

TECH-KNOWLEDGE

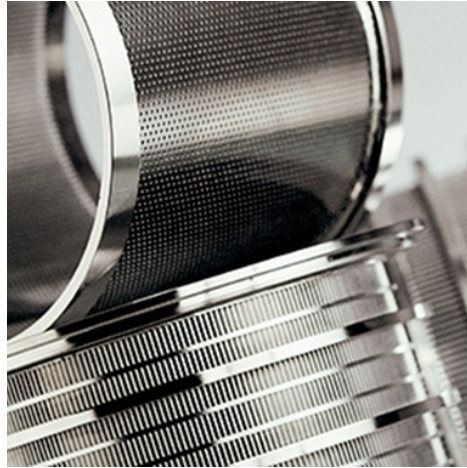
The Official PMG Engineering Newsletter

**FOOD & BEVERAGE
INDUSTRY**

**ENGINEERING
& DESIGN**

**SCIENCE &
TECHNOLOGY**

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APPLE CIDER PROCESSING



Introduction

In the processing industry, apples are often used for the production of sauce and juice, but can also be processed into other products, such as cider and cider vinegar. Cider and vinegar are both produced by fermentation.

Cider is an alcoholic beverage made from fermented apple juice (at least in England). However, in the US, 'cider' meant rough apple juice while 'hard cider' is the fermented stuff. Various types of apples are needed to make good blended cider.

Sweet apple cider

(Sweet apple cider, by its name, is much sweeter due to the presence of either unfermented or added sugar.

Dry cider

Dry ciders are those which have been left to ferment to maturation.

Principle

Fermentation is the basis of Vinegar processing. During alcoholic fermentation, yeasts utilise sugar in apple juice to produce ethanol, an anaerobic process that results in cider.

The production of vinegar involves an additional aerobic fermentation step, where acetic acid bacteria convert ethanol in cider into acetic acid. The sensorial characteristics of cider and vinegar depend on the fermentation processes microorganisms and the selected processing techniques.

Production

The process of manufacturing of Apple cider vinegar completes in the following steps-

1.Harvesting: Harvesting is done between September and December ,manual collection is done by sacks, and more extensive orchards are harvested mechanically.

2.Selection of Apples: Apples should be firm and ripe. Green, under mature apples cause a flat flavor.

3.Sweating: It is optional mellowing period, the apples are stored in a clean, odor free area, sometimes they are allowed to mellow and soften for about a week to ten days before grinding

4.Washing: After the apples have mellowed, they must be washed to remove leaves, twigs, insects, spray residues, and harmful bacteria. They are automatically poured out from the bins onto a scrubber.

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5.Grinding: As apples are a hard fruit, slicing is necessary to facilitate juice extraction. This is done with high-speed rotary blades, which reduce the fruit to a pulp or the apples are put in a large mill and ground to a fine pulp with applesauce consistency. It is done to ensure that the maximum amount of juice can be extracted from the apples.

6.Pressing : To extract the juice from the mash, three main types of presses are used in commercial production of apple juice; the hydraulic press, the screw press and the belt press. Unlike the hydraulic press, the screw press is operated continuously and has a high working capacity. Two additional types of presses are the bladder press and the basket press. These are mainly used in small and medium-scale production.

7.Pasteurization: It is done around 92°C for 10-15 sec. It is done to kill all the unwanted microorganism.

8.Cooling and Filling: The juice expelled from the pomace is pumped through plastic tubes to a cooling tank. As the cider is transferred to the cooling tanks, it is passed through a screen mesh to remove any pulp pieces from the liquid. It is then chilled and stored at 33° F (0.6° C). This helps to inhibit the contamination by undesirable microorganisms. Preservatives such as potassium sorbate are added and the juice is sent off to the fermentation tank.

9.Fermentation: The apple juice ferments for eight weeks often in two stages This includes classical alcoholic fermentation of sugars into ethanol performed by yeast strains followed by acetobacter fermentation to produce vinegar.

10.Racking off: Using a clean plastic tube, the cider is drained off into the second fermenting tank or directly into bottles.

