NIFTEM

- NIFTEM would emerge itself as a pioneer in the field of Food Science and Technology.
- Food Processing has an important role in linking Indian agriculture to consumers in the domestic and international markets.
- Food Processing has a lot of potential for the development of the Food Sector.

OBJECTIVES OF THE PILOT PLANT

- Enabling the scale-up and development of innovative process technology by setting up the pilot plant.
- Will serve as a Business Incubation Centre for the farmers, existing food industries as well as the budding entrepreneurs for small, medium and large scale industries
- To facilitate ‘Hands on Training’ to the students, progressive farmers as well as the potential entrepreneurs
- Facilitates continuous experimental learning for the students with faculty monitoring
- Caters to provide a vital source for starting up or evaluating new process or product lines
- It is also a platform for the development of novel and innovative products and processes and modification of existing products and processes
- Will help in efficient utilization of all the resources in the process of production, proper targeting and marketing strategies, and the entire value chain

NIFTEM PILOT PLANTS

In order to cater to the needs of the Food Industry (Large Scale, Medium, Small & Micro Scale Enterprises) NIFTEM is in the process of setting up five Pilot Plants within its campus covering the following sectors:

- Fruits and Vegetable Products.
- Milk and Dairy Products
- Meat and Poultry Products.
- Ready to Eat Indian Traditional Food Products
- Grain and Bakery Products

MILK AND DAIRY PRODUCT PILOT PLANT

The milk and dairy pilot plant facility at NIFTEM will be considering the following key issues:

- To enhance the knowledge of stakeholders of milk production system for effective backward linkages.
- Will be equipped with the state-of-the-art infrastructure and energy-efficient processing lines for its production.
- A provision is made for effective by-product utilization to minimize the milk solids losses by creating Membrane Processing Plant.
- There is a large flexibility to process a wide variety of dairy products.
- The plant has processing and packaging facilities such as sterilizer and aseptic packaging.
- Pilot plant will also be integrated with Quality Assurance and Food Testing Laboratory of the NIFTEM to inculcate the culture of quality assurance among the entrepreneurs and trainees .
- A parlor will be established which will act as nodal point for the test marketing and consumer feedback.

