PM Formalization of

Micro Food Processing Enterprises (PMFME) Scheme

HANDBOOK

OF

BORA (WAXY RICE) RICE PROCESSING

AATMANIRBHAR BHARAT

National Institute of Food Technology Entrepreneurship and Management
Deemed to be University (De-novo Category) under Section 3 of the UGC Act, 1956
An Autonomous Institution under Ministry of Food Processing Industries, Government of India, Sonepat, Haryana, India
Website: www.niftem.ac.in
Email: pmfmecell@niiftem.ac.in
Call: 0130-2281089

Table of Contents

ABBREVIATIONS

1	PET	Polyethylene terephthalate
2	LDPE	Low-density polyethylene
3	HDPE	High-density polyethylene
4	HACCP	Hazard Analysis Critical Control Point
5	FSSAI	Food Safety and Standards Authority of India

1. Introduction

India is cultivating various variety of rice and it occupies around one quarter of total cropped area. Rice cultivation contributed around 45 % of the total food grain production and plays a vital role in national food security system. Rice has many cultivars and adapted under various environmental conditions. Rice is a nutritious cereal crop and is the main source of energy. Rice has abundant quantity of niacin and contains very low amount of calcium, iron, riboflavin and thiamine. Among different rice varieties, some variety exhibits glutinous properties. In the state of Assam, nearly 41 traditional waxy rice varieties are cultivated. The different important bora cultivars are Jotabora, Malbhogbora, Gandhibora, Khamtibora, Ghewbora, Maubora etc. Among these, Bora variety is popular. Generally, rice is composed of amylose and amylopectin.

In waxy rice the amount of amylopectin is quite higher than amylose content. Amylopectin is a highly branched molecule and gives sticky nature to rice. The grains of the glutinous rice are opaque and cooked sticky.Therefore, Bora rice possesses adhesive properties and suitable for making different traditional products like Pithas, flaked rice, sandohguri, etc. Many communities in the region also prepare high class rice beer out ofbora rice. It is also suitable for development of drug delivery devices. Glutinous rice seems to have attracted many companies outside the state for preparation of instant and packet food, battery component etc. There is also possibility for preparation of glue, beverages etc. The food items prepared from this class of rice has a great demand not only in the local and domestic market but it has export potential too.

Fig 1. Bora Rice

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.

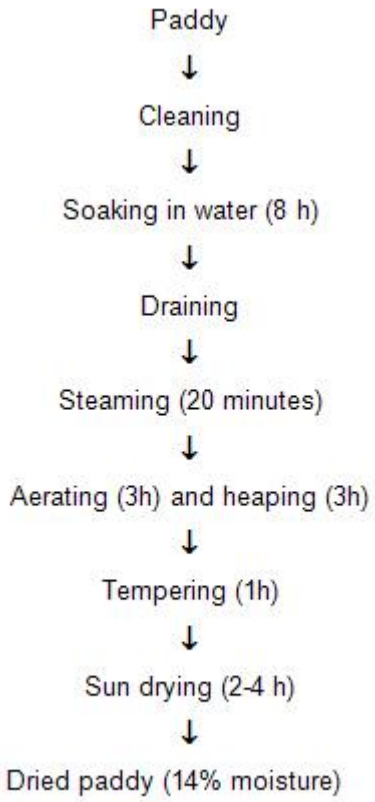

Fig 2. Process flow diagram of parboiling

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.

2.2 Milling of Paddy

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

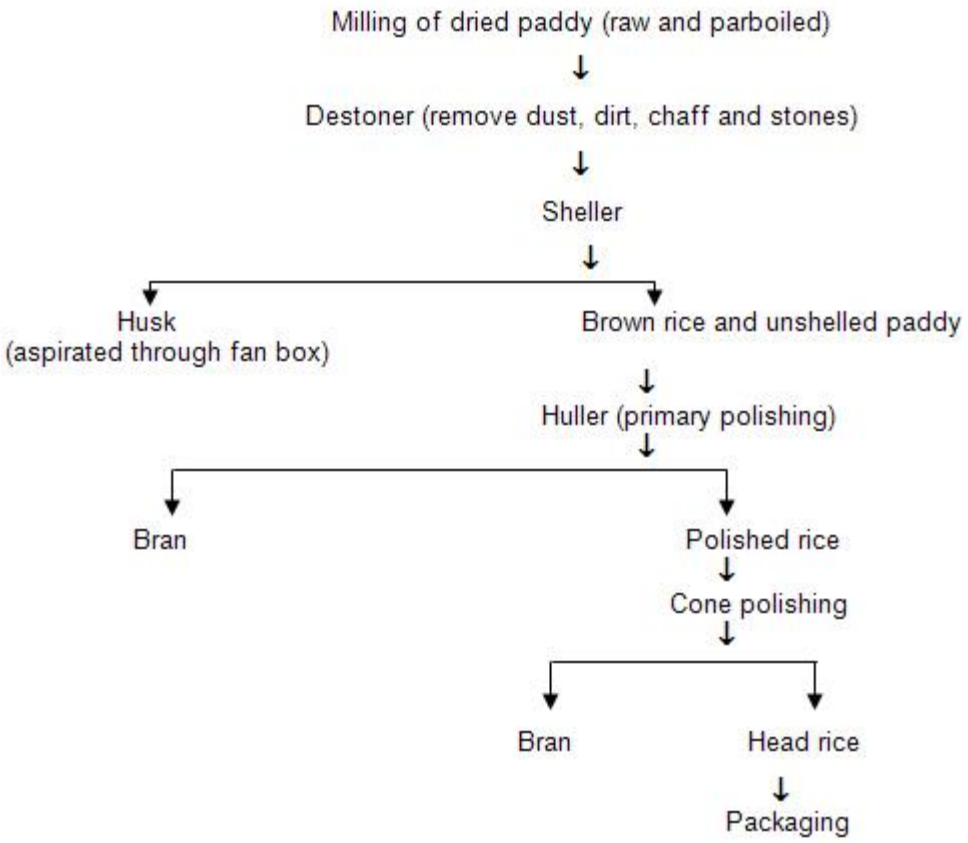

Fig. 3 Process flow diagram of paddy milling

3. 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.