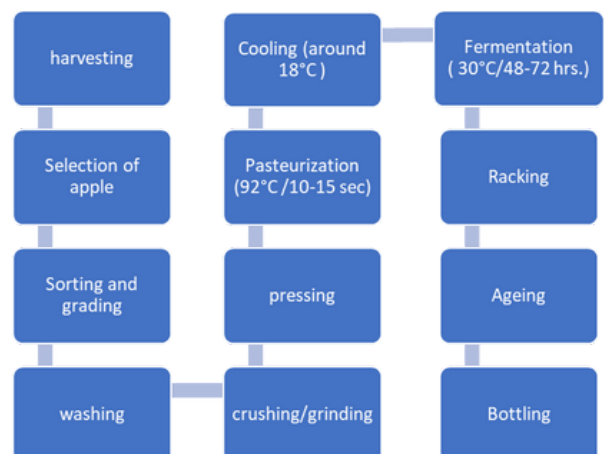
11.Filtering or fining: This step makes a cider crystal clear. It can be done by:

- Using a closed filter system avoiding exposing the cider to air.
- Mixing gelatin, bentonite, and pectic enzyme into the cider to clear unwanted material.



12.Aging and Bottling: Ageing is done in oak barrels to enhance the flavour. Use sterile bottles for cider. For an "in-bottle fermentation" small amount of sugars may be added to each bottle. Cap or cork the bottle and then pasteurize the cider to prevent further fermentation. To avoid killing the yeast by pasteurization after adding sugar, the addition of sulphur is most practiced.

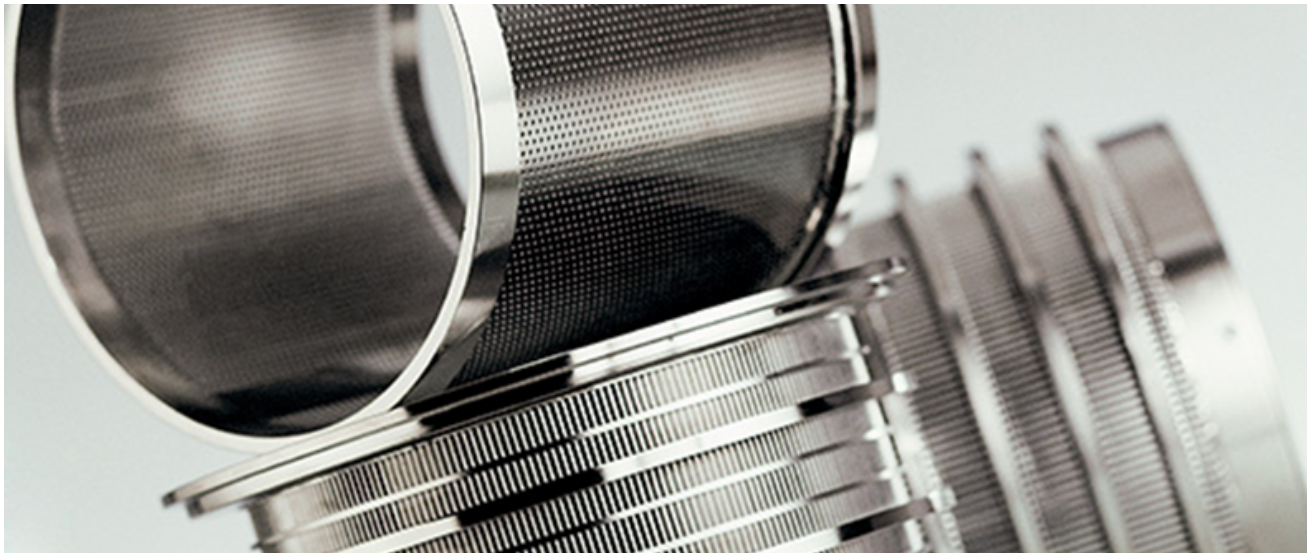
13. Storage: The bottles should be kept in a cool, dark storage place.



Conclusion

Cider is made from fermenting apple juice, which relies on natural yeast present in the apples for fermentation . In the United States, fermented alcoholic apple juice is called "hard cider," while freshly pressed, nonalcoholic cider is called "sweet cider." It contains acetic acid and nutrients such as B vitamins and vitamin C.

INDUSTRIAL BASKET STRAINER



Introduction

We are very well aware about the fact that physical contaminants can be the biggest disaster in food manufacturing industries, this is the reason why food technologists / engineers install devices like sifter, magnet trap, basket strainers, disc filters in process for eliminating foreign bodies that not only helps in achieving food safety goals but also reduces maintenance cost and downtime by protecting valuable equipment like flow meters, heat exchangers, valves, cooling towers, spray nozzles, pumps, valves, pasteurizer etc. from the damage associated with nuts, bolts, metal shavings etc. But to achieve removal of the foreign bodies from the pipeline system conveying process fluids, basket strainer becomes the most preferred choice among the available options as it can remove both-metallic and non-metallic contaminants up to specific particle size.

1. Sanitary Basket Strainers

These are closed vessel consisting of wire mesh screens which traps solid debris from the process fluids. Installation of basket strainers in food industries is considered as a good practice for removing contaminants, regulating product size, or bettering product quality. The mesh is designed in many sizes and shapes and is either woven or welded together.

These screens are tightly woven to provide an adequate straining material that are capable of filtering material that are either 100 microns or larger.

1. Types of Strainers-

A. On the basis of size of mesh

Strainers are broken down into three main filtering categories:

- 1.Coarse Strainers – for large particles
- 2.Medium Strainers – for particles 75 to 1905 microns
- 3.Fine Strainers – for particles down to 5 microns

B. On the basis of mode of operation

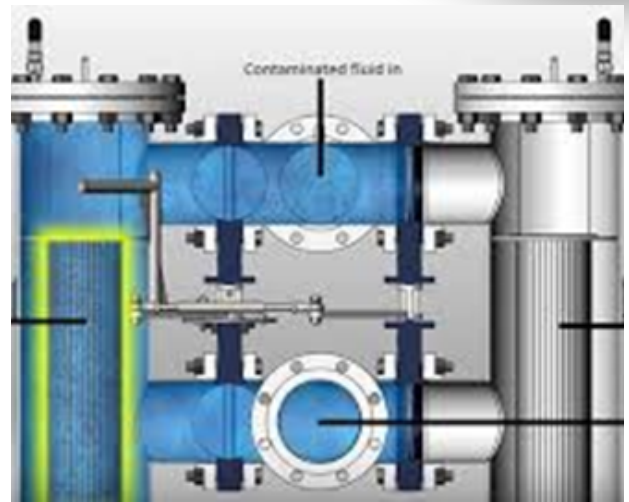
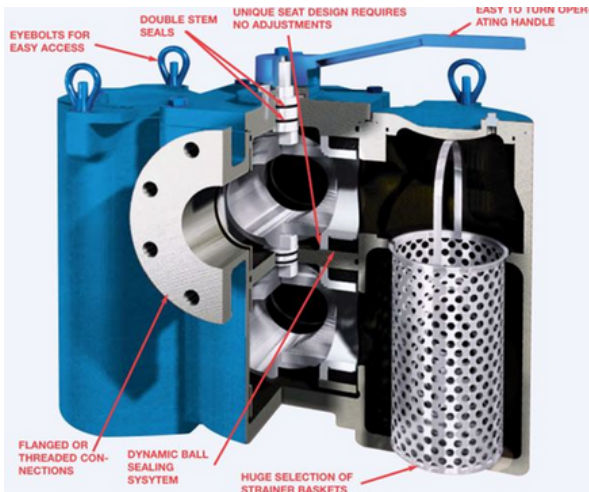
1.Simplex Filter:

These are single chambered equipment installed in pipeline systems which removes the particles and debris from the flowing fluid in pipeline systems. These kinds of strainers are not useful for the continuous process, as it requires the process to shut down for certain period to replace/clean the basket strainer. We can easily determine when the basket is clogged by comparing the pressure at inlet and outlet.

2.Duplex Filter:

It is a twin basket filter with two identical simplex filters which are connected via pipe and valves. These have two independent basket strainer chambers having common inlet and outlet ports and are very essential for the processes that are required to be operated under continuous mode.

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3. Self-Cleaning Basket Filters:

It is the advanced form of basket strainers which are also known as automatic self-cleaning strainer. They basically offer two main advantages:

1.Reduction in in downtime as you do not require baskets to uninstall for cleaning thus saving maintenance cost.

2.A worry-free maintenance costs. G

Components

Basket strainers are assembly of different components and parts which are discussed below:

a. Industrial Basket Strainer Housing: It is the outer covering of the strainer in which basket assembly rests.

b. Filter Element: It is a cleanable screen, built in basket strainer to allow filtering of larger particles or dirt in the pipe system. Basket straining element is either made of straight or staggering perforated plates.

c. Handle: It is ergonomically designed handle for easy removal/installation of basket assembly.

d. Internal Cylinder: It closes the inlet and outlet for replacement of dirty elements by turning position.

e. Vent Valve: Used for pressure relief.

f. Clogging Indicator: It indicates when filter element requires replacement.

g. Blow off Valve: It removes dirt particles and help strainer bodies to clean.

h. Inlet Port: It is the point from where contaminated process fluid enters the strainer element.

i. Outlet Port: It is the point from where clean fluid exits the strainer element.

Components

a. Material of Construction of Removable Basket Assembly: Beverage and food strainers are manufactured from stainless steel mesh (304L/316L), but other corrosion resistant alloys can be used for processing highly corrosive fluids.

b. Type of Process: It is critical for model selection to understand that if process has to operate under batch or continuous mode.

c. Nature of Fluid: It is Paramount to know if the fluid is liquid, gaseous, abrasive, corrosive in nature.

d. Process Parameters: Whenever you are buying an industrial basket strainer to install in a piping system, ensure that the system parameters like working pressure, temperature, flow rate etc. must match with strainer's standard specifications.

e. Easy to Clean: Low surface roughness makes basket strainers extremely easy to clean, which is important for maintaining product safety. Any corrosion could lead to bacterial growth that causes contamination and potential health issues for consumers.

f. Flow Rate: It is important to know the process flow rate as it decides whether model of basket filter will be able to withstand it or not.

g. Mesh Size: Mesh Size indicates the particle retention by cleanable screen.

h. Fabrication: The industrial welded simplex basket strainers manufacturers uses either bolts or welding to join various components. But still fully welded strainers are better than the casted ones as they offer zero leakage and superior cleanability.

i. Location of Installation: As per standard engineering practices, strainers are employed in pipelines to protect downstream mechanical equipment such as condensers, heat exchanges, pumps, compressor, meters, spray nozzles, turbines, steam traps, etc. from the detrimental effect of sediment, rust, pipe scale or other extraneous debris.



INDUSTRY BUZZ



FSSAI introduces a specific category rule to advance gender equality.

'Special Category' is a brand-new feature that the Food Safety and Standards Authority of India (FSSAI) has added to the Food Safety Compliance System (FoSCoS) portal. The recently implemented rule intends to advance gender equality and equal opportunity for female and transgender business owners in the food industry.

As long as there are pending applications in either category, the Licensing and Registering Authorities must process "Special Category" applications equitably to preserve a one-to-one ratio with ordinary applications. These people will be recognized during the application submission procedure using Aadhaar/PAN authentication.

Coffee meets draw young people to a variety of events. - Brewer, Latte Art

According to a recent survey by Kerry, a world authority on taste and nutrition, one-third of consumers are open to switching to brands or goods with a longer shelf life. A massive 98% of those surveyed were actively attempting to minimize food waste, motivated by diverse motives such as financial worries, environmental considerations, and awareness of world poverty. This openness to change is being driven by consumers' strong desire to act on food waste.

These findings underscore the need for the food industry to take action on food loss and, where possible, increase the shelf life of products in light of September 29 being recognized by the UN as the International Day of Awareness of Food Loss and Loss. According to the organization, by doing this, businesses can satisfy the changing needs of customers who are becoming more aware of the effects of food waste.





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Launch of new curry masala bread mix by Puratos India

Puratos India, a leading provider of bakery, patisserie, and chocolate ingredients, offers the new Easy Curry Masala Bread Mix. The rich and savory flavors of Indian food are sure to please consumers who purchase this new product. A versatile ingredient, the Easy Curry Masala Bread Mix may be used to create a range of finished goods, including bread loaves, rusks, pizza bases, crusty bread, and even hot dog buns. To offer an authentic and tasty taste, a blend of carefully chosen Indian spices is used in its preparation.

Puratos Food Ingredients India Pvt. Ltd. managing director Ashish Seth stated, "Indian food has traditionally been acclaimed for its excellent balance of spices that create a distinct and distinctive flavor. The Easy Curry Masala Bread Mix is a fascinating addition to our range, demonstrating our dedication to innovation and accommodating changing consumer demands."



The new insecticide 'Benzilla' from Rallis India is intended to combat BPH and aid in safeguarding paddy production.

Rallis India, a Tata company and a significant player in the Indian agro inputs market, has introduced "Benzilla," a unique crop protection product. It is a cutting-edge device powered by patented BPX technology from Japan that promises to change crop management practices, increase yields, and benefit farmers. Significant research and field experiments back it.

Its distinctive formulation, which combines IGR technology, is the outcome of a strategic relationship between Rallis India and the Japanese agro-chem company Nihon Nohyaku Co., Ltd (Japan). This partnership ensures a protracted and sustained control of Brown Plant Hopper (BPH) infestations in rice crops.

WEEKS HIGHLIGHT



29 SEPTEMBER

WORLD HEART DAY

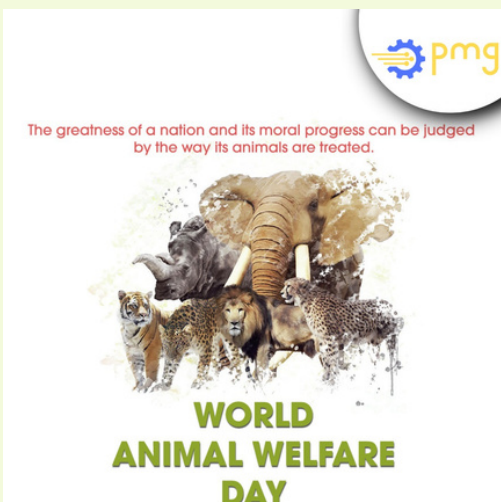
The World Heart Federation established World Heart Day to remind people around the world that CVD claims 18.6 million lives each year. It aims to motivate people to take action by educating them on how risk factors such as tobacco use, poor diet, and physical inactivity can prevent at least 80% of premature deaths from heart disease and stroke.



2 OCTOBER

GANDHI JAYANTI

Gandhi Jayanti is an annual event held in India to commemorate Mahatma Gandhi's birthday on October 2. Gandhi led the freedom movement, bringing together all national leaders and advocating for peace and nonviolence. The United Nations General Assembly designated October 2 as International Day of Nonviolence in 2007.



4 OCTOBER

WORLD ANIMAL WELFARE DAY

World Animal Day is an animal welfare movement that encourages global countries to work together to create a more favorable place for all animal life. It was widely observed on October 4. It is a special day for individuals who love and care for God's magnificent creations. Under the banner of World Animal Welfare Day, animal lovers, activists, and organizations are invited to raise awareness.

DID YOU KNOW?

MARGARINE PRODUCTION PLANTS



1/4

Margarine is a spreadable vegetable-based butter substitute that is commonly used in cooking and baking. It is made by blending various vegetable oils with water, emulsifiers, and other ingredients to create a smooth, creamy texture that resembles butter.

- Margarine production plants typically have a series of large tanks and mixing vessels where the various ingredients are blended.
- The mixture is then pasteurized to kill any bacteria or pathogens and then cooled to the appropriate temperature.
- The cooled mixture is then pumped into packaging machines where it is filled into containers, typically plastic tubs or and sealed.

2/4

Working principle

- Margarine production plants involves a series of processes that transform various vegetable oils into smooth, creamy, and stable fat that can be used as a butter substitute.
- The main processes involved in margarine production include:
 1. **Blending:** Vegetable oils, water, emulsifiers, and other ingredients are blended in large tanks to create a homogenous mixture.
 2. **Pasteurization:** The mixture is then pasteurized to kill any bacteria or pathogens.
 3. **Cooling:** The mixture is cooled to a specific temperature, which helps to create a stable fat structure.
 4. **Homogenization:** The cooled mixture is homogenized to create a smooth, creamy texture.
 5. **Packaging:** The finished margarine is then packaged in containers, typically plastic tubs, or blocks, and sealed.
- Margarine production plants typically use high-tech equipment, such as homogenizers, pasteurizers, and packaging machines, to ensure consistent quality and efficiency in the production process.
- Quality control measures are also typically implemented to ensure that the finished product meets standards and specifications.

3/4

Insights into the market

1. The global demand is expected to increase over the next few years, driven by increasing consumer awareness of the health benefits of vegetable-based spreads.
2. Consumers are increasingly looking for healthier alternatives to animal-based fats leading to the development of new products that are lower in saturated fat and trans-fat.
3. Many margarine production plants are investing in new technology to improve efficiency, reduce costs, and improve product quality.
4. Many margarine production are adopting sustainable practices, such as using renewable energy sources, reducing waste, and using environmentally friendly packaging.
5. Although demand for margarine is growing, it faces competition from other spreads such as plant-based butter, nut spreads, and avocado spreads.

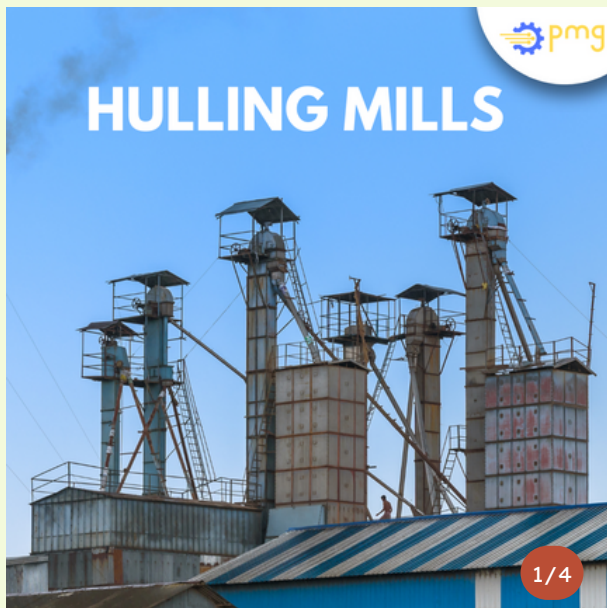


3/4

Fact 1

Margarine production is the process of manufacturing margarine, a butter substitute made from vegetable oils, water, emulsifiers, and other ingredients. It is a popular alternative to butter due to its lower cost and lower saturated fat content, making it a suitable choice for cooking and spreading on bread.

HULLING MILLS



1/4

Machines used for removing the hulls or outer coverings of various seeds and grains such as rice, oats, barley, and coffee beans. The hull or husk is the outermost layer that needs to be removed before the seeds or grains can be processed further.

- The process of hulling involves passing the seeds or grains through a machine that uses a combination of friction, impact, and compression to remove the hull.
- Hulling mills are commonly used in the food industry and are an essential part of the processing of many crops.



2/4

Principle

- 1. Feeding:** The food product is fed into the hulling mill through a hopper.
- 2. Friction:** Inside the hulling mill, the food product comes into contact with abrasive surfaces, which rub against the outer layer of the food product. The friction between the abrasive surfaces and the food product generates heat and causes the hull to loosen.
- 3. Pressure:** Pressure is applied to the food product to separate the hull from the edible portion. The pressure can be applied using a variety of methods, including rolling or crushing.
- 4. Separation:** The separated hulls are removed from the food product using a separator or sieves, leaving behind the inner, edible portion.



3/4

Products that are commonly processed using hulling mills

- 1. Rice:** Used to remove the outer husk of rice grains.
- 2. Coffee:** Using hulling mills to remove the parchment layer and outer skin.
- 3. Oats:** Remove the inedible outer husk before they are further processed.
- 4. Buckwheat:** The outer shell of buckwheat seeds, known as the hull, is removed using hulling mills.
- 5. Sunflower seeds:** Removed using hulling mills to produce the inner kernel.
- 6. Spelt:** Remove the outer hull before they are used in baking or other food products.
- 7. Millet:** Remove the outer layer before they are cooked or used in other food products.



4/4

Fact 2

Hulling mills, also known as huller mills or dehuller mills, are industrial machines used primarily in the agricultural and food processing industries. Their main purpose is to remove the outer husk or hull from various types of seeds, grains, or fruits. This hull removal process is important because the hulls can be tough, indigestible, or unpalatable, and removing them improves the quality and usability of the underlying product.



Fact 3

Cornflakes are a popular breakfast cereal made from toasted flakes of corn. They are typically thin, flat, and crispy, and they are known for their mild, slightly sweet flavor. Cornflakes are commonly eaten with milk, yogurt, or fruit and are often used as a base for various breakfast cereals and snacks.



STEAMING, COOKING AND FLAKING PLANTS FOR MILLING

1/3

Steaming, cooking, and flaking plants are commonly used in the milling industry to process grains such as corn, wheat, and rice.

- During steaming, grain is heated with steam to soften it and make it more pliable.
- Cooking is similar to steaming but involves heating the grain to a higher temperature for a longer period of time.
- Flaking involves pressing the grain between two rollers to flatten it into flakes.

Products

Breakfast cereals



Animal feed



Snack foods



Flour



2/3

Working Principle

- Grains are exposed to steam at high temperatures and pressures for a specific period.
- Heating the grains to a specific temperature for a specific period, usually with the addition of water.
- Passing the grains through a pair of rollers to flatten them into flakes.
- Produce foods that are ready to eat or require minimal preparation.
- Produce foods that are rich in nutrients and easy to digest.
- Reduce food waste and optimize the use of resources.

The Key players in the market include Bühler AG, CPM Wolverine Proctor LLC, FLSmidth & Co. A/S, and Alvan Blanch Development Company Limited

3/3

Fact 4

Steaming, "cooking," and "flaking" are processes commonly used in the milling of grains and oilseeds, particularly in the production of various food products, including cereals, oils, and animal feeds.



PMG ENGINEERING

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