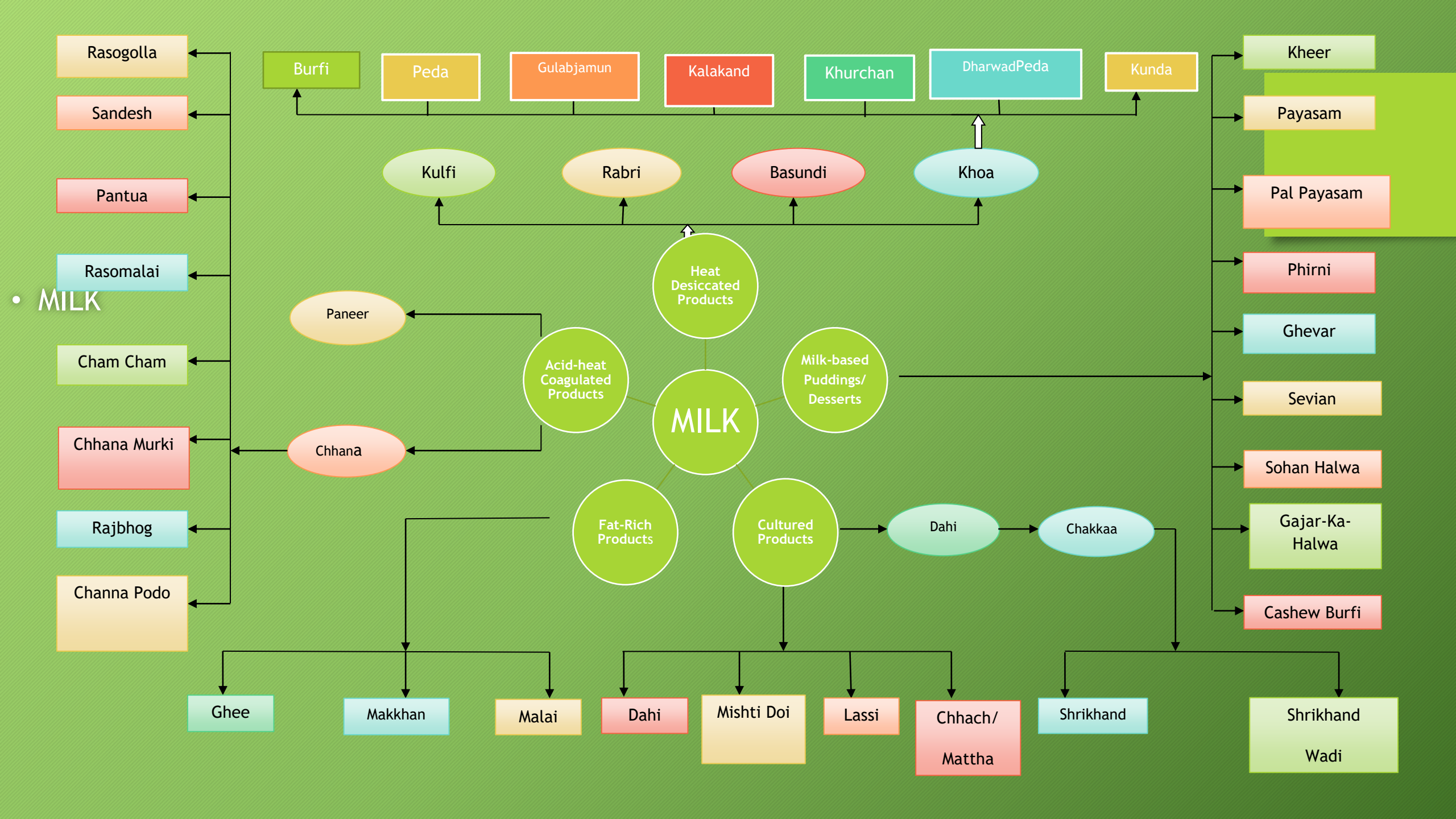
INFRASTRUCTURE AND FACILITIES

Area: Approximately 2,150 sq.m area is dedicated for the dairy plant.

Product Variants:

The facility so designed shall be suitable to produce the following items:

- **Indigenous Dairy Products:** Khoa, khoa based sweets; heat-acid coagulated dairy products including Chhana and other traditional dairy products (ghee, butter).
- **Dairy Beverages:** It will include market milk, flavored milk, innovative dairy beverages (in combination with fruit/malt components) and fortified dairy beverage, with enhanced shelf-life.
- **Frozen Dairy Products:** Products include ice cream, frozen dessert, kulfi, novelties, frozen yoghurt and candies.
- **Fermented Milks:** manufacture of dahi, yoghurt, lassi, yoghurt drinks; shrikhand, quargand probiotic dairy products.
- **High Value Dairy Ingredients:** Milk protein concentrates (MPC), whey products, lactose, and colostrum and fractionated proteins/peptides.
- **Dried Milks:** Milk powders, whey powder, malted milk foods, milk-fruit/vegetable powders, ice-cream mix powder etc.
- **Cheese:** Fresh variety cheese(Mozzarella, Feta, Cottage), processed cheese, ripened variety cheese(Cheddar, Gouda), Cheese dips, Cheese sauces, Paneer


MILK
Heat Desiccated Products
Acid-heat Coagulated Products
Milk-based Puddings/ Desserts
Fat-Rich Products
Cultured Products
Paneer
Chhana
Burfi
Peda
Gulabjamun
Kalakand
Khurchan
DharwadPeda
Kunda
Kulfi
Rabri
Basundi
Khoa
Rasogolla
Sandesh
Pantua
Rasomalai
Cham Cham
Chhana Murki
Rajbhog
Channa Podo
Kheer
Payasam
Pal Payasam
Phirni
Ghevar
Sevian
Sohan Halwa
Gajar-Ka-Halwa
Cashew Burfi
Dahi
Chakkaa
Ghee
Makkhan
Malai
Dahi
Mishti Doi
Lassi
Chhach/ Mattha
Shrikhand
Shrikhand Wadi

MILK RECEPTION AND CHILLING

Process Flowchart

Milk collection for pilot plant

↓

Quality check (grading of milk)

↓

Weighment

↓

Filtration (duplex inline filter), Chilling of milk

↓

Transfer of milk to Raw milk silos

↓

Washing of cans and can lids
(Provided with can steaming block, dip saver, tipping bar etc.)

