

Project Profile: Corn Flakes Manufacturing



Project Profile 6: Corn Flakes Manufacturing

Introduction

Corn flakes, or cornflakes, are a popular breakfast cereal made by toasting flakes of corn. The cereal was first created by John Harvey Kellogg in 1894 as a food that he thought would be healthy for the patients of the Battle Creek Sanitarium in Michigan where he was superintendent. The breakfast cereal proved popular among the patients and the Kellogg Company (Kellogg's) was set up to produce corn flakes for the wider public. A patent for the process was granted in 1896. With corn flakes becoming popular in the wider community, a previous patient at the sanitarium, C. W. Post, started to make rival products. Kellogg continued to experiment and various ingredients were added and different grains were used. In 1928, he started to manufacture Rice Krispies, another successful breakfast cereal. There are many generic brands of corn flakes produced by various manufacturers. As well as being used as a breakfast cereal, the crushed flakes can be a substitute for bread crumbs in recipes and can be incorporated into many cooked dishes.

Products & Its Application

Advantages of Flakes: Ready to Serve & Eat. Healthy & Energetic food, Low in Fat, Zero Cholesterol, Enriched with Minerals & Iron, Corn Flakes is manufactured keeping in mind the healthy breakfast requirements. Breakfast being an ideal meal of the day, it becomes necessary, to eat healthy in the morning. The healthy meal early in the day gives an individual mental and physical strength. These flakes have high amount of iron and vitamins. Corn flakes are a packaged cereal product formed from small toasted flakes of corn, usually served cold with milk and sometimes sugar. Since their original production, the plain flakes of corn have been flavoured with salt, sugar and malt, and many successive products with additional ingredients have been manufactured such as sugar frosted flakes and flakes. Though several other breakfast cereals are also available in the market but they are still to gain popularity.

Desired Qualification for Promoter

The promoter may have experience in selling consumer food products. Academic qualification in science or food technology may be advantageous to produce quality corn flakes.

Industry Outlook and Trends

In India and many others corn flakes are mostly taken in breakfast. Mostly it is taken with milk though it can be had in many other ways also depends one's taste. As a breakfast meal, corn flakes are soaked in milk and then taken. It is very quick meal and acts as appetizer also. Now a day's people don't like to have chapatis or paranthas in all the four meals which they have been having for long. Corn flakes are good substitute for such people. Corn flakes have very good taste. Though several other breakfast cereals are also available in the market but they are still to gain popularity. Besides the good taste, crispy nature, corn flakes are also popular because of their friable texture, blend flavour and above all the ease with which it can be prepared for consumption. Breakfast cereals may be conveniently divided into two major categories as follows: -

1. Those cereals such as oatmeal, which require cooling before they are served.
2. Those cereals, such as corn flakes, fully cooked and ready to eat.

The former class is probably about as old as civilization, since it is very likely that gruels and porridges made from crushed grains were among the first cereal foods of mankind. Prepared breakfast foods have a short and interesting history. Corn Flakes can be manufactured either of the two white or yellow corns. The only difference is that flake formed using yellow corn is more dark in colour. Both types of corn are grown in India. These days, predominantly, hybrid type of yellow corn is used as raw material for the manufacture of corn flakes. The by-products of this industry also find uses as animal feed and making of corn syrup or corn oil.

Market Potential and Market Issues, If Any:

Corn flakes being one of most nutritious foods and is consumed as breakfast food not only in India but-elsewhere in the world. Basically, it is prepared from maize; this is the main raw material. Flavours, like sugar or salt are also added. Maize, the main raw material, is itself a corn grain. Corn flakes have very good taste. Though several other breakfast cereals are also available in the market but they are still to gain popularity. Besides the good taste, crispy nature, corn flakes are also popular because of their friable texture, blend flavour and above all the ease with which it can be prepared for consumption. Corn Flakes can be manufactured either of the two white or yellow corns. The only difference is that flake formed using yellow corn is more dark in colour. From raw corn flakes (before roasting) corn syrup can be prepared. It is prepared by removing starch from maize by soaking and treating with chemicals. It is also being used by liquor industry for manufacture of beer etc. It all began with Kellogg's entry in India with its cornflakes. It was marketed by the establishment of a 100% subsidiary as Kellogg's India, being the parent company's 30th manufacturing facility, at a total investment of USD 30mn at Taloja, near Mumbai (Maharashtra). India is considered as one of the largest market for breakfast cereals worldwide. The company was aiming at a business volume of Rs 2bn in three years' time. When Kellogg's entered India, the per capita consumption of breakfast cereals was a low 2 gm per family per annum which increased to 4.5 gm against 5 kg per annum globally. Few Indian Major Players are as under:-Bagrrys India Ltd., K C L Ltd., Kellogg India Pvt. Ltd. Mohan Meakin Ltd., Mysore Sales International Ltd., Riddhi Siddhi GlucoBiols Ltd

Raw Material Requirements

The major raw material used for the manufacture of corn flakes is maize (hybrid yellow and white corns).

Maize is widely produced in all parts of the country the varieties grown are mixtures of white, yellow and purple seeds where it is largely produced by the private farms. Sugar is another raw material used for the manufacture of corn flakes. White sugar, which is used in the manufacture of corn flakes, is also

available. This exhibits the presence of ample raw material. Other ingredients including cocoa powder and flavours are also available.

Manufacturing Process

The milling process removes the corn kernels from the cobs and turns them into flaking sized 'grits'. Malted barley can be added to enhance the flavour of the Corn Flakes. The corn grits are cooked in steam pressure cookers, at temperatures exceeding 100C. This cooking process lasts for an hour and softens the hard grits. During cooking additional water is incorporated in the form of steam which condenses and the water content in the batch rises to 30-35%. Then the hot 7 grits are transported from the cookers to large driers via the network of pipes. The grits spend several hours in the hot-air driers in order to red use their moisture content. The corn grits are milled using rollers, which squeeze the grits flat. The flakes are then tumble toasted in huge cylindrical ovens. The air in the ovens is heated by 600C 0 gas flames and the flakes are tossed around in a rotating drum. The drum is angled so that the flakes whirl around and pass through it quite quickly, and stops them spending too long in the fierce heat. The flakes are then coated with chocolate on demand and also sprayed with flavours, minerals to make them as nutritious as possible. The Corn flakes are then bagged up with the help of a bagging machine, which uses rolls of polythene. The alternative technology is related to the volume of production. That is, for a large quantity of production (such as 600-800kg/hr) the alternative option is more appropriate. This choice requires a fully automated system at all steps-in production, packaging and boxing.

Manpower Requirement

For the production of peanut butter following category of manpower will be required for day to day production.

| Sr.No. | Designation | No. of employees required | Amount (Per Person) | Total |
|--------------|--------------------|---------------------------|---------------------|---------------|
| 1 | Production Manager | 1 | 20,000 | 20,000 |
| 2 | Operator | 2 | 12,000 | 24,000 |
| 3 | Helper | 2 | 9,000 | 18,000 |
| Total | | | | 62,000 |

Implementation Schedule

The project can be commissioned within six months of tying up of finance. There is no complicated machinery and equipment required and space required is also small. Therefore, implementation time is six months.

List of Machinery

1. Flour mixer, 2. Spiral Elevator, 3.Extruder, 4.Cooling Vibration, 5.Air Conveyor, 6.Spreading & Cooling Machine, 7.3-layer Cooling Machine, 8.Large Elevator, 9.5-layer Fuel Oven, 10.Large Elevator, 11.Double-drum Spraying Machine, 12.Spreading Vibrator, 13.5-layer Fuel Oven 14.5 Meters Cooling Conveyor.

All the machines and equipments are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of machines and tooling to have modern and flexible designs. It may be worthwhile to look at reconditioned imported machines, dies and tooling. Some of the machinery and dies and tooling suppliers are listed here below:

1. Fry-Tech Food Equipments Private Limited

S. No. 4, Ravi raj Industrial Estate,

Bhikhubhai Mukhi Ka Kuwa Bharwadvash,

Ramol, Ahmedabad - 380024,
Gujarat, India

2. Hindustan Vibrotech Pvt. Ltd.

Office No. 2, Ground Floor,
Vrindavan Building, Vile Parle East,
Mumbai - 400057,
Maharashtra, India

3. Electrons cooling systems Pvt. Ltd.

S-27, SIDCO Industrial Estate
Kakkalur Industrial Estate
Tiruvallur - 602003,
Tamil Nadu, India

4. Springboard Enterprises India Ltd.

1st, 2nd & 3rd Floor,
Plot No. 7, 8 & 9,
Garg Shopping Mall,
Service Centre, Rohini Sector 2
New Delhi - 110085,
Delhi, India

Cost of Project

The cost of project as per market rate of factory building, machinery, and miscellaneous items, preliminary and pre-operative expenses works out as under:

| Sr. No. | Particulars | Amount |
|--------------|--------------------------------------|-----------------|
| 1 | Land(rent) | 30,000 |
| 2 | Plant & Machinery | 4,00,000 |
| 3 | Furniture & Electrical Installations | 90,000 |
| 4 | Miscellaneous | 40,000 |
| Total | | 5,60,000 |

Break-Even Analysis

| Sr. No. | Particulars | Details |
|---------|---|---------------|
| 1 | Fixed Investment (A) | 560000 |
| 2 | Loan | 435500 |
| 3 | Interest Rate @7.5% on Loan (B) | 32662.5 |
| 4 | Capital Investment | 186500 |
| 5 | Depreciation @10% on Capital investment (C) | 18650 |
| 6 | Total Fixed cost (D = A+B+C) | 611313 |
| 7 | Variable Cost (E) | 40000 |
| 8 | Manpower cost (F) | 62000 |
| 9 | Total Variable cost (G = E+F) | 102000 |
| 10 | Number of Units Sold/Month (H) | 1000 |
| 11 | Average Variable cost (I = G/H) | 102 |

| | | |
|----|--------------------------------|-------|
| 12 | Selling price per unit (J) | 150 |
| 13 | Contribution margin (K = J-I) | 48 |
| 14 | Beak Even Point in Units (D/K) | 12736 |

Assumptions

- Interest rate is assumed at the rate of 7.5% p.a.
- Depreciation on capital investment i.e. machinery would be 10% p.a.
- Unit can produce 950 kg of corn flakes p.m. at full capacity then it would be at breakeven when they will sell 12736 packets of corn flakes packet of 200gm.
- Variable cost comprises of the raw material price p.m. and electricity and other administrative/utility expenses.

Means of Finance

Based on the present norms of bank, means of finance is worked out as under:

| Sr. No. | Particulars | Amount |
|--------------|-------------------------|-----------------|
| 1 | Promoter's contribution | 1,86,500 |
| 2 | Bank Finance | 4,35,500 |
| Total | | 6,22,000 |

Statutory/Government Approvals

The Ministry of Food Processing Industries has been operating several plan schemes for the development of processed food sector in the country during the 10th Plan. One of the schemes relates to the Technology Up-gradation/ Establishment/ Modernization of food processing industries.

The Indian food processing industry is regulated by several laws which govern the aspects of sanitation, licensing and other necessary permits that are required to start up and run a food business. The legislation that dealt with food safety in India was the Prevention of Food Adulteration Act, 1954 (hereinafter referred to as "PFA"). The PFA had been in place for over five decades and there was a need for change due to varied reasons which include the changing requirements of our food industry. The act brought into force in place of the PFA is the Food Safety and Standards Act, 2006 (hereinafter referred to as "FSSA") that overrides all other food related laws.

FSSA initiates harmonization of India's food regulations as per international standards. It establishes a new national regulatory body, the Food Safety and Standards Authority of India (hereinafter referred to as "FSSAI"), to develop science based standards for food and to regulate and monitor the manufacture, processing, storage, distribution, sale and import of food so as to ensure the availability of safe and wholesome food for human consumption. Entrepreneur may contact State Pollution Control Board where ever it is applicable.

All food imports will therefore be subject to the provisions of the FSSA and rules and regulations which as notified by the Government on 5th of August 2011 will be applicable.

Key Regulations of FSSA

- A. Packaging and Labeling
- B. Signage and Customer Notices
- C. Licensing Registration and Health and Sanitary Permits

Backward & Forward Integration

The objective of the scheme is to provide effective and seamless backward and forward integration for processed food industry by plugging the gaps in supply chain in terms of availability of raw material and linkages with the market. Under

the scheme, financial assistance is provided for setting up of primary processing centres/ collection centres at farm gate and modern retail outlets at the front end along with connectivity through insulated/ refrigerated transport.

The Scheme is applicable to perishable horticulture and non-horticulture produce such as, fruits, vegetables, dairy products, meat, poultry, fish, Ready to Cook Food Products, Honey, Coconut, Spices, Mushroom, Retails Shops for Perishable Food Products etc. The Scheme would enable linking of farmers to processors and the market for ensuring remunerative prices for agri produce.

The scheme is implemented by agencies/ organizations such as Govt./ PSUs/ Joint Ventures/ NGOs/ Cooperatives/ SHGs / FPOs / Private Sector / individuals etc.

Backward Linkage:

- Integrated Pack-house(s) (with mechanized sorting & grading line/ packing line/ waxing line/ staging cold rooms/cold storage, etc.)
- Pre Cooling Unit(s)/ Chillers
- Reefer boats
- Machinery & equipment for minimal processing and/or value addition such as cutting, dicing, slicing, pickling, drying, pulping, canning, waxing, etc.
- Machinery & equipment for packing/ packaging.

Forward Linkage:

- Retail chain of outlets including facilities such as frozen storage/ deep freezers/ refrigerated display cabinets/cold room/ chillers/ packing/ packaging, etc.
- Distribution centre associated with the retail chain of outlets with facilities like cold room/ cold storage/ ripening chamber.

Training Centers/Courses

For food processing industry training and short term courses are available at Indian Institute of Food Processing Technology, Thanjavur, Tamil Nadu and Central Food Technological Institute, Mysore, Karnataka and Ground Nut Research Centre, Junagarh, Gujarat.

Udyamimitra portal (ink: www.udyamimitra.in) can also be accessed for handholding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.

Entrepreneurship development programs help to run businesses successfully and are available from Institutes like Entrepreneurship Development Institute of India (EDII) and its affiliates all over India.