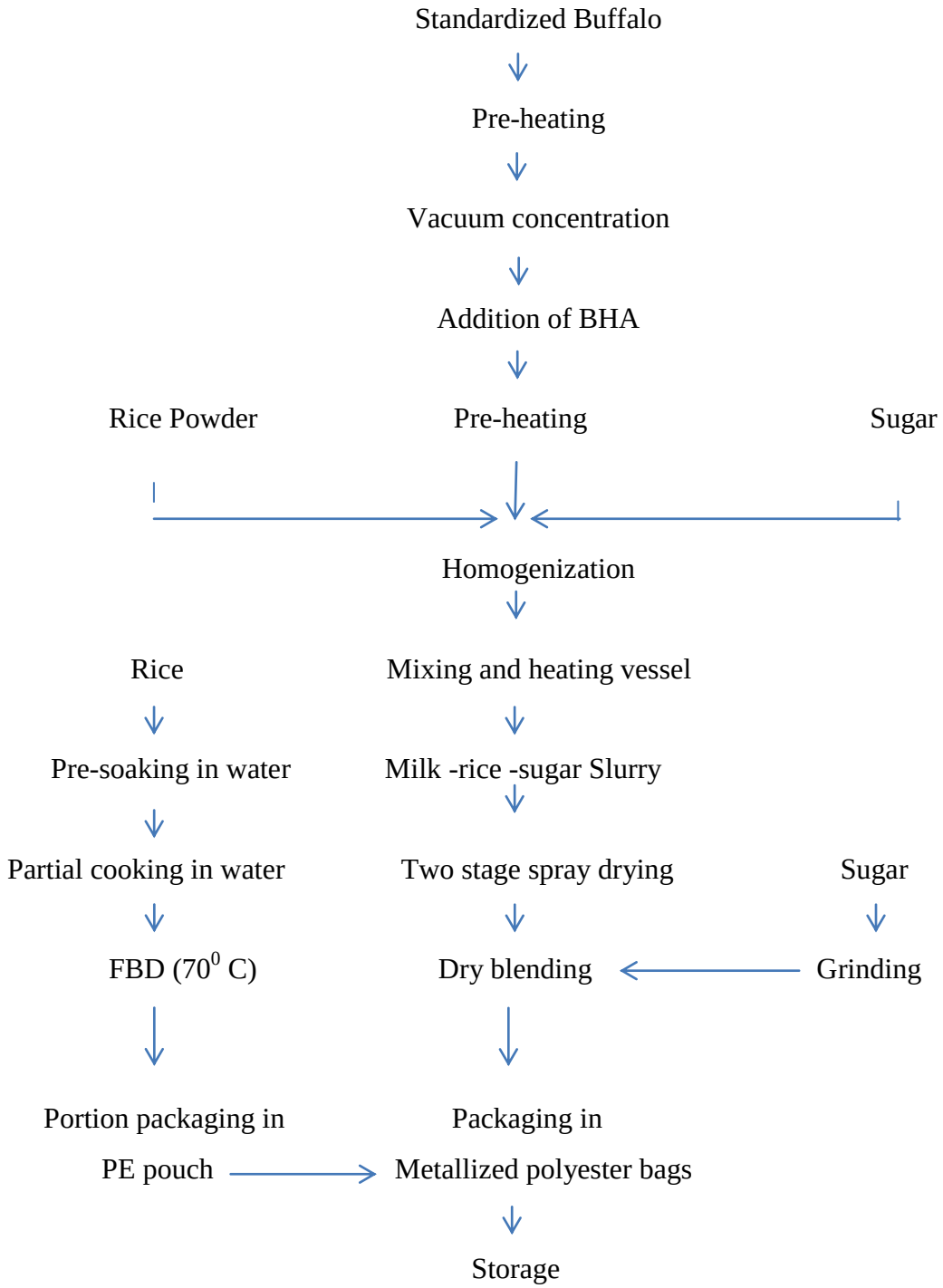

Fig. 4Flow chart for the manufacture of instant *kheer* mix.

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. Hurum (Expanded flaked rice)

Hurum is an expanded rice produce made from waxyBora rice. This product is traditionally taken with milk and sugar or jaggery. The final product is translucent in colour. This is due to less amylose content in waxy rice. Its processing is entirely different from puffed rice. The basic traditional method includes of following steps.

