BVFP 365S

Preparation of Food Processing Plant Proposal (Skill based)

Report on,

Mango frozen pulp processing unit

Submitted by,

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ROLL/Reg. NUMBER 7

Submitted to,

M.V.P. Samaj's

Arts, Science & Commerce College, Uttam Nagar CIDCO, Nashik 08

(Affiliated to SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

Under the guidance of

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Academic Year

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M.V.P. Samaj's

Arts, Science & Commerce College, Uttam Nagar CIDCO, Nashik 08

(Affiliated to SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

CERTIFICATE

This is to certify that,

Mrs. Kale Shravani Nanasaheb .Reg. no...7...of VI semester, of B. Voc. (**Food Processing Technology**) has completed the necessary work for the requirement of Course No. **BVFP 365S** Course Title: **Preparation of Food Processing Plant Proposal (Skill based)** in the year 2020-21. She has undergone fair exposure to start new industry on food processing and agro based includes present market position and expected future demand, market size, statistics, trends, SWOT analysis and forecast.

Course Teacher	Head of Department	Co-ordinator	Principal
Prof. A.K. Tiwari	Prof. Manoj Kumar	Dr.Prof.M.S.Girase	Dr.J.D.Sonkhaskar

Date: 24/6/2021
Place: Nashik

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DECLARATION

I` am hereby declare that this report is record authentic work carried out by us during the VI th semester and has not been submitted to any other university or institute.

Kale

Kale Shravani Nanasaheb

Regn. Number

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4. ACKNOWLEDGEMENT

I have great pleasure in presenting Preparation of Food Processing Plant Proposal report that I convey my sincere thanks to Course coordinator Prof. Dr. Manisha Girase for their valuable guidance & motivation throughout Preparation of Food Processing Plant Proposal report. I pay my deep sense of gratitude to Prof. Manoj Kumar (HOD Department of Food Processing Technology), Prof Tejas (Assistant Professor Department of Food Processing Technology) for the valuable guidance. Without their valuable suggestions & support this project would not have been a success.

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5. ABBREVIATIONS

HACCP	Hazard Analysis Critical Control Point
ISO	International Organization for Standards 14001
ISO	International Organization for Standards 22000
GRB	Glass Rinsible Bottle
PET	Polyethylene Terephthalate
BIB	Bag In Box
SDI	Slit Density Index
HEPA	High Efficiency Particulate Air Filter
WTP	Water Treatment Plant
TH	Total Hardness
TA	Titrable Acidity
CSD	Carbonated Soda Drink
TOA	Taste Odour Appearance
UV	Ultra Violet
RO	Reverse Osmosis
GV	Gas Volume
IB	Inverted Brix
CD	Controlled Drink

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Mango frozen pulp unit: -

8. Introduction and current status:

India is known as the second largest Fruits and vegetables producer in the world followed by china. India, during 2017-18 has produced about 97358 Thousand Ha and 184394 Thousand MT vegetables in about 6506 Thousand Ha and 10259 Thousand Ha areas, respectively. India's share of global exports of fresh fruits and processed fruit and product also quite meager compared with other major fruit produces of the world.

Mango is one of the most important and popular fruit in Bangladesh and is referred as the "king of fruits" because of excellent overall eating characteristics. It is consumed as a fresh fruit, in the frozen, preserved or dried forms or it's processed into juices, purees, chutneys and pickles. Ripe mangoes are best eaten as fresh fruit, usually as and are used in confectionary ice creams and bakery products .Mango contains variety of phytochemicals and nutrients. The fruit pulp is high in dietary fiber, vitamin c, provitamin A , carotenoids and diverse polyphenols.

The main varieties of mango produced in Bangladesh are Frazil, Gopalbhog, Khisrapat, Langra and BARI Aim 2,3 and 4. The major growing regions are in Rajshahi, chapai Nawbgani and Dinagpur Which are far from the consumption center of Bangladesh like Dhaka. Maintaining the quality are ensuring the safety of harvested mangoes from the farm until the fruit reaches the consumer should be the prime consideration of all stakeholders in the mango supply chain. This will also reduce the level of post-harvest loss in the supply chain.

Project at Glance

1.	Name of firm	
2.	Constitution	Company
3.	Name of proposed project	Partnership/company/proprietorship
4.	Nature of activity	Manufacturing of Mango frozen pulp
5.	Product	Product Capacity Mango pulp 300kg/per/hours
6.	Financial Assistance	Team loan 26.54 lacs
7.	Required	Working capital loan 22.00 lacs
8.	Primary security assets	Hypothecation of plant & machinery 1st charge on current.
9.	Proposed project capacity	100 MT/annum 100 % capacity utilization in the 2nd ,3rd& 4th year. Onwards and respectfully.
10	Raw material	Mango fruits
11	Major product output	Mango pulp

COST OF PROJECT:

PARTICULARS	**TOTAL COST**
Civil work	-
Plant & Machinery	26.22
.Office Furniture	5.00
Working Capital required	25.88
Total	**57.10**

MEANS OF FINANCE

PARTICULARS	**TOTAL COST**
Own contribution	7.00
Team Loan	28.10
Working capital From Bank	22.00
	57.10

FINANCIAL ASSISTANCE REQUIRED

Term Loan Rs. 26.54 Lacs and working capital limit of Rs. 22Lacs

COST OF PROJECT

PARTICULARS	**AMOUNT**	**AMOUNT**	**AMOUNT**
Land		15%	18%
Building civil work			
Plant & machinery	26.22	3.93	22.29
Furniture & fixtures and other assets	5.00	0.75	4.25
Working capital	25.88	3.88	22.00
Total	**57.10**	**8.57**	**48.54**

MEANS OF FINANCE

PARTICULARS	**Amount**
Own contribution	8.57
Bank Loan	26.54
Working capital limit	22.00
Total	**57.10**

8.1 Health Benefits and Nutritional value of mango:

The Vitamins, minerals and antioxidants in mangoes can provide important health benefits .for example, our blood vitamin k, helps your blood clot effectively and helps prevent anemia. It also plays an important role in helping strengthen your bones. Mangoes are rich in vitamin c, which is important for forming blood vessels and healthy collagen, as well as helping you heal. Mangoes are rich in folate, which is used for healthy cell division and DNA duplication

Mango prevent cancer, prevent heart disease ,helps lower cholesterol, improve digestion , prevent asthma , Improve eye health, regulate blood pressure and improves immunity and many other benefits. It also has a high amount of vitamin A, Vitamin c, potassium, protein and fiber due to which it helps prevents infection in pregnant women and also helps prevent eye problem in newborns. It also enhances skin health due to the presence of carptenoids.

8.2Nutrition facts:

Amount per 100gm

Calories 60

			% Daily value
Total fat 0.4 g			0%
Saturated fat 0.1 g			0%
Polyunsaturated fat 0.1 g			
Monounsaturated fat 0.1 g			
Cholesterol 0 mg			0%
Sodium 1 mg			0%
Potassium 168 g			4%
Total carbohydrates 15 g			5%
Dietary fiber 1.6 g			6%
Sugar 14 g			
Protein 0.8 g			1%
Vitamin A	21 %	Vitamin	60%
Calcium	1 %	Iron	1%
Vitamin D	0%	Vitamin B-6	5%
Cobalamin	0%	Magnesium	2%

Table 1: Nutritional facts

8.3 Current Status:

- State –wise details of the mango Production during the last three years and the current year.

Production in'000 Metric tones

SR .No	States	2015-16	2016-17	2017-18	2018-19
1	Andhra Pradesh	2803.66	4043.47	4043.47	5001.74
2	Arunachal Pradesh	0.03	NR	NR	NR
3	Assam	460.15	47.15	48.44	61.21
4	Bihar	1464.93	1472.38	2443.47	2434.65
5	Chhatisgarh	420.61	434.32	461.73	474.42
6	Gujrat	1241.59	1424.87	1207.78	1219.86
7	Haryana	89.97	96.79	98.60	119.32
8	Himachal Pradesh	37.63	48.24	31.35	44.19
9	Jammu & Kashmir	23.74	24.15	30.35	30.48
10	Jharkhand	393.67	438.54	435.86	432.93
11	Karnataka	1725.67	1719.73	1760.60	1866.23
12	Kerala	382.52	388.14	439.20	424.75
13	Madhya Pradesh	371.48	586.24	654.79	643.62
14	Maharashtra	463.17	603.83	791.36	566.32
15	Mizoram	4.18	4.80	4.19	4.19
16	Nagaland	3.74	4.23	4.24	4.243
17	Odisha	778.72	817.91	805.77	805.77
18	Punjab	113.50	113.69	116.52	118.76
19	Rajasthan	82.27	154.79	87.37	105.00
20	Tamil Nadu	975.11	1282.44	1234.00	1250.77
21	Telangana	1778.32	482.146	1080.14	1080.13
22	Tripura	59.06	57.03	54.93	52.70
23	Uttar Pradesh	4512.71	4341.00	4551.83	4577.15
24	Uttarakhand	149.73	150.14	152.71	152.89
25	West Bengal	693.39	736.90	918.35	844.88
26	Others	27.00	33.58	35.14	36.63
	Total	**18642.53**	**19506.20**	**21822.32**	**22352.87**

Table 2: state wise details of mango production

NR= not reported

Source : Horticulture Division, DAC & FW

- State wise important mango varieties grown are given in the table below :

State	**Varieties produce**
Ratnagiri ,Maharashtra	Alphonso, Mankurad, Mulgoa, Pairi, Rajapuri, Kesar.
Junagadh, Gujrat	Kesar, Alphonso, Kesar, Rajapuri, Vanraj ,Jamadar, Totapuri
Lucknow and Malihabad, Uttar Pradesh	Dasheri
Murshidabad, West Bengal	Himsagar and kishan Bhog, Langra , Frazil, Gulabkhas
Hardoi, Uttar Pradesh	Chausa, Bombay green, Langra, Safeda,Lucknow.
North Karnataka	Badami., Alphonso
Punjab	Bombay Green Mangoes, Dashehari, Langra
Varanasi, Uttar Pradesh	Langra,Safeda
Banglore , Karnataka	Totapuri
Andhra Pradesh	Neelam ,Allumpur, Baneshan, Banganapali, Totapuri
Karnataka	Raspuri, Alphonso, Bangalora, Mulgoa, Pairi, Totapuri
Salem, Tamil Nadu	Malgoa ,Mulgoba, Bangalora, Neelum, Rumani, Alphonso,Totapuri
Malda, West Bengal	Lakshmanbhog mango
All over India	Amrapali , Mallika
Andhra Pradesh / Telangana/Tamil Nadu	Imam pasand mangoes
Bihar/west Bengal	Frazil, Bombai, Himsagar, Kishen Bhog,Gulabkhas
Goa	Mankurad, Fernadin
Gujrat	Paheri /Pairi/ Vanraj, Kesar, Alphonso, Totapuri
Bihar, Jharkhand , and west Bengal	Gulab Khaas, Bombai, Frazil, Kishen Bhog, Sukul
Kerala	Kilichundan, Olour, Pairi
Chennai	Rumani

Table 3: State wise mango varities

Mango is cultivated in almost all the states of India. The state-wise growing belts are given in the following :

State	**Growing belts**
Andhra Pradesh	Krishna, East and West Godavari, Vishakhapatnam, Srikakulam, Chittoor, Adilabad, Khamman, Vijaynagar
Chhattisgarh	Jabalpur, Raipur, Bastar
Gujarat	Bhavnagar, Surat, Valsad, Junagarh, Mehsana, Khera
Haryana	Karnal, Kurushetra
Jammu & Kashmir	Jammu, Kathwa, Udhampur
Jharkhand	Ranchi, Sindega, Gumla, Hazaribagh, Dumka, Sahibganj, Godda.
Karnataka	Kolar, Bangalore, Tumkur, Kagu
Kerala	Kannur, Palakkad, Trissur, Malappuram
Madhya Pradesh	Rewa, Satna, Durg, Bilaspur, Bastar, Ramnandgaon, Rajgari, Jabalpur, Katni, Balagha
Maharashtra	Ratnagiri, Sindhudurg, Raigarh
Orissa	Sonepur, Bolangir, Gajapati, Koraput, Rayagada, Gunpur, Malkanpuri, Dhenkanal, Ganjam, Puri
Punjab	Gurdaspur, Hoshiarpur, Ropar
Tamil Nadu	Dharmapuri, Vellore, Tiruvallur, Theni, Madurai
Uttaranchal	Almora, Nainital, Dehradun, Bageshwar, UdhamSingh Nagar, Haridwar
Uttar Pradesh	Saharanpur, Bulandshahar, Lucknow, Faizabad, Varanasi
West Bengal	Malda, Murshidabad, Nadia

Table 4: State wise of growing belts

9. Project description, technological process, quality control and standard

9.1 Origin and History of Mango:

Mangoes originated in India over 4000 years ago and are considered a sacred fruit. Mangoes spread gradually throughout Asia and then to the rest of the world. Due to mango's large center seed, the fruit relied on humans transport them across the world.

The mango is inextricably connected with the folklore and religious ceremonies of India. Buddha himself was presented with a mango grove that he might repose in its grateful shade. The name mango, by which the fruit is known in English and Spanish speaking countries, is most likely a derived from the malayam manna, which the Portuguese manga when they came to Kerala in 1498 for the spice trade. Probably because of the difficulty in transporting seeds (they retain their viability a short time only), the tree was not introduced into the western Hemisphere until about 1700, when it was planted in Brazil; it reached the west Indies about 1740.

9.2 Cultivation and Bearing, Post-Harvest management and storage of mango

Mango can be propagated from seed or propagated vegetatively. Plants are generally propagated vegetatively by using several techniques like veneer grafting ,inarching and epicotyl grafting etc. Planting is usually done in the month of July – August in rainfed areas and during February – March in irrigated areas.

Mango is very well adapted to tropical and subtropical climates. It thrives well in almost all regions of the country from sea level to an altitude of 600 m. The ideal tempreture range of mango 24-30 degree.C. during the growing season ,along with high humidity. A rainfall range of 890-1015 mm in a year is considered as ideal for growing season. However, mango can be grown in regions of both heavy (2540 mm) or scanty (254 mm) rainfall.

Fog, cloudy weather at the time of flowering from November to February results in poor setting of fruits and favours pest and disease incidence. Mango grows well on wide variety of soils, such as latertic, alluvial, sandy loam and sandy .The loamy ,alluvial ,well –drained ,aerated and deep soils (2- 2.5 m)rich in organic matter with a range of 5.5 -7.5 are ideal for mango cultivation. The water table should be around 3m and soils with high water table are unsuitable for mango.

Tempreture between 10^0C. and 12^0C.are best for storage of backward or ripe fruit for a maximum of three days. Tempreture between 12^0C and 16^0C are best for transport to market. Tempreture between 18^0c and 22^0C are best for ripening.

9.3 Manufacturing process of frozen mango pulp:

India is the home of mangoes. A large number of varieties are found in almost all parts of the country. Mango pulp is prepared from selected varieties of fresh mango fruit. Fully matured mangoes are harvested, Quickly transported to the fruit processing plant, inspected and washed. Selected high quality fruits go to the controlled ripening chambers; fully ripened Mango fruits are then washed , blanched, pulped ,deseeded, centrifuged, homogenized, concentrated when required, thermally processed and aseptically filled maintaining sterility.

The preparation process includes cutting, de-stoning, refining and packing. In case of aseptic product the pulp is sterilized and packed in cans, hermetically sealed and reported. Frozen pulp is pasteurized and deep-frozen in plate freezers. The process ensures that the natural flavor and aroma of the fruit is retained in the final product.

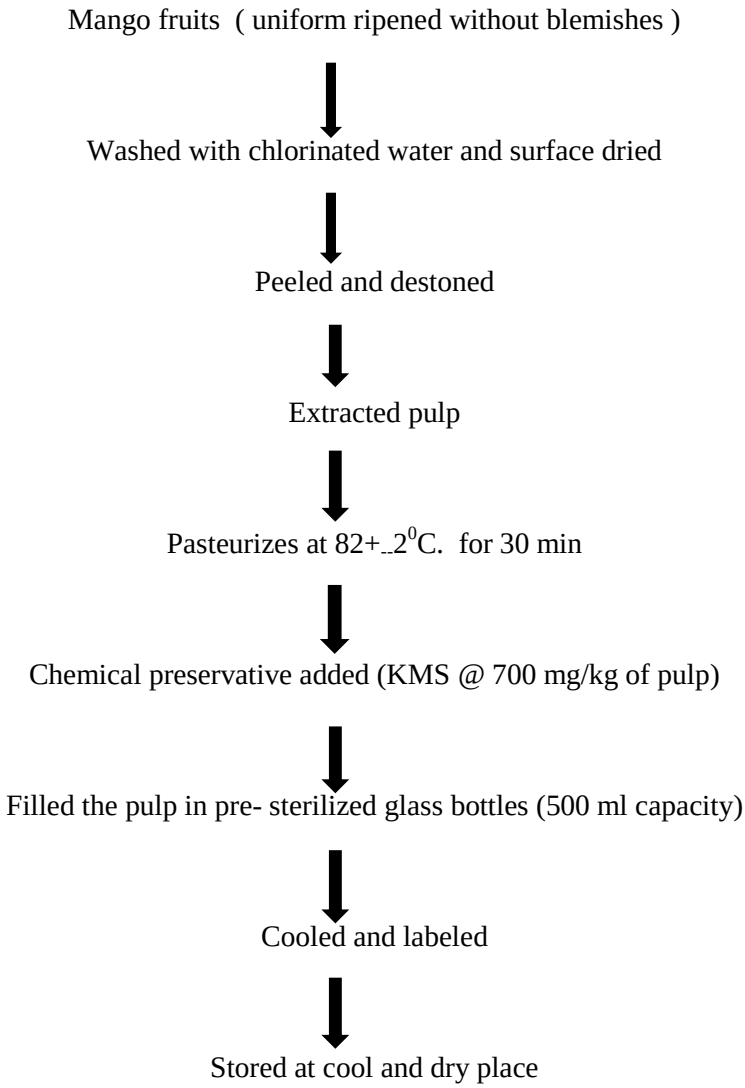
Mango pulp is used as a major food ingredient in the making of mango juices, nectars, juice blends, dairy, bakery ,baby food, manufacturing ,ice-creams etc.. However, in recent years the popularity of mango has spread to the western markets with the consumers showing interest in the taste.. The US juice industry and fresh market has shown consistent interest in both fresh mango and its processed products. The US juice industry has been making more and more use of mango pulp in its orange juice blends.

Mango pulp making machine:

With such benefits, mangos are processed into a variety of products, such as mango pulp, mango juice and dried mango. And mango pulping becomes the most prevailing method for the simple process, high nutrition remain and high yield. **The mango pulp processing includes mango cleaning, selecting, peeling and pitting, pulping, precook, blending, concentration, filling, sterilization and cooling. The mango pulp machine for pre-treatment includes fruit sorting machine, brush and spray cleaning machine, mango peeling and destoning machine, fruit pulping machine.** TICO can provide you with customized mango pulp processing plant to make high quality mango pulp at high efficiency.

9.4 Mango Pulp Technological Processing Flow:

Mango frozen pulp flow chart:



Raw material treatment

In this process, we must separate superior, qualified and defective mangos with fruit sorting machine. Different quality is suitable for making varied end-products. To make mango pulp, the pectin and acid content should be around 1%. If the raw materials don't reach this level, additional fruit pectin and acid is required. As for the selected mangos, they have to go through cleaning processes to remove the purities and pesticide residues.

Figure 1: mango washing and peeling

Mango peeling and pitting

The interfusion of mango peel and core will greatly influence the taste of mango pulp, they must be removed completely before mango pulping. Our self-developed mango pulping and destoning machine is specialized in mango processing. It is able to peel and pit mango simultaneously, with the pulp recovery rate up to 99.5%. The equipment is made of stainless steel, remember to clean and sterilize it before mango processing.

Mango pulping

Under the function of crushing and centrifuging of mango pulping machine, mangos are processed into fluid form. The mango pulping machine adopts enclosed structure as a way to avoid mango pulp oxidation, thus preserving the taste and nutrition of the raw materials. The mango pulp made by this machine present uniform texture, high thickness and fine granule.

Mango pulp pre-cooking

Usually, crude mango pulp need heating to soften the content and promote its taste. Before heating please remember to clean the tools thoroughly. As you pour the mango pulp into the container, keep stirring it to let the pectin fully leak out. The temperature rise up high in the beginning. You have to limit the heating time to under 10 minutes, or the color would go dark and the taste would go bad.

Blending with batching

After heating and batching, the mango pulp can be added with certain proportion of batches. Generally, the pure mango pulp should take up 40%-50%. Among all batches, sugar is supposed to be 45%-60%, the quantity of fruit pectin and acid must be measured in line with raw materials. Add proper volume of pectin, agar and citric acid to make the pectin content in end products between 0.4% and 0.9%, and the acid content from 0.4% to 1.0%. The feeding sequence is syrup, pectin fluid and citric acid after 10-min heating.

Concentration process

Sweetening concentration refers to eliminate most of the water content in mango pulp by heating, so that the sugar, pectin and citrus acid are interpenetrate uniformly and thus improve the pulp texture and flavor.

Figure 2: Mango pulp

Filling sterilization and cooling

After mango pulp is concentrated by heating, fill it into cans at once. Make sure the container is clean, sterilized by steam and the moisture is drained. Keep the temperature of cans over 40 ℃, and the temperature of pulp between 80℃ and 90℃ during filling process. The sterilization process is taken in steam environment for 5 to 10 minutes right after can sealing, then the cans are cooled to under 38℃.

Mango pulp processing plant is essential for massive production of mango pulp. TICO is a professional manufacturer dedicated to mango, orange, pineapple, grape and other fruit processing machinery. **The mango processing plant adopt scientific design, sustainable stainless steel, stable performance and handy operation, widely applies to various fruits.** You can make high quality mango pulp and high profits with our mango pulp machines.

9.5 Quality parameter of Mango:

As a reputed supplier of frozen alphonso pulp, we ensure that only the best quality alphonso mangoes are made use of in pulp preparation. Farm-fresh alphonso mangoes are peeled and the pulp scooped out which is then individually quick frozen to get the final processed product. The frozen mango pulp is maintained at storage temperature of -18° until delivered to customer.