EQUIPMENTS AVAILABLE IN MILK RECEPTION CENTRE

1. Weighment tank (100kg)
2. Filtration (duplex inline filter)
3. Chilling of milk (PHE): 1KLPH
4. Raw milk silos: 5KL
5. Processed milk silos: 2KL

MILK PROCESSING

Process Flowchart

Raw milk from silos to balance tank by milk transfer pump

↓

Homogenizer

↓

Pasteurizer

↓

Processed Milk Silo

↓

Packing

EQUIPMENTS AVAILABLE IN MILK PROCESSING

1. Homogeniser (1KLPH)
2. Pasteurizer (1KLPH)
3. Cream separator (1KLPH)

CREAM PROCESSING, BUTTER AND GHEE SECTION

Process Flowchart

Cream Chillers

↓

Cream Storage tank

↓

Cream Ripening tank

↓

Cream Aging tank

↓

Continuous Butter Making machine

↓

Butter Melting Vat

↓

Butter Milk Chiller

Ghee Boiler

Ghee Strainer with balance tank

Ghee Settling Tank

Ghee Clarifier

Ghee Granulation tank

Ghee Pouch Filling Machine

EQUIPMENTS AVAILABLE IN CREAM, BUTTER AND GHEE SECTION

1.Cream Chillers (250LPH)

2. Cream Ripening tank (500l)

3. Cream Aging tank (250l)

4. Continuous Butter Making machine (50kg/hr)

5. Butter Melting Vat (250kg)

6. Ghee Boiler (200l)

7. Ghee Settling Tank (250l)

8. Ghee Clarifier (500-100kg/hr)

9.Ghee Granulation tank (250l)

10. Ghee Pouch Filling Machine (200PPH)

MILK POLY PACK SECTION

1. Processed milk from silos

2. Milk Pouch Filling machine (Form Fill Seal) (1000 pouches/hr)

DAHI/CHHACH/LASSI SECTION

Process Flowchart

Processed milk from silos

↓

Curd setting tank (after culture addition)

↓

Cup Filling and Sealing Machine

↓

Curd Incubation Room

↓

Cold room

EQUIPMENTS AVAILABLE IN DHAI, CHHACH AND LASSI SECTION

1. Curd setting tank (after culture addition) (500l)

2. Cup Filling and Sealing Machine (100/200/400gm – 25 cups per minute)

3. Curd Incubation Room

4. Cold room

PANEER /CHEESE SECTION

Process Flowchart

Rectangular shape, jacketed and insulated Paneer/ Cheese vat

↓

Paneer/ Cheese washing cum cooling tank

↓

Paneer/ Cheese Press single head

↓

Paneer/ Cheese Hooves

↓

Slicing

↓

Vacuum Packing

↓

Vertical cooler paneer cabinet

EQUIPMENTS AVAILABLE FOR PANEER/CHEESE SECTION

1. Rectangular shape, jacketed and insulated Paneer/ Cheese vat (500l)

2. Paneer/ Cheese washing cum cooling tank (50l)

3. Paneer/ Cheese Press single head

4. Vacuum Packing

5. Vertical cooler paneer cabinet

SHRIKHAND SECTION

TECHNICAL SPECIFICATION

1. Separator/Basket centrifuge (250LPH)

2. Shrikhand Mixing Vat (250l)

3. Cup Filling and Sealing Machine (25 cups per minute)


Continuous Freezer
I.C. Pasteurizer

Process Flowchart

Double Jacketed Aging Vat

↓

Ice cream mix 2 stage hydraulically operated homogenizer

↓

Ice cream mix pasteurizer

↓

Triple wall vertical tank conical top and bottom insulated Mix aging vat

↓

Choco-bar/Mango/Other flavour tunnel (flavouring tank)

↓

Choco-bar/Mango/Other flavour Dip Tank

↓

Lolly pop defrosting tank

↓

Batch freezer or Continuous freezer

↓

Fruit Feeder

↓

Cup cum Cone Filling machine

TECHNICAL SPECIFICATION

1. Double Jacketed Aging Vat (200L)

2. Ice cream mix 2 stage hydraulically operated homogenizer (1450LPH)

3. Ice cream mix pasteurizer (150LPH)

4. Triple wall vertical tank conical top and bottom insulated Mix aging vat (100L)

5. Choco-bar/Mango/Other flavour tank (100L)

6. Choco-bar/Mango/Other flavour Dip Tank (100L)

7. Lolly pop defrosting tank (100L)

8. Batch freezer or Continuous freezer (100L)

9. Fruit Feeder

10. Cup cum Cone Filling machine

FLAVOR MILK SECTION

Process Flowchart

Intermediate dimple jacket multipurpose vat

↓

Sugar Mixing tank

↓

Double Head Filling Machine

↓

Shrink wrapping machine

↓

Bottle sleeving machine

↓

Bottle corking machine

↓

Bottle sterilizer

TECHNICAL SPECIFICATION

1. Intermediate dimple jacket multipurpose vat (250l)

2. Sugar Mixing tank (250l)

3. Double Head Filling Machine

4. Shrink wrapping machine

5. Bottle sleeving machine

6. Bottle corking machine

7. Bottle sterilizer (24 bottles/ batch)

MEMBRANE PROCESSING SECTION

- Ultra filtration Plant (100l flux rate/hr)
- Microfiltration (100l flux rate/hr)
- Reverse Osmosis (100l flux rate/hr)
- Ion Exchange Plant

FRUITS AND VEGETABLE PROCESSING PILOT PLANT

The pilot plant facility at NIFTEM has to consider the following key issues:

- To help the entrepreneurs to work on processes to reduce cost
- For developing innovative products for domestic and international market.
- Processed vegetables need to focus on overseas market to drive the volume throughput and hence need to conform to international quality standards.
- The pilot plant must help to reduce the national wastage:

✓ By increasing processing levels including variety which are not processed at all

✓ Preserving seasonal surplus by converting to value added products

✓ Developing new products for newer markets

✓ Using best state of the art technology to reduce cost and improve quality.

✓ Help our farmers to get remunerative price for their produce and help integrate them with global market as is being done by Clinton Foundation.

Process Lines

In nutshell, the plant will be interweaved web of the different equipment but is divided into the following sub –groups:

- Pulps , Purees and Juices,
- Squash, Cordial and formulated beverages
- Jams, Jellies and Marmalades
- Fruit Bars and fruit candy
- Aseptic processing lines for bag –box filling line
- Pickles
- Frozen foods

INFRASTRUCTURE AND FACILITIES

Approximately 2,150 Sqm area (building & open space) is dedicated for the F&V processing plant

EQUIPMENTS AVAILABLE IN F&V

1. Multiple effect falling film type evaporator (100kg/hr)
2. Pulper, Juice extractor and Screw Press
3. Stream Jacketed syrup making tank(500l)
4. Homogenizer (200l/hr)
5. Sterilizer (Rotating Auto Clave) (300kg)
6. Can filter (10cans/min)
7. Tray dryer (100kg/hr)

8. Drum dryer (65kg/hr)

9. Spray dryer (100kg/hr)

10. Freeze dryer (65kg/hr)

11. Small IQF plant (100kg/hr)

12. Plate freezer (100kg/hr)

13. Pre-fab Walk-in-cooler of storage (2MT)

READY TO EAT PILOT PLANT

1. Serve as Business Incubation Centre for budding entrepreneurs from both large scale industries as well as medium, small and micro enterprises.
2. Provide a vital source for food companies that are just starting up or evaluating new process or product lines.
3. Should have processing vessels, product and process lines of varying capacities to cater to the needs of the different sectors of the food industry (large, medium, small and micro enterprises).
4. Provide Research facilities to the food industry for development of novel and innovative products and processes and modification of existing products and processes.

5. Should be ideal for the evaluation of new ingredients, formulations, and processes on a small and medium scale production and demonstration.
6. Deliver product quality as best as possible as expected from a full scale production line (Hence all equipment should meet the regulatory standards).
7. Provide training to the students and the industry personnel and the facility to work and conduct research in an operating production facility.
8. Should house all the latest technologies and processes.
9 Should maintain strict adherence to food safety and hygiene and be compliant with international food safety norms and standards.
10. Should be capable of providing sufficient production for test marketing.

