MINISTRY OF FOOD PROCESSING INDUSTRIES
GOVERNMENT OF INDIA

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Reading Material for

Black Rice Processing

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1. Introduction

Rice is a staple food across the world. There are several types of rice exists around the world like white, red, black, purple, brown, etc. Different name exists due to physical appearance of the paddy and the different colour exists due to presence of different pigments in different rice varieties. Black rice is also called forbidden rice or emperors rice. It is called Forbidden rice because onne in a time a Chinese emperor forbidden this rice in his state and stored all for self-health and longevity. It was found to be of short duration, photo insensitive, non-responsive and low productive towards the fertilizer doses. Black contains a high amount of protein and fiber over all the other types of rice. Black rice contains 18 different amino acids, copper, carotene and several other essential vitamins. It is often considered a superfood because of its high nutritional content, in addition to the fact that it's naturally high in anthocyanins, which are the antioxidant pigments that give the rice it is unique coloring. This rice variety is rich in

- Antioxidants
- Protects heart health
- Able to detoxify liver
- Prevent diabities
- Helps to fight cancer
- Regulates blood pressure

Despite its long history, the origins of black rice have not been clear. Black rice cultivars are found in locations scattered throughout Asia. In India, black rice variety is cultivated in Manipur and the name "Chakhao Amubi" originates from the Manipuri language, "Chakhao" means delicious and "Amubi" means black, thus translating the name to 'Delicious Black Rice'.Black rice, however, is unique. Its purplish-black color is a result of its high concentration of anthocyanin. Japanese researchers found that a change in a gene that controls anthocyanin rearranged to create black rice; this mutation occurred in a subspecies of rice. Since then, the rice has been replicated and transferred to other rice species through cross-breeding. The grain is cultivated in Southeast Asian countries such as India, Indonesia, Thailand, and China. Owing to its popularity in Western countries, it is now also grown in small amounts in the Southern United States as well. Black rice cultivation has agronomic qualities like stable grain yield in marginal lands, stress tolerance, and pest and disease resistance.

Fig 1 Black rice in field condition

Table 1 Nutritional quality

Nutritional information of black rice over all the other types of rice (Serving size: 100 g)

Rice	Protein	Iron	Fiber
Polished White Rice	6.8 g	1.2g	0.6g
Brown Rice	7.9 g	2.2 g	2.8 g
Red rice	7.0 g	5.5 g	2.0 g
Black rice	8.5 g	3.5g	4.9 g

2. Paddy to Rice Processing

2.1 Parboiling

Parboiling is an important step before milling of paddy. It is a hydrothermal treatment which improve the head rice count and increase the yield of rice. The parboiling is given below.

The main advantages of parboiling are:

- Smooth surface finish and increase the head rice count.
- Loss of soild during cooking is also less.
- Cooking quality of rice increased
- More nutrient retention in rice.

Disadvantages:

- It develops a relatively darker colour compared to raw rice.
- The traditional parboiled process produces and undesirable smell.
- Parboiled rice takes more time to cook to the same degree of softness than raw rice.
- Because of long soaking in traditional process, mycotoxins may develop in parboiled rice and cause health hazards.
- Parboiling process requires and additional investment of capital.

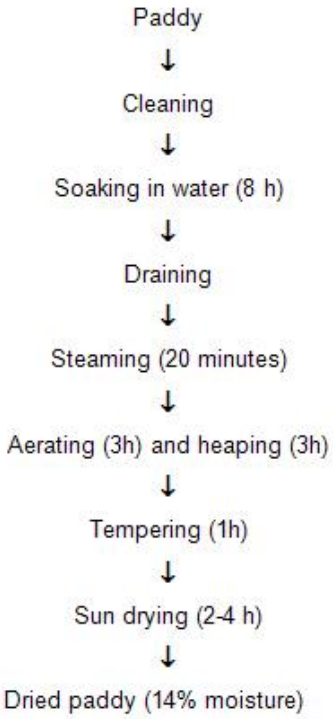

Fig 2 Process flow diagram of parboiling

2.2 Milling of Paddy

After parboiling, paddy is subjected to milling to make rice. The processing steps of milling is given below.

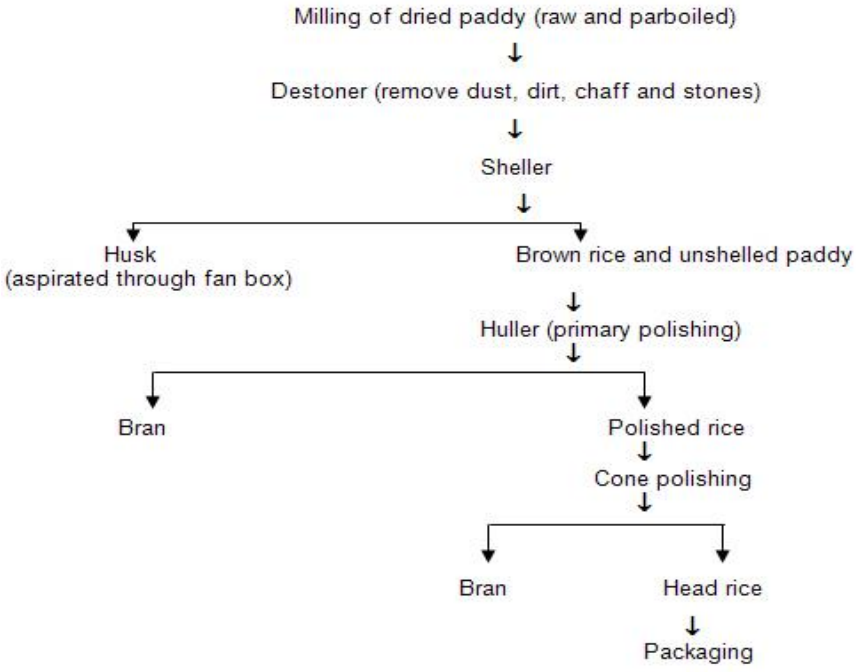

Fig. 3 Process flow diagram of paddy milling

3. Processing of Rice Flakes (Poha)

India is the world's largest producer across a range of commodities due to its favourable agroclimatic conditions and rich natural resource base. Paddy (Oryza sativa) is second largest major cereal crop which produces starchy seeds. Rice is a source of nourishment for more than half of the world's population. it is one of the leading food crops of the world. The paddy is converted into edible form of the rice for which the paddy undergoes several post-harvest operations. Rice flakes are prepared from paddy. It is also popularly known as "Poha". It is often eaten for breakfast or brunch and is quite light and nutritious. It is mainly used in the Western region i.e., in Maharashtra and Gujarat and some parts of the Eastern & Northern Region. It is a fast-moving consumer item and generally eaten as breakfast item. It can be fried with spices and chilly to make hot and tasty food item or milk / curd is mixed with it and then eaten. Most people take it after frying whereas some takes it with milk; the dish is easy to cook & nutritious and contains carbohydrates & proteins. The flakes are very easy to cook and can make a meal in minutes. In order to make a snack using beaten rice, wash the beaten rice in water and then soak for 10 minutes. Strain using a strainer and use as required. It may be used in either savory or sweet snacks.

Fig. 4 Raw material paddy grain and its value-added product flaked rice (poha)

3.1 Processing steps of flaked rice

The process of product (flaked rice in two different size) development is depicted in the flow diagram shows the steps involved in process for preparation of flaked rice. Raw paddy was soaked in the water for 24 to 30 hours at a room temperature to increases its moisture content up to 30 to 32 %. This was followed by complete removal of water from soaking tank and the soaked paddy was conveyed through a 5 kg cloth carry bags into the hopper of the paddy roaster operated at the highest temperature about 172-175ºC for a short period of time about 35 to 40 seconds in fine sand. The process results in drying of husk with its internal moisture content in the range of 17 to 19 % yielding roaster paddy that was immediately conveyed to the rice flaked machine operating at 200 rpm by 3 HP electric motor.

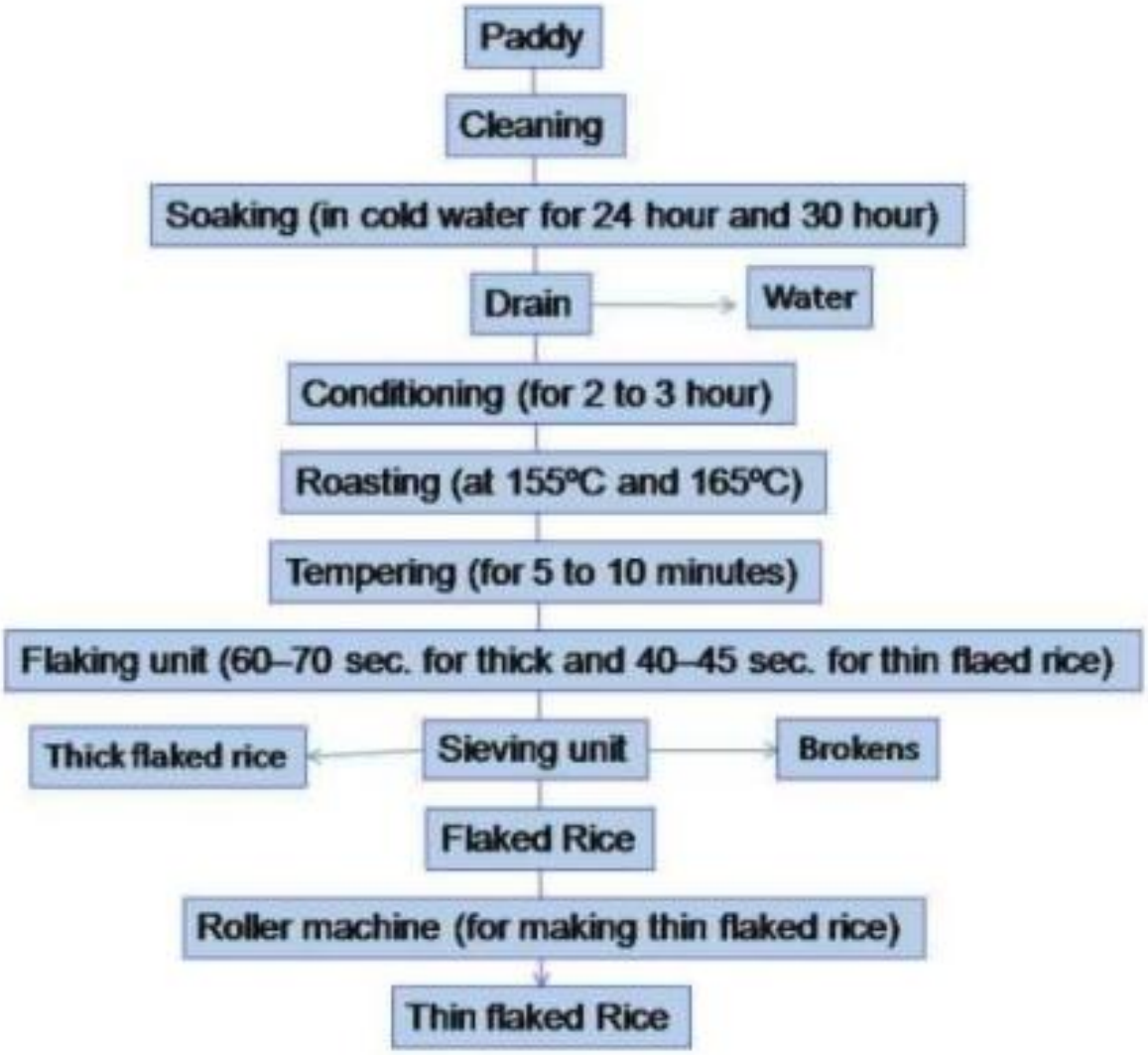

Fig. 5 Process flow chart for preparation of flaked rice

Fig. 6 Roaster machine for flaking process

3.1.1 Sieving and Conditioning

The roasted paddy is fed to the flakers, whereas, in medium and large-scale system it is moistened and conditioned to obtained different types of flakes, such as thick (~1 mm), medium (~0.6 mm), thin (0.55-0.3 mm) and very thin (<0.3 mm). For the largest processors that operate the continuous type of roasters, the sand roasted paddy is sieved in order to remove the adhering sand and impurities.

3.1.2 Flaking

Edge runners are batch type flaking machines with the capacity to flake 50, 100, and 150 Kg/hr of paddy. In edge runners, the paddy is pressed in between the body of the edge runner and flaking roller. The husk and bran come out through the perforated mesh at the base of the edge runner. The remaining husk parts and bran that continue along with the flaked rice are cleaned by manual winnowing or by using a sieving shaker. After completion of flaking, the flaked rice is scooped out by hand and collected in plastic buckets.

Fig. 7 Edge runner machine

In some places. The flaked rice obtained from the edge runner is again pressed and flattened in roller flakers to further reduce the thickness. In roller flakers, it consists of two cylindrical rollers. The roasted paddy is shelled and polished and then fed in between the roller, in which it is pressed and flattened.

The reduction in thickness is accomplished by passing the paddy through the set of rollers in sequence and passing the flakes for further flattening. The gap between the rollers is maintained by pressures. In medium and large-scale industries, different types of flakes are produced. The end products are categorized according to the thickness of the flakes.

Fig. 8 Roller machine for making thin flaked rice

3.1.3 Sieving and packing

The flaked rice is sieved in a sieve shaker in order to separate small, broken, powdered material and lumps. The thick flaked rice requires drying (shade drying) in order to reduce the moisture content before packing. After this, the flaked rice is packed directly into polyethylene bags.

Fig. 9 Sieving machine

Different packing systems are in practice, depending on the requirements of the local market and the quality and type of flaked rice. The shelf life of the thick type of flaked rice is less than the medium and thin type flaked rice as it contains more moisture and undergoes less polish than the other grades. Generally, 65-70% of yield is obtained in the field depending on variety, quality of paddy, processing, condition and the type of flaked rice processed.

4. Instant Dry Mixes

The preservation of food products in its dry form is an old age technique; the low moisture content in the dry product not only lowers the shipping cost and storage space requirement, but also produces a shelf-stable valuable product that can be stored at ambient temperature for extended periods. One of the major constraints which restrict the large-scale organized production and marketing of traditional Indian foods are the limited shelf life of the product under both ambient and refrigerated storage. Therefore, all stakeholders in this segment have realized the need to develop instant dry mixes of these products. In addition to the substantial value-addition and product diversification achieved by this line of product development, instant dry mixes are also designed to provide convenience to the consumers during its preparation, reduce wastage from spoilage, save consumers time, and reduce financial costs using economics of scale.

The commercial manufacturing of *kheer/ payasam* in its dry form suitable for RTR purpose was possibly conceived to overcome the problem of the inadequate storage life of this popular milk-based traditional product. The dry mix offers advantages of value addition and product diversification to the dairy industry and convenience to the consumer. Several attempts to formulate and standardize various instant dry mixes for varieties of *payasam/ kheer*, which can readily be reconstituted into a ready to consume product have been reported over the years and the same are summarized below.

4.1 Instant kheer mix

Though *kheer* is popular throughout India, its limited shelf life even under refrigerated temperature imposes severe limits on its organized manufacture and marketing. It was visualized that if a process were developed for rice *kheer* in a shelf-stable form, it would offer significant value addition and product diversification for Indian dairy industry. Production of *kheer* in a dry form suitable for ready reconstitution was probably conceived to help overcome the problem of limited shelf life of this popular traditional product.

The manufacture of an instant rice-based *kheer* mixes by separate drying-cum-instantization of concentrated milk in a spray dryer and rice grains in a fluidised bed dryer. It involves spray drying of the admixture of milk concentrate and rice flour (preheated to partially pre-gelatinize the

rice starch) along with sugar in two stage spray dryer followed by fluidized bed drying to make the powder which has excellent reconstitution properties. Readily rehydrable rice grains obtained by a technology which involved partial cooking of rice, its conversion into a paste, subsequent extrusion and dehydration in air dryer.

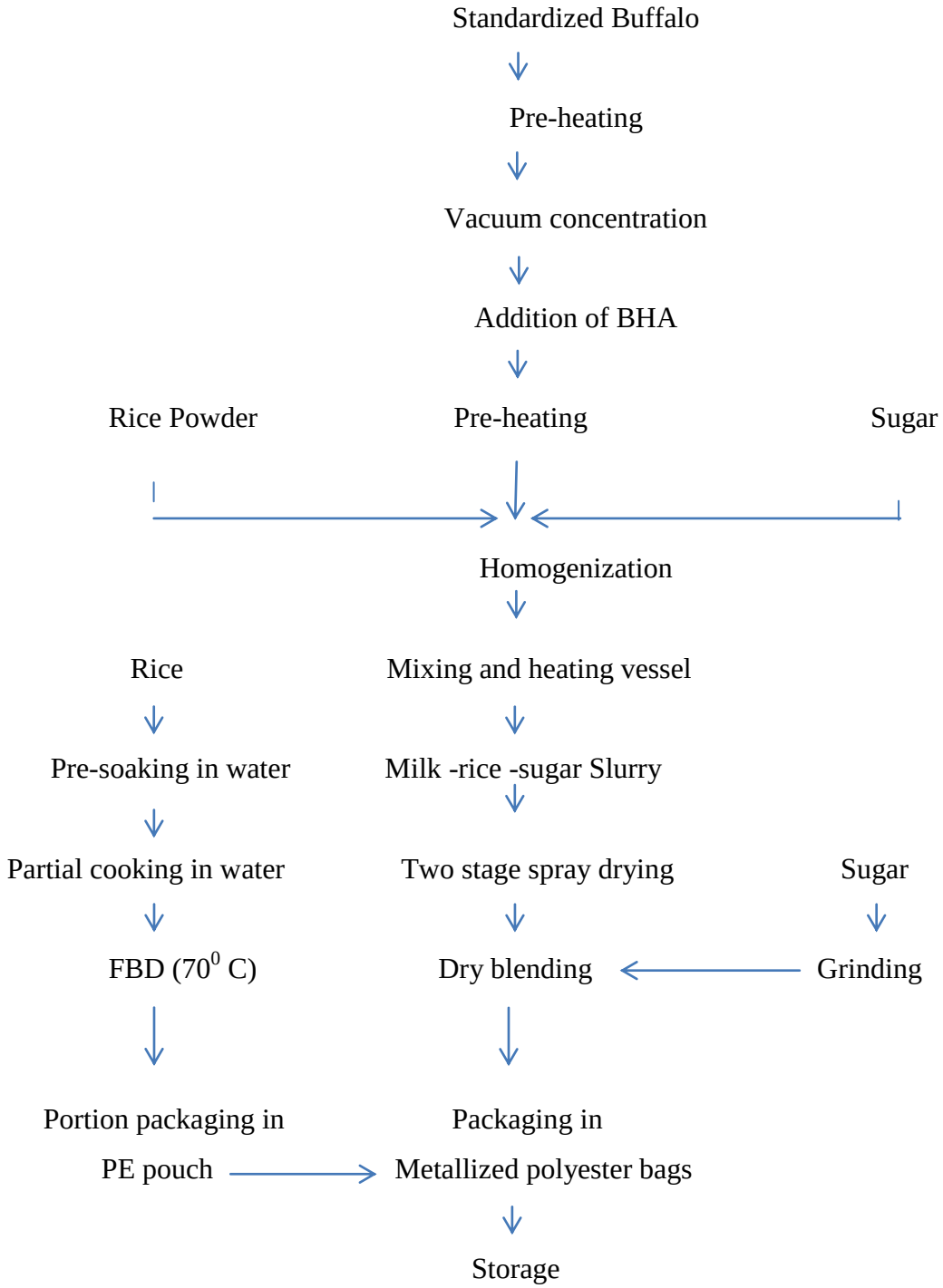

Fig. 10 Flow chart for the manufacture of instant *kheer* mix.

This form of instant rice was rehydrated in about 5 min. In an alternate process, quick cooking rice was obtained by drying of partially soaked rice in a fluidized bed dryer. The rice thus

obtained could be cooked in hot water in about 10 min. Spray dried *kheer* powder mixed with instant rice and was portion packed in metallized polyester laminates. Such instant mix could be stored at room temperature without any loss of quality for a period of 6 months.

Reconstitution of *kheer* mix involves rehydration of instant quick-cooking rice in boiling water for 10 min followed by dispersal of the powdered component into the rice-water mixture. The reconstituted product could be suitably flavoured and enriched with dry fruits etc.

The process involved two major processing steps. The production of a milk-rice powder (representing the liquid fraction of *kheer*) was achieved by spray drying of a slurry containing concentrated milk, rice flour and sugar in a two-stage spray dryer. Instant rice/ quick-cooking rice representing the particulate phase, was manufactured by drying of presoaked rice grains in a fluidized bed dryer. The instantized rice was observed to cook satisfactory by boiling in hot water for 10 min. The spray-dried *kheer* premix powder and instant rice grains were recommended to be separately portion packed in metalized polyester (PS) laminates.

4.2 *Palada payasam* mix

Palada payasam is milk based sweet delicacy popular in Kerala. Milk, ada (pre-gelatinized cut rice flakes) and sugar are the base ingredients used for its preparation. Unnikrishnan *et al.* (2003) developed a method for *palada payasam* dry mix. In this method, *ada* flakes (prepared using rice flour) **were** soaked for about an hour in hot water followed by decantation of the water. The soaked *ada* was then washed 2-3 times in cold water and cooked with milk and sugar in a steam kettle till the mixture attained a pasty mass consistency. At this stage sugar solution (prepared and kept separately) was added to the kettle and further heated with constant scraping. At last stage steam supply was stopped, then powdered sugar and rice powder ware added and thoroughly mixed to get a dry mix. This mix packed in LDPE (Low density Polyethylene) pouches had a shelf-life of about a year at ambient temperature.

In another method, *ada* flakes, ground sugar and skim milk powder were dry blended in the proportion of 15: 60: 25, respectively. The sugar used in the mix contained 25% caramelised sugar, which improved the flavour of the final product. *Payasam* could be prepared from the mix by cooking 44 g of the dry mix in 100 g of water for 10 min. The desired amount of fat was added during cooking in the form of cream (Rai *et al.*, 2002). The product obtained from dry crystallization technique scored better in term of colour, consumer acceptance, body & texture that product obtained from dry blending technique.

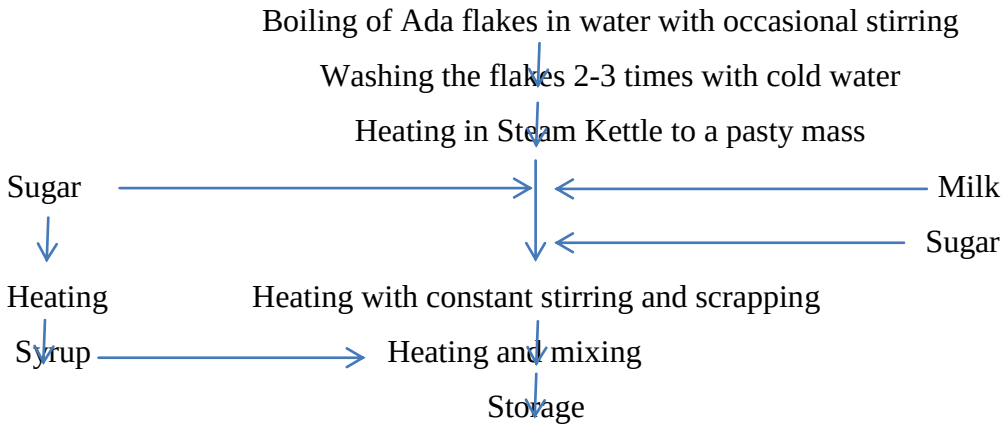

Fig.11 Flow chart for the preparation of *Palada payasum* dry mix

4.3 Avalakki (Beaten Rice) *Payasam* Mix

Avalakki payasam is a popular delicacy in Karnataka and Kerala. The cereal ingredient used in this *payasam* is Avalakki (beaten rice). The product is free flowing, low viscous with suspended cooked beaten rice flakes and coconut gratings. It has a pleasant cooked flavour. The traditional method of preparation involves deep frying of beaten rice (300 g) in ghee followed by cooking in milk (2 lit). The product is sweetened with sugar (400 g) and flavoured with cardamom and saffron. Avalakki *payasam* has a low shelf-life (< 24 h at room temperature). Therefore, several attempts are made to develop a ready-to-reconstitute dry mix.

In this process one fifth part of soaked beaten rice were concentrated along with milk and sugar in a steam kettle to a high viscous semisolid form. Sugar syrup and remaining wet flakes were added to the kettle and vigorously stirred to get the mix in the dry form. *Payasam* could be prepared by boiling the dry mix (225 g) in 700 ml dilute milk (milk to water, 5:2) for 10 min. The product had acceptable flavour, but the texture was found to be depending on the initial soaking of the beaten rice. While traditional frying of the flakes gave a hard texture to the flakes, prolonged soaking in milk gave a pasty mass. Addition of a small quantity of *ghee* to the soaked beaten rice improved the texture of the *payasam*. However, the flakes were found to be hard. Therefore, attempts were made to get a product with a better texture. Dry Avalakki flakes fried in ghee were cooked during concentration of milk with sugar. This was followed of crystallization drying technique as followed in the preparation of dry mix for *palada payasam*.

5. Ready to Eat (RTE) rice processing

Ready to eat foods are the precooked food which can be consume directly. Before RTE preparation food products are pre-cleaned, precooked and retort in flexible package or canned. According to the 2009 US Food code (FDA, 2009), RTE foods should be in an edible form without an additional preparation step to achieve food safety. The advantages of RTE are time saving, convenient and value for money.

The processing steps of RTE: For making of RTE rice, firstly cleaned with lukewarm water to remove extra husk and socked the rice for 25-30 minutes. The rice grains are precooked in boiling water and after that drain the extra water. Here, insure that the rice is about 75% cooked. After that, spices and herbs are added into the precooked rice according to the formulation. The whole material is transferred into flexible packet and sealed and send for retort process. The retort process includes sterilization of mass at 120°C for 15-20 minutes. The packet is then cooled and ready for distribution.

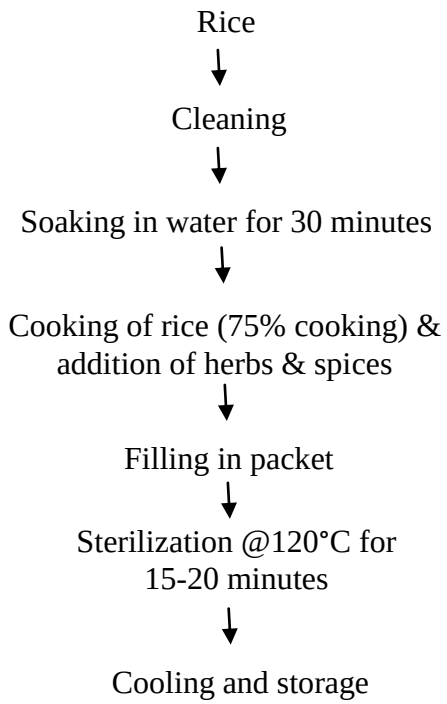

Fig. 12 Process flow diagram of RTE rice processing

6. Parched rice

It is also called *Murmure, muri, pori* in India and is widely consumed with different

preparation. In traditional process, the paddy is socked overnight in water. After draining of water, the paddy is dry roasted or steamed for parboiling. The parboiled paddy is then milled to get rice. The rice is roasted in sand for expansion and then sand is removed by sieve and packed in suitable packaging material for marketing and distribution. The flow chart for preparation is given below.

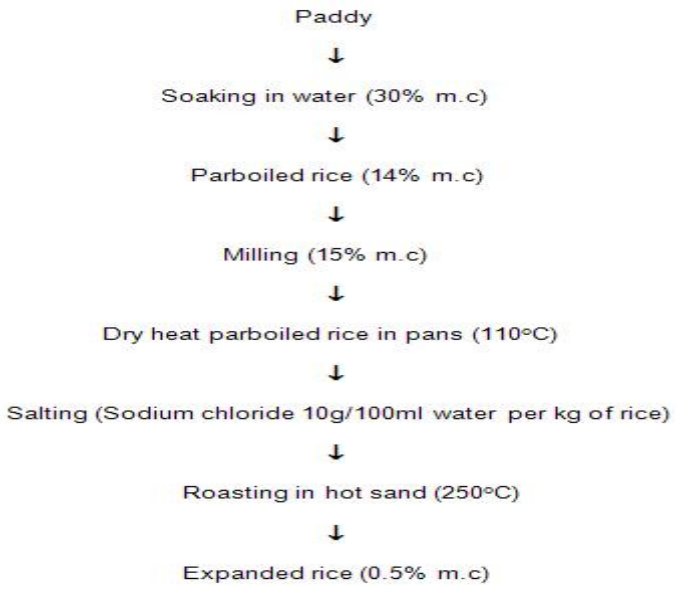

Fig. 13 Processing steps of Parched rice

7. Rice Kheel

Kheel, also known as lava or lai, is easily found in the kitchen of every household in India. It has many tradition values and being used in religious functions (Lohri, Makar Sankranti, Vivah, Lakshmi Puja, Diwali) is also very beneficial in terms of health. It is considered healthy breakfast due to its digestibility and food properties. By including it in your diet, it can save you from many diseases. Some of the important health benefits of Kheel is –

- Kheel has high fiber content which will prove beneficial in reducing your obesity. Apart from this, the skin will also cure your constipation problem.
- Beneficial in Hematitis and diarrhea.
- Give instant energy to our body.
- Improve digenstion

Kheel is manufactured from paddy. Paddy is soaked in water for 6-8 h at room temperature followed by draining of water. The paddy is then subjected to roasting in sand. The paddy expands and it becomes Kheel. The Kheel is then sieve to remove extra sand and paddy. The Kheel is then packed in suitable packaging material for further marketing and distribution.

Fig. 14 Rice Kheel

8. Rice flour

Rice flour can be used in making rice-based food products such as biscuits, cakes, noodles and other rice-based snacks. Rice flour is a unique over other flour because

- It eases in digestion
- Make as carrier of food colour and preservatives
- Bland taste
- Hypoallergenic properties
- Low in fat helps in absorbing fat
- Low in protein and helps in making essential baked products.
- Can be made from broken rice makes it more cost effective
- High value lysine than similar cereal flours and therefore could be easily fortified with high lysine food than the other cereals.

8.1 Method of rice flour production

Its production process is different from wheat, maize and millet flour production process. Rice flour is made by grinding broken milled rice and there are generally three methods adopted for flour preparation of rice.

1. Wet grinding
2. Semidry grinding
3. Dry grinding

1. Wet grinding: It is a traditional method to prepare rice flour. In this process, firstly rice is soaked in water followed by grinding, filtering, drying, sieving and packaging.

2. Dry grinding: In this method rice is directly grind to produce fine powder. It is cost effective,

required less energy but need machine having good grinding capacity.

3. Semidry grinding: In this process, rice is soaked in water and then excess water is removed with the help of dryer before grinding. The obtained flour having good physico-chemical characteristics than other grinding methods.

9. Packaging and Labelling Requirements in Rice Processing

9.1 General Requirements for Packaging

The general requirement for packaging includes:

1. A utensil or container made of the following materials or metals, when used in the preparation, packaging and storing of food shall be deemed to render it unfit for human consumption:
   a) containers which are rusty;
   b) enameled containers which have become chipped and rusty;
   c) copper or brass containers which are not properly tinned
   d) containers made of aluminium not conforming in chemical composition to IS:20 specification for Cast Aluminium & Aluminium Alloy for utensils or IS:21 specification for Wrought Aluminium and Aluminium Alloy for utensils.
2. Containers made of plastic materials should conform to the following Indian Standards Specification, used as appliances or receptacles for packing or storing whether partly or wholly, food articles namely;
   i. IS : 10146 (Specification for Polyethylene in contact with foodstuffs)
   ii. IS : 10142 (Specification for Styrene Polymers in contact with foodstuffs);
   iii. IS : 10151 (Specification for Polyvinyl Chloride (PVC), in contact with foodstuffs);
   iv. IS : 10910 (Specification for Polypropylene in contact with foodstuffs);
   v. IS : 11434 (Specification for Ionomer Resins in contact with foodstuffs); (vi) IS: 11704 Specification for Ethylene Acrylic Acid (EAA) copolymer. (vii) IS: 12252 - Specification for Poly alkylene terephathalates (PET).
   vi. IS: 12247 - Specification for Nylon 6 Polymer; (ix) IS: 13601 - Ethylene Vinyl Acetate (EVA);
   vii. IS: 13576 - Ethylene Metha Acrylic Acid (EMAA);
   viii. Tin and plastic containers once used, shall not be re-used for packaging of edible oils and fats;

Provided that utensils or containers made of copper though not properly tinned, may be used for the preparation of sugar confectionery or essential oils and mere use of such utensils or

containers shall not be deemed to render sugar confectionery or essential oils unfit for human consumption.

3. **General packaging requirements for Canned products,**
   i. All containers shall be securely packed and sealed.
   ii. The exterior of the cans shall be free from major dents, rust, perforations and seam distortions.
   iii. Cans shall be free from leaks.

9.2 General Requirements for Labelling

1. Every prepackaged food shall carry a label containing information as required here under unless otherwise provided, namely;
2. The particulars of declaration required under these Regulations to be specified on the label shall be in English or Hindi in Devnagri script: Provided that nothing herein contained shall prevent the use of any other language in addition to the language required under this regulation.
3. Pre-packaged food shall not be described or presented on any label or in any labelling manner that is false, misleading or deceptive or is likely to create an erroneous impression regarding its character in any respect;
4. Label in pre-packaged foods shall be applied in such a manner that they will not become separated from the container;
5. Contents on the label shall be clear, prominent, indelible and readily legible by the consumer under normal conditions of purchase and use;
6. Where the container is covered by a wrapper, the wrapper shall carry the necessary information or the label on the container shall be readily legible through the outer wrapper and not obscured by it;

License number shall be displayed on the principal display panel in the following format, namely: -

i. For food additives falling in the respective classes and appearing in lists of food additives permitted for use in foods generally, the following class titles shall be used together with the specific names or recognized international numerical identifications:

Acidity Regulator, Acids, Anticaking Agent, Antifoaming Agent, Antioxidant, Bulking Agent, Colour, Colour Retention Agent, Emulsifier, Emulsifying Salt, Firming Agent, Flour Treatment Agent, Flavour Enhancer, Foaming Agent, Gelling Agent, Glazing Agent,

Humectant, Preservative, Propellant, Raising Agent, Stabilizer, Sweetener, Thickener:

ii. Addition of colours and/or Flavours

a) Extraneous addition of colouring matter to be mentioned on the label – Where an extraneous colouring matter has been added to any article of food, there shall be displayed one of the following statements in capital letters, just beneath the list of the ingredients on the label attached to any package of food so coloured, namely:

1. CONTAINS PERMITTED NATURAL COLOUR(S)

OR

2. CONTAINS PERMITTED SYNTHETIC FOOD COLOUR(S)

OR

CONTAINS PERMITTED NATURAL AND SYNTHETIC FOOD COLOUR(S)

b) Provided that where such a statement is displayed along with the name or INS no of the food colour, the colour used in the product need not be mentioned in the list of ingredients.

c) Extraneous addition of flavouring agents to be mentioned on the label.

d) Where an extraneous flavouring agent has been added to any article of food, there shall be written just beneath the list of ingredients on the label attached to any package of food so flavoured, a statement in capital letters as below:

CONTAINS ADDED FLAVOUR (specify type of flavouring agent as per Regulation 3.1.10(1) of Food Safety and Standards (Food product standards and food additive) Regulation, 2011

e) In case both colour and flavour are used in the product, one of the following combined statements in capital letters shall be displayed, just beneath the list of ingredients on the label attached to any package of food so coloured and flavoured, namely:

CONTAINS PERMITTED NATURAL COLOUR(S) AND ADDED FLAVOUR(S)

OR

CONTAINS PERMITTED SYNTHETIC FOOD COLOUR(S) AND ADDED FLAVOUR(S)

OR

CONTAINS PERMITTED NATURAL AND SYNTHETIC FOOD COLOUR(S) AND ADDED FLAVOUR(S)

Provided that in case of artificial flavouring substances, the label shall declare the common name of the flavours, but in case of the natural flavouring substances or nature identical

flavouring substances, the class name of flavours shall be mentioned on the label and it shall comply with the requirement of label declaration as specified under the regulation 2.2.2 (5) (ii) Note: — When statement regarding addition of colours and/or flavours is displayed on the label in accordance with regulation 2.2.2(5)(ii) and regulation 3.2.1 of Food Safety and Standards (Food Product Standards and Food Additive) Regulation, 2011, addition of such colours and/or flavours need not be mentioned in the list of ingredients. Also, in addition to above statement, the common name or

Name and complete address of the manufacturer

(i) The name and complete address of the manufacturer and the manufacturing unit if these are located at different places and in case the manufacturer is not the packer or bottler, the name and complete address of the packing or bottling unit as the case may be shall be declared on every package of food;

(ii) Where an article of food is manufactured or packed or bottled by a person or a company under the written authority of some other manufacturer or company, under his or its brand name, the label shall carry the name and complete address of the manufacturing or packing or bottling unit as the case may be, and also the name and complete address of the manufacturer or the company, for and on whose behalf, it is manufactured or packed or bottled;

(iii) Where an article of food is imported into India, the package of food shall also carry the name and complete address of the importer in India.

Provided further that where any food article manufactured outside India is packed or bottled in India, the package containing such food article shall also bear on the label, the name of the country of origin of the food article and the name and complete address of the importer and the premises of packing or bottling in India.

Net quantity

i. Net quantity by weight or volume or number, as the case may be, shall be declared on every package of food; and
ii. In addition to the declaration of net quantity, a food packed in a liquid medium shall carry a declaration of the drained weight of the food.

   Explanation – 1: For the purposes of this requirement the expression “liquid medium” include water, aqueous solutions of sugar and salt, fruit and vegetable juices or vinegar, either singly or in combination.

   Explanation – 2: In declaring the net quantity of the commodity contained in the package, the weight of the wrappers and packaging materials shall be excluded:
iii. Where a package contains a large number of small items of confectionery, each of

which is separately wrapped and it is not reasonably practicable to exclude from the net weight of the commodity, the weight of such immediate wrappers of all the items of the confectionery contained in the package, the net weight declared on the package containing such confectionary or on the label thereof may include the weight of such immediate wrapper if the total weight of such immediate wrapper does not exceed –

a) eight per cent, where such immediate wrapper is a waxed paper or other paper with wax or aluminium foil under strip; or
b) six per cent. In case of other paper of the total net weight of all the items of confectionery contained in the package minus the weight of immediate wrapper.

Exemptions from labelling requirements

Where the surface area of the package is not more than 100 square centimetres, the label of such package shall be exempted from the requirements of list of ingredients, Lot Number or Batch Number or Code Number, nutritional information and instructions for use, but this information shall be given on the wholesale packages or multi piece packages, as the case may be.

1. The date of manufacture' or 'best before date' or 'expiry date' may not be required to be mentioned on the package having surface area of less than 30 square centimetres but this information shall be given on the wholesale packages or multipiece packages, as the case may be;
2. In case of liquid products marketed in bottles, if such bottle is intended to be reused for refilling, the requirement of list of ingredients shall be exempted, but the nutritional information specified in regulation.
3. “To make a fluid not below the composition of toned milk or skimmed milk (as the case may be) with the contents of this package, add (here insert the number of parts) of water by volume to one part by volume of this condensed milk or desiccated (dried) milk”.
4. In case of food with shelf-life of not more than seven days, the 'date of manufacture may not be required to be mentioned on the label of packaged food articles, but the 'use by date' shall be mentioned on the label by the manufacturer or packer.
5. In case of multi piece packages the particulars regarding list of ingredients, nutritional information, Date of manufacture/ packing, best before, expiry date labelling of irradiated food and, vegetarian logo/non-vegetarian logo, may not be specified.

Date of manufacture or packing

The date, month and year in which the commodity is manufactured, packed or pre-packed, shall be given on the label:

Provided that the month and the year of manufacture, packing or pre-packing shall be given if the "Best Before Date" of the products is more than three months:

Provided further that in case any package contains commodity which has a short shelf life of less than three months, the date, month and year in which the commodity is manufactured or prepared or pre-packed shall be mentioned on the label.

Best Before and Use By Date

i) the month and year in capital letters upto which the product is best for consumption, in the following manner, namely:

"BEST BEFORE..... MONTHS AND YEAR

OR

"BEST BEFORE..... MONTHS FROM PACKAGING

OR

"BEST BEFORE..... MONTHS FROM MANUFACTURE

(Note: — blank be filled up)

ii) In case of package or bottle containing sterilised or Ultra High Temperature treated milk, soya milk, flavoured milk, any package containing bread, dhokla, bhelpuri, pizza, doughnuts, khoa, paneer, or any uncanned package of fruits, vegetable, meat, fish or any other like commodity, the declaration be made as follows

"BEST BEFORE ……DATE/MONTH/YEAR"

OR

"BEST BEFORE..... DAYS FROM PACKAGING"

OR

"BEST BEFORE..... DAYS FROM MANUFACTURE"

Note:

a) blanks be filled up

b) Month and year may be used in numerals

c) Year may be given in two digits

iii. On packages of Aspartame, instead of Best Before date, Use by date/recommended last consumption date/expiry date shall be given,

which shall not be more than three years from the date of packing;

iv. In case of infant milk substitute and infant foods instead of Best Before date, Use by date/ recommended last consumption date/expiry date shall be given, Provided further that the declaration of best before date for consumption shall not be applicable

9.3 Documentation and Record Keeping

Every organization has to maintain records of raw material procurement, production processes, and sales. This is to ensure that the business runs effectively and is profitable. Listed below are some reasons why there is a need for documentation:

1. It gives detailed knowledge about running the business.
2. It helps to control product quality.
3. It helps to keep track of the money invested in the business.
4. It helps to identify the separate costs of raw material or product ingredients.
5. It helps to identify the production cost of a particular process.
6. It helps to make sure that all the quality assurance practices were followed during the production.
7. It helps to make sure that the production equipment is running smoothly/effectively.
8. It works as an evidence for legal procedures.
9. It helps to set an appropriate product price.
10. It helps to take corrective measures at the right time.

Every food processing organization follows a more or less similar way of keeping records. Production records keep a log of the following:

- The quantity and type of raw materials received
- The quantity and type of ingredients used during processing
- The processing conditions in which production took place (e.g. the temperature set or the air pressure applied)
- The product quality produced

Product quality can be maintained only when:

- The same quantity and quality of ingredients and raw materials are mixed in every batch
- A standard formulation is used for every batch
- Standard process parameters are applied for every batch

Every batch of food is given a batch number. This number is recorded in:

- Stock control books (where raw material procurement is noted)

- Processing logbooks (where production process is noted)
- Product sales records (where sales and distribution is noted)

The batch number must correlate with the product code number, which is printed on labels. This helps the processor to trace any fault found in a batch back to the raw material used or the production process.

10. Food Safety Regulations and Standards

10.1 Registration and Licensing of Food Business

All Food Business Operators in the country will be registered or licensed in accordance with the procedures laid down

Registration of Petty Food Business

a. Every petty Food Business Operator shall register themselves with the Registering Authority by submitting
b. An application for registration in Form A under Schedule 2 of these Regulations along with a fee as provided in Schedule 3.
c. The petty food manufacturer shall follow the basic hygiene and safety requirements provided in Part I of Schedule 4 of these Regulations and provide a self-attested declaration of adherence to these requirements with the application in the format provided in Annexure-1 under Schedule 2.
d. The Registering Authority shall consider the application and may either grant registration or reject it with reasons to be recorded in writing or issue notice for inspection, within 7 days of receipt of an application for registration.
e. In the event of an inspection being ordered, the registration shall be granted by the Registering Authority after being satisfied with the safety, hygiene and sanitary conditions of the premises as contained in Part II of Schedule 4 within a period of 30 days.
f. If registration is not granted, or denied, or inspection not ordered within 7 days as provided in above sub regulation (3) or no decision is communicated within 30 days as provided in above sub regulation (4), the petty food manufacturer may start its business, provided that it will be incumbent on the Food Business Operator to comply with any improvement suggested by the Registering Authority even later.
g. Provided that registration shall not be refused without giving the applicant an opportunity of being heard and for reasons to be recorded in writing.
h. The Registering Authority shall issue a registration certificate and a photo identity card, which shall be displayed at a prominent place at all times within the premises or vehicle

or cart or any other place where the person carries on sale/manufacture of food in case of Petty Food Business.

i. The Registering Authority or any officer or agency specifically authorized for this purpose shall carry out food safety inspection of the registered establishments at least once in a year. Provided that a producer of milk who is a registered member of a dairy Cooperative Society registered under Cooperative Societies Act and supplies or sells the entire milk to the Society shall be exempted from this provision for registration.

10.2 Cleaning and Sanitation

i. Cleaning and sanitizing programmes shall be established at facility to ensure that the food-processing equipment and environment are maintained in a hygienic condition to prevent contamination of food, such as from metal shards, flaking plaster, food debris and chemicals and records of the same shall be maintained. The programme should ensure that all parts of the establishment are appropriately clean, and shall include the cleaning of cleaning equipment.

ii. Master sanitation schedule shall be maintained for overall facility through checklists which includes:

- Areas, items of equipment and utensils to be cleaned;
- Responsibility for particular tasks;
- Cleaning method and frequency of cleaning; and
- Monitoring arrangements for checking effectiveness of cleaning
- Person responsible for cleaning
- Persons responsible for monitoring & verification of effectiveness of cleaning
- In case of any deviation what correction & corrective actions being taken.
- Where ever chances of microbial risk with product air count & swab test being recommended.

iii. Cleaning and disinfection chemicals shall be food grade wherever chances of it may come in direct or indirect contact through equipment's or plant surfaces, handled and used carefully and in accordance with manufacturers' instructions, for example, using the correct dilutions, and stored, where necessary, separated from food, in clearly identified containers to avoid the risk of contaminating food.

iv. Cleaning shall remove food residues and dirt and it can be carried out by the separate or the combined use of physical methods, such as heat, scrubbing, turbulent flow and vacuum cleaning or other methods that avoid the use of water, and

chemical methods using appropriate cleaning agents.

v. These facilities should be constructed of corrosion resistant materials, be easy to clean and shall have adequate supply of hot and cold potable water, where appropriate. It is recommended to have different colour for hot and cold pipes. A validation mechanism should be in place for all cleaning programme.

Cleaning procedure should generally involve;

- Removing gross visible debris from surfaces.
- Applying a detergent solution to loosen soil and bacterial film (cleaning)
- Rinsing with water (hot water where possible) to remove loosened soil and residues of detergent.
- Dry cleaning or other appropriate methods for removing and collecting residues and debris and
- Where necessary, cleaning should be followed by disinfection with subsequent rinsing.
- Designated area with lock & key provision should be allocated for cleaning equipment's & chemicals. Where ever necessary & applicable CIP procedure should be defined for equipment's cleaning.

10.3 House keeping

i. A housekeeping schedule covering manufacturing and storage areas shall be maintained.

ii. The surrounding areas including roads, parking lots and drains should be well maintained.

iii. Walls and floors should be maintained neat and clean. Ceilings and light fixtures should be easy to clean.

iv. Drains should be sufficiently sized and well sloped. Drains should have removable grates installed for ease of cleaning.

v. For 3rd party (contract) cleaning companies, the supplier should define clear scope, details of services and responsibilities.

vi. Waste storage areas should be clearly marked and waste shall be disposed of in a timely manner.

10.4 HACCP procedure

HACCP means Hazard Analysis Critical Control Points and must be studied to control the quality of the product. Documentation shall include (as a minimum) the following:

- HACCP team composition;

- Product description;
- Intended use;
- Flow chart;
- Hazard analysis;
- CCP determination;
- Critical limit determination;
- Validation process; and
- HACCP plan

The HACCP plan shall include the following information for each identified CCP:

- Food safety hazard(s) to be controlled at the CCP;
- Control measure(s);
- Critical limit(s);
- Monitoring procedure(s);
- Corrections and corrective action(s) to be taken if critical limits are exceeded;
- Responsibilities and authorities for monitoring, corrective action and verification;
- Record(s) of monitoring.

Records to include

- CCP monitoring activities;
- Deviations and associated corrective actions;
- Disposition of non-conforming products;
- Verification procedures performed;
- Modifications to the HACCP plan;
- Validation record; Product release records and Testing records.