During selection, optimum care is taken to pick only blemish-free alphonso mangoes as after prolonged maturity, this fruit starts showing signs of decay. You will experience the richness of our frozen Alphonso mango pulp as soon as you get to savour the very first bite of it. It exhibits a golden yellow colour with a thick texture

Single Strength Specification:

PARAMETERS	**VALUE**
Total Soluble Solids % TSS at 20° C	16.0 °Brix min.
pH	3.5 to 4.5
Color	Golden Yellow
Taste	Wholesome & characteristic
Appearance	Golden Yellow Homozinics pulp passed through 1/32" Mesh Sieve size
Flavor	Sweet and tart very remotely Comparable with ripe Alphonso. Typical of freshly extracted Puree from well ripened. Fruit free from cooked flavor and off-flavor of any kind.
Packaging	Product is packed in 3.1Kg Cans and Aseptic Bag in Drum using a polyliner
Net Weight	215 Kg/Drum for Aseptic Bags and 6x3.1Kg Cans/Carton packaging
Loadability	Aseptic: 80 Drums per 20' FCL
	Canned : 1000 Cartons per 20' FCL
Storage Condition	Storage at -18° Temperature

9.6 Standards for mango frozen pulp:

1. Thermally Processed Mango Pulp / Puree and Sweetened Mango Pulp / Puree (Canned, Bottled, Flexible Pack And/ Or Aseptically Packed) means unfermented but fermentable product intended for direct consumption obtained from edible portion of sound, ripe mangoes (Mangifera indica.L.), by sieving the prepared fruits, whereas, the puree is obtained by finely dividing the pulp by a finisher or other mechanical means and processed by heat in an appropriate manner, before or after being sealed in a container, so as to prevent spoilage.
2. It may contain one or more nutritive sweeteners in amounts not exceeding 50 gm/ kg. However, the product shall be described as sweetened Mango pulp/ puree if the amount of nutritive sweeteners is in excess of 15 gm / kg.
3. The product may contain food additives permitted in these regulations including Appendix A. The product shall conform to the microbiological requirements given in Appendix B. It shall meet the following requirements:-
    1. Total Soluble Solids (m/m)
        1. Sweetened – Not less than 15.0 percent
        2. Unsweetened (Natural Mango Pulp) – Not less than 12.0 percent
    2. Acidity as Citric Acid (For sweetened canned mango pulp) – Not less than 0.3 percent
4. The container shall be well filled with the product and shall occupy not less than 90.0 percent of the water capacity of the container, when packed in the rigid containers. The water capacity of the container is the volume of distilled water at 20ºC which the sealed container is capable of holding when completely filled.

9.7 Quality Control:

The following test is used to determine the following content:

1. Total soluble solid (a. Clear liquid products, b. semi thick product, c. Thick products)
2. Min fruit content (a. solid products, b. Liquid products)
3. Ethanol content
4. Essential oil content
5. Total solids exclusive of added sugar
6. Microbial analysis of thermally processed food

10. Present Market position:

Mango is commercially grown in more than 90 countries worldwide and is consumed both in fresh or processed form. About 1600 varieties are registered in the world, of which about 1200 exist in India alone. India is the leading producer of mango in the world.

This growth in mango exports from India would remain sustainable for years to come considering the growing import demand of fresh mangoes in the world. Global demand of mangoes which was meager 1.4 USD million in 2009 have been facing a continuous rise reaching a promising figure of 3.2 USD million recently giving huge potential for Indian mangoes to capture the rising global demand.

The details of India's exports of mangoes during the last three years and the current year are as under:

Quantity (in MT); Value (in Million USD)

ITCHS	**COMMODITY DESCRIPTION**	**2015-16**		**2106-17**		**2017-18**		**2018-19 (UPTO Nov-18)***	
		Quantity	**Value**	**Quantity**	**Value**	**Quantity**	**Value**	**Quantity**	**Value**
08045020	MANGOES FRESH	36779.26	50.10	52761.00	66.46	49671.32	59.45	43063.70	53.80
08045030	MANGOES SLICED DRIED	3644.09	6.94	376.78	2.40	569.05	3.05	1035.56	3.39
08045040	MANGO PULP	128866.01	121.29	130886.07	126.14	110923.73	104.54	72187.96	64.12
TOTAL		**169289.36**	**178.33**	**184023.85**	**195.00**	**161164.10**	**167.04**	**116287.22**	**121.31**

Source DGCI&S, *Figures of 2018-19 are provisional only

Table 5: India's exports of mango (Quantity and value)

11. Expected future demand:

India is the largest mango pulp exporter in the world. Mango production is throughout world. However, most of the pulp industries are established in southern and western India and these regions account foe major proportion of export that happens from India.

The global mango pulp market is driven by a significant increase In consumer' preference towards the fruit based products apart from its taste, mango has health benefits such as it helps in boosting the immune system , aids digestion, promoters healthy gut and others. The increasing product demand from the beverage industry will positively leverage the mango pulp market in upcoming years. Growing consumption of fruit flavored yogurt is projected to support the growth of the mango pulp market during the forecast period. In February 2019, Danone launched a new peach mango flavored yogurt variant.

The leading food franchise is focused on experimenting and producing new products that include mango pulp as a crucial ingredient. For instance, many leading food franchises, such as McDonald and starbucks, have started using mango pulp for the preparation of smoothies and shakes. Mango pulp is commercially used in pudding, bakery filling, and as a flavor across the food & beverages industry. In April 2019. Danone India announced the launch of new mango – flavored protinex variant.

The Global mango pulp market is accounted for $995 million in 2017 and expected to grow at CAGR of 8.7 % to reach $ 2110 million by 2026

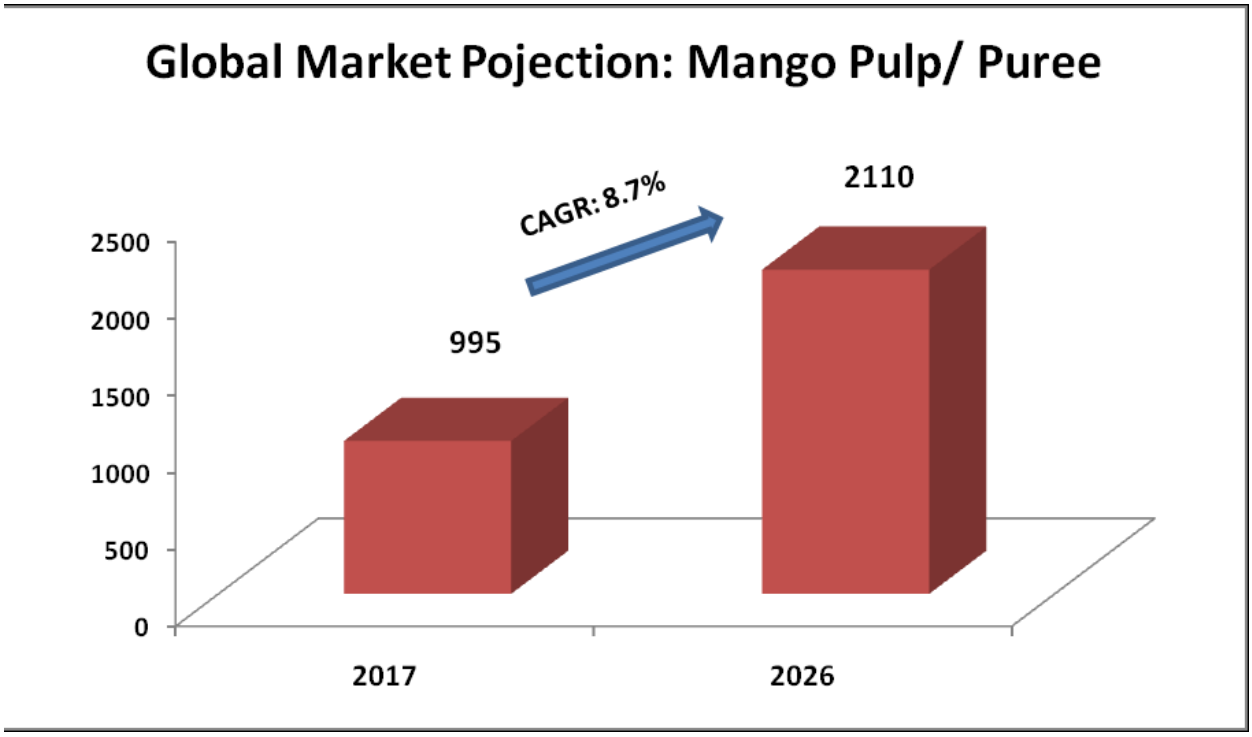


Table 6: Global market projection: Mango pulp

11.1 International Markets for Indian Mango:

Asian producers find it easier to expand sales to the European Union. Europe's acceptance of different varieties is greater, because of a large demand from Asian immigrant groups. Phytosanitary restrictions are less stringent. Transportation costs are not as big a factor in exporting mangoes to the European Union as in exporting to the United States market: for example, India and Pakistan are able to compete with non-Asian suppliers to the European Union, whereas proximity gives Mexico and Haiti a clear advantage in supplying to the United States market.

Fifty-four percent of European Union imports enter during the periods May to July and November to December, with peak imports in June. French imports reach peak in April and May, whereas United Kingdom imports are concentrated during the May to July. German imports are spread more evenly throughout the year. Of the top suppliers, Brazil provided chiefly during the period November to December, the United States during June to October, South Africa during January to April and Venezuela during April to July. Pakistan supplies the majority of its exports to the European Union during June and July; **Indian exports take place mainly during the month of May**.

Although a lion's share of Indian mango goes to the Gulf countries, efforts are being made to exploit European, American and Asian markets. About 13,000 MT of Alphonso varieties is exported to Middle East, UK and Netherlands every year.

The different products of mango which are exported include mango chutney, pickles, jam, squash, pulp, juice, nectar and slices. These are being exported to U.K., U.S.A., Kuwait and Russia. Besides these, the fresh mangoes are being exported to Bangladesh, Bahrain, France, Kuwait, Malaysia, Nepal, Singapore and U.K.

The varieties in demand at the international market include Kent, Tomy Atkin, Alphonso and Kesar. Varieties such as Alphonso, Dashehari, Kesar, Banganapalli and several other varieties that are currently in demand in the international markets are produced and exported from India.

‘ Mahamango’, a co-operative society was established in 1991 with the support of Maharashtra State Agricultural & Marketing Board (Pune). This was mainly formed to boost the export of Alphonso mangoes as well as for domestic marketing. Facilities like pre-cooling, cold storages, pack house, grading packing line etc. have been made available at the facility centre of Mahamango for which the financial assistance was given by APEDA, New Delhi and Maharashtra State Agricultural & Marketing Board (Pune).

A similar type of association named ‘MANGROW’ has been formed for the export of Kesar mangoes from Aurangabad district of Maharashtra.

12. Market size:

The prospects for mango pulp exporters India is on the upward swing as demand is growing exponentially. The mango fruit industry is gearing up to meet this increased demand and mango pulp manufactures are investing in infrastructure and resources to cater this.

India is also a major exporter of mango pulp in the world. The country has exported 1,35,621.22 MT of mango pulp to the world for the worth of Rs. 864.97 crores/129.29 USD Millions during the year 2016-17.

India produces 350,000 tons of mango pulp annualy, 50 percent of the estimated 700,000 tons of global mango pulp production .It .exports 200,000tonnes of pulp, while 150,000 tones are consumed domestically.

Mango pulp exports mainly cater to B2B segment ie. Beverage (juice) manufacturers, Dairy, Ice-cream, Bakery and confectionery industry.

The country's mango production has been increasing every year and is estimated to be up by 8 percent to approx. 22 million tonnes by 2018-19. Indian Mango pulp export has a comparative advantage over the other countries due to the superior quality and grade of varieties available. However, Indian Mango pulp is facing severe competition from countries in South America & Africa since the mango from these countries is relatively quite cheaper. The challenge is especially dismal this year because of a natural shortage owing to lower production of fruit. While we have been able to maintain our export volumes, we have been compelled to pay higher prices. For e.g. Current year TMP price for EU markets ranges between USD 750-850 per MT compared to last year average between USD 480-550 per MT. Such enormous variability and price inconsistency leads to loss of valuable orders and key customer retention.

13. Statistics (Land, machinery, infrastructure, raw material, consumable power and utility, installed capacity)

Description of Automatic Mango Pulp Machine:

Pulping processing of machine

- Fruit washing Machine
- Sorting/Inspection conveyor
- Working Table
- Screw feeder
- Fruit crusher
- Pulper
- Pulp collection tank
- Transfer pump
- Steam jacketed kettle
- Twin pulper
- Filling tank
- Steam boiler

Machinery & Equipment's required :

Name	**Cost**
Fruit washing machine	4,86,000
Sorting conveyor	1,80,000
Working table	1,12,500
Screw feeder	2,70,0000
Fruit crusher	36,000
Pulper	18000
Pulp collection tank	36,000
Transfer Pump	81,000
Steam jacketed kettle	90,000
Twin pulper	2,25,000
Filling Tank	75,000
Steam boiler	6,30,000
Total	2,239,500

Table 7: Machinery & Equipment cost

Cost of the machine is exclusive of GST & other than transportation cost.

Land & Building required:

Land required 2500 square feet.

Approximate rent for the same is 50,000 per month.

Labour Requirement

5 Manpower are required for the Mango pulp Unit

Includes:

2 skilled Labour

3 Unskilled Labour

Raw Material Requirement:

Mango is required for the mango pulp unit:

Average raw material (cost per KG) :Rs. 50-60

KMS (700 mg/kg)

Mango Pulp license & registration

For company:

- Obtain the GST registration.
- Additionally, obtain the Udyog Aadhar registeration Number.
- FSSAI license Required
- Fire / pollution Registration vas required
- Choice of a brand name of the product and secure the name with Trademark if required.
- NOC (No Objection Certificate
- Pollution department
- Land – permit registeration
- APEDA
- Patent

Implementation schedule :

S.N	Activity	Time required (in months)
1	Acquisition of premises	1
2	Construction	1-2 months
3	Procurement & required Manpower	1
4	Arrangement of Finance	1
5	Required of required Manpower	1
	Total time Required (some activities shall run concurrently)	2-3 months

Table 8: Implementation schedule

COMPUTATION OF PRODUCTION OF MANGO PULP

Items to be manufactured Mango pulp		
Machine capacity per Hour	300	KG
Wastage	5 %	
Output per hour	285	KG
Machine capacity per annum	547200	KG
Raw material Requirement Mango Required per Annum	576000	KG

Table 9: Computation of production of mango pulp

Production of mango pulp

Production	**Capacity**	**KG**
1st year	50%	273,600
2nd year	53%	290,016
3rd year	55%	300,960
4th year	58%	317,376
5th year	60%	328,320

Table 10: Production of mango pulp

Raw Material	**Capacity Utilisation**	**Rate per KG**	**Amount (Rs. In lacs)**
1st year	50 %	55.00	158.40
2nd year	53%	56.00	170.96
3rd year	55%	57.00	180.58
4th year	58 %	58.00	193.77
5th year	59%	59.00	203.90

Table 11: Raw material

COMPUTATION OF SALE

Particulars	**1st year**	**2nd year**	**3rd year**	**4th year**	**5h year**
Op Stock	-	11,400	12,084	12,540	13,224
production	273,600	290,016	300,960	317,376	328,320
Less :Closing Stock	11,400	12,084	12,540	13,224	13,680
Net Sale	**262,00**	**289,332**	**300,504**	**316,692**	**327,864**
Sale price per KG	90.00	**91.00**	92.00	93.00	94.00
Sales(in Lacs)	**235.98**	**263.29**	**276.46**	**294.52**	**308.19**

Table 12: Computation of sale

BREAK UP OF STAFF SALARY

Particulars	**Wages Per month**	**No of Employess**	**Total salary**
Supervisor	20000	1	20000
Accountant	18000	1	18000
Helper	8000	2	16000
Total salary per month			54000
Total Annual Labour Charges			**6.48**

Table 13: Break up of salary

Utility charges at 100 % capacity (per month)

Particulars	**Value**	**Description**
Power connection required (3 phase)	30	KWH
Consumption per day	240	Units
Consumption per month	4800	Units
Rate per Unit	7	RS.
Power Bill per month	33600	Rs.

Table 14: Utility charges

CONSUMPTION OF CLOSING STOCK & WORKING CAPITAL					
PARTICULARS	**1st year**	**2nd year**	**3rd year**	**4th year**	**5th year**
Finished Goods					
	8.32	8.88	9.38	10.05	10.59
Raw Material					
	3.30	2.85	3.01	6.46	10.20
Closing stock	**11.52**	**11.73**	**12.38**	**16.51**	**20.79**

Table 15: Consumption of closing stock & working capital

COMPTATION OF WORKING CAPITAL

REQUIREMENT

TRADITIONAL METHOD			

PARTICULARS	AMOUNT	OWN MARGINE	BANK FINANCE
Finished Goods & Raw Material	11.52		
Less :Creditors	2.64		
Paid stock	**8.88**	**15% 1.33**	**85% 7.55**
Sundry Debtors	**24.58**	**15% 3.69**	**85% 20.89**
	33.46	**5.02**	**28.44**
WORKING CAPITAL LIMIT DEMAND (from bank)		**22.00**	

Table 16: comptation of working capital

13.1 Background of the promoters/Owners and Required Documents:

The detailed bio-data of promoter/promoters inter-alia name, age, qualification, business experience, training obtained ,contact number, email, office address, permanent address, holding e pattern , definite sources of meeting the commitment of promoters contribution , details of others business experience ,training obtained ,contact number, email, address, share holding pattern, definite sources of meeting the commitment of promoters contribution ,details of other business along with certified balance sheet and profit loss account for the last 3-4 years, tax registration, PAN number , income tax return etc for the last 3-4 years and other requirements as specified in the FME guidelines must be provided with the DPR.

13.2 Background of the proposed project

The entrepreneur must specify whether it is a new project or expansion of the existing project. If new project is proposed then the reason to go in to the project and if expansion of the existing project, the must specify what kind of expansion is proposed in terms of capacity, product, machines, civil infrastructure etc.

13.3 Location of the proposed project and Land :

The entrepreneur must provide description of the proposed location ,site of the project , distance from the targeted local and distant markets ;and the reasons/advantages therefor i.e . in terms of raw materials availability, market accessibility, logistics support , basic infrastructure availability etc, The entrepreneur must mention whether project is proposed in self-owned land or rented/allotted land in any industrial park or private location. Accordingly, he /she must provide ownership document, allotment letter/lease deed. Land clearance certificate must be from village authority. The ideal location for establishment of exclusive mango frozen pulp unit are in the production of the cluster of ten major mango growing states such as Maharashtra, Uttar Pradesh , Gujrat, Bihar, Tamil Nadu, West Bengal, Andhra Pradesh, Karnataka, Jharkhand, Odisha where adequate quantities of surplus raw materials can be available for processing.

13.4 Detailed Project Assumption:

The model DPR for mango based mango frozen pulp unit is basically prepared a template based on certain assumption that may vary with capacity, Location, raw material availability etc. An entrepreneur can use this model DPR format and modify as per requirement and suitability. The assumption made in preparation of this particular DPR is given in table. This DPR assumes expansion of existing unit by adding new mango based pulp line. Therefore, land and civil infrastructures are assumed as already available with the entrepreneur.

Table : Detailed project assumption		
	Parameter	**Value assumed**
1.	Capacity of the mango frozen pulp processing Unit	100MT/annum
2.	Utilization of capacity	1st year 50 % implementation, in 2nd year 53% ,in 3rd year 55 % and in 4th year onwards.
3.	Working days per year	300 days
4.	Working hours per day	8-10 hrs.
5.	Interest on term & working capital loan	12 %
6.	Repayment period	54 months
7.	Average price of raw material	60kg
8.	Pulp extraction	200 gm pulp/kg of mango
9.	Pulp processing	2 liters pulp/Kg of mango

Table 17: Detailed project assumption

13.5 Plant layout:

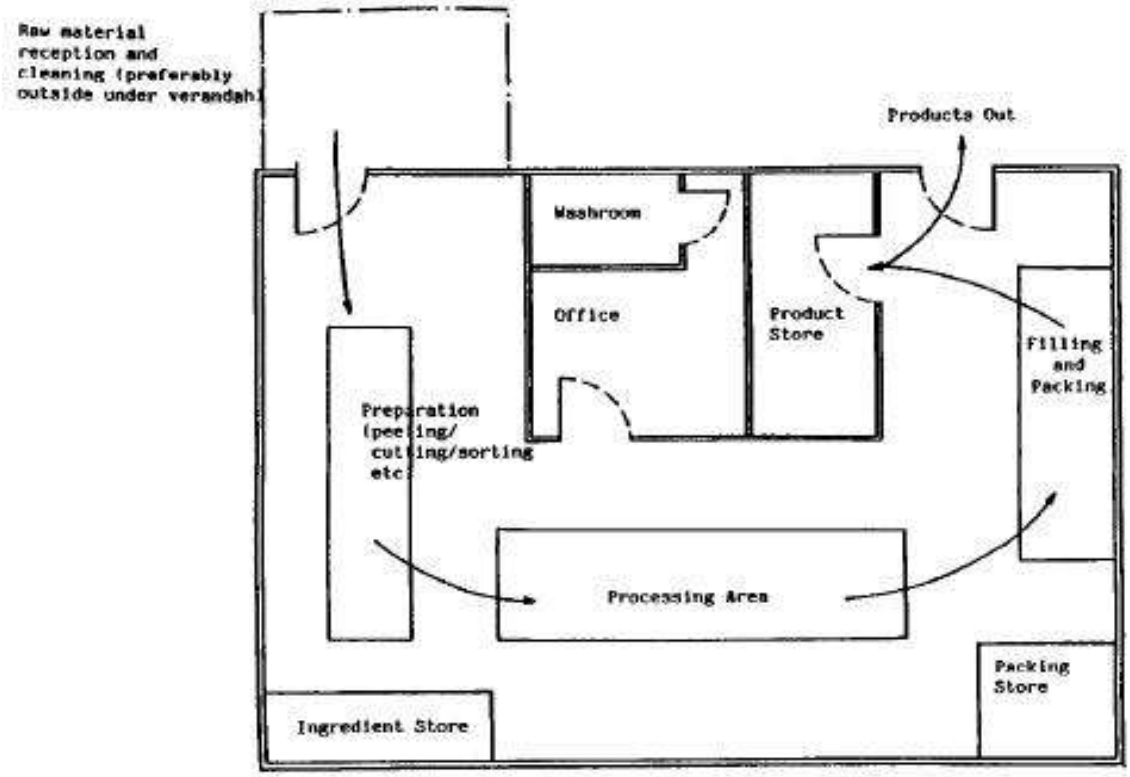


Figure 3: plant layout

14. Trends:

The food processing industry is a mature sector which is experiencing a turbulent period due to the growing global demands for food safety, increasing food insecurity and consumer demand for higher quality and sustainability.

There is a significant economic impact of getting food safety wrong if modern food supply chains are incorrectly assessed and risk mitigation is absent. Even a small impact on a supply chain can have a large economic impact. The processed food industries are valued at over $2 trillion dollars globally and consist of over 400,000 businesses.

In 2011, it's estimated that 48m Americans fell ill and 128k were hospitalised as a result of food hygiene issues. The cost to the US economy was $77.7bn.

source: CDC, Centre for Disease Control and Prevention, 2011

Food processing is also significantly impacted by multiple external factors, including economic trends, climate change, demographic shifts, emerging power markets, new trade partnerships and world population growth predictions.

Today's food supply chain is more globalised, longer and far more complex than ever before. With growing imports and exports, processed foods are dependent on longer supply chains which poses a great challenge to assuring food safety.

The below content dives into the detail of the major trends affecting the food processing sector and their implications for the evolution of the industry.

Regional socioeconomic trends impacting food processing

In many countries, the food processing industry is a major contributor to the health of the national economy. In the same way too, the sector is impacted by both the local economy where it manufactures as well as by the global economy in terms of food logistics and imports and exports.

Shifts and changes in regional economies, population size, food consumption, and the food and drinks industry in general all have significant implications for food processing.

Leading food industry regions

According to the European Food and Drink Industry there are three leading production regions worldwide:

EU — 44% of turnover

USA — 20% of turnover

China — 19% of turnover

The turnover of the EU food & drink processing industry alone is double that of the USA and China. However, this will change significantly in the next few decades.

Growing demand for food

In order to feed the growing world population, predicted to reach 9.3 billion by 2050, agricultural production needs to grow by 70% and by nearly 100% in fast growing economies.

Demographic shifts

By 2030, India will have the largest population in the world, representing 1/3 of the Asian population and 17% of world population.

In fact, by 2050, India, China, Indonesia, Philippines and Pakistan will represent more than 50% of the world's population.

Consumption & Urbanisation

By 2050, two thirds of the world population will be living in cities, increasing demand for processed foods and meat protein — in Asia protein consumption will have grown by 128%.

Economic power shifts

By 2030, E7 countries (China, India, Brazil, Mexico, Russia, Indonesia, Turkey) will overtake the G7 (Canada, France, Germany, Italy, Japan, UK, US) in size and purchasing power.

The growth in demand and high growth of both exports and imports in key emerging markets is making food safety and hygiene in this sector a priority.

Global shift in demand

The emerging markets (India, Indonesia, China, Malaysia) will increasingly drive global growth. The share of both exports and imports for food and drink products in these markets is growing rapidly. Manufacturing & processing will increasingly shift to these markets, to be close to a growing customer base.

Prosperity

65% of the world's middle class will be living in the Asia Pacific region by 2030. The increasing disposable income in emerging economies will drive demand for manufactured food products.

Macro factors in food processing

The complexity of modern supply chains is just one recognized factor affecting food processing today. It is no longer enough to mitigate risk in the primary processing and manufacturing unit. To truly assure food safety in today's world, businesses need to assess levels of risk along the entire supply chain, from end to end.

The increased cost of raw material will impact cost of damages in case of pest infestation. This places a heightened need on businesses to action recommendations to prevent, reduce and control pest infestations at pace.

15. SWOT analysis of frozen mango pulp:

1. **S –Strength:**

- Raw material & manpower availability
- Mango pulp use for another product like juice, nectar, jam, jelly etc.
- Day by day mango pulp selling is increasing.
- Price, a competitive advantage natural product
- Innovative (New tastes)
- Export growing in market day by day
- Off season availability of mango products /pulp

2. **W-Weakness**

- High cost equipment
- Brand acknowledgement
- Seasonal availability of raw mango
- Not perceived as a health drink
- Seasonal work

3. **O--Opportunities:**

- High export market potential
- Demand in foreign country
- Innovative ideas in mango pulp products

4. **T- Threats:**

- High Capital investment
- High power
- The same products are also available in the market
- High consumer preference for flavors other than mango
- Competition with global giants
- High supply chain cost

Forecasting:

Global marketing forecasting used a modeling approach such as statistical techniques and forecasting, both techniques are being used to estimate and forecast market data. Each regional market is evaluated separately.

16. Market Growth drivers:

Some of the major factors expected to drive growth of the global processed mango products ach regional market is evaluated separate in North America and Europe regions. Shifting preference from citrus-based oranges and sweet limes to sweeter fruits and based products is ongoing trend in various western countries.

Increasing awareness regarding health benefits of mangoes is another factor expected to drive demand for processed mango products to a great extent. Mangoes are low-calorie fruit and have high fiber content

Mango pulp is derived from fully ripened mangoes, which is a native fruit in most of the regions of the world. People in the developed and developing regions due to lack of time prefer mango pulp instead of raw mangoes for different recipes and dessert. Mango pulp is mostly used to make juices, nectars, drinks, jams, fruit cheese and various other kinds of beverages. It is also used in puddings, bakery fillings, and fruit meals for children and flavors for the food industry, and also to make the ice creams, yogurt, and confectionery items. The mostly sold mango puree product in the market is to the foodservice industry. There are several benefits of mango puree such as it prevents cancer, prevents heart disease, helps lower cholesterol, improves digestion, prevents asthma, improves eye health, regulates blood pressure, improves immunity and many other benefits. It has a high amount of vitamin A, vitamin C, potassium, protein and fiber due to which it helps prevents infection in pregnant women and also helps prevent eye problem in newborns. It also enhances skin health due to the presence of carotenoids. Because of these benefits, mango puree market is expected to grow on a higher scale in the forecast period.

Apart from all the benefits, due to the presence of high amount of carbohydrate people who are focusing towards weight loss do not prefer mango puree, which is restraining the mango puree market.

However, mangoes require tropical climate to grow, hence cannot be grown everywhere and cannot be grown all the time of the year. In addition, fluctuating climatic conditions results in fluctuating prices of mangoes. Moreover, cultivators do not provide mangoes at a standard cost, and stop supplying when the cost is low. These Aforementioned factors could result in low-profit margins for food processing industry, and inability to meet substantially high demand for processed mango products.

Drivers of growth of agricultural marketing in India:

1. Technological changes in Agriculture :

Technological developments in agriculture, such as the evolution of high yielding varieties of seeds ,increased use of modern inputs and cultivation practices in the agricultural sector, have resulted in substantial increase in farm production. The marketed surplus of agriculture produce has resulted into the growth on the marketing system.

2. Specialization :

The tendency towards increasing specialization by farmers and regions in certain crops or livestock has resulted an increase in their efficiency and the breakdown in the self-sufficiency of the family unit. Specialization ,thus has resulted in increased production, which is the base for the growth of marketing and, in turn ,of the economy. This has also resulted in improved use efficiency of natural resources like land and water

3. Urbanization:

Urban people are the main buyers of agricultural surpluses. The urban population of India has increase significantly which necessitated a faster growth of agriculture marketing activities .The rate of growth of urban population is much higher than rural population (due to rural – urban migration) which has further increased the importance of marketing system for farm products.

4. Transportation and communication:

The increase in transportation and communication facilities has widened the market for farm products. The length and breadth of the market to which a product is taken from the production areas have increased. In the absence of these facilities, the movement of produce from one area to another was limited, and the consumption of a product was restricted only to the areas of production or; at the most, to nearby areas. The scope of marketing has, thus increased manifold.

17. Factors limiting market Growth:

The following are some of the factors which put a limit on the growth of a business :

1. Shortage of Labour or capital:

If increased suppliers of trained labour are not available the growth of a business will be automatically checked.

In the same way, if fresh capital cannot be raised, expansion stops. But these are not insurmountable obstacles.

If the business prospects are very bright, and if the entrepreneur is a man of established reputation, he will be able to cross these hurdles.

1. Nature of the market :

If demand is limited or fluctuating, it will be imprudent to increase the size of business. The nature of demand is most important limiting factor .It almost settles the matter. If individuals tastes have to be satisfied, large scale production is ruled out.

3. Managerial Capacity:

Another serious limitation comes from the capacity of the manager. A point is reached in the expansion of a business beyond which it is not possible for the manager to control it efficiently. There is a limit to what a man can successfully manage. Beyond the point, supervision will become lax, Materials will be wasted and machinery mishandled. Cost will overtake profits and, in the end, the profits may vanish. The limit is reached when the marginal revenue is equal to the marginal cost.

4. Nature of the Industry:

In some industries, large-scale production is out of the question. They require close personal supervision, e.g,, jewellery- making and tailoring. Or, there are industries where there is not much scope for the use of machinery and division of labour, e.g, agriculture, fruit and vegetables gardening .etc, Bulky articles like bricks can only be made on a small scale,for it will not pay to carry them over long distances.

5. Operation of the law of Diminshing Returns :

It happens sometimes that the expansion of an industry leads to increasing cost and the returns are less than proportionate. It will not be wise in such cases to expand the business beyond a certain limit.

18. Current market trends:

1. Increased product demand from the beverage industry in the coming years.

2. Several large food producers have introduced product based on mango puree into the market.

3. Mango pulp based smoothies are in large demand amongst the consumers, which is likely to positively leverage the mango purees market in upcoming future.

4. Organic mango puree is in higher demand by consumer owing to growing awareness regarding the usuages of organic product.

5. Growing consumption of flavored yoghurt in various regions across the globe is projected to further support the growth of mango pulp market.

6. Juice industry and fresh market has shown consistent interest in both fresh mango and its processed products.

19. Market structure

The term structure refers to something that has organization and dimension – shape, size and design; and which is evolved for the purpose of performing a function. The term market structure refers to the size and design of the market. It also includes the manner of the operation of the market. Some of the expression describing the market structure is;

1. Market structure refers to those organization characteristics of a market which influence the nature of competition and pricing, and affect the conduct of business firms.
2. Market structure refers to those characteristics of the market which affect the traders' behavior and their performances.
3. Market structure is the formal organization of the functional activity of a marketing institute.

An understanding and knowledge of the market structure is essential to identify the imperfections in the performance of a market.

Components of a market structure

The components of the market structure, which together determine the conduct and performance of the market are;

1. **Concentration of market power:**
   The concentration of market power is an important element determining the nature of competition and thus market conduct an performance. This is measures by the number and size of the firms existing in the market. The extent of concentration represents the control an individual firm or a group of firms over the buying and selling of the produce. A high degree of market concentration restricts the movement of goods between buyers and sellers at fair and competitive prices, and creates an oligopoly or oligopsony situation in the market.

2. **Degree of product differentiation**:
   Whether or not products are homogeneous affects the market structure. If the products are homogeneous, the price variation in the market will not be wide. When products are heterogeneous, the firms have the tendency to charge different prices for their products.

3. **Conditions for entry of firms in the market:**
   Another dimension of the market structure is the restriction, if any, on the entry of firms in the market. Sometimes, a few big firms do not allow new firms to enter the market or make their entry difficult by their dominance in the market. There may also be some government restrictions on the entry of firms.

4. **Flow of market information**:
   A well-organized market intelligence information system helps all the buyers and sellers to freely interact with one another in arriving at prices and striking deals.

5. **Degree of integration:**
   The behavior of an integrated market will be different from of a market where there is no or less integration either among the firms or of their activities. Firms plan their strategies in respect of the

methods to be employed in determining prices, increasing sales, co-ordinating with competing firms and adopting predatory practices against the rivals or potential entrants.

Market conduct and market performance

The term market conduct refers to the patterns of behavior of firms, specially in relation to the pricing, and their practices in adopting and adjusting to the market in which they function. Specifically, market conduct includes ;

- Market sharing and pricing setting polices
- Policies aimed at coercing rivals, and
- Polices towards specification of the quality of product

The term market refers to the economic results that flow from the industry as each firm pursues it particular line of conduct.

Criteria for measuring market performance:

Society has to decide criteria for the satisfactory market performance. Some of the criteria for measuring market performance and of the efficiency of the market

Structure is as follows:

1. Efficiency in the use of resources, including real cost of performing various marketing functions.
2. The existence of monopoly or monopoly profits, including the relationship of margins with the average cost of performing various functions.
3. Dynamic progressiveness of the system in adjusting the size and number of the firm in relation to the volume of business, in adopting technological innovations and in finding and/or inventing the new form of product to maximize the social welfare.
4. Whether or not a system aggravates the problems of inequalities in inter – personal, inter-regional or inter-group incomes. For example, inequalities increase under the following situations:
    A. A market intermediary may pocket a return greater than its real contribution to the national product.
    B. Quantum of surplus.

The market structure has always to keep on adjusting to changing environment if it has to satisfy social goals. For a satisfactory market performance, the market structure should keep pace with changes I1)production pattern 2)Demand . 3) costs and patterns of marketing functions, and 4) technological changes In industry

20. KEY HIGHLIGHTS

1. . It is the process in which mango washed, graded **and destoned** ,removal of peel and crushed in pulper. after that add preservative and pasteurize pulp.

2. Health Benefits:

The fresh mango pulp can be consumed. It combats acidity and improve digestion .Mango is rich source of vitamin A and Vitamin E which helps hormonal system function efficiently. Selenium is also present in mangoes which provide protection against heart disease.

3. .Feasibility:

- Obtain the GST registration.
- Additionally, obtain the Udyog Aadhar registeration Number.
- FSSAI license Required
- Fire / pollution Registration vas required
- Choice of a brand name of the product and secure the name with Trademark if required.
- NOC (No Objection Certificate
- Pollution department
- Land – permit registeration
- APEDA
- Patent

4. Requirements of working capital for setting up of mango pulp processing plant

- . Fruit washing Machine
- Sorting/Inspection conveyor
- Working Table
- Screw feeder
- Fruit crusher
- Pulper
- Pulp collection tank
- Transfer pump
- Steam jacketed kettle
- Twin pulper
- Filling tank
- Steam boiler

5. Requirement of utilities:

Utility charges at 100 % capacity (per month)

Particulars	Value	Description
Power connection required (3 phase)	30	KWH
Consumption per day	240	Units
Consumption per month	4800	Units
Rate per Unit	7	RS.
Power Bill per month	33600	Rs.

6 .Process flow sheet diagram of mango pulp processing:

Mango frozen pulp flow chart: