



## Market Intelligence Report: Makhana

## FOXNUT/MAKHANA

Makhana (Foxnut), also known as Gorgon Nut, is grown in India, Korea, Japan and Russia. It comes from the lotus seeds. Foxnut (Makhana) can be mixed with vegetables, popped like corn and made into yummy porridge. Makhana has been proven to be high nutrients food which is rich in medicinal properties and good for daily health diet. The nutrients contained are vitamin, minerals and fibers.

Makhana is a high value commodity commercially cultivated only in Bihar and certain parts of eastern India. Besides this, it is grown as a natural crop in Madhya Pradesh, Rajasthan, Jammu & Kashmir, Tripura and Manipur.



## MAKHANA – GLOBAL PROSPECTS AND OPPORTUNITIES

**The Makhana market will grow at a CAGR of almost 7% during the forecast period of 2019-2023.**

**The global Makhana market size will grow by USD 72.5 million during 2019-2023.**



**Makhana is highly popular in countries such as India, China, Japan, and Thailand.**

**The potential of the Makhana market in Western countries such as the UK and the US is still untapped.**

**With growing consumer awareness about the several health benefits of Makhana, its demand is expected to increase rapidly in coming years.**

**The presence of a large number of untapped markets will also encourage new players to enter the market.**

**The demand for Fox nut is increasing and is considered as a substitute for popcorn.**

## GLOBAL TRENDS & SCENARIO OF FOXNUTS

### INDIA

- Bihar produces 90% of the world production of fox nut. It has been adapted to the tropical climate of India and is found in natural, wild forms in various parts of north-east India and scattered pockets of central and northern India.
- Another significant contribution was seen in the demand for fox nut when two Indian players Makhanawala's and Too Yum introduced packed fox nut snacks including chatpata masala and classic homestyle flavors that has undoubtedly changed the consumption for fox nut in the region.

### CHINA

- In China, it has been cultivated in the Hainan and Taiwan islands for 3 - 4 millennia and widely used in Chinese medicine. Raw makhana seed powder is an essential ingredient of the baby foods in China. Its distribution includes the islands of Taiwan (Formosa) and Kyusyu, Shikoku and Honshu in Japan.
- The most common use of the seed is in the form of lotus seed paste, which is used extensively in Chinese pastries as well as in Japanese desserts.
- Dried lotus seeds must be soaked in water overnight prior to use. They can then be added directly to soups and congee or used in other dishes. Fresh lotus seeds are sold in the seed heads of the plant and eaten by breaking the individual seeds out of the cone-shaped head and removing the rubbery shell. Crystallized lotus seeds, made by drying lotus seeds cooked in syrup, are a common Chinese snack, especially during Chinese new year.

## UNITED KINGDOM

- Nuto a London-based start-up have started producing popped lotus seeds manufactured in India and shipped to the U.K. the supply of fox nut is stable, as it is harvested twice per year. CEO of the company was inspired to create a brand that is healthier and provides savoury snacks to the masses. With growing popularity of fox nut in France, Germany, and Italy has also created high growth opportunity of the fox nut producers, due to the large customer base in these regions.

## COLOMBIA

- Lotus seeds are also common in the northern part of Colombia, especially in cities like Barranquilla and Cartagena. Locals usually refer to lotus seeds as "martillo." Fresh lotus seeds are sold in street markets and are generally eaten raw by the locals.