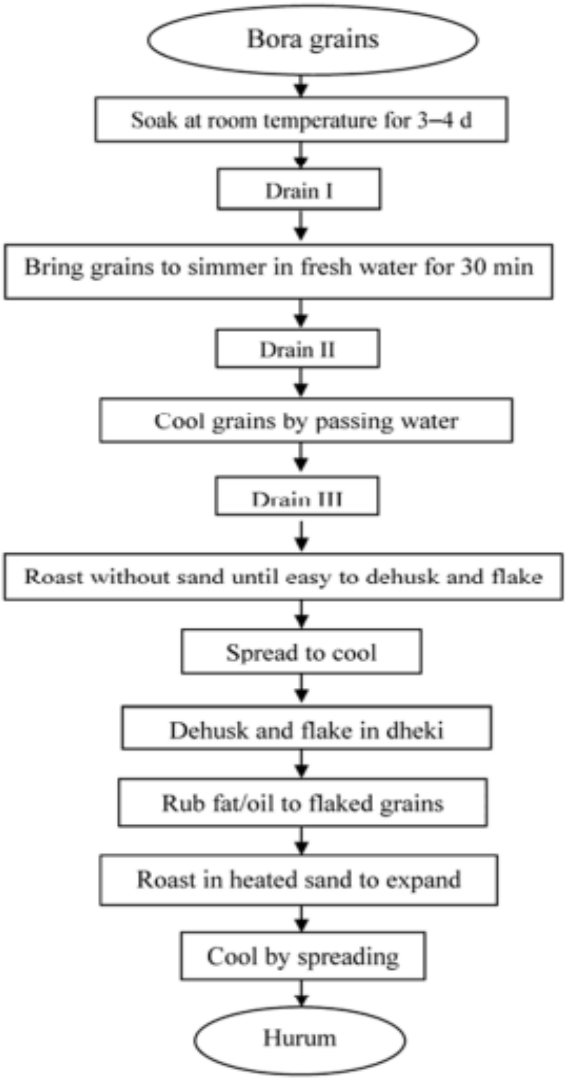

Fig. 5Traditional process of making Hurum

Fig. 6 Hurum

Traditional process is very time consuming. So, the researchers tried to make process

simpler and can be taken for small-scale processing unit. The optimised process of making Hurum is given in following steps.

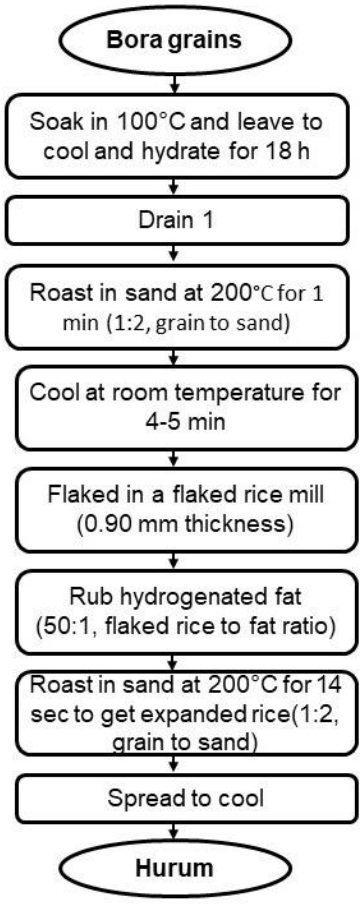

Fig. 7Improved process of making Hurum

5. Komalchaul (soft rice)

This is a type of quick cooking rice and made from waxy variety of rice. After processing, this can be taken after simply soaking in lukewarm water. This product is very much acceptable for making ready-to-eat product. This preparation is an old age traditional method of Assam and made from low amylose content waxy rice variety. Komalchaul is generally taken with curd and jaggery. The dish is high in carbohydrate and minerals, especially iron. The processing steps are as follows.

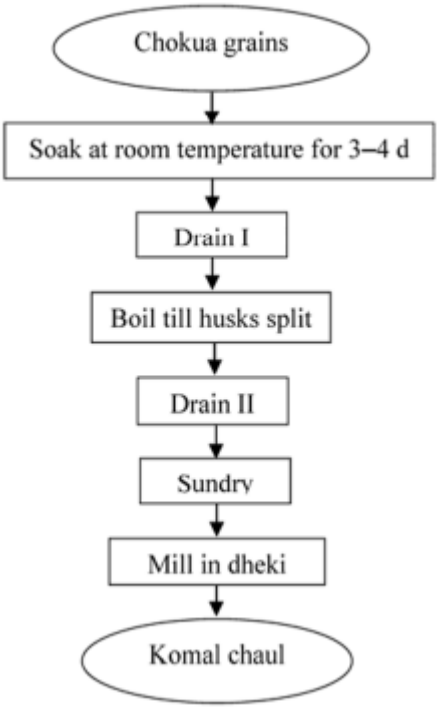

Fig. 8Traditional process of making Komalchaul

Fig. 9Komalchaul

6. Bhojachaul

Bhojachaul in simple terms is a dry-heat parboiledrice product (Fig. 10). Unlike the common puffed rice,Bhojachaul grains do not undergo excessive structuraland morphological disorganization during the process.The product is relish with milkcream, curd and jaggery. The desirable characteristics ofBhojachaul are the roasted aroma and colour, a sticky and chewy texture and appearance of the rice grains clinging together to form the lump. The processing steps are as follows.

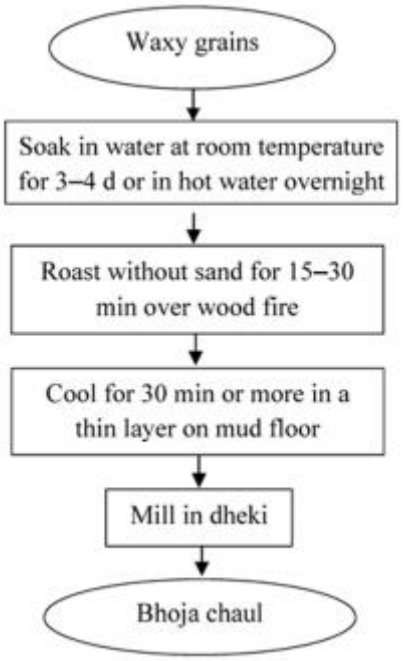

Fig. 10 Traditional process of making Bhojachaul

Fig. 11Bhojachaul

7. Sandahguri

Sandahguriis obtained as a coarsely ground powderof parboiled rice. Generally, Chokua rice variety is to bepreferred over others rice variety to make Sandahguri. Traditionally, obtained powder is taken with hot milk and jaggery or sugar. The product is thick, cohesive and porridge like consistency. The desirable characteristics is strong roasted aroma. The tradition method for preparation of Sandahguri is as follows:

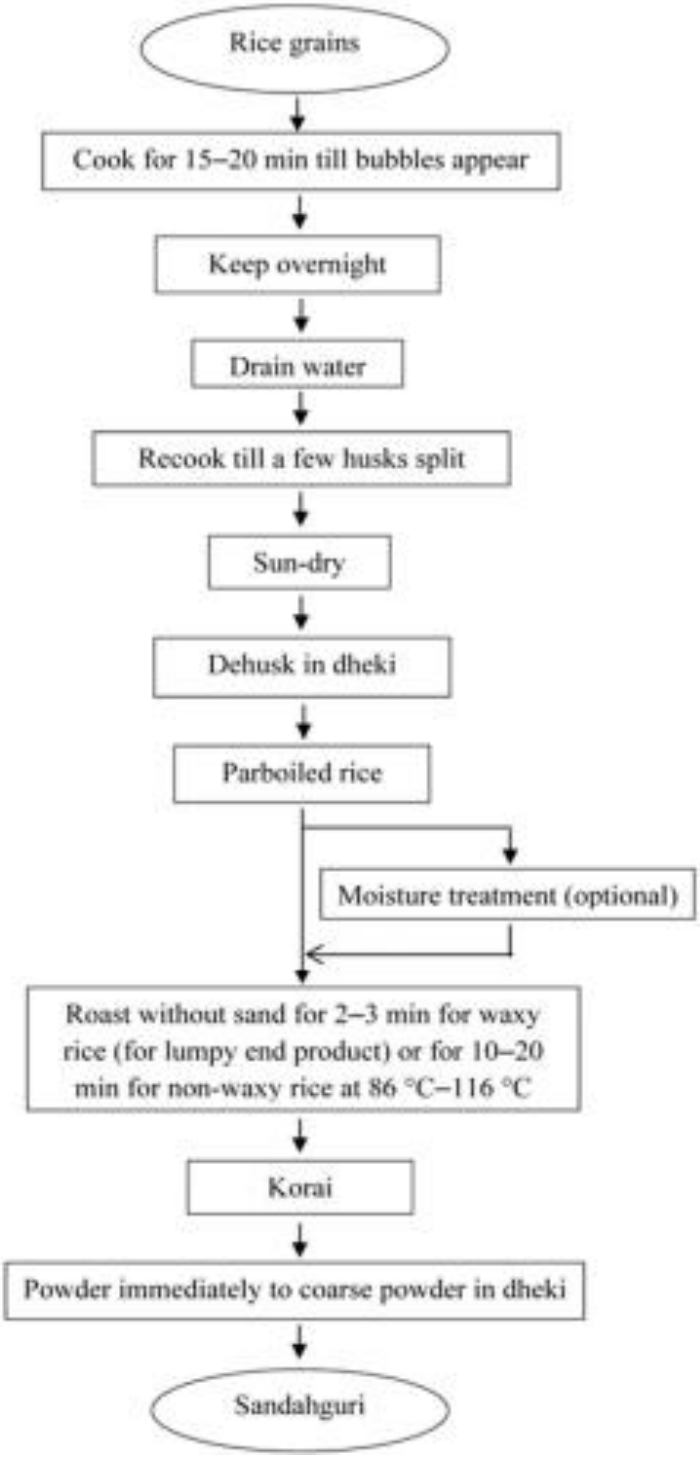

Fig. 12Traditional process of making Sandahguri

Fig. 13 Korai and Sandahguri

8.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.

Rice

↓

Cleaning

↓

Soaking in water for 30 minutes

↓

Cooking of rice (75% cooking) &
addition of herbs & spices

↓

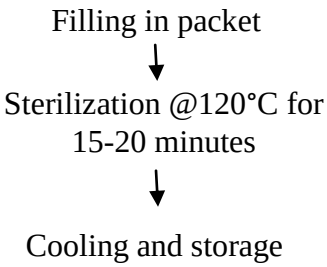

Fig. 14 Process flow diagram of RTE rice processing

9. Pithas

Pithas are the traditional preparation of Assam. It can be sweet or salty and made from the rice flour dough. It can be made in different shapes and expresses the artistic mind of the homemaker women. Some version of Pithas contains fillings or garnish. Few may be shaped after cooking. This recipe is generally taken with tea or made during some special festivals like Bihu. Pithas can be steamed, fried in oil or ghee, roasted over fire, baked or rolled over a tawa (hot plate). Til-pitha is very common amongst other Pithas and is made with filling of sesame and jaggery. The traditional process of making TilPitha is as follows:

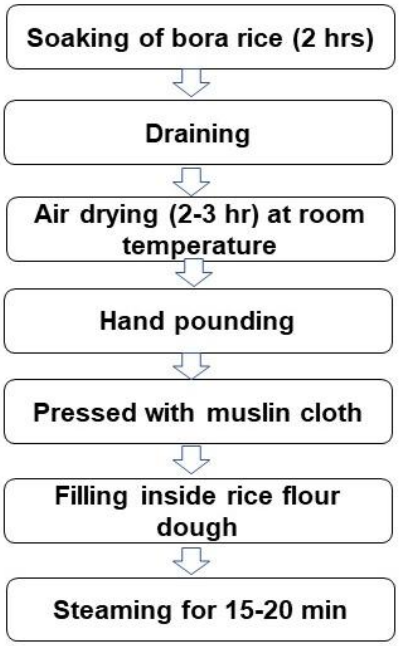

Fig. 15 Flow diagram of preparation of Pitha

10. 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.

10.1 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.

11. Packaging and Labelling Requirements in Rice Processing

11.1 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 andrusty;
c) copper or brass containers which are not properlytinned
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 forutensils.

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 articlesnamely;

i. IS : 10146 (Specification for Polyethylene in contact withfoodstuffs)
ii. IS : 10142 (Specification for Styrene Polymers in contact withfoodstuffs);
iii. IS:10151(SpecificationforPolyvinylChloride(PVC),incontactwithfoodstuffs);
iv. IS : 10910 (Specification for Polypropylene in contact withfoodstuffs);
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 andfats;

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 Cannedproducts,

i. All containers shall be securely packed andsealed.
ii. The exterior of the cans shall be free from major dents, rust, perforations and seam distortions.
iii. Cans shall be free fromleaks.

11.2 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 thisregulation.
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 thecontainer;
5. Contents on the label shall be clear, prominent, indelible and readily legible by the consumer under normal conditions of purchase anduse;
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 byit;

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 additivespermittedforuseinfoodsgenerally,thefollowingclasstitlesshallbeused together with the specific names or recognized international numerical identifications:

AcidityRegulator,Acids,AnticakingAgent,AntifoamingAgent,Antioxidant,BulkingAgent, 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/orFlavours

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)ofFoodSafetyandStandards(Foodproductstandardsandfoodadditive)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 ADDEDFLAVOUR(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 complywiththerequirementoflabeldeclarationasspecifiedundertheregulation2.2.2(5)(ii)

Note:—Whenstatementregardingadditionofcoloursand/orflavoursisdisplayedonthelabel in accordance with regulation 2.2.2(5)(ii) and regulation 3.2.1 of Food Safety and Standards (FoodProductStandardsandFoodAdditive)Regulation,2011,additionofsuchcoloursand/or flavours need not be mentioned in the list of ingredients. Also, in addition to above statement, the common nameor

Name and complete address of the manufacturer

(i) Thenameandcompleteaddressofthemanufacturerandthemanufacturingunitiftheseare 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 offood;

(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 orbottled;

(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 inIndia.

ProvidedfurtherthatwhereanyfoodarticlemanufacturedoutsideIndiaispackedorbottledin India, the package containing such food article shall also bear on the label, the name of the countryoforiginofthefoodarticleandthenameandcompleteaddressoftheimporterandthe premises of packing or bottling inIndia.

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. Inadditiontothedeclarationofnetquantity,afoodpackedinaliquidmediumshall carry a declaration of the drained weight of thefood.

   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 whichisseparatelywrappedanditisnotreasonablypracticabletoexcludefromthenet weight ofthecommodity,theweightofsuchimmediatewrappersofalltheitemsoftheconfectionery containedinthepackage,thenetweightdeclaredonthepackagecontainingsuchconfectionary 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 immediatewrapper.

Exemptions from labellingrequirements

Wherethesurfaceareaofthepackageisnotmorethan100squarecentimetres,thelabelof such package shall be exempted from the requirements of list of ingredients, Lot Number orBatchNumberorCodeNumber,nutritionalinformationandinstructionsforuse,butthis information shall be given on the wholesale packages or multi piece packages, as the case maybe.

1. The date of manufacture' or 'best before date' or 'expiry date' may not be required tobe 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 maybe;
2. Incaseofliquidproductsmarketedinbottles,ifsuchbottleisintendedtobereusedfor refilling, the requirement of list of ingredients shall be exempted, but the nutritional information specified inregulation.
3. “Tomakeafluidnotbelowthecompositionoftonedmilkorskimmedmilk(asthecase maybe)withthecontentsofthispackage,add(hereinsertthenumberofparts)ofwater 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 maynotberequiredtobementionedonthelabelofpackagedfoodarticles,butthe'use by date' shall be mentioned on the label by the manufacturer orpacker.
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 bespecified.

Date of manufacture orpacking

Thedate,monthandyearinwhichthecommodityismanufactured,packedorpre-packed,shall be given on thelabel:

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:

"BESTBEFORE..... MONTHS ANDYEAR

OR

"BESTBEFORE..... MONTHS FROMPACKAGING

OR

"BESTBEFORE..... MONTHS FROMMANUFACTURE

(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 containingbread,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

"BESTBEFORE. ..... DAYS FROMPACKAGING"

OR

"BESTBEFORE ..... DAYS FROMMANUFACTURE"

Note:

a) blanks be filledup

b) Month and year may be used in numerals

c) Year may be given in twodigits

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 ofpacking;

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

11.3 Documentation and RecordKeeping

Everyorganizationhastomaintainrecordsofrawmaterialprocurement,productionprocesses , andsales.Thisistoensurethatthebusinessrunseffectivelyandisprofitable.Listedbeloware some reasons why there is a need fordocumentation:

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

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 materialsreceived
- The quantity and type of ingredients used duringprocessing
- The processing conditions in which production took place (e.g. the temperature set or the air pressureapplied)
- The product qualityproduced

Product quality can be maintained onlywhen:

- Thesamequantityandqualityofingredientsandrawmaterialsaremixedineverybatch
- A standard formulation is used for everybatch
- Standard process parameters are applied for everybatch

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

- Stock control books (where raw material procurement isnoted)
- Processing logbooks (where production process isnoted)
- Product sales records (where sales and distribution isnoted)

The batch number must correlate with the product code number, which is printed on labels.