RTE plant is divided into four sections. They are:

- Raw Material Receiving & storage Section
- Traditional ready to eat and ready to cook section
- Non-Traditional/Heath extruded snack foods
- Packing Unit & Storage Unit

Various processing techniques:

- Retorting
- HTST processing
- Accelerated freeze drying
- Hot air drying
- High pressure processing (HPP)
- Frying
- Extrusion
- Grit mixing
- Puffing
- Coating
- Peeling
- Dough making
- Namkeen Extruding
- Namkeen mixing
- Baking
- Grating
- Forming
- Indigenous Cooking/ processing
- Washing of Fruits and Vegetables
- Trimming/cutting/peeling
- Packing and Labelling

PRODUCT VARIANTS

Ready to Eat Traditional Foods

- Preserved Chapaties
- Flavoured Chapaties
- Parathas
- Puff and Serve Chapaties
- Besan Burfi
- Cashew nut Burfi
- Canned Upma
- Vegetable Halwa
- Mutton vegetable kurma
- Khakara
- Puri
- Panipuri
- Papad
- Samosa
- Samosa Patti
- Sev
- Chandra
- Ganthiya
- Bundi
- Papdi
- Chowkdi
- Fulvadi
- Potato Chips
- Sticks chips
- Topioco Chips
- Papaya chips
- Raw mango chips
- Sweet potato Chips
- Bitter Guard chips etc
- Khawa
- Mawa
- Kunda
- Pedha
- Burfi
- Kaju kathri
- Mesur Pak
- Sonapapdi
- Khichiya
- Tropical fruit Jam
- Tropical fruit Jelly
- Halwa
- Pop Corn
- Ladoo
- Rasagulla
- Chum chum
- Chakli
- Idli
- Dosa

Non- Traditional Ready to eat products

1. Breakfast Cereals

- Corn Flour based
- Maize Flour based
- Rice Flour based
- Peanut Flour based
- Wheat Flour based
- Oats Flour based
- Barley Flour based
- Sorghum Flour based
- Cassava Based

2. Core Filled Snacks

- Chicken/mutton/fish Based snacks
- Vegetables based snacks
- Fruit Based Snacks
- Protein rich snacks
- Nutrified snacks

3. Texture Soya protein food

4. Texture vegetable protein food

5. Extruded Snacks

- Screw shaped
- Shell shaped
- Bulges
- Half-moon Shaped
- Star Shaped
- Ball shaped
- Ring Shaped
- Stick Shaped
- Foodstuffs
- corn curls
- cheese curls
- cheese ball
- core snacks,
- Chocos Sticks
- Chocos
- Honey loops
- Fruit loops

6. Others Products

- Bread Crumbs
- Baby foods
- Artificial rice
- Reconstructed / Modified Rice/ Products
- Fortified Rice/ Products
- Modified starch
- Doritos
- Tangles
- Bugles
- Triangles
- Cracker
- Ribs Chips
- Pillow shapes
- Wavy chips
- Diamond chips
- Square Sheets

7. Health Bar

- Fruit Bar
- Compressed Cereal Bar
- Stabilized Chikki
- High Protein based bar
- Emergency / Survival Bar

8. Ready to Fry /Cook

- **Shell shape**
- **Spiral shape**
- **Square tube**
- **Circle tube**
- **Macroni**
- **3 D pellet**

INFRASTRUCTURE AND FACILITIES

The proposed RTE pilot plant will occupy around 800 Sq M area

RTE and Bakery pilot plant occupies approximately 1655 Sq M

EQUIPMENTS AVAILABLE FOR RTE

1. Automatic sheeting and die cutting machine (800-122pcs/hr)
2. Auto papad dryer machine (50-60 kg/hr)
3. Auto farsan Namkin Machine
4. Batch fry system with gas heating and temperature system (45l)
5. Auto peeling machine (200kg)

6. Auto chips cutting machine (200kg)

7. Atta blending Machine (10 to 12 kg)

8. Pulverizer Machine for spice (10 to 80kg)

9. Pulverizer machine for flour (5 to 40kg)

10. Auto heating mixing machine (50l to 100l)

11. Gravy making machine (10 to 150kg)

12. Automatic Gulla Cutting and Rounding Machine (2000 to 15000 pcs/hr)

13. Semi-automatic Chakli Making machine (40 to 80kg)

14. Dosa vada making machine (40 to 80kg)

15. Idly streamer (100pieces/hr)

16. Hydraulic press tabling machine for RTE various veg and non-veg cakes (20cakes/min)

MEAT AND POULTRY PILOT PLANT

Product and Process Development Facility

The meat processing pilot plant consists of *Product & Process Development Facility and Product testing & sensory evaluation facility*

Equipment is integrated to provide a process made up of unit operations such as:

- Cutting/chopping/comminuting (size reduction)
- Massaging/tumbling
- Salting/curing
- Mixing - Utilization of spices/non-meat additives
- Stuffing/filling into casings or other containers
- Heat treatment/cooking/tandoor
- Smoking
- Retort pouch line (for curry based products etc.)

