014a).



It is also a rich source of essential amino acids such as glutamic acid, followed by arginine, leucine, valine, and aspartic acid (Singh *et al.* 2018).

Besides, it is also considered a nutritive value (Nath and Chakraborty 1985) a powerful tonic for postnatal weakness and acts as an expectorant and cardiac stimulant. It consolidates the heart and is very beneficial in anemia (Das *et al.*, 2006). Makhana is an important ingredient that is used to strengthen the spleen and kidneys. It contains low sodium and high potassium which reduces Blood Pressure and since it contains a very low amount of monosaturated fat, which prevents to increase in blood sugar level (Jha *et al.*, 1991).

Uses of Makhana

Popped Makhana is used in the preparation of several delicious and rich sweet dishes like Makhana kheer, Makhana vermicelli Makhana halva, etc (Jha and Prasad, 2003 and Kumar *et al.*, 2011). It is used in the pudding and milk-based sweets. Dal makhani and vegetable curries become delicious when Makhana is mixed for taste and thickening objects. Makhana raita is also tastier and digestive. The medicinal properties of Makhana are well documented in Indian and Chinese ancient literature (Dragendorff, 1898).

Conclusion

Makhana is a high-valued aquatic product due to its prosperous source of carbohydrates as well as protein. The biological and agronomical traits of Makhana make it an alternative crop for sustainable agricultural systems for marginal farmers by providing livelihood generation. It may be evaluated as a viable alternative product, particularly where the availability of natural water bodies like lakes, ponds, etc. Makhana is used in the preparation of several delicious and rich sweet dishes...

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