## Driving factors for Makhana/ Fox nut

<b>Increasing demand for healthy food from an increasingly health-conscious consumer base.</b>	<b>A great snack food for diabetics and heart patients as they contain the good fat and have a low quantity of saturated fats.</b>	<b>Growing popularity of snack food category (ready-to-eat packed foods)</b>
<b>Rising demand for Demand for Gluten Free Protein Foods</b>		<b>Rising Use in the Cosmetic Products</b>
	<b>Makhana can be very good alternative cash crop</b>	

## **Insight into the Demand for healthy snacks**

**According to insight provider IRI, health and wellness is increasingly important for European shoppers who want more on-the-go healthy snacking options.**

**Analysis of 2017 sales data from six markers - the UK, France, Germany, Italy, Spain and the Netherlands - showed growing sales of healthier snacks, which are helping to propel the overall ambient food category.**

**Olly Abotorabi, senior regional insights manager at IRI, commented: "Our analysis of the bestselling macro categories in 2017 throws up some interesting developments in terms of the changing role of the typical European shopper.**

**"Quick and easy access to food and drink choices is becoming more important, so manufacturers and retailers will need to maximise opportunities.**

**"With demand for healthier options, as sugary snacks become less attractive to shoppers, and offer alternatives more suited to guilt-free grazing, such as nuts and seeds, fruit and popcorn."**



## Crop Advantage

- ❖ Makhana grows profusely in the stagnant water of wetlands, tanks, ponds, lakes and ditches in the northern parts of Bihar. Besides stagnant water bodies, it is also cultivated in paddy fields and low-lying areas.
- ❖ Lotus seed was an 'incredibly sustainable' crop, grown in water near other crops and fish.
- ❖ Compared to corn or soy, for instance, lotus seeds do not require additional water other than the ponds and rivers in which they grow.

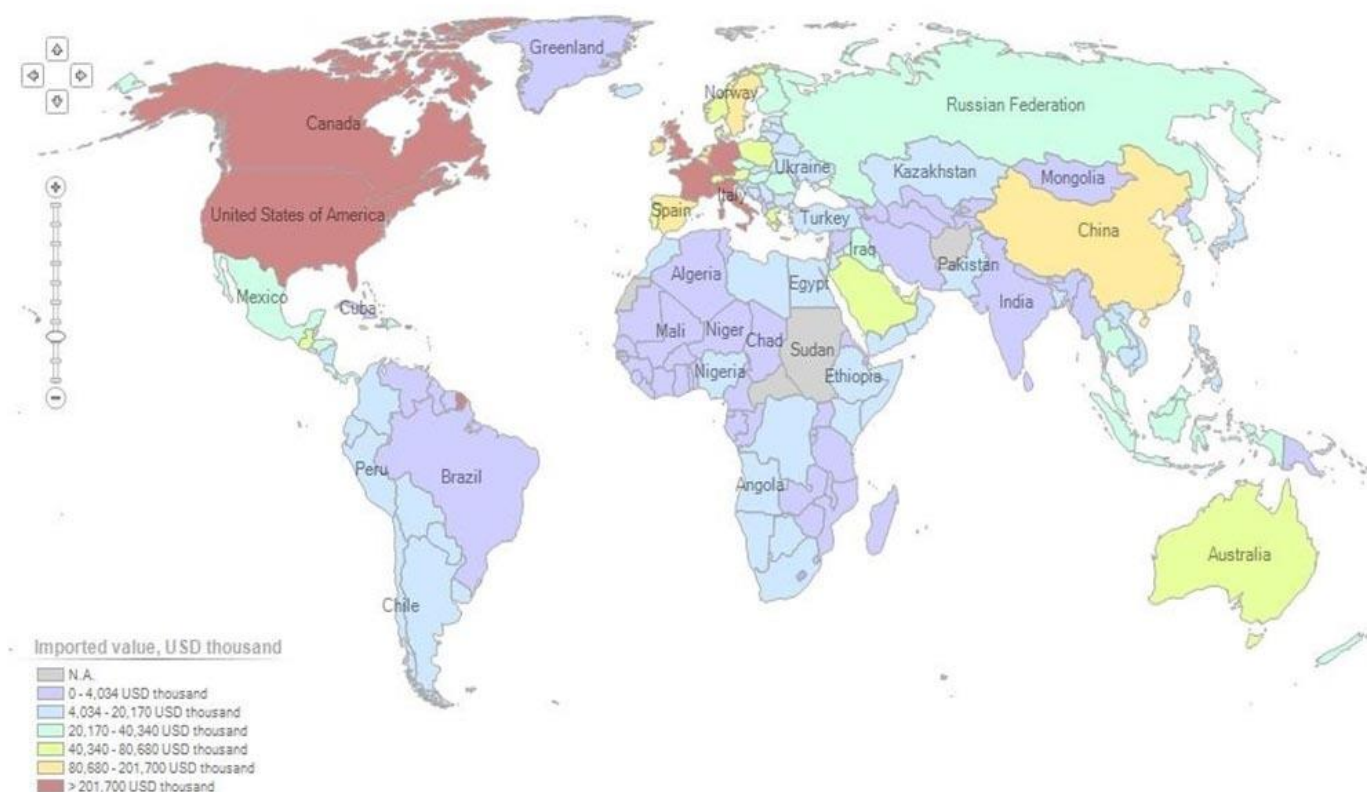
## What Challenges Industry needs to Overcome