INFRASTRUCTURE AND FACILITIES

Approximately 1655 Sq m area (building & open space) is available for meat & poultry unit.

EQUIPMENT AVAILABLE IN MEAT & MEAT PRODUCT PILOT PLANT

1. Automatic Mixer Grinder/ Mixer (75 ltrs.)
2. Vacuumized Emulsifier(100 kg/h)
3. Hydraulic Filler, Stuffer (Vacuum) (200kg/hr.)
4. Casing Holding Device
5. Linkers (Filling rate up to 100 kg/h)
6. Link Cutters (300 - 500 cuts/min)
7. Forming Line, Portioning machine (1000 forms per hour)
8. Heavy Duty Automatic Slicer
9. Injector (8 needles hand-injector)
10. Tumbler (100 Kg at least)
11. Ham Cooker (5 x 7kg capacity)

12. Ice maker (50 kg/hour)
13. Gas Flushing Machine (MAP +Vacuum packaging machine) (Speed of 7-20 trays per minute)
14. Braising machine (100 Litres Capacity)
15. Burger/Patty/Rolls making machine (Up to 20 -25 forms per minute)
16. Fermenting, Drying, aging and speciality product cabinet/room (Ripening Chamber for fermented meat products) (6.5" x 2.7" x 2.5")
17. Stewing, Cooking Range, Broiling, Frying, Roasting, machines/equipment (Minimum 5 kg/litres)
18. Metal detector (18” Height x 36” width)
19. Charcoal Grill

Cereal, Grain and Bakery Products

Process Lines

Broadly process lines will be divided into the following sub -groups:

- Biscuits
- Bread
- Snacks including baked chips
- Roti(Chapati), Nuns, Kulchas and Pizzas
- Cakes and Pastries

PRODUCT TYPES

- Biscuits
- Cookies
- Specialty Biscuits such as coated biscuits, high fiber biscuits etc.
- Bread
- Specialty Breads such as garlic bread, fruit bread,Sesame Pistachio Honey Bread, Rye Bread (used for mustard and aubergine sandwich), Rustic Herb Bread (tastes great with butter or cheese and balsamic vinegar or truffle oil) etc.
- Focaccia including Olive Focaccia – normally taken with cheese and tomato
- Chutney Bread (taken with green salad)
- Buns and Pav
- BrunPav – normally taken with vada or samosa stuffing. Also go well with slices of salad with some bhaji on the top.
- Sweet Buns (normally taken with maska , jam with tea)
- French Baguette (crust is very hard and base is salty). Ciabatta or baguette should have numerous air pocket.
- Cakes
- Pastries
- Danish Pastries and Doughnuts
- Croissants
- Rusk
- Pizzas
- Burgers
- Pancake
- Crisp Bread
- Crouton for Soups
- Baked Snacks including baked potato chips.
- Bread Sticks
- Chapatis, Kulchas and Nuns
- Baked Cereal Bars
- Baked Desserts
- Frozen Baked Meals
- Baked French Fries
- Baked Potatoes
- Oven baked Chips
- Crackers

INFRASTRUCTURE AND FACILITIES

Approximately 1655 Sq m area (building & open space) is available for meat & poultry unit.

300 Sq M of area is used to set up bakery pilot plant.

1. Automatic spiral mixer (120kg/hr)
2. Automatic volumetric driver (2500pcs/hr)
3. Automatic conical rounder
4. Automatic intermediate proofer (224pockets)
5. Bread moulder with pressure plate (upto 3500pcs/hr)
6. Automatic proofing chamber
7. Rotor oven (120kg/hr)
8. Convection oven

9. Cream cooker (50-60l/hr)
10. Flour sifter (800kg/hr)
11. Planetary mixer (80-90kg/hr)
12. Pastry sheeter
13. Electrical fryer (21l)
14. Bread slicer
15. Pasta machine (8-9kg/hr)
16. Burger machine