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Makhana: A Nutritious and Fabulous Functional Food

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Abstract

Apart from basic nutrition, functional foods have a potentially positive effect on health and vigour to the human body. Medicinal super food makhana is highly nutritious and rich in proteins (10.5%) and fibre (0.5%) and low in fat (0.1%). About 100 grams of makhana gives around 362.0 calories of energy. It is a fair source of calcium, magnesium, potassium and phosphorus and micronutrients like Fe, Zn and Cu. The presence of a few flavonoids (quercetin and kaempferol) in moderate and vitamins in less quantity make makhana a unique food. Makhana seeds have the ability to prevent inflammation, cardiovascular diseases and BP (blood pressure) and diabetes. Gorgon nuts *i.e.*, makhana help to strengthen the spleen and kidneys and cure jaundice. Makhana pop is a fancy diet, more than a nutritional importance and also use in regional rituals. It is a very useful food that can be consumed during Covid-19 spread, as it works as immune booster, stress remover and helps in remain medically fit.

Introduction

Makhana (*Euryale ferox* Salisb.) is a unique, nutritive natural food of wetland and extensively grown in north Bihar. It is an unexploited and underutilized crop (Figure 1) in Bihar, especially in nine districts *viz.*, Madhubani, Darbhanga, Purnia, Katihar, Kisanganj and Sapaul, etc. It is also known as Gorgon nut or Fox nuts, are one of the highest selling dry snack in India as well as some foreign country, like UK, USA, Australia and Singapore and Middle East and Gulf countries. Used for centuries as a snack, it may serve as a healthy substitute to popcorn and chips (mixed floor or potato), not only because of its crunchiness but also due to the health benefits. The roasted seeds in 1-2 teaspoon of ghee or vegetative oil (olive) are preferred by all. Indian cuisine makes ample use of these in the form masala makhana, with a sprinkling of spices and condiments to provide a tasty treat. It is a wonderful nutritious medicinal plant fortified with fair amount of macro and micronutrients (Kumar *et al.*, 2016). It is used in Indian Ayurveda medicine from ancient times for having important ingredients along with vitamins and minerals. Makhana is a nutrient-dense functional food and fair source of fiber, Mg²⁺, resistant starch, amino acids like arginine, histidine, lysine, methionine which control obesity diabetes, oxidative stress and hypothyroidism.

Medicinal Properties

- Makhana is an excellent food for immune boosting. It has unique amino acid composition, trace quantity of selenium and chromium and the presence of flavonoids like quercetin, kaempferol and amino acids like arginine, histidine glutamine,

coupled with some special merits of having moderate amount of Zn and Cu, which boost the immune system.

- Anti-oxidant and anti-aging amino acids like proline, isoleucine arginine and flavonoid like kaempferol and quercetin are present in makhana (Jana and Idris, 2018). Hence, makhana is a great anti-ageing food. It is gluten free food and is rich in folate, which are the key matter for pregnant women, during their first trimester of pregnancy as it helps for development baby.
- Important two minerals, magnesium and potassium which have beneficial effect to alleviate heart problem. Potassium helps to control blood pressure and magnesium sustain cardiac health. The vitamin folate also helps in protecting heart health. Makhana are high potassium and low in sodium which controls blood pressure of the body. Amino acids and antioxidant in makhana protect heart from myocardial ischemic reperfusion injury (Das et al., 2006).
- The amino acids arginine and histidine along with magnesium increases insulin sensitivity and helps in glucose metabolism. The glycemic index of makhana is very low. It is free from cholesterol also. Thus makhana is very nice food for diabetic patient.

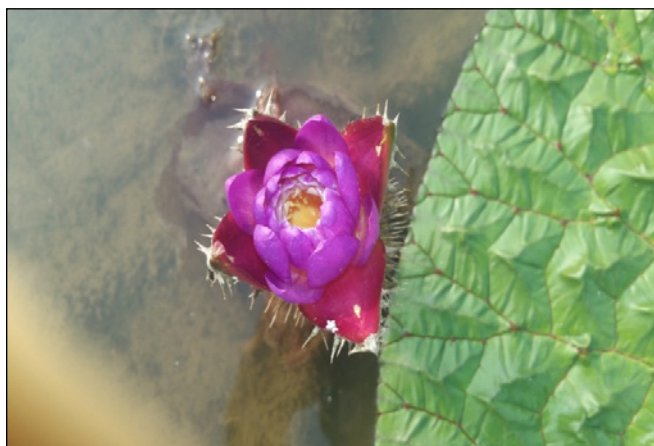


Figure 1: Makhana plant

Usages

Pop makhanas are like white sparkling pearls (Figure 2), which are very attractive and crazy snacks. Daily dose for adult and children are 28.0 g and 14.0 g, respectively. Therapeutic use of makhana pop for 3 months or 6 months could control many degenerative diseases of human. One large cup of makhana is about 28.0 g. As per RDA (Recommended Daily Allowance) the following energy and nutrients can be obtained from makhana pop (28.0 g).

Energy	–	100.0 calories
Protein	–	3.0 g
Carbohydrate	–	21.0 g
Fat	–	0.55 g

Overdose for Long Time

- Flatulence and disturbance of stomach and intestines may occur.
- Cell may become resistant to insulin recognition for glucose transport.
- Pregnant woman must follow the use of daily dose and consult with physician.



Figure 2: Pop makhana (August)

Future Perspectives

Market demands are increasing day by day in national and international arena as important nutritious food. Farmers are also producing more makhanas involving with self help group (SHG). Different low cost processed products are also coming in the markets. In the context of development, makhana food industries are also on the eye of Government of India and some progressive private sectors. It has also become the pride of poor farmers of Mithialanchal of North Bihar. With the advancement of new production technologies, farmers could earn more in future particularly by using organic manures.

Conclusion

Makhana is very nutritious food rich in protein, fibre and minerals. It has considerable amount of divalent cations (Ca^{2+} and Mg^{2+}), resistant starch and important amino acids like arginine, histidine, proline, isoleucine and important flavonoid (Kaempferol). Hence it is a kind of medicinal super food. Judicious use of this food for long periods may cure many degenerative diseases particularly in old age. During Corona period it may be used to keep body fit throughout the day and strengthen immune system.

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