Thishelpstheprocessortotraceanyfaultfoundinabatchbacktotherawmaterialusedorthe productionprocess.

12. Food Safety Regulations and Standards

12.1 Registration and Licensing of FoodBusiness

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 bysubmitting
b. An application for registration in Form A under Schedule 2 of these Regulations along with a fee as provided in Schedule3.
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 Schedule2.
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 forregistration.

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 providedinabovesubregulation(3)ornodecisioniscommunicatedwithin30daysas providedinabovesubregulation(4),thepettyfoodmanufacturermaystartitsbusiness, provided that it will be incumbent on the Food Business Operator to comply with any improvement suggested by the Registering Authority evenlater.

g. Provided that registration shall not be refused without giving the applicant an opportunity of being heard and for reasons to be recorded inwriting.

h. TheRegisteringAuthorityshallissuearegistrationcertificateandaphotoidentitycard , whichshallbedisplayedataprominentplaceatalltimeswithinthepremisesorvehicle or cart or any other place where the person carries on sale/manufacture of food in case of Petty FoodBusiness.

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 forregistration.

12.2 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,fooddebrisandchemicalsandrecordsofthesameshallbemaintained.The programmeshouldensurethatallpartsoftheestablishmentareappropriatelyclean , and shall include the cleaning of cleaningequipment.

ii. Master sanitation schedule shall be maintained for overall facility through

checklistswhich includes:

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

iii. Cleaninganddisinfectionchemicalsshallbefoodgradewhereverchancesofitmay come in direct or indirect contact through equipment's or plant surfaces, handled andusedcarefullyandinaccordancewithmanufacturers'instructions,forexample, using the correct dilutions, and stored, where necessary, separated from food, in clearly identified containers to avoid the risk of contaminatingfood.

iv. Cleaning shall remove food residues and dirt and it can be carried out by the separateorthecombineduseofphysicalmethods,suchasheat,scrubbing,turbulent flow and vacuum cleaning or other methods that avoid the use of water, and chemical methods using appropriate cleaningagents.

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 cleaningprogramme.

Cleaning procedure should generally involve;

- Removing gross visible debris fromsurfaces.
- 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 debrisand

- Wherenecessary,cleaningshouldbefollowedbydisinfectionwithsubsequentrinsing.
- 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.

12.3 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 toclean.
iv. Drains should be sufficiently sized and well sloped. Drains should have removable grates installed for ease ofcleaning.
v. For3rdparty(contract)cleaningcompanies,thesuppliershoulddefineclearscope, details of services andresponsibilities.
vi. Waste storage areas should be clearly marked and waste shall be disposed of in a timelymanner.

12.4 HACCPprocedure

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 teamcomposition;
- Productdescription;
- Intendeduse;
- Flowchart;
- Hazardanalysis;
- CCPdetermination;
- Critical limitdetermination;
- 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 theCCP;

- Controlmeasure(s);
- Criticallimit(s);
- Monitoringprocedure(s);
- Corrections and corrective action(s) to be taken if critical limits areexceeded;
- Responsibilities and authorities for monitoring, corrective action andverification;
- Record(s) ofmonitoring.

Records to include

- CCP monitoringactivities;
- Deviations and associated correctiveactions;
- Disposition of non-conformingproducts;
- Verification proceduresperformed;
- Modifications to the HACCPplan;
- Validation record;Product release records and Testingrecords.