- ❖ Allergies Associated With Lotus Root Seeds
- ❖ Lack of Availability of Lotus Root Seeds

## Major Importing Countries in the world (data is based on the broad category, it may include products other than Makhana)

List of importing countries for the selected product in 2018

Product : 190410 Prepared foods obtained by swelling or roasting cereals or cereal products, e.g. corn flakes



## MAKHANA SECTOR - INDIA

Bihar accounts for more than 85 percent of the makhana produced in the country. Northern part of Bihar, constituting districts of Madhubani, Darbhanga, Sitamarhi, Saharsha, Katihar, Purnia, Supaul, Kishanganj and Araria, is agro climatically suitable for makhana cultivation.

As per the estimates of the National Research Center for Makhana, Darbhanga (ICAR), total area under makhana cultivation in India is estimated to be 15000 Ha. It yields 1,20,000 MT of makhana seeds, which after processing yields 40,000 MT of makhana 5 pop. The estimated value of the production at farmers end is Rs 250 Crore and it generates revenue of Rs 550 Crore at traders' level.

### Total Value & Volume of Exports in India

Total Value: \$1,388,394

Total Quantity: 292,822

### Average Price

Average price per unit: \$4.74

Average value per shipment: \$1,126

### Top Suppliers

United States: \$751,132

United Kingdom: \$171,480

Canada: \$120,861

### Top Ports of Discharge

Mundra: \$545,155

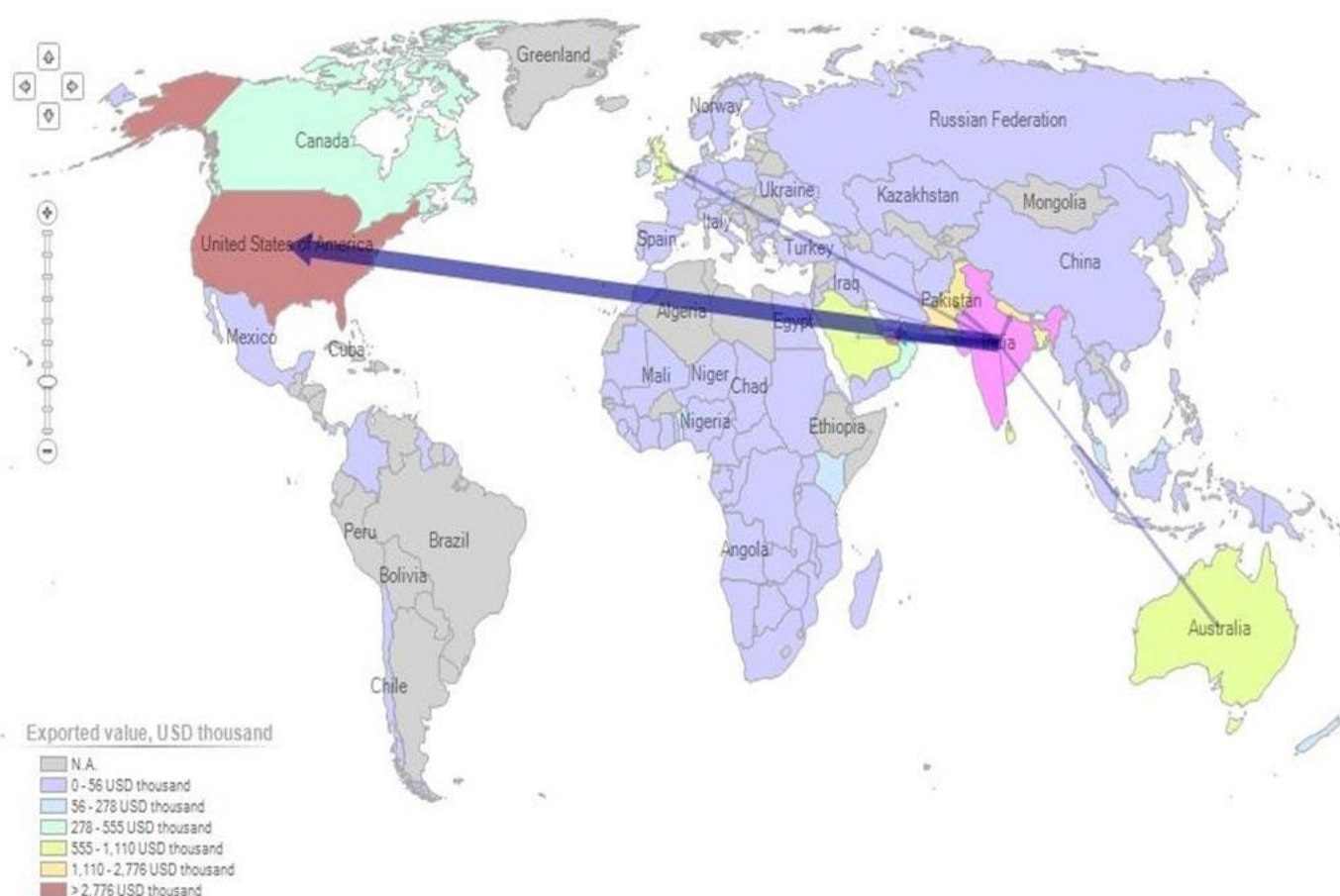
Nhava Sheva Sea: \$475,398

Sabarmati: ICD \$110,582



### List of importing markets for a product exported by India in 2018

Product : 19041090 Prepared foods obtained by swelling or roasting cereals or cereal products, e.g. corn flakes: Other



## NUTRITION IN MAKHANA: MAJOR DRIVING FORCE

The nutritional value of Makhana is attributed its high fiber content, low glycemic index and phytochemical constituents. It is low in calories. Its fiber content acts as an absorbent. Because of this property, it is commonly used for treating diarrhea.

100 grams Makhana (fox nuts) contains 350 calories from which 308 calories come from carbohydrates and 39 calories from protein content. It has an insignificant amount of fats and no trans-fat. Moreover, it is high in potassium and provides a little amount of calcium.

Nutritional Information on vitamin and mineral content is not yet fully studied. But some research papers suggested that it contains Vitamin B1, carotene, iodine, iron, and phosphorous in addition to potassium and calcium.

The sodium content in Makhana is insignificant, but nutritional value changes when it is further processed with spices and salt. You should read the label of the product to check salt content in it.

Unflavored Makhana has almost no cholesterol, low fat and low sodium. It is an ideal snack for people having frequent hunger pangs.

## Nutritional Value of Makhana

(Per 100 Gram)

**Total Calories - 350**

**Carbohydrates - 77 gm**

**Fat - 0.1 gm**

**Protein - 9.7 gm**



**Dietary Fibre - 7.6 gm**

**Calcium - 60 mg**

**Iron - 1.4 mg**

**Potassium - 500 mg**

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## 10 HEALTH BENEFITS OF MAKHANA

- Instead of taking sleeping pills, take Makhana! Proven to help, it is a much healthier solution to deal with insomnia.

**INSOMNIA  
REMEDY**



- Makhana is a good snack as well as a good source of calcium. 60mg in every 100 g.

**RICH IN CALCIUM**



- The high potassium and lower sodium contained in Makhana is good for anyone with hypertension. It helps to regulate blood

**pressure.  
GOOD FOR BLOOD  
PRESSURE**



- For those with arthritis, Makhana's high calcium content is a real benefit.

**ARTHRITIS  
SOLUTION**



- Makhana is recommended for those with digestion issues because its very high fibre content is proven to be good for body metabolism.

**HELPING TO DEAL  
WITH DIGESTION**



- Roasted Makhana could become a coffee substitute. For those worried about having too much coffee being bad for their health, substituting coffee with Makhana is the healthier solution.

**COFFEE  
SUBSTITUTE**



- Makhana is rich in kaempferol which is a well known anti-aging property.

**CONTAINS SPECIAL  
ENZYME TO FIGHT  
AGEING**



- Makhana contains medical properties which are believed to strengthen the heart and improve cardiovascular function.

**REDUCES HEART  
DISEASE RISK**



- By being high in fibre and low in fat Makhana helps the metabolism system, making your stomach feel full, while low fat is an immediate support in any weight loss diet program.

**WEIGHT LOSS  
SOLUTION**



- The high nutrients contained in Makhana are good for pregnant women at high risk of gestational diabetes and hypertension and the high calcium content is very good for fetal development.

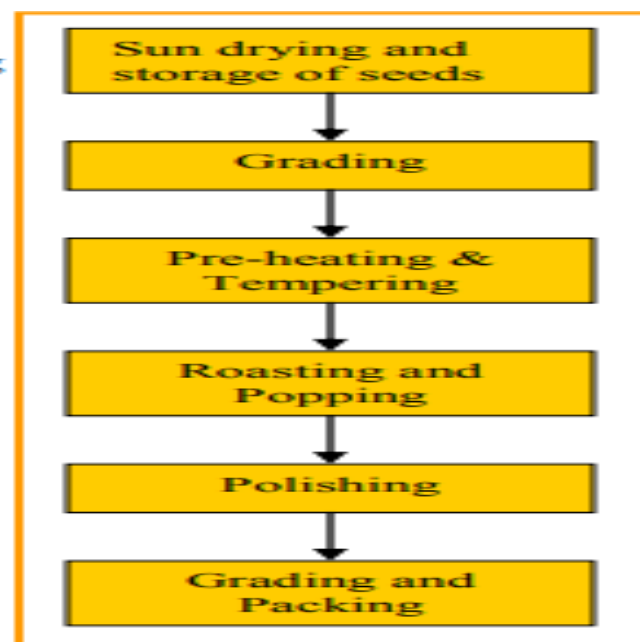
**GOOD FOR  
PREGNANT  
WOMEN**



## PROCESSING OF MAKHANA

Processing of makhana is cumbersome, labour intensive and time consuming process and involves human drudgery to a great extent. Seeds of Makhana (Guri) are sun dried for ease of transportation and temporary storage. It is stored in water tanks or water is sprinkled frequently to maintain the quality of the seed. Usually, guri is stored for 20-25 days in the clusters. The sun-dried nuts are then categorized into 5 to 7 grades according to their sizes by means of a set of sieves. Subsequently, nuts are heated in earthen pitcher or cast iron pan by placing them over fire and stirring them continuously. The pre-heated seeds are kept for tempering in basket/pots for 45-72 hours, which loosen the kernels from the hard seed coat.

Roasting and popping are the most painstaking operations of makhana processing. About 300 gm of pre-heated and tempered nuts are taken and roasted in a cast iron pan in single layer over the fire at 290 degree Celsius to 340 degree Celsius surface temperature with continuous stirring. When crackling sound is heard after 1.5 – 2 min, 5-7 roasted seeds are scooped quickly by hand and kept on hard surface and sudden impact force is applied on them by means of a wooden hammer. As the hard shell breaks, the kernel pops out in expanded form, which is called makhana. It is followed by polishing and packing in gunny bags. The yield of makhana varies from 30 to 35% on raw nut weight basis.



## STORAGE OF MAKHANA

Makhana is stored in two forms in the clusters: 1. Seeds 2. Makhana pop

**Seeds:** Farmers store Makhana seeds in their houses by spreading it on the pucca floor and water is regularly sprinkled to keep it moist and the average duration of storage is around 25 days. Some of the farmers of Katihar and Purnea store it in cemented water tanks till it goes for processing. Storage for future gains is not a common practice but it is held for the short period before it goes for processing.

**Makhana pop:** Makhana pop can be stored for longer periods i.e. a year if stored under proper conditions. Pop is stored in jute bags of 10-12 kg each and is kept on raised wooden platforms to protect it from moisture. Farmers in the clusters store it in their houses till it's purchased by the local wholesaler. Since pop is stored in temporary storage structures, rat and rodents damage it to the extent of 5-10%. The retention capacity at grower level is low because of pressing need of cash. As such the entire marketable surplus is sold to local wholesalers who actually store the produce for price advantage in the off-season. Makhana pop is stored by local wholesalers after grading and packing in polythene bags which is further packed in jute bags. Each wholesaler owns and operates his own godown and its capacity varies upon the handling ability of the trader. They store the material in anticipation of future gains due to increase in price of Makhana in wholesale markets.

## GRADING OF MAKHANA

Makhana is procured by wholesalers/ traders from villages and brought to the major trading locations. The produce is graded manually at the godowns of the local wholesaler and it is separated into approximately three grades viz. Lawa, Murra and Thurri. Depending upon the requirement and demand from wholesalers of Delhi, Kanpur etc, the produce is packed in various pack sizes and grades.

## PACKAGING

Makhana pop is packed in rudimentary style in all the clusters, which has a direct bearing on the quality, grade and price of the final product. It is packed in smaller polythene bags for retail markets and in gunny bags for wholesale markets. Makhana being light and voluminous, a standard gunny bag can accommodate about 10 kg. Grading of the Makhana Pop at \*Shakti Sudha . Packaging of the Makhana Pop for retail and Whole sell markets.

### **Packing for retail marketing :**

For retail markets, Makhana is packed in plastic bags to keep it moisture proof. The entire process is done manually i.e. grading, filling in bags, weighing, packing etc. However hand operated machines are used by local wholesalers of the clusters for sealing of the Makhana packet. Since the entire process is done manually by unskilled laborers, there is no quality and grade assurance of Makhana pop. Also, the hygienic and nutritional qualities of the product are not safeguarded which acts as an important stumbling block in its market acceptability for export purposes.

### **Packing for wholesale marketing :**

Makhana is packed in gunny bags (28 x 44 inches) weighing 8 kg, 10 and 12 kgs. Depending upon the quality of Makhana, quantity that can be accommodated in a standard gunny bag varies as shown in the proceeding page:

Quality	Quantity in Kg
High	8
Medium	12
Low	More than 25

## **EXPORT PROMOTION STRATEGY**

- To propose to interact with the State Governments of Makhana producing states and ICAR institutions to collate production data and identify specific pockets for inducing development programs for export growth.
- To conduct export awareness programs for Makhana. Assistance under Agriculture Export Promotion Plan Scheme of APEDA to potential export units in the producing states.
- To get geo mapping conducted to estimate the number of ponds, district wise production, and productivity calculation.
- To interact with ICAR RCER Research Centre for Makhana located at Darbhanga, Bihar for assistance in promoting production and processing technology for Makhana.