

TECH-KNOWLEDGE

The Official PMG Engineering Newsletter

**FOOD & BEVERAGE
INDUSTRY**

**ENGINEERING
& DESIGN**

**SCIENCE &
TECHNOLOGY**

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Processing of Frozen Dessert



Introduction

No one knows exactly when a frozen dessert was first produced. Ancient manuscripts tell us that the Chinese liked a frozen product made by mixing fruit juices with snow – what we now call water ice. This technique later spread to ancient Greece and Rome, where the wealthy in particular were partial to frozen desserts.

Frozen dessert and Ice cream were made possible only by the discovery of the endothermic effect. Prior to this, cream could only be chilled but not frozen. It was the addition of salt, that lowered the melting point of ice, which had the effect of drawing heat from the cream and allowing it to freeze. The processing and production of Frozen dessert has drastically changed from then to now, with the addition of advance technologies and process lines in Ice cream. Before studying the process and manufacturing of Ice cream, a basic understanding on the raw materials and its chemistry is important to understand Ice cream on a larger scale.

Raw Materials and Ingredients

1. Fat

Fat makes up about 10 to 15% of the frozen dessert mix. The fat gives creaminess and improves melting resistance by stabilizing the air cell structure of the frozen dessert. Milk fat is replaced in the case of frozen dessert by vegetable fat, where refined or hydrogenated (hardened) coconut oil and palm kernel oil are most commonly used.

2. Milk solids non-fat (MSNF)

MSNF consists of proteins, lactose, and mineral salts derived from whole milk, skim milk, condensed milk, milk powders, and/or whey powder. In addition to its high nutritional value, MSNF helps to stabilize the structure of ice cream due to its water-binding and emulsifying effect.

3. Sugar/non-sugar sweetener

Sugar is added to increase the solids content of the frozen dessert and give it the level of sweetness consumers prefer. Ice cream mix normally contains between 12 to 20% sugar. The consistency of the ice cream can also be adjusted by selecting different types of sugar. This makes it possible to produce ice cream that is easy to scoop.

4. Emulsifiers/stabilizers

Emulsifiers and stabilizers are typically used as combined products at dosages of 0.5% in the ice cream mix. Traditionally, these products were produced by dry blending, but today integrated products are preferred due to the improved dispersion and high storage stability.

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5.Flavours

Flavours are a very important factor in the customer's choice of ice cream and can be added at the mixing stage or after pasteurization. The most popular flavours are vanilla, chocolate and strawberry.

6.Colours

Natural or artificial colours are added to the mix to give the ice cream an attractive appearance. Local legislation exists in most countries regarding the use of colours in food.

7.Other ingredients

Ripples (sauces) are incorporated in frozen desserts for taste and appearance. They can also be applied for pencil filling and top decoration.



3.Ageing

The mix must be aged for at least 4 hours at a temperature of 2 to 5°C with continuous gentle agitation. Ageing allows the milk proteins and water to interact and the liquid fat to crystallize.

4.Freezing and Packaging

Continuous freezer is the device used to whip a controlled amount of air into the mix and to freeze a significant part of the water content in the mix into a large number of small ice crystals.

5.Hardening and Storage

A filling machine fills the frozen dessert directly from the freezer into cups, cones, