ASEPTIC PACKAGING

Introduction:

Aseptic packaging can be defined as the filling of a commercially sterile product into a sterile container under aseptic conditions and hermetically sealing the containers so that reinfection is prevented. This results in a product, which is shelf-stable at ambient conditions. The term "aseptic" is derived from the Greek word "septicos" which means the absence of putrefactive micro-organisms. In practice, generally there are two specific fields of application of aseptic packaging technology:

- Packaging of pre-sterilised and sterile products. Examples are milk and dairy products, puddings, desserts, fruit and vegetable juices, soups, sauces, and products with particulates.
- Packaging of non-sterile product to avoid infection by micro-organisms. Examples of this application include fermented dairy products like yoghurt.

Major Categories of Aseptic Packaging Systems

- Can system: It includes hermetically sealed cans.
- Bottle systems: Glass containers and plastics bottles fall into this category. The bottles can further be divided into; a) Non-sterile bottles; b) Sterile blown bottles; c) Single station blowing, filling & sealing
- Sachet and pouch systems: This system classified into Form-fill-seal systems and Lay flat tubing
- Cup systems: The aseptic packaging of food into cups can be into; Pre-formed plastic cups; and Form-fill and seal cups
- Carton systems: This type of aseptic packaging system includes Form-fill-seal cartons; and Prefabricated cartons
  Bulk packaging systems: This type of system classified into; Metal drum; and Bag-in-box Packaging Lines for Aseptic Processing There are five basic types of aseptic packaging lines as given below;
- Film & Seal: Pre-formed containers made up of thermoformed plastic, glass or metal are sterilized, filled in aseptic environment and sealed.
- Form, Fill & Seal: Roll of material is sterilized, formed in sterile environment, filled and sealed. e.g. Ex tetra packs n Erect, Fill & seal: Using knocked, down blanks, erected, sterilized, filled sealed. e.g. Ex. Gable-top cartons, Cambri-block.
- Thermoform, Fill, sealed roll stock, sterilized, thermoformed, filled, sealed aseptically. e.g. Ex. Creamers, plastic soup cans.
- Blow, Mold, Fill & Seal. e.g. Different package forms used in Aseptic UHT processing are cans, paperboards/plastic/foil/plastic laminates/flexible pouches, thermoformed plastic containers, bag in box, bulk totes.
- Type of Package Forms available in India

In India, Tetra Pak offers the following packaging systems currently:

  - TBA: Tetra Brik Aseptic
  - TCA: Tetra Classic Aseptic
  - TFA: Tetra Fino Aseptic
  - TWA: Tetra Wedge Aseptic
  - Bulk- Asceptic Packaging

- Bulk- Asceptic Bags

Drivers of Demand:

World demand for aseptic packaging is projected to grow 9.1 percent per year to $35.8 billion in 2015. Advances will be stimulated by the increasing number of applications and the cost and convenience benefits associated with aseptic packaging. Strong growth is expected in developing countries, where the lack of a cold supply chain infrastructure will continue to fuel demand for shelf stable products packaged aseptically.

In India health conscious consumers are constantly on the rise. Moreover busy lifestyle of consumers are compelling them to buy products which are ready to use. So this kind of packaging is gaining a lot of popularity in recent times and will have a huge market in countries like India & China in the near future.

Methodology:

Aseptic processing comprises the following:

- Sterilisation of the products before filling
- Sterilisation of packaging materials or containers and closures before filling
- Sterilisation of aseptic installations before operation (UHT unit, lines for products, sterile air and gases, filler and relevant machine zones)
- Maintaining sterility in this total system during operation; sterilization of all media entering the system, like air, gases, sterile water
- Production of hermetic packages

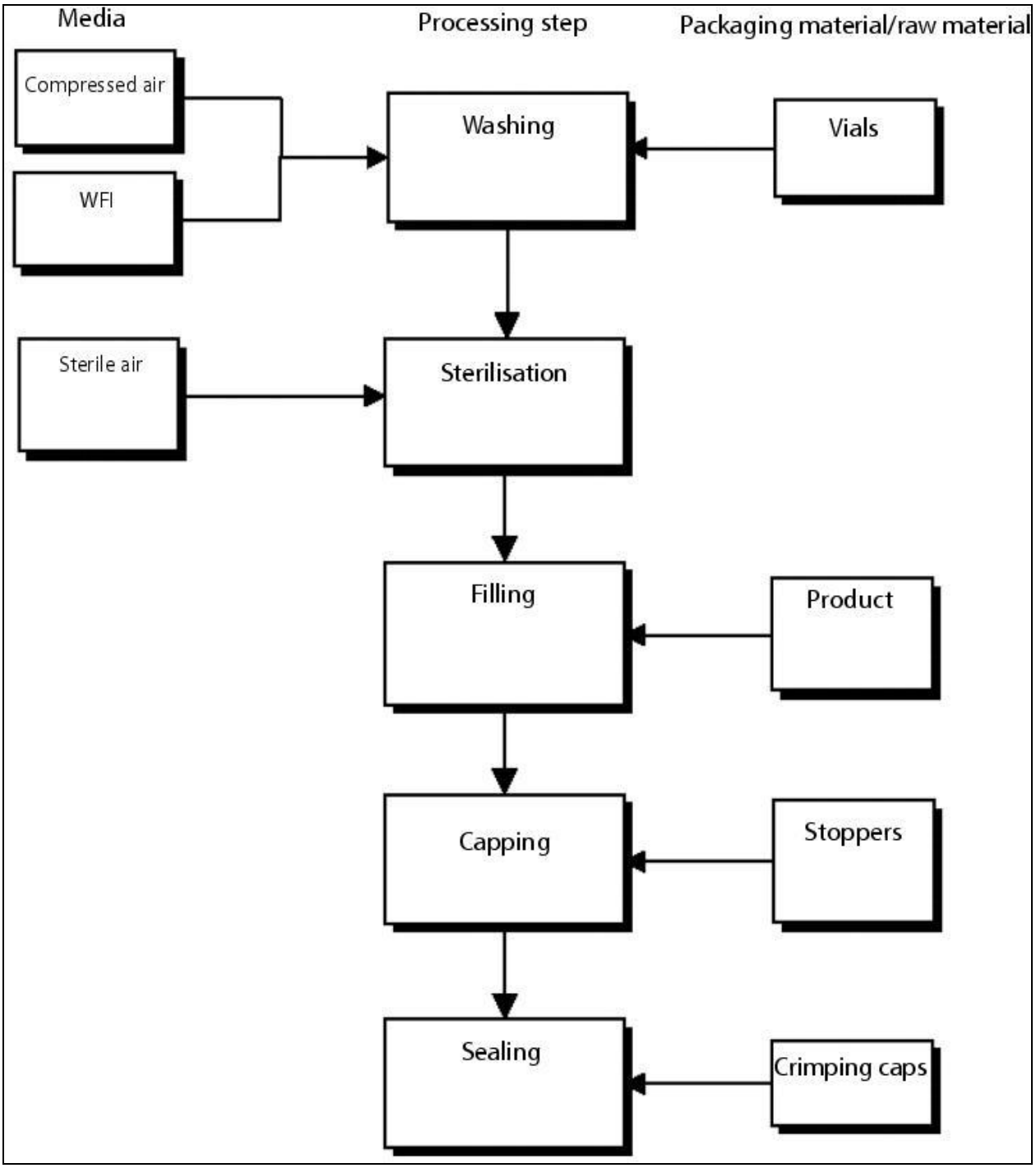
Sterilization of Products: Pre-sterilization of a product usually consists of heating the product to the desired UHT temperature, maintaining this temperature for a given period in order to achieve the desired degree of sterility, with subsequent cooling, usually to ambient temperature and sometimes to an elevated temperature to achieve right viscosity for filling. Heating and cooling should be performed as rapidly as possible to achieve the best quality. Some of the latest methods of sterilisation of products include:

- ✓ Microwaves
- ✓ Electrical resistance heating
- ✓ High voltage discharge
- ✓ Ultra high pressure

Sterilisation of Aseptic Packaging Materials and Equipment: Heat, chemicals and radiation have been used, alone or in combination, for sterilization of aseptic equipment and packaging materials.

Filling: Once the product has been brought to the sterilisation temperature, it flows into a holding tube. The tube provides the required residence time at the sterilisation temperature. The process is designed to ensure that the fastest moving particle through the holding tube will receive a time/temperature process sufficient for sterilisation.

Seals & Closure: Any aseptic system must be capable of closing and/or sealing the package hermetically to maintain sterility during handling and distribution. The integrity of the closure and seal is therefore of paramount importance. The integrity of the heat-seals used in most aseptic systems is principally influenced by the efficiency of the sealing system used and by contamination of the heat seal area by the product. To avoid recontamination, tight production units are required. Two systems are manufactured in the Tetrapak system- the longitudinal and the transverse seam.



Project Cost:

The tentative cost of the project is estimated to be around **Rs.2 crores** (INR).
Note*: For detailed project cost DPR needs to be prepared.*

Available Machinery:
Company Name: Tetra Pak

For Tetra Brik Aseptic, there are two line of equipments:

1) Tetra Pak A3/Flex [Filling machine for aseptic packaging of liquid food. Maximum capacity(packages/hr): 4500-8000 , Package Volume(ml): 500-2000] along with Line Controller 30, Accumulator (ACHX 30), Cap Applicator (Capper 25 & Cap 30 Flex), Film Wrapper(FW 68 & TS 30), Cardboard Packer (CBP 32) & Conveyor(PC 23 & UC 24)
2) Tetra Pak A3/Speed [Filling machine for aseptic packaging of liquid food. Maximum capacity(packages/hr): 9000-24000 , Package Volume(ml): 100-1000] along with Line Controller 30, Accumulator (ACHX 30), Cap Applicator (CAP 30), Film Wrapper(FW 68), Cardboard Packer (CBP 30) & Conveyor(PC 23 & UC 24).

For Tetra Classic Aseptic, there is only one line of equipment:

1) Tetra Pak A1 [Filling machine for aseptic packaging of liquid food. Maximum capacity(packages/hr): 10500-17500 , Package Volume(ml): 65-200] along with Straw Applicator (SA 30) & Conveyor(UC 24).

For Tetra Fino Aseptic, there is only one line of equipment:

1) Tetra Pak A1 [Filling machine for aseptic packaging of liquid food. Maximum capacity(packages/hr): 6100-14200 , Package Volume(ml): 100-500] along with Conveyor(UC 24).

For Tetra Wedge Aseptic, there is only one line of equipment:

1) Tetra Pak A1 [Filling machine for aseptic packaging of high acid liquid food. Maximum capacity(packages/hr): 11300 , Package Volume(ml): 200-2000] along with Accumulator (ACHX 30), Straw Applicator (SA 30) & Cardboard Packer (CBP 12).

