

Value addition of Rice

Approximately 9% of paddy is lost when using traditional methods of postharvest processing; therefore, there is a need to replace these methods with improved technologies. Although harvesters, combine harvesters, mechanical threshers, and winnowers were originally introduced to reduce operational costs, a suitable combine machine should also be designed for drying and segregating immature grains. Sun drying of harvested paddy in open spaces is unhygienic and losses occur due to scattering or pest consumption. Various types of mechanical dryers are available; however, Louisiana State University (LSU)-type dryers and fluidized bed dryers are most commonly used.

The use of silos with sensors and aeration is most desirable for bulk storage of dried grains. Different types of milling systems have been developed, the most suitable of which is a rubber-roller sheller mill that gives the highest outturn of rice and produces high-quality bran. Various value-added products of rice have also been developed but products such as ready-made mixes (i.e., *dosa* and *idli*) and noodles have huge potential in the export market. In addition to white rice, milling also produces bran and husk as by-products. The bran has potential to produce edible oil, high-quality protein, and dietary fiber. Fresh rice bran needs to be stabilized. Otherwise, it becomes unfit for human consumption, and the protocol developed by CIPHET was found to be the most suitable in this regard. Rice protein has the highest nutritional value and is known as one of the lowest allergy-generating proteins; however, rice bran protein concentrates and isolates are not commercially produced because of the lack of a commercially feasible extraction method. The fatty acid composition of edible rice bran oil is closest to that recommended by various organizations, including the Indian Council of Medical Research (ICMR).

Rice husk has several uses, but the most promising and profitable one is for generating electricity. Rice straw is abundantly available in the country (~275 million tons in 2014–15) and is the single most important dry fodder for dairy animals. Rice straw also has huge potential to contribute to the growth of the dairy sector, to produce bioenergy, and to be used for electricity generation. Government support is needed to create facilities for enhanced use of biomass for energy generation.

Parched rice

It is prepared by throwing rice in sand heated to a high temperature in an iron or mud pan. On stirring, rice begins to crackle and swell. Then the content of the pan are removed and sieved to separate the parched rice from sand. Parboiled rice is used for making grayish to brilliant white colour parched rice and sold either salted or unsalted. It is eaten as such or mixed with butter milk or milk.



Expanded rice (Pori)

Expanded rice (murmura, pori, muri) is a traditional convenience food widely consumed in India either as such or with Jaggery, roasted Bengal gram and shredded vegetables and spices. The product is mostly produced in home or cottage sector by skilled artisans.

In the traditional process, the paddy is soaked in water preferably over night until saturation, drained and then either steamed or dry roasted in sand for parboiling. The parboiled paddy is milled, salted and again roasted in sand for expansion.

Market Outlook

The most common sight today would be Bhel puri - is a savoury snack originating from the Indian subcontinent, and is also a type of chaat. It is made of puffed rice, vegetables and a tangy tamarind sauce.

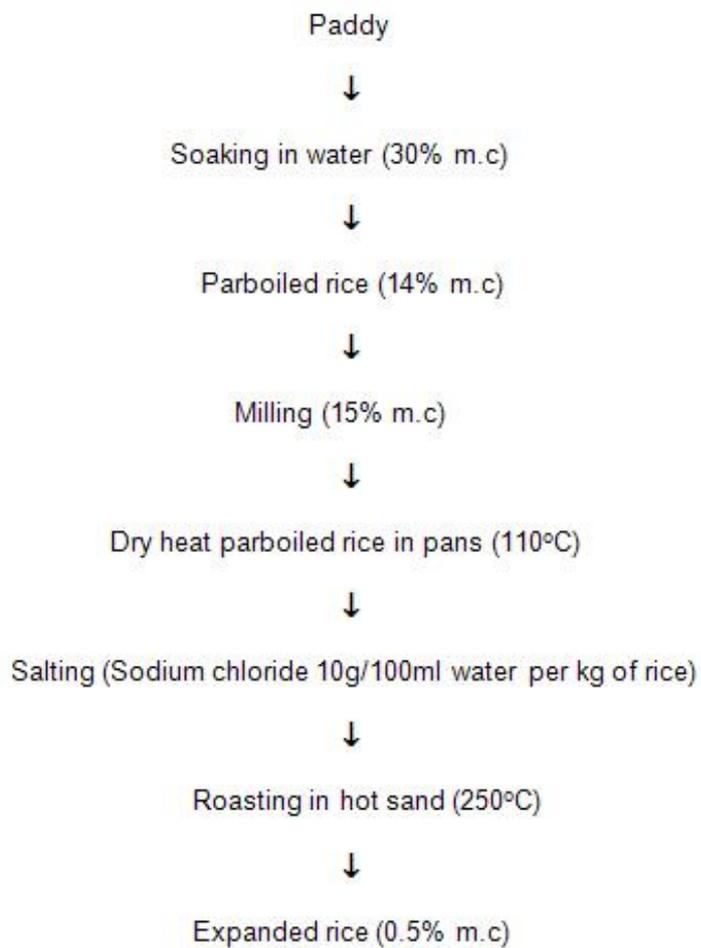


ROASTER MACHINE



PACKING MACHINE

Steps in Production of expanded rice



Puffed rice

Muri is to rice as popcorn is to corn. A traditional puffed rice called muri (sometimes spelled mouri) is made by heating rice in a sand-filled oven.

Puffed rice also known as kurmura, murmura, muri in Hindi are very lightweight and crisp. As the same suggest puffed rice are made from rice, where the rice grains are expanded because of high-pressure heating.

Rice grains are slow roasted with sand in huge iron kadai (wok) with lot of patience keeping the heat very slow so that the rice grains do not burn. Puffed rice has greater volume than regular rice but is less in calories which means that given equal sized servings puffed rice will have fewer calories than rice. Puffed rice is used to make bhelpuri and snacks and for other needs.

Market Outlook

Puffed rice is a popular low cost breakfast cereal and snack used worldwide because of its ready to eat (RTE), lighter and crispness characteristics. India produces annually 89 million tonnes of rice (second largest producer of rice in the world), but, only 10 percent of it is converted to different value added products such as puffed rice, popped rice or flaked rice.

Puffed rice has got a highest demand both in national and international market. Quality factors such as uniform puffing, contamination free, good colour, crispness etc. are the major concern for export of puffed rice. However, the production of puffed rice in India is only limited to village levels. The puffing method traditionally followed in India is sand-roasting. The whole process of puffing is very tedious, time consuming and involves a large amount of skilled labour working in hot conditions.

The Puffed Rice Market to grow at a substantial Compound Annual Growth Rate during the forecast period 2017-2022. With the increase in demand for muri, farmers are growing more rice to meet the demands.

Puffing of food is done by using high temperature, pressure, or extrusion. In puffing process expansion of seed is carried out and at that period the vapor pressure escapes through the micropores of the grain structure due to high pressure or thermal gradient. There are different methods of puffing viz. dry heat, sand and salt treated, hot air popping, gun puffing, popping in hot oil, and microwave heating. A wide range of cereals and millets used for puffing such as rice, wheat, corn, sorghum, and ragi.

Puffed food

Puffed food has a primary role in human consumption. Consumer demand is increasing for puffed foods due to various health benefits such as weight loss. Therefore increasing the market share of puffed food market. Increasing demand for flavor food products is expected to increase the puffed food market over the forecast period. The growing puffed market attributed to the shift in consumer demand for various flavors and nutritious food.



Puffed rice (using rice)

This popular ready-to-eat snack product is obtained by puffing milled parboiled rice. In the traditional process rice is gently heated on the furnace without sand to reduce the moisture content slightly. It is then mixed with salt solution and again roasted on furnace in small batches with sand on a strong fire for a few seconds to produce the expanded rice. Rice expands about 8 times retaining the grain shape and is highly porous and crisp.

Parched paddy or puffed rice (using paddy)

Sun dried paddy is filled in mud jars and is moistened with hot water. After 2-3 min. the water is decanted and the jars are kept in an inverted position for 8-10 hours. Next the paddy is exposed to the sun for a short time and then parched in hot sand as in the preparation of parched rice. Puffed rice is prepared by throwing pretreated paddy into sand heated to a high temperature in an iron pan. During parching the grain swell and burst into a soft white product. The parched grains are sieved to remove sand and winnowed to separate the husk.

Puffed rice from parboiled rice

The rice is soaked in salt water to increase the moisture to about 20%. The moist rice is introduced into a hot vessel at about 250-275°C for 30-40 seconds. The rice puffs suddenly.

Popped rice

This is yet another traditional value added product prepared from raw paddy. The paddy at a moisture content of 12-14% is directly roasted in iron pans using sand as a medium at a temperature of 150-200°C. The production of popped rice is comparatively less and the product is mainly used in religious functions and ceremonies.

Puffed Rice is a commonly consumed commodity as a pastime snack. It can be used in combination with nuts such as groundnut or roasted and salted cashews; with fried gram with jaggery and coconut gratings, or dusted with salt and spices after enrobing with oil. Since the product is easily digested and assimilated, it finds a wide acceptance among a cross section of the households. It is a versatile product with an excellent market potential.

Puffed rice is used in snack foods and breakfast cereals, and is also a popular street food in some parts of the world. It is an ingredient of bhel puri, a popular Indian chaat item. It is also used in temples and gurudwaras as prasad. In temples of South Indian states of Kerala and Tamil Nadu, it is used as an offering. Famous pilgrims of Sabarimalala, uses puffed rice or Malar in their Irumudikkettu along with jaggery and is offered to Lord Ayyappan