Offices in India:
Office: Tetra Pak India Pvt. Ltd.
Global Business Park Tower C, 5th Floor, Mehrauli-Gurgaon Road,
Gurgaon - 122002. Haryana
Phone: +91 124 412 4600
Fax: +91 124 406 4308

Registered Office:Tetra Pak India Pvt. Ltd.
Mayfair Towers (Ground Floor) Wakdewadi, Shivajinagar 411 005 Pune
Phone: +91 20 2551 0800
Fax: +91 20 2551 0820

Office:Tetra Pak India Pvt Limited
134, 3rd Floor, 100 Feet Road
HAL 2nd Stage, Indiranagar
Bangalore : 560 038

Phone: +91 080 25294491
Fax: + 91 080 25271005

Company Name: Shanghai Gofun Machinery Company

Products: Aseptic filling machine

Model	GFM-AF-3	GFM-AF-6
Filling heads	Single filling head	Double filling heads
Evaporating capacity (t/h)	3-4	6-8
Dimension (mm)	2300x2000x2500	3500x2000x2500
Power (kw)	1kw/6.5kw(with dynamic conveyer)	13kw
Steam (kg/h)	20	40
Compressed air (m3/h)	0.3M^3 per min（0.8Mpa）	0.3M^3 per min（0.8Mpa）

Contact: Shanghai Gofun Machinery Co., Ltd.
TEL: 0086-21-39197146
FAX: 0086-21-39197147
Business Centre: Room 706, No. 25,Lane 66 Xin-yuan Road, Jiading District. Shanghai China.
Factory: No.888 ,Pengqing Road,Huaqiao Town,Kunshan City,Jiangsu Province.
Contact person: Henry Lee (Sales Manager)
Mobile: 189 1610 9848
E-MAIL:info@sh-gfm.com

Company Name: HRS Process Systems Private Limited (Asia Division)

Products: Aseptic Fillers

Filling Machine	Structure Support	Pack Size
Single Head Aseptic Filler	SS 304 support structure with conveyors for single drum	200 litres bag in drum and 3 to 25 litres bag-in-box.
Double Head Aseptic Filler	SS 304 support structure with conveyors for single drum - 2 sets	200 litres bag in drum and 3 to 25 litres bag-in-box.
	SS 304 support structure with motorized conveyors - 2 sets	4 drums in a pallet of 200 litres each or single container of 1000 litres

Contact:

Corporate Office: 201/202, Karan Selene

851, Bhandarkar Institute Road

Pune 411004, India
Tel: +91 20 2566 3581 / 6604 7894 & 95
Fax: +91 20 2566 3583

BANANA RIPENING CHAMBER & PROCESSING

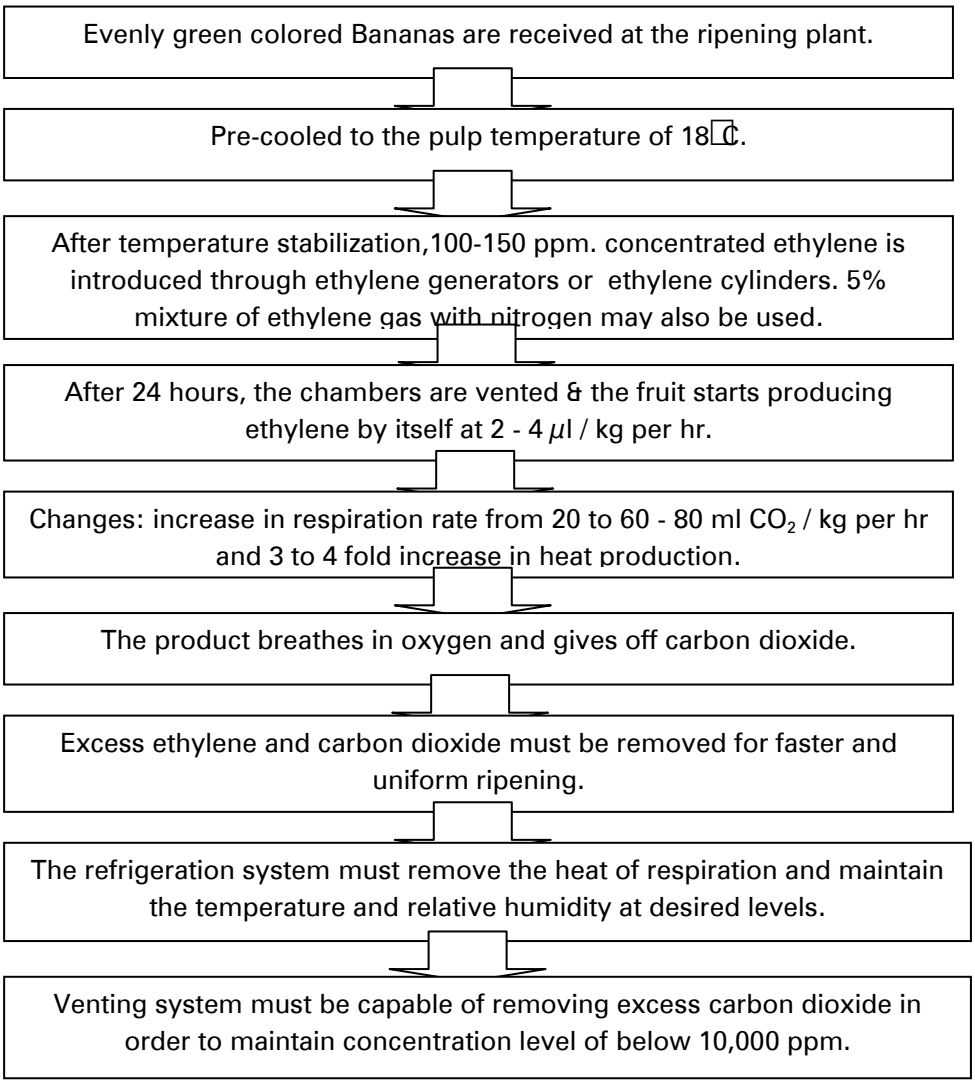
Introduction:

Banana is a climacteric fruit. The most ripened climacteric fruits are too soft and delicate to withstand rigorous of transport and repeated handling. These are harvested hard and green, but fully mature ripening is done near the consumption areas.

Banana Ripening Chamber:

For optimum quality, flavor, color and texture it is essential that bananas are harvested green, but fully mature, with little or no angularity. The quality of the ripe bananas depends on maturity at harvest, the care and speed in handling, avoidance of chilling injuries, and ripening under optimum conditions.

Banana ripening using ethylene comprises of following steps:



Ripening Cycle:

Bananas are ripened to more green than yellow colour or more yellow than green colour depending on mode of retailing for dispatch to market. Depending on cultivar and market requirements, ripening cycle maybe spread from 4 to 8 days.

Details of Banana Ripening Chamber:

Capacity: 10 tonne

Measurement: 7 meters x 6.5 meters x 3 meters (LxBxH)

Chamber: An insulated airtight room, which can hold the produce, allowing 30 % free volume is required.

Enclosed area with 8mtrs x 12 meters plinth to be provided.

Control panel for controlling (optional): This panel controls the following parameters:

- Temperature
- Humidity
- Ventilation
- Ethylene injection
- Oxygen and CO_2display
- microcontroller based controller

Temperature: Different fruits need different temperatures to get optimum ripening, the rough thumb rule is that the temperature for ripening will be the lowest possible temperature the fruit can withstand without injury. Generally all fruit ripening temperatures fall between 15□ to 26 □.

Ethylene: A catalytic Ethylene generator capable of bringing ethylene levels to 400 ppm in closed rooms of 200cu. meters is provided. This can be optionally controlled from the central microprocessor unit. For larger facilities there is a centralized system.

Ventilation: Every fruit respires and from time to time air changes are necessary as oxygen levels drop and co2 levels increase. In order to decrease co2levels air changes are effected by a specially designed blower, which is used for ventilating.

Ethylene Analyzer (optional): We have developed an analyzer which gives an indication of the Ethylene content in the chamber.

Ethylene Scrubber (optional): The 'ETHYLENE PRO' converter is a catalytic reactor that is primarily intended for the indoor elimination of gaseous pollutants. Besides ethylene it also removes carbon dioxide.

Machinery available in India:

Banana Ripening Chamber can be available from the following companies in India.

- **Phoenix Refrigeration & Engineering Services, Pune**: They are manufacturer and supplier of a precision engineered assortment of Ripening Chambers.

Address: Mr. Narendra Kashiwar (Director)
Office No. 2 & 3, Sr. No.31/3/1, Near Tulaja Bhavani Mandir, Abhinav College Road, Nahre Gaon, Pune - 411 041, Maharashtra, India
Phone: +(91)-20-65604337

- **Chemtron Science Laboratories, Navi Mumbai, Navi Mumbai:** Their products include:
  - Ripening Gas
  - Manual Dosing Ripening System Using Cylinders
  - Semi Automatic Ripening System
  - Fully Automated Multi Rooms With Centralized Ripening System
  - Gas Analyzer
  - Single Room Ripening System
  - Multi Room Centralized Ripening System
  - Complete Ripening Management Solution

Address: El- 47 Electronics Zone, T. T. C. Industrial Area, Mahape, Navi Mumbai - 400 709, Maharashtra, India
Phone: +(91)-22-67847300

- **Mech Air Industries, Gujrat:** They are manufacturer and supplier of banana ripening, mango ripening and other food processing machines and equipments.

Address: 3/16-A, BIDC Industrial Estate, Gorwa,, Vadodara, Gujarat, 390016, INDIA
Phone: +(91)-(265)-2285751, 2290728
Fax: +(91)-(265)-2280062
Email : info@mechelecgroup.com

- **Bothra Electric & Refrigeration Company, Ahmedabad**:

Address: L. L. - 16, Agrawal Complex, Opposite Town Hall, Ellisbridge , Ahmedabad - 380 006, Gujarat, IndiaPhone: +(91)-79-26575459

Processable Items of Banana:

About 17 varieties of products could be made from banana. The primary product of banana in market is “fried chips and candy” which constitute a major portion, rest are banana puree, banana pulp, banana beer, banana wafers, banana powder and others. India has an excellent scope for development of several value added products like juice, biscuit, banana powder and industrial amylase enzyme with longer shelf life.

Drivers of Demand:

About 90% of banana produced is consumed domestically as fresh fruit. 5% is consumed in processed form providing a good potential for future processing. About 2.5% is processed purely as

banana products and the rest as an ingredient in other foods. There is a good market demand of all banana products. There is an ample scope for new local market to grow in India.

Methodology:

Banana Chips: Harvesting => Receiving => Washing => Peeling => Slicing => Removal of excess water => Frying => Mixing of salt and spices => Cooling => Packaging => Transport => Marketing

Banana Powder: Harvesting => Receiving => Washing => Peeling => Drying => Pulverising => Packaging => Transport => Marketing

Project Cost for banana processing plant:

Key Assumptions:

The Project Cost for the above unit has been derived keeping the following assumptions in consideration:

- Interest related costs have not been considered.
- Contingency factor has not been accounted for.
- Land & Land Development cost have not been considered.

Capacity

The model is for processing 0.8 MT per day.

The plant will work at 50% capacity in first year, 80% in second year and 90% from third year onwards.

Annual Installed Capacity:

- Raw Material: 120 MT
- Finished Product: 43.2 MT

Total land required: 0.2 acre

Land required for factory building: 400 square meter.

Estimated Cost of Project: Rs.1.00 cr

Sl No.	Cost Components	INR in Lakh
1.	Buildings and civil structures	16.50
2.	Plant and Machinery (includes: Banana peeling machine, Fruit washing tanks, Slicer, Diesel furnace, Frying pan, Pouch sealing machine, Stainless steel working table, DG set, Misc. equipment and assets)	60.00
3.	Misc. Fixed Assets	0.60
4.	Working Capital	0.85
5.	Preliminary and Preoperative expenses	0.05
	Total Project Cost (excluding cost of land)	78.00

***Note**: For detailed project cost DPR needs to be prepared.*

Other Facilities:

- Adequate amount of water is required for washing, steam peeling, starch removal.
- Adequate electricity is required for frying, blanching.
- Storage facility is required for storing of raw materials as well as finished product.

SOURCES OF RAW MATERIAL:

Since Nadia, North 24 Parganas and Hooghly contributes to more than 60% of total banana production in West Bengal, a banana ripening chamber can be established in Nadia which has good connectivity with the other two districts so procurement of raw material will not be a problem. Since Nadia is well connected with state capital Kolkata via road and railway network, market for finished product is easily accessible.

Market Scenario:

Banana is available in India round the year. However, arrivals of banana start increasing from April and arrivals are at peak during August to October period.

India is the largest banana producing country in the world. It contributes to nearly 30% of total banana production in the world. West Bengal holds 9th position in India in terms of total banana produced. So there is a huge market potential for banana in West Bengal.

Export Potential:

- India is the largest producer of banana in the world.
- Geographically, India is better placed compared to South East Asian, Central and South American countries for exports to Gulf countries.
- Banana is cultivated in sufficient acreage and in different agro-climatic conditions and thus is in a position to meet the large demands from importing countries on a continuous basis, provided planting and cultivation is well planned.

FRUIT JUICE PROCESSING

INTRODUCTION

India is 2nd largest fruit productive country in the world. West Bengal is one of the largest fruits productive states in India and the manufacturing of various canned and bottled fruit juice and vegetable products are well established. In 2009, the production of fruits in West Bengal stood at 3.85 million tonnes. This abundant availability of fruits provides the state a competitive edge in the food processing industry. The juice market of Mango, Litchi and Watermelon is in soaring position.

Processable Items

- Process able items for Mangoes are juice Pulp, Puree, Morobba, Mango pickle, Amsatta, Bar, Candy, Squash and much more.
- Process able items for Litchi are Puree, Pulp, Juice, Wine, Candy, Cosmetics products.
- Process able items for Watermelon are Puree, Pulp, Juice, Candy, Cosmetic products.

Sources of Raw materials

- For Mango sources of raw materials are Malda, Mursidabad, North 24 Parganas, Hoogly, Burdwan, and East Midnapore.
- For Litchi Murshidabad, Malda, Nadia and North 24 parganas are the main sourcing points in West Bengal.
- For watermelon Midnapore West, Cooch Behar, Murshidabad, Nadia, South 24 parganas are the major sourcing points.

Drivers of demand

Traditionally, the Indian life style has a predilection for fresh fruits and vegetables or those processed at home. There is a sea change. People, are now increasingly going in for fresh fruit vending from kiosk fountains, which produce instant juices from fresh fruits in the presence of the consumer. The demand of fruit juice in the West Bengal market is going upward. There are huge numbers of vendors and stalls in Kolkata and districts as well.

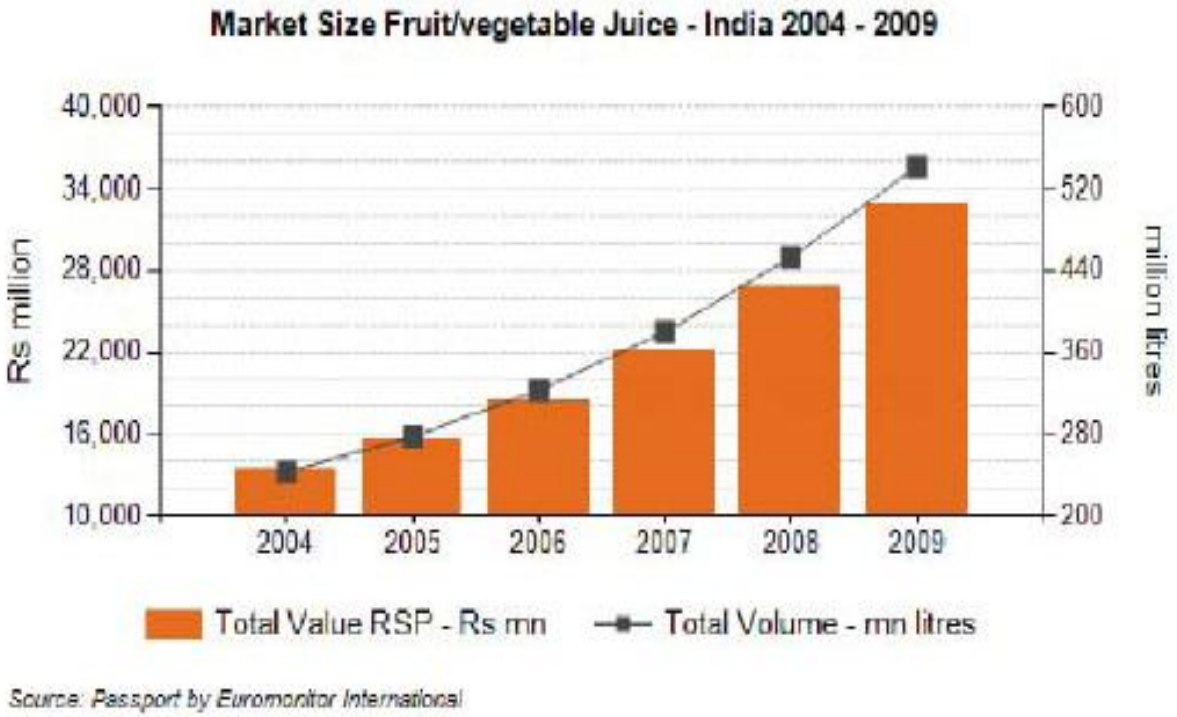
Most of the unauthorized vendors are selling fruit juice at the road side or in a temporary stall. The gatherings around those stalls are very high all the time. The demand of Mango, Litchi and Watermelon juice is perennial. So the demand of the fruit juice is mainly driven by all class of the people of the society

Market Details

Accounting to 10% of the global production of Fruits India ranks first in the world. West Bengal is 5th in rank in production of Mangoes. In the state variety types of Mangoes are found and the demand is very high through out the season. To meet the demand through out the year mango juice is a very good substitute. West Bengal is the 2nd productive area of Litchi after Bihar. The company Pran has good market coverage for Litchi juice. The Litchi juice marketers are also getting good response from the customers as well. Maaza, Tropicana, Frooiti, Real and Appefiz are the well known brands of fruit juice market in India. A fruit juice market can be set up from the following variables:

- The key growing districts for mangoes are Malda, Mursidabad, North 24 Parganas, Hoogly, Burdwan, and East Midnapore.
- Malda, Murshidabad both the districts have Food parks on fruit juice in West Bengal
- 42.50% mangoes are processed and rest is exported to different location.
- Rising Industries, Suan Scientific Instruments & Equipments, East India Agro, Pran and many more are involved in the processing of Mango juice.
- There are few mandis of watermelon in West Bengal
- Domestic market potential of Watermelon is high
- Murshidabad, Malda, Nadia and North 24 parganas are the main penetrated area of litchi in West Bengal.
- Murshidabad, Malda, Nadia and North 24 parganas are the Agri export zones for Litchi.
- West Bengal is the 2nd productive area of Litchi after Bihar.
- Catchment areas for Litchi in Murshidabad are Suti, Jangipur, Raghunathganj, Lalgola, Bhagwangola, Sagardighi, Jiaganj, Lalbagh, Domkal, Bahranpur, Hariharpura, Belaanga, Nawada Bharatpura, Barwan, Khargram
- So Murshidabad can be an ideal place for the fruit juice market of litchi juice. Pran the fruit drinks company has taken very good initiatives in litchi juice market.

A data of market size of Indian fruit juice is given below from the year 2004 to 2009:

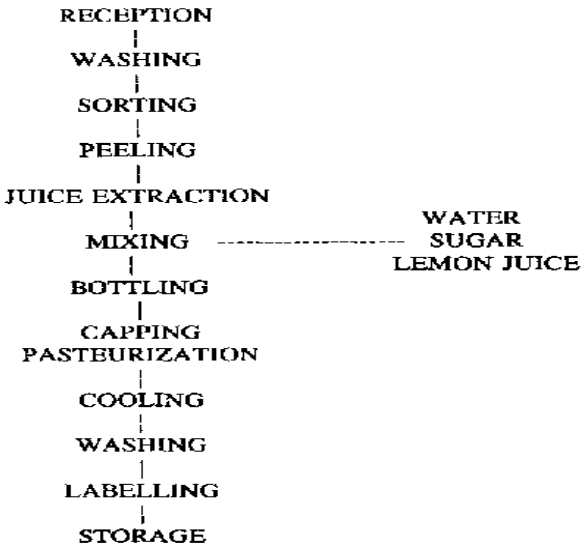


Source: Passport by Euromonitor International

There are number of market players of fruit juice in India and West Bengal as well. Some major players are Foods & Inns, Dynamix Dairy, Godrej Foods, Keventer Agro, Bhilai Engg Corp. Frigerio Conserva Allana, Vinsari Fruitech. Some other players in West Bengal are Krishna Agro Tech Ltd, Bio Care, Vaibhav International, Sudha International, Sidhi Vinayak Enterprize, Roys Food Products etc.

Brief processing method

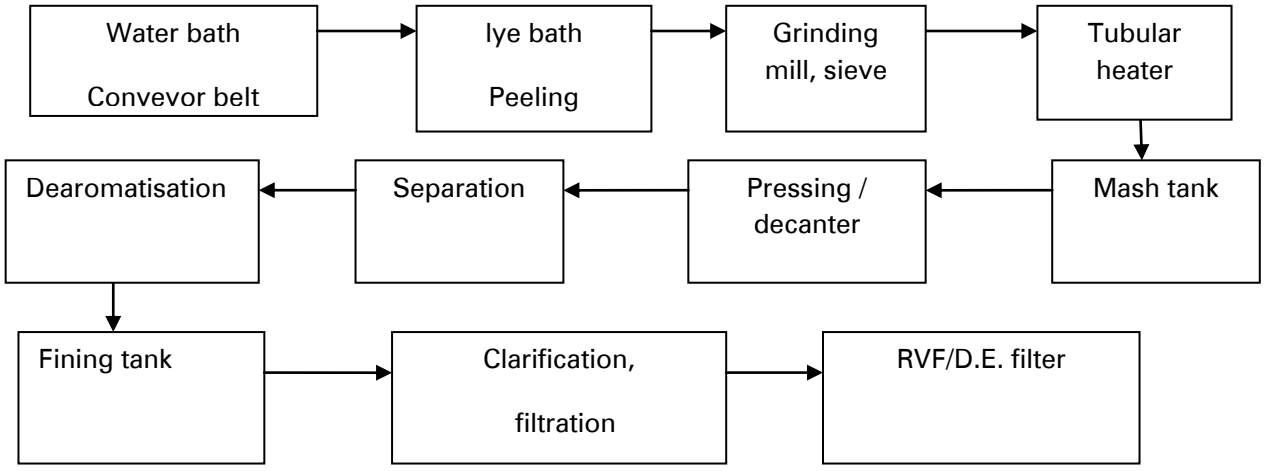
Mango Processing



Litchi Processing

Processing of lychee is done in different forms. Canning of pulp, aseptic packing and ready to serve lychee juice is common. Pulp of lychee is aseptically packed and stored at 2-3□C for preparing lychee juice.

Watermelon Processing



Cost of project

Juice market is quite competitive in India. The up comers' entrepreneur who is looking for to set up fruit processing units, they can stick their decision. West Bengal is a cluster of fruit production and the supply of fruits will never fall short. Demand of quality fruit juice in West Bengal is there all the time. The proposed project will require approx. 9680 Sq. yards of land. The initial capital requirement can be varies between 1-5 crores which include cost of Land, Cost of Building, Cost of Machineries, cost of labor and others. An example can be given from the following unit set up cost of Mango fruit juice:

Tentative project cost: **1.60 crores**

Land requirement: The land requirement for a unit set up would be around 9680 square yards or 2.00 acres. Break up of tentative project cost is as follows:

Sl.No.	Description	Cost (Rs in Crores)
1	Buildings (including AC Sheds)	0.30
2	Plant & Machinery (including test equipment, Fruit sorter, Fruit Washer, Fruit Crusher, Pulping Machine, Juice Filling machine)	0.95
3	Misc. Fixed Assets	0.03
4	Preliminary & Preoperative Expenses	0.05
5	Technology Transfer Fees	0.02
6	Margin money for working capital	0.18
	Total Project Cost	**1.53**

***Note**: For detailed project cost DPR needs to be prepared.*

Other than the above requirement raw materials, cost of labor and other variables are required to run a unit.

Other facilities required :

- The facility for supplying suitable water for fruit juice unit must be adequate.
- There should be cold storage facilities to preserve the processable items for future purpose.
- Facilities should be there to adapt new technology for production of fruit juice.

Machinery Manufacturers and Suppliers in India

Fruit juice machinery can be available from the following companies:

- **Harvest Pumps Company:** They are a leading manufacturer of fruit juice homogenizer, drive end spares, fruit juice homogeniser, fruit juice homogenizer, high pressure homogenizer & homogeniser for dye chemical.

  Address: No. 16 - A, Sarathi Nagar, Nandha Nagar Road, Singanallur, Coimbatore, Tamil Nadu -641005,India **Phone:** +(91)-(422)-2580712 / 4348040 **Fax:** +(91)-(422)-2580712

- **SGK Industries**: They are manufacturer & supplier of fruit juice machine, sugarcane juice machine. We also offer food cart, food processing machine & sugarcane juice machines.

  Address: Plot No. 10, Techocraft Industrial Estate, I. D. A., Balanagar, Hyderabad, Andhra Pradesh-500037,India Phone: +(91)-(40)-65244948 Fax: +(91)-(40)-64540304

- **Naru Equipment, Mumbai**
  It deals in manufacturing and exporting fruit juice machine that includes commercial juicers, steel commercial juicers and stainless steel commercial juicers.
  Address: No. 86, Sunrays Mall, Sector - 5, Charkop Market, Kandivali West, Mumbai, Maharashtra-400067,IndiaPhone: +(91)-(22)-28672748

- **Madaan International**
  Exporter and manufacturer of fruit juice machines such as orange juice machines, pineapple juice machines and mousami fruit juice machines along with electric bain marie, electric baking ovens and electric deep fryers.
  Address: 21 B Swasthya Vihar Appartment, Preet Vihar, Delhi, Delhi - 110 092, India
  Phone: + (91)-(11)-23212004

Domestic and export market

- Litchi produced in Bihar and West Bengal find markets in Ahmedabad, Mumbai, Pune, Nagpur, Hyderabad, Delhi, Chandigarh, and Lucknow etc.
- The foreign export markets of fruit juice are USA, Netherlands, UK, Germany, Nepal etc.
- Domestic demand and outside demand of fruit juice is always in top position.

Available technology

- Central Food Technological Research Institute (CFTRI) can be worked as a source of technology advancement. For Litchi juice processing CFTRI provides a unique technology.
- National Research Development Corporation (NRDC) can serve to the units in respect of technological know-how.

Processed fruits juice export market in India:

Processed Fruit Juices Export	2007	2008	2009	2010	2011
Rupees in Crores	711	773	1099	1159	1006

The above export table is a positive sign for the new entrepreneurs of fruit juice. From the year 2007 the export amount increases up to 41% in the year 2011. So the demand is going upward from all over the country.

GROUNDNUT PROCESSING

Introduction:

Peanut is a mass consumption item and is used for extraction of oil, for making butter, chikkies and chocolates, as an ingredient in making several food and snack preparations, for munching and so on. India is one of the largest producers along with the USA; China and Argentina. Gujarat, Andhra Pradesh, Tamilnadu and Maharashtra are the main cultivating states. Peanuts from the Saurashtra region of Gujarat are famous all over the world on account of their big size, nutty flavour and crunchy taste. The market is primarily controlled by the small and unorganized sector. The preferred locations are Gujarat, Maharashtra, TN, AP etc.

Groundnut is an agriculture produce with 2 crops, with the winter crop contributing more than the summer crop. Groundnuts in shell (pods) are de-stoned and then de-shelled to obtain peanuts. After grading them as per different sizes (known as counts) they are sold in the market.

Processed Groundnut Products:

- Groundnut Oil
- Peanut Butter
- Peanut Flour
- Roasted & Salted Peanut
- Groundnut Milk

Sources of Raw Materials:

Medinipur (E & W), Hooghly, Nadia & Howrah is the major production zone for groundnut in West Bengal. Among these districts both East & West Medinipur produces 56% of the total groundnut production in West Bengal. We can thus conclude that a potential investor will have no shortage of raw materials.

Peanut Butter:

Peanut butter is a food paste made primarily from ground dry roasted peanuts. It is mainly used as a sandwich spread, sometimes in combination as in the peanut butter and jelly sandwich. Peanut butter is included as an ingredient in many recipes, especially cookies and candies. Its flavor combines well with other flavors, such as chocolate, oatmeal, cheese, cured meats, savory sauces, and various types of breads and crackers. peanut butter is said by some to combine well with pickles, mayonnaise, olives, onion, horseradish, bacon, Marmite, or Vegemite in a sandwich.

Peanut Butter is an idyllic alternative for Dairy butter as bread spread. It is consumed in large quantities in USA and Western countries and has good potential for export and the untapped domestic market as the product is relatively new for India.

Considering India's position as the world's second largest producer of peanuts in the world, its share in the world market is restricted to raw peanuts only, with negligible contribution in value added products like Peanut Butter, roasted - blanched, and coated peanuts etc;. Thus, there is ample scope for development.

India is facing high levels of fluctuation in production and due to its failure in producing aflatoxin free Peanuts, the value added products are not finding an export market.

Though, the Domestic market for Peanut Butter is small at present, its export potential is good and with people becoming more health conscious the local market is sure to develop.

Growth Drivers

- The market for Peanut butter is likely to grow due to emerging demand for healthier and
- nutritious products.
- Demand in healthier Low calories & low fat food like wheat bread and peanut butter due to
- emergence of nuclear family and hectic life schedule.
- Changing life style and shift towards consumption of convenient food.

Manufacturing Process / Technology Sources

- Pre cleaning and shelling of Ground nuts in shell
- Kernel Grading using Sortex
- Dry roasting, Cooling and blanching: A photometer indicates when the cooking is complete.

At the exact time cooking is completed, the roasted peanuts are removed from heat as quickly as possible in order to stop cooking and produce a uniform product. The hot peanuts then pass from the roaster directly to a perforated metal cylinder (or blower-cooler vat), where a large volume of air is pulled through the mass by suction fans. The peanuts are brought to a temperature of 86 degrees Fahrenheit (30 degrees Celsius). Once cooled, the peanuts pass through a gravity separator that removes foreign materials. The skins (or seed coats) are now removed with either heat or water. The heat blanching method has the advantage of removing the hearts of the peanuts, which contain a bitter principle.

Heat blanching*:* Depending on the variety and degree of doneness desired, the peanuts are exposed to a temperature of 280 degrees Fahrenheit (137.7 degrees Celsius) for up to 20 minutes to loosen and crack the skins. After cooling, the peanuts are passed through the blancher in a continuous stream and subjected to a thorough but gentle rubbing between brushes or ribbed rubber belting. The skins are rubbed off, blown into porous bags, and the hearts are separated by screening.

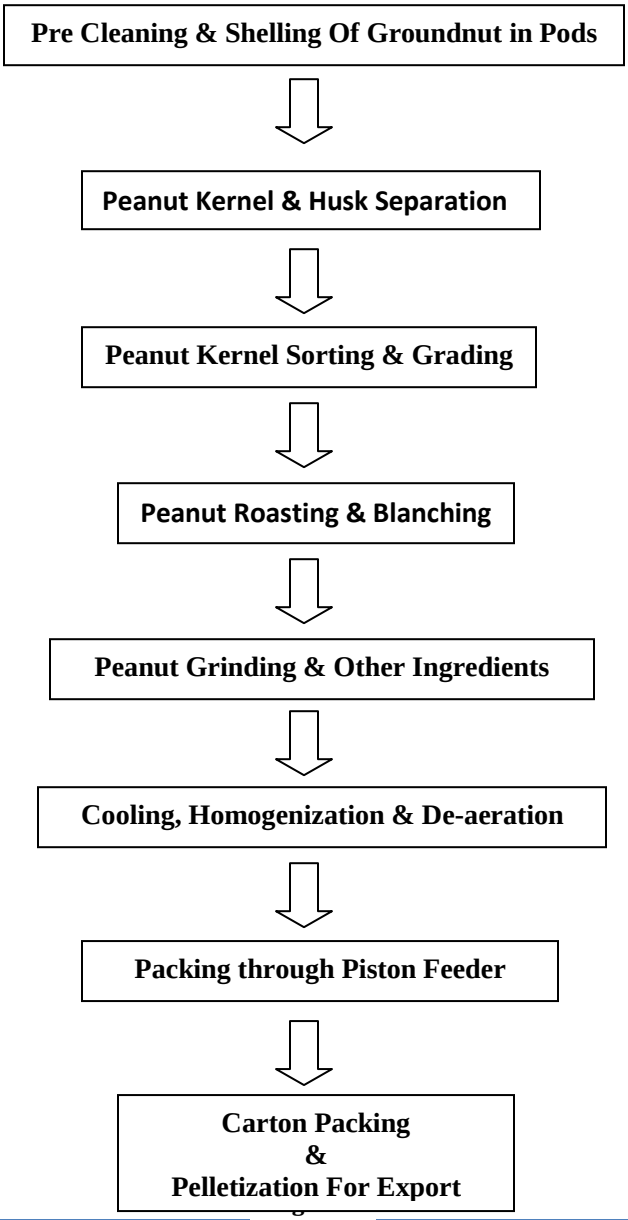
Water blanching*: A* newer process than heat blanching, water blanching was introduced in 1949. While the kernels are not heated to destroy natural antioxidants, drying is necessary in this process and the hearts are retained. The first step is to arrange the kernels in troughs, then roll them between sharp stationary blades to slit the skins on opposite sides. The skins are removed as a spiral conveyor carries the kernels through a one-minute scalding water bath and then under an oscillating canvas-covered pad, which rubs off their skins. The blanched kernels are then dried for at least six hours by a current of 120 degrees Fahrenheit (48.8 degrees Celsius) air.

Grinding and Mixing of ingredients (In this phase peanut butter is prepared): Peanut butter is usually made by two stage grinding operations. The first reduces the nuts to a medium grind and the second to a fine, smooth texture. For fine grinding, clearance between plates is about .032 inch (.08 centimeter). The second milling uses a very high-speed grinder cum mixer that has a combination cutting-shearing and attrition action and operates at 9600 rpm. This milling produces a very fine particle with a maximum size of less than 0.01 inch (.025 centimeter). Peanuts are kept under constant pressure from start to finish of the grinding process to assure uniform grinding and to protect the product from air bubbles. A heavy screw feeds the peanuts into the grinder. This screw may also deliver the de-aerated peanut butter into containers in a continuous stream under even pressure.

Rotator for creating texture of Peanut Butter: From the grinder, the peanut butter goes to a stainless steel hopper, which serves as an intermediate mixing and storage point. The stabilized peanut butter is cooled in this rotating refrigerated cylinder (called a votator), from 170 to 120 degrees Fahrenheit (76.6 to 48.8 degrees Celsius) or less before it is packaged.

Packing: The stabilized peanut butter is automatically packed in jars, capped, and labeled. Since proper packaging is the main factor in reducing oxidation (without oxygen no oxidation can occur), manufacturers use vacuum packing. After it is put into final containers, the peanut butter is allowed to remain undisturbed until crystallization throughout the mass is completed. Jars are then placed in cartons and placed in product storage until ready to be shipped out to retail or institutional customer.

Peanut Butter technology could be sourced from CFTRI, Mysore or from any established food technology and machinery suppliers from India. The unit shall require procuring few critical Plant and Machineries / equipments from abroad to meet quality requirements as per international quality requirements. The manufacturing process is schematically shown in following diagram:



A few major manufacturers of Peanut butter in India are:

- Bajaj Foods Limited, Ahmedabad
- Suprat Enterprise, Ahmedabad
- Ruparel Foods Pvt Ltd.

Project cost: Around Rs. 3.2 cr

Key Assumptions:

The Project Cost for the above unit has been derived keeping the following assumptions in consideration:

- Interest related costs have not been considered.
- Contingency factor has not been accounted for.

Land Requirement: The proposed project will require approx. 2000 Sq. mt of land out of which the built-up area is 1000m^2. Out of the total built up area, 500m^2 will be covered by production facility, 350m^2 for store and 150 m^2 for office building.

Other Facilities: The project should have the following facilities:

- Warehouse required for storage of raw unshelled groundnut.
- Adequate amount of basic amenities like water & power.
- Cold chamber for finished or semi-finished products.

The estimated cost of Project will be around Rs. 3.15cr. The break up of the cost is tabulated below:

Sl No.	Cost Components	INR in crore
1.	Building & Civil works	0.67
2.	Plant & Machinery	2.15
3.	Furniture	0.06
4.	Preliminary & Pre-operative	0.27
	Total Fixed Assets	3.15

***Note**: For detailed project cost DPR needs to be prepared.*

Machinery Required:

- Peanut Sheller - Used to shell peanuts with high efficiency, high capacity and minimum split creation.
- Sizing Shakers – Used to separate dry, flowable products, like peanuts, by specific size.
- Stoners – Used for removal of large stones, dirt clods, and glass in the pre cleaning stages and precision small stone removal in finishing circuits
- Roll Feeders – Used to regulate flows and evenly distribute product flow across processing equipment
- Vibratory Feeders – Used to evenly distribute product flow across processing equipment
- Aspirators – Used to separate lights (shells, pops, sticks and stems) from heavies (in shell, and meats) based on aerodynamic profile and density.
- Easy Dump Elevators – Used to gently elevate products
- Vibratory Conveyors – Used to gently convey products
- Gravity Separators – Used to separate lights from heavies based on density

Suppliers of Machinery:

DEP Agro Machineries Pvt Ltd.
Mr. Damil J. Patel
Near Kashiram Textiles, Narol
Ahmedabad - 382405, Gujarat, India

Urschel India Trading Private Limited
101, 1st floor, Navale IT Zone, Phase – 2, S. No, 51/2A/2, Near Navale Bridge
NH4, Pune – Bangalore Highway, Narhe Gaon, Taluka Haveli
Pune 411041
India
Phone: +91-20-6680 3400
Fax: +91-20-6680 3401

Lewis M Carter (LMC), INC.
615 Highway 84 West
Donalsonville, GA 39845
Phone: 229.524.2197
Toll Free: 1.800.332.8232

GUAVA PROCESSING

Introduction:

Guava (*Psidium guajava* L.), which belongs to the Myrtaceae family, is a native of tropical America and grows well in tropical and subtropical regions. Guava fruit has a characteristic flavor, to which its acidity (pH 4.0 to 5.2) contributes. It is a rich source of ascorbic acid, containing over 100 mg/100 g. Most of the guava produced around the world is consumed fresh. Marketing of processed products such as puree, paste, canned slices in syrup or nectar is limited.

A significant portion of the population prefers a grit-free, clear, haze-free guava juice. Clarified guava juice may be more acceptable to the general population, and may be used in the manufacturing of clear guava nectar or jelly, clear guava powder or a mixed fruit juice blend. There is also potential for use of an instant guava powder in formulated drinks, baby foods and other products.

Processable Guava Products:

- Guava Pulp
- Guava Juice-Puree
- Guava Jam/Jelly
- Guava Powder (huge potential)

Sources of Raw materials:

South 24 Parganas is a major guava producing zone in the state of West Bengal. It ranks 1st in the state in terms of guava production amounting to nearly 20% of the state's guava production. So a guava processing unit in the state would not face any shortage or dearth of raw materials.

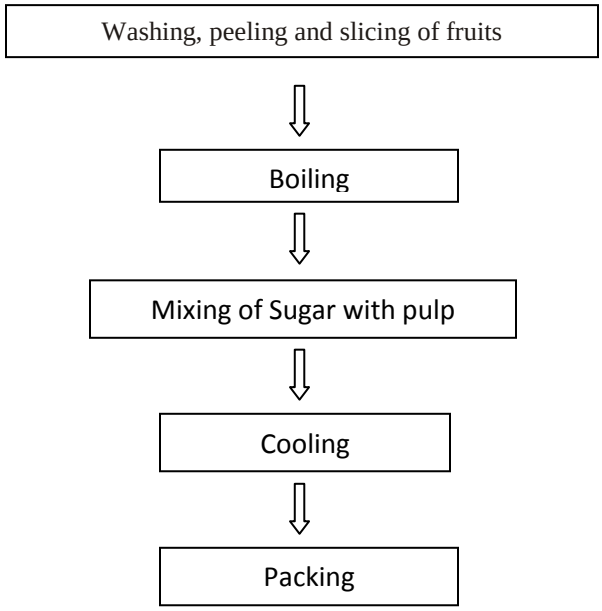
Drivers of Demand:

Jams, jellies and marmalades share 17% of the total production of processed fruits and vegetable products. The demand is constantly increasing. The domestic market comprises defence sector, institutional sector, railways, airlines and regular channels of consumer stores and bakeries.Jam & jelly are used in homes as well as restaurants and other eateries. These items are mainly consumed in urban areas.

MANUFACTURING PROCESS

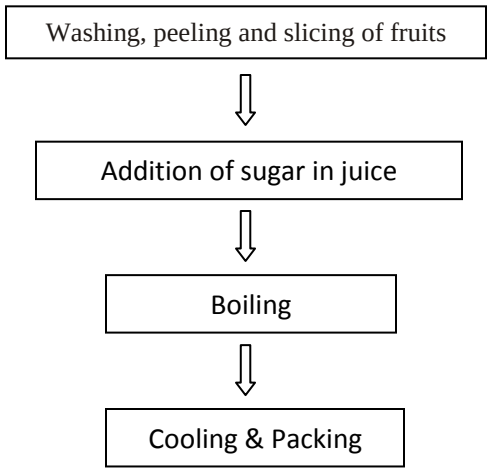
Jam

Fresh fruits are washed in water and after removing their skin, they are cut or sliced in small pieces. These pieces are boiled with water. Appropriate quantity of sugar is mixed with the pulp. When the temperature is around 60 C; citric acid, colour, essence etc. are added. This mixture is then stirred for a while, cooled and then packed in bottles. The process flow chart is as under:

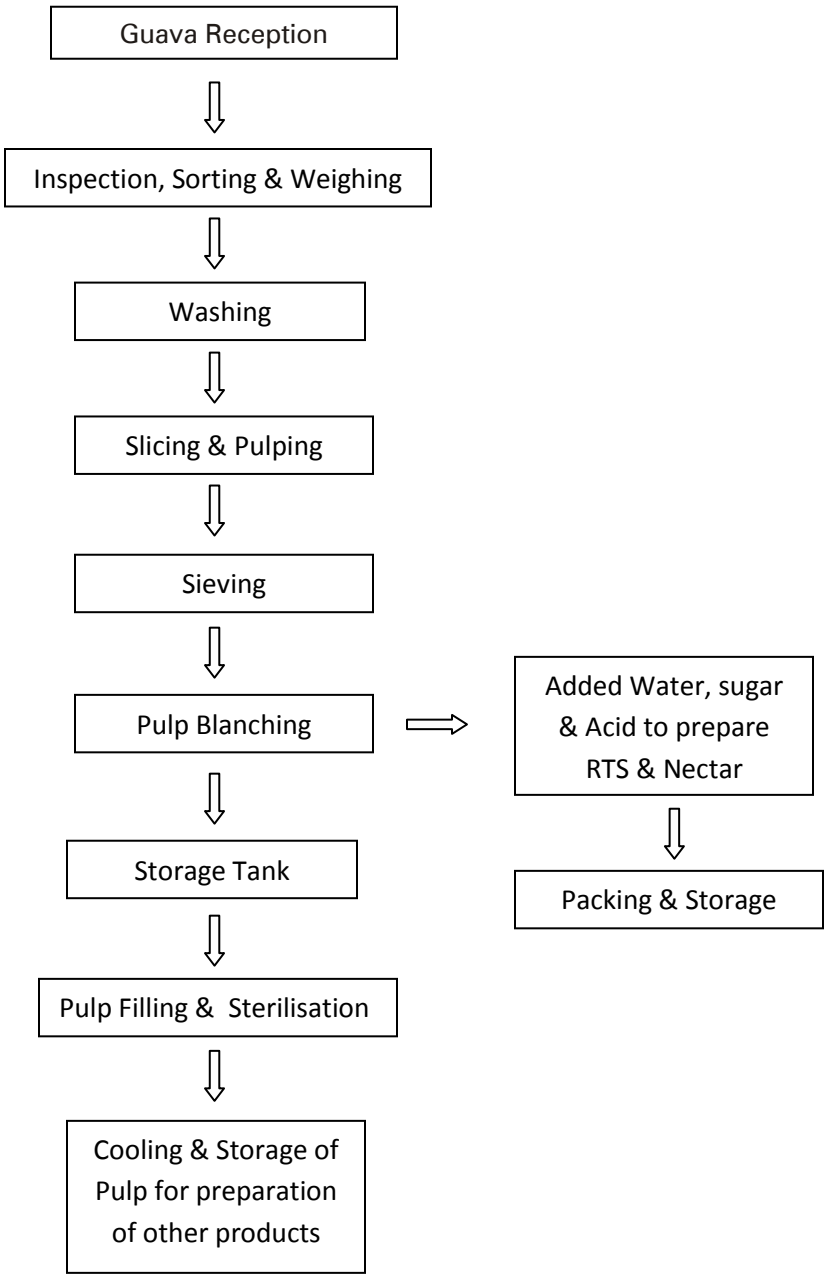


Jelly

Washed and peeled fruits are fed to the hopper of a juice extractor and the juice so obtained is filtered. Certain fruits like rosella or guava need to be boiled in water before extracting juice. Sugar is added to juice and then this mixture is boiled to convert it in jelly form and pectin, citric acid, colour etc. are added in the required quantity. Boiling is done till jelly-like formation is obtained. Packing is done on cooling. The process flow chart is as under:



Juice:


Guava Reception
Inspection, Sorting & Weighing
Washing
Slicing & Pulping
Sieving
Pulp Blanching
Added Water, sugar & Acid to prepare RTS & Nectar
Packing & Storage
Storage Tank
Pulp Filling & Sterilisation
Cooling & Storage of Pulp for preparation of other products

Estimated project cost: Rs.1.25 cr

Sl.No.	Description	Cost (Rs in Crores)
1	Plant & Machinery (including test equipment, Fruit washing system, Guava de-stoning machine Sterilizer/Pasteurizer Aseptic filling system Stainless steel tanks SS screw conveyer for waste removal Brushing machine)	0.85
2	Misc. Fixed Assets	0.06
3	Preliminary & Preoperative Expenses	0.05
4	Technology Transfer Fees	0.02
5	Margin money for working capital	0.18
	Total Project Cost (excluding Land & Building)	**1.16**

***Note**: For detailed project cost DPR needs to be prepared.*

Land Requirement: The space of the land for a Guava processing units can be around 87121.6 sq. foot out of which 17424.32 sq. foot space can be left for Building. Other than the above requirement raw materials, cost of labor and other variables are required to run a unit.

Other Facilities: The project should have the following facilities:

- Warehouse required for storage of guava.
- Adequate amount of basic amenities like water & power.
- Aseptic Packaging facility for finished products.

Note:
1. All figures mentioned above are only indicative and may vary from place to place.
2. If the investment on Building is replaced by Rental Premises-
(a) Total Cost of Project will be reduced.
(b) Profitability will be increased.
(c) Interest on Capital Expenditure will be reduced.

Machinery required:

- Fruit washing system,
- Guava de-stoning machine
- Sterilizer/Pasteurizer
- Aseptic filling system
- Stainless steel tanks
- SS screw conveyer for waste removal
- Brushing machine

ADDRESSES OF MACHINERY AND EQUIPMENT SUPPLIERS

Batliboi Engineers (Bangalore) Pvt. Ltd.
99/2&3, N.R.Road
Bangalore – 560 002

B.Sen Barry & Co.
65/11, New Rohtak Road
New Delhi – 110 005

Gardners Corporation
158 Golf Links,
New Delhi – 110 003

Raylon Metal Works
Kondivitta Lane
Post Box 17426
J.B.Nagar, Andheri (E)
Mumbai – 400 059

Bajaj Maschinen Pvt. Ltd.
7/20-7/27 Jai Laxmi Industrial Estate,
Site IV
Sahibabad Industrial Area - 201010
Dist.Ghaziabad, UP

Ganson Ltd.
645 Anna Salai
Chennai – 600006

Grovers Pvt. Ltd.
223, Kaliandas Udyog Bhavan
Prabhadevi
Mumbai – 400 025

Macneill and Magor Ltd.
4, Mangoe Lane
Kolkata – 700 001

Sri Venkateswara Industries,
Yadavgiri Industrial Estate,
Mysore – 570 002

Mather & Platt (India) Ltd.,
805-806, Ansal Bhawan
16, Kasturba Gandhi Marg,
New Delhi – 110 001

Cowel Can Ltd.,
Industrial Area
Barotiwala, Solan, H.P.

Larson & Toubro Ltd.
Ballard Estate, Douggel Road
Mumbai – 400 001

INDIVIDUAL QUICK FREEZING (IQF)

Introduction:

Individual Quick freezing (IQF) technology used will be latest and indigenous. It is a freezing method of choice for seasonal products such as fruits and vegetables and over the years it has further developed to cover a broader range of other product such as diced meat, shrimps, pasta and rice etc. IQF is a technology originally developed by Frigoscandia Equipment as a specific solution to block or cluster-freezing of small-sized products, to preserve quality and to give unparalleled convenience to end-users. Quick Freezing is the only process whereby, virtually all the properties of most of the parent food stuffs can preserved.

In IQF, each piece is frozen individually using technique of fluidization resulting in freezing of fruit and vegetables only in 10 to 12 minutes which otherwise takes at least 3 to 4 hours or even more in the blast freezer. This results into better texture and there is no lump/ block formation and the product is free flowing. One does not have to thaw or defrost the whole packet to take out only a portion, and the rest will remain frozen till required again.

Objective:

The primary objective of the model report is to facilitate the entrepreneurs in understanding the importance of setting up an IQF unit . This model report will serve as guidance to the entrepreneurs on starting up such a new project and basic technical knowledge for setting up such a facility.

Processable Items:

- Frozen fruit pulps
- Frozen fruits - chunks, cubes, slices and other assortments.
- Frozen mainstream vegetables.
- Frozen Indian ethnic vegetables.
- Frozen mixed Vegetables.

Sources of Raw Materials:

West Bengal is one of the leading producers of fruits and vegetables in the country. So availability of raw materials for an IQF unit would not be much of a problem for the entrepreneur who is willing to set up such an unit in the state. For eg: Malda is famous for it mango & litchi production, Districts in North Bengal is famous for pineapple, Hooghly well known for its massive potato production.

Major vegetables grown in the state are Potato, Tomato, Brinjal, Cabbage, Cauliflower, Peas and Onion etc. Banana, Orange, Guava, Papaya, Pineapple etc. are the major fruits grown.

Drivers of Demand:

With the ever increasing increase in the number of middle class families in the country and simultaneously in the state of West Bengal, food products frozen in IQF is gaining popularity. Also as lives of people are getting hectic with each passing day, people are slowly shifting their base to readymade products. The demand for these products would mainly be driven by the middle and

higher middle class of the society. So an investment in an IQF unit at this juncture would be hugely profitable for the entrepreneur.

Market Opportunities:

India is the world's 2nd largest producer of food next to China, and has the potential of being the biggest within the food and agricultural sector. With India's food production likely to double in the next decade, there is an opportunity for large investments in food and food processing technologies, skills and equipment, especially in areas of Canning, Dairy and Food Processing, Specialty Processing, Packaging, Frozen Food/ Refrigeration and Thermo Processing.

Demand for IQF fruits and vegetables are showing strong growth as the income benefits of economic liberalization measures are fuelling consumption among India's booming middle class. The market for frozen fruits and vegetables is growing both in the domestic and international market. Growth in the fast food sector offers outstanding opportunities for IQF operators to enter into supply agreements with restaurant chains, hotels and airlines, catering businesses etc. Frozen fruits and vegetables have a huge market potential not only in India, but there is an excellent export opportunity to Middle East and neighboring countries as well.

The major market segments for IQF are-

- Retail outlets for direct consumption
- Hotels, restaurants, caterers and eateries
- Food industries which use fruits and vegetables as raw material and want to process during the lean season
- Good export potential

Project cost: Around Rs. 6.00 cr

Key Assumptions:

The Project Cost for the above unit has been derived keeping the following assumptions in consideration:

- Interest related costs have not been considered.
- Contingency factor has not been accounted for.

The proposed project will require approx. 2000 Sq. mt of land.

The estimated cost of Project will be around Rs. 5.86cr. The break up of the cost is tabulated below:

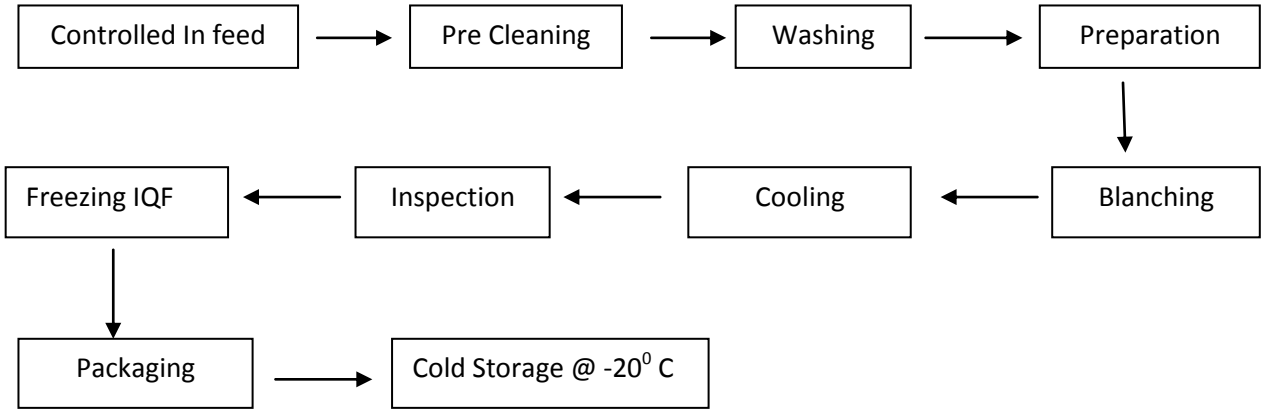
Sl No.	Cost Components	INR in crore
1.	Building & Civil works	0.78
2.	Plant & Machinery	4.54
3.	Furniture	0.05

4.	Preliminary & Pre-operative	0.47
	Total Fixed Assets	5.86

***Note**: For detailed project cost DPR needs to be prepared.*

Manufacturing Process & Technology:

Oxidation (rancidity) can occur during freezer storage causing off flavors through exposure of frozen product to air. Using high quality plastic bags or containers designed for freezing can prevent rancid flavor development as well as protect against freezer burn which is a result of moisture loss. The process of freezing involves freezing the water in the cellular spaces of fruit tissue. As this water freezes it expands forming ice crystals that rupture cell walls resulting in softer texture once fruit is thawed. To reduce cellular damage chill and freeze fruit quickly so that the ice crystals formed are smaller. Process flow of IQF is given below:



Technology:

The technology of IQF involves three sub sections:

- Processing Equipment
- Individual Quick Freezing Equipment
- Auxiliary Equipment

Processing equipments involves Pea Podder, cross collection conveyor for peas, waste collection conveyor, bucket elevator, Winnower, Fruit/Vegetable washer, Inspection Conveyor, Pea blancher, After cooler, dewatering conveyor, grain recovery system and potato dicer etc.

Freezing equipment is with Polyethylene product belting. High efficiency SS coils, air foil fans. It consists of Conveyor System, Defrost system, refrigeration evaporator, freezer enclosure, Belt washer and dryer and electrical control panel, Caycore IQF soft, Dual Defrost Mechanism and refrigeration machine etc.,

Auxiliary Equipment consists of Boiler, Reverse Osmosis plant, Laboratory Equipments, Fire Fighting equipments, ETP, Electrical infrastructure and accessories etc.

Sources of technology:

Frigoscandia contracting b
Box 913, S-25109 Helsingborg,
Rusthallsgatan 21, Sweden,

Paul Kunz Gmbh
Ein unternahmen Der Zimenermann & Jansen Group,
5419, Dottesfeld
Germany

Frick India Ltd
Jeevan Vihar, 3- Sansad Marg,
New Delhi-110001

Sri Sai Tech Refrigeration Pvt Ltd
3-a Numbal Road , Velappanchavadi
Chennai - 600 077, Tamil Nadu, India
Mobile: +(91)-9841731335
Telephone: +(91)-(44)-64554447
Fax: +(91)-(44)-26495335

Phoenix Refrigeration & Engineering Services
Office No. 2 & 3, Sr. No. 31 / 3 / 1, Near Tulaja Bhavani Mandir,
Abhinav College Road, Narhe Gaon, Pune - 411 041, Maharashtra,
India.
Mobile: + 91 - 99225 33337, + 91 - 8888109084
Telephone: + 91 - 020 - 65604337

IQF Frost AB
Volframgatan 3
SE-213 64 Malm□
Sweden
Tel +46 42 33 22 60
Fax +46 42 33 22 62

Some major companies dealing with IQF products (fruits & vegetables):

Capricorn Food Products India Ltd, Chennai

Essen Foods, Chennai

ONION PASTE MANUFACTURING UNIT

Introduction

Onion is one of the important ingredients of curries used by almost all households in the world. Onion Paste has very high market demand. Though not available during the entire year it requires storages to be preserved so that it can be consumed during the entire year.

Onion paste is a commercially very sound product and large players have set up onion paste units in small or medium scale to cater to the demand of readymade paste. The shelf life of this product varies between 12-14 months depending on the class of preservative used.

Objective

The primary objective of the model report is to facilitate the entrepreneurs in understanding the importance of setting up a unit of potato flakes. This model report will serve as guidance to the entrepreneurs on starting up such a new project and basic technical knowledge for setting up such a facility.

Raw Material Availability

The available raw material is Onion. The total production of onion was 304.60 ('000 tonnes) in the year 2011-12.Onion is available in varied quantities across all the districts in the state.
Following is the table indicating the top five districts in the state of West Bengal which contribute to the majority of onion production in the state:-

Sl. no.	District	Production ('000MT)	%age of state's production
1.	Hooghly	57.21	18.78
2.	Paschim Medinipore	44.41	14.57
3.	Nadia	37.89	12.43
4.	Murshidabad	29.7	9.75
5.	Burdwan	16.95	5.56
	Total	186.16	61.11

Market Opportunities

India is a very insignificant player in the global trade of dehydrated / powdered /paste products. There are negligible exports to neighboring states also which can be largely expanded as it has enough room for growth.
At present, good quality onion paste are available in the market. Yet it has enough potential as in today's fast moving lifestyle, readymade paste is easily usable by working women who prefer to finish their cooking chores at the earliest.
Big companies are constantly inverting R&D efforts in innovating new products constantly to explore new market possibilities. Recently, a leading onion paste company has launched new and innovative products mixing tomato to onion paste and ginger garlic to onion paste. The response was encouraging among the household in Metros,.

In West Bengal we have companies like Smith & Jones, Nestle, Homemade who market their products here. Moreover local brands like Shelley,Zyaka and Keya who have their manufacturing units in and around Kolkata. They market their products on a pan west Bengal basis. New manufacturing units can have its forward linkages throughout the country with special emphasis on the north eastern states where packaged, processed food products are in high demand.

For a small onion paste manufacturing unit the following will be required:

Equipment Required: 1. Frying Pan,
2. Autoclave Steam Cooker,
3. Diesel Bhatti,
4. Sterilization Tank,
5. Small utensils like mug, cups, balance etc.,

Tentative project cost is: Rs. 1.00 crore
Land requirement: The area of the land can be around 2000 sq.ft out of which 500 sq. ft can be left for Building.

Estimated project cost

Sl.No.	Description	Cost (Rs in Crores)
1	Building Shed 500 Sq.ft.	0.12
2	Equipment (Frying Pan, Autoclave Steam Cooker, Diesel Bhatti, Sterlization Tank, small utensils, mug, cups, balance etc.)	0.42
3	Misc. Fixed Assets	0.15
4	Preliminary & Preoperative Expenses	0.10
5	Working Capital	0.16
6	Technology Transfer Fees	0.08
	Total Project cost (excluding Land)	**1.01**

***Note**: For detailed project cost DPR needs to be prepared.*

The other variables which are required to run a unit are Raw materials, Salaries and wages, Overhead expenses etc.

Other facilities:

- The facility for supplying suitable water for onion paste unit must be adequate.
- There should be cold storage facilities to preserve the processable items for future purpose.
- Facilities should be there to adapt new technology for production of fruit juice.
- Storage facilities of onion must be there.

Note:
1. All figures mentioned above are only indicative and may vary from place to place.
2. If the investment on Building is replaced by Rental Premises-
(a) Total Cost of Project will be reduced.
(b) Profitability will be increased.
(c) Interest on Capital Expenditure will be reduced.

Machinery Manufacturers and Suppliers in India

Shalimar Food Products

Manufacturer, Trader and supplier
of onion paste, onion powder, onion flakes, onion chopped, paste...garlic powder, garlic product, dehydrated onion product, chilly powder, garlic flakes, onion powder, onion flakes, imli powder, coconut milk

Address: Shalimar Complex, Wadibhokar Road, Near Jai Hind Sr. College Dhule, Pune - 424002, Maharashtra, India

Shiva Engineers:

Exporter, manufacturer and supplier of onion paste making machinery, onion, food processing machinery onion paste making machinery, fruit processing machinery onion paste making machinery, ginger paste making machinery...food processing equipment, fruit processing machinery, fruit processing plant, mango processing plant, tomato processing plant, pineapple processing line, pea processing machinery, multi fruit processing.

Address: Patel Avenue, Plot No.165, Flat No.1, Right Bhusari Colony, Nr. Kothrud Bus Depot, Paud Road, Pune - 411038, Maharashtra, India

Sana Industries:

Manufacturer and supplier of onion paste grinding pulveriser, ginger-garlic-onion paste-sugar grinding pulveriser...pulverizers, grinders, roasters, mixers, blenders, micro pulverisers, cone pulverisers, bottom discharge pulverisers, ginger grinding pulveriser, garlic grinding pulveriser, onion

Address: 4-41-440, Papireddy Nagar, Idpl Colony Post, Gandhinagar, Hyderabad - 500037, Andhra Pradesh, India

Om India Trading Company:

Exporter, manufacturer, trader, distributor and supplier of onion seeds, onion, sesame seed paste, dehydrated garlic &onion...raisins, brown raisins, yellow raisins, golden raisins, sultanana, bakery raisins, sesame seeds, hulled sesame seeds, natural sesame seeds, sesame oil, cassia tora seeds, cassia tora powder, white sesame

Address: 1004, Nirmal Towers, Barakhamba Road, New Delhi - 110001, Delhi, India

Available technology

- Central Food Technological Research Institute (CFTRI) can be worked as a source of technology advancement.
- National Research Development Corporation (NRDC) can serve to the units in respect of technological know-how.

POTATO FLAKES

Introduction

Potato flakes are the most important form of dehydrated potato products, which also include potato granules, pellets, powder, shredded and sliced potato. Dehydrated potato flakes are made by pressing cooked mashed potatoes onto a drum drier, which forms a sheet that can be broken up and ground to the required density. Potato flakes can be used anywhere, where one would use mashed potatoes.

They are also used in commercially available products, like instant mashed potatoes, croquettes, pasta and fabricated snacks. As a thickener, they enhance creamy frozen desserts, gravies and chocolate milk. Like other dehydrated potato products, they extend the shelf life of baked goods. After wheat, rice and maize, potato is the most important food crop in the world. It contributes to almost 50% of the total tuber and root crop production. Potato has a good food value as compared to other staple food crops as it is rich in carbohydrates and also contain proteins, minerals like calcium and potassium and vitamins like vitamin C. Boiling the potatoes increase their protein content even more than maize has and almost doubles their calcium content. It is vastly consumed as a vegetable and is also used in various forms such as starch, flour, alcohol, dextrin and livestock fodder.

Objective

The primary objective of the model report is to facilitate the entrepreneurs in understanding the importance of setting up a unit of potato flakes. This model report will serve as guidance to the entrepreneurs on starting up such a new project and basic technical knowledge for setting up such a facility.

Raw Material Availability

The available raw material is potato. The total production of potato was 13391.24 ('000 tonnes) in the year 2010-11.Potato is available in varied quantities across all the districts in the state.
Following is the table indicating the top five districts in the state of West Bengal which contribute to the majority of potato production in the state:-

Sl. no.	District	Production ('000MT)	%age of state's production
1.	Hooghly	3434.459	24.82
2.	Paschim Medinipore	2448.136	17.69
3.	Burdwan	2268.242	16.39
4.	Bankura	1350.135	9.76
5.	Jalpaiguri	904.993	6.54
	Total	10405.965	75.20

Market Opportunities

India is a very insignificant player in the global trade of dehydrated potato products. The exports of dehydrated products from India are only to neighboring countries in form of dehydrated slices, dehydrated chips, powder, etc manufactured by small scale units.

At present, good quality flakes at affordable prices are not available in the country. Therefore, only the manufacturers of premium products have been in a position to use this product. Further, as flakes are generally imported in container loads, only bulk users can afford keep stocks and the agents importing the products have never tried to reach to the small end users. The consumption of potato flakes in India can increase manifold, once a good quality product, at an economical price is available. There are very good prospects for the growth of potato flakes in India. The following factors are likely to drive demand.
Big companies are constantly inverting R&D efforts in innovating new products constantly to explore new market possibilities. Recently, a leading potato snack company has conducted a market survey for new products, containing potato with egg and potato with chicken. The response was encouraging among the household in Metros, which may result in new product launch in the coming months. Similarly, there are immense possibilities of developing Indian snacks.

In West Bengal, a model unit is Pailan Potato Flakes situated alongside the NH connecting Kolkata to Burdwan. This unit is now supplying potato flakes not only to districts in West Bengal but to other parts of the country Apart from that Potato king Foods Limited and Basukinath Food Processors Limited operate out of Kolkata.This it is presumed that there is immense opportunity in setting up units in districts of Hooghly, Burdwan, Medinipur(W) and etc.
The manufacturing units can have its forward linkages throughout the country with special emphasis on the north eastern states where packaged, processed food products are in high demand.

Fast growth of fast food chains

During the last five years, fast growth of foreign and Indian fast food chains has been observed in India. The companies are now trying to open outlets not only in Metros but also in Class I towns and destinations of tourist Interest. The fast food chains are recording good turn over, as given below:

Annual sales of fast food chains

Mc Donald's Rs. 125-150 crores
Pizza Hut: Rs. 100 crores
Dominos Rs. 80-100 crores
Haldiram: Rs. 60-70 crores
Pizza corner Rs. 30 crores
The fast food chains use flakes for processing of formed products like cutlets, burger, meat products and Indian delicacies like pau bhaji and there are possibilities of using flakes for several other delicacies.

Applications of potato flakes

India is a very insignificant player in the global trade of dehydrated potato products. The exports of dehydrated products from India are only to neighboring countries in form of dehydrated slices, dehydrated chips, powder, etc manufactured by small scale units Potato flakes are most often used as an ingredient in manufactured snacks or bakery foods. However, they are far more versatile than that. A few examples of how these products enhance the taste, value and quality of different foods are:

As a Thickener

As a replacement for cornstarch or wheat flour, dehydrated potato flour, flakes and granules add volume to soups, stews, sauces, and broths.

As a Binder

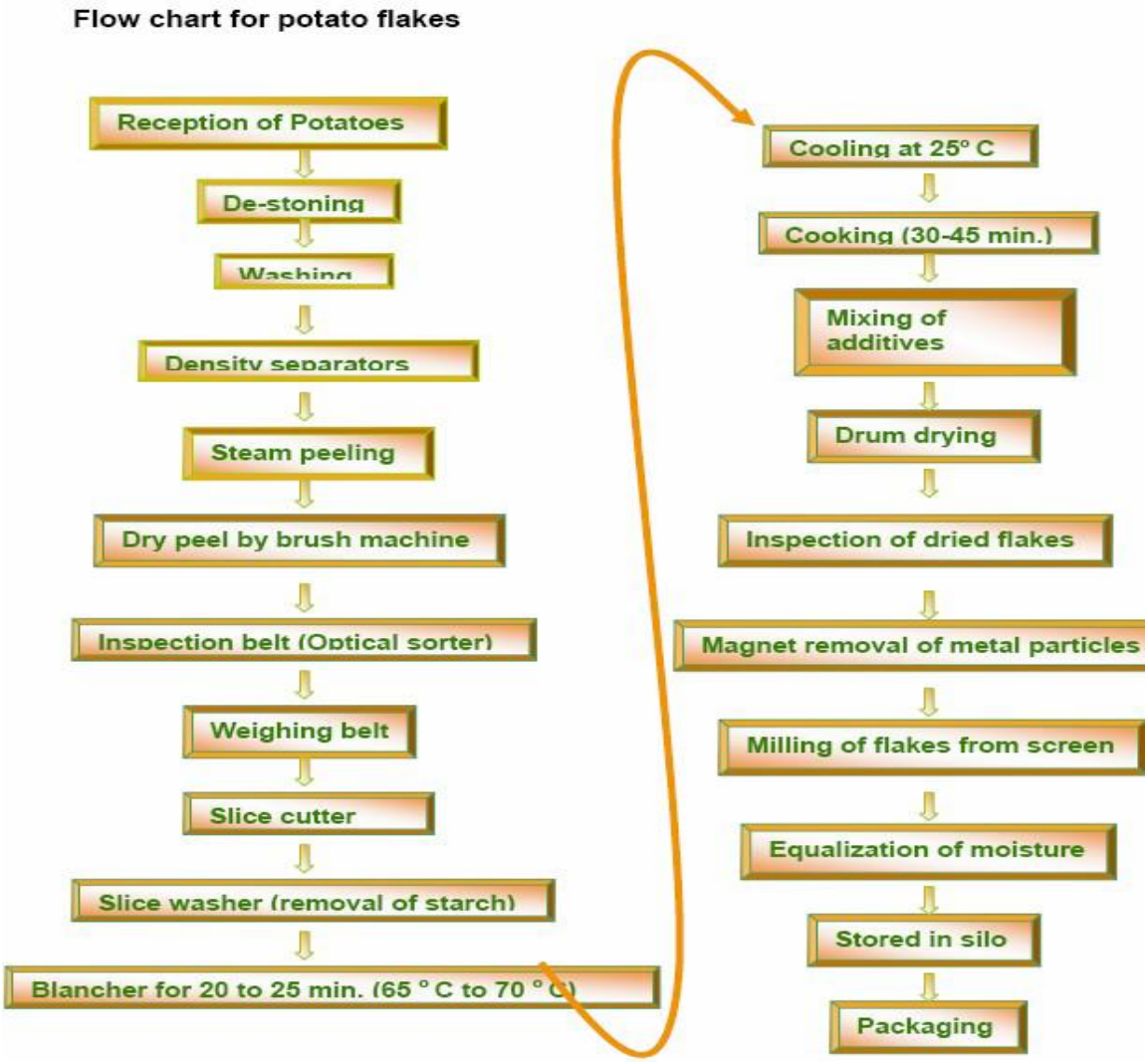
The starch in dehydrated potato products makes them perfect for use as a binding agent in meat, fish or vegetable patties, sausages and cakes.

As a Baking Ingredient
Because of their subtle earthy flavor, dehydrated potato products are popular in baked goods such as breads, cakes, muffins, etc. Moreover, they retain water better than substitute flours, increasing the shelf life of bakery goods.

As an Ingredient for formed products
Formed product like Burgers, Patties etc can be conveniently made from potato flakes.

As an Ingredient for packed snacks
Long shelf snacks like extruded products, fabricated chips are made from potato snacks. Apart from the above uses, in Indian snacks, a variety of applications can be made by using dehydrated potato products. Potato flakes can be used for various Indian delicacies like Aloo bhujia, fillings for Samosa, Dosa etc.

Manufacturing Process



Project cost: Around Rs.2.00 cr

Key Assumptions:

The Project Cost for the above unit has been derived keeping the following assumptions in consideration:

- Interest related costs have not been considered.
- Contingency factor has not been accounted for.

The estimated cost of Project will be around Rs. 1.98cr (excluding Land Cost). The break up of the cost is tabulated below:

Sl No.	Cost Components	INR in crore
1.	Building & Civil works	0.60
2.	Plant & Machinery	1.08
3.	Furniture	0.06
4.	Preliminary & Pre-operative	0.24
	Total Fixed Assets	1.98

***Note**: For detailed project cost DPR needs to be prepared.*

Land Requirement:

As indicated above the proposed project will require approximately 0.75 acres of land and proposed built up area for proposed unit will be approximately 1000 square meter.

Other Facilities:

- ❖ Adequate amount of water is required for washing, steam peeling, starch removal.
- ❖ Adequate electricity is required for frying, blanching.
- ❖ Storage facility is required for storing of raw materials as well as finished product.

Machineries Required:

1. Flake Plant
2. Steam Pressure Peeler
3. Cooling Tank With Screw Elevator
4. Continuous Washer/Brusher
5. Cutting ,Blanching , Cooling & Cooking
6. Mashing & Drying
7. Air Transport ,Inspection, Grinding & Milling
8. Storage-
    - Energy - Air Compressor Inc. Dryer
    - Control System

Suppliers of Machinery:

Sl. No.	Particulars	Suppliers/ Technology Provider
1.	Potato Washer	Global Agri Tech Engineer, Vadodara Shriram Temp Exchangers, Vadodara
2.	Potato Peeling Machine	Global Agri Tech Engineer, Vadodara Shriram Temp Exchangers, Vadodara
3.	Slicing Machine	Ambica Boiler & Fabricators, Ahmedabad Hind Pulverizer works, Ahmedabad
4.	Dryer	Shivaom Machine Tools, Noida SSP (PVT) Limited, Haryana
5.	Pulveriser	Kaps Engineer, Vadodara Shriram Temp Exchangers, Vadodara
6.	Sealing Machine	Ajinomoto India Pvt Ltd, Chennai
7.	Steam Boiler	Sadanand Approtech Pvt. Ltd, Mumbai
8.	Electric Weighing Scale	Avery India Ltd, Kolkata

Sources of technology:

- **Refrigeration equipments**
  Mr A.K.Vashist
  Manager (Technical services)
  Frick India Limited, 809,Suryakiram,19 K.G.Marg
  P.O Box – 118,
  New Delhi-110001
  Email: Delhi@frick.co.in
  Website: www.frickweb.com

- **Kriemko(UK) Ltd**
  Tasveld 7, P.O.Box 5, 3417 ZG Montfoort
  The Netherlands
  Tel:+31(0)348-479400
  Fax:+31(0)348-471307
  Email:Kriemko@Kriemco.com
  Website: http://www.kriemco.com/

Identification of promising project

Introduction

14 projects have been identified on the basis of following parameters:

- Availability of raw materials
- Agro climatic zones
- Availability of related infrastructure
- Manpower in the vicinity
- Marketability of the product
- Agri export zones
- Existing food processing industrial scenario

These 14 projects are as follows:

Sl. No	Name of Project	Tentative location	Natural advantage
1.	Large Modern Abattoir under private sector	Durgapur	West Bengal is highest producer of meat and also largest consumer of meat. It is the main rearing state of Bengal Black Goat which has a high demand in export market. Moreover bovine meat produced in the state are routinely exported through other states as there is no APEDA certified slaughter house in the state. Hence setting up a modern abattoir, certified by APEDA may be a viable proposition for the state.
2.	Watermelon juice processing and packaging unit	Coochbehar	Watermelon juice is not available in India; however it has been observed that every juice center in the road side offers watermelon juice during the season. The concentration in aseptic packaging can and marketed through out the year. Coochbehar area has a natural advantage in terms of availability of the fruit.
3.	High end cashew processing and packaging unit	East Medniapur	It has been observed from the export import data that a huge quantity, 2088 MT (2010-11) of cashew nut (fresh /dried in shell) was imported. This also opens up the business opportunities for a high end cashew nut processing unit in East Mednipur where cashew nut is produced in abundance.
4.	Fish processing unit (Frozen & ready to cook)	East Medniapur	West Bengal is the highest producer and largest consumer of fish. But there is deficiency in

Sl. No	Name of Project	Tentative location	Natural advantage
			availability of processed fish items. With increasing per capita income, demand for processed fish items is also rising. Moreover frozen fish of West Bengal has ready export market.
5.	Onion paste manufacturing unit	Hooghly	There is no unit producing onion paste in eastern and north eastern region, however demand for the product is growing day by day due to changed family structure and nature of working force of the society. A big storage unit for onion is also coming up in Hooghly district which would ensure regular supply of onion throughout the year. With huge production base there is a scope for enjoying natural advantage.
6.	Ground nut processing (milk, oil, cheese) unit	Hooghly	In the absence of any processing units ground nuts are transported to other state immediately after harvesting period. However products like groundnut butter, cheese, isolate, oil, bars have a good market in the state and in other adjacent states. Hence a groundnut processing unit can be set up in the state.
7.	Fruits grading, storing and processing unit	Howrah	Howerah is the place for end of supply chain and starting of distribution
8.	Mango, Litchi Processing unit	Malda	Mango, Litchi are produced abundantly in the district of Malda and Murshidabad
9.	Ice cream within the premises of Bhagirathi Milk Federation	Murshidabad	Bhagirathi Milk Federation shows interest for venturing into a Strategic Business Unit for ice cr□me production for which they are ready to provide land. Bhagirathi is also an established brand in north Bengal. Hence a Ice cr□me unit can be set up to serve the read market with established brand.
10.	IQF of fruits and vegetables unit	Nadia	West Bengal is highest producer of vegetables but in absence of any suitable infrastructure it can't export the vegetables to other countries. Hence an IQF facility with sorting, grading and packaging services can be set up, specially in Nadia, which is rich in vegetables.
11.	Banana processing unit	Nadia	Banana is abundantly growing in Nadia and

Sl. No	Name of Project	Tentative location	Natural advantage
			Hooghly district. A unit for processing banana will boost up farmers also.
12.	Sunflower oil processing unit	S-24 Parganas	South 24 Parganas district is famous for Sunflower production. Moreover Hooghly district has natural potential to grow sunflower.
13.	Guava processing and Pickle manufacturing unit (High end)	S-24 Parganas	Guava is available in abundant quantity in South 24 Parganas at a very low price. This can be processed and marketed for further value addition. For viability of the project processing of other fruits using the same line is suggested.
14.	Starch factory	Malda	Corn is growing in increasing quantity in the districts of Murshidabad, Malda, Uttar Dinajpur, Dakshin Dinajpur. Starch can be extracted from corn and it has a good established market.

Some of the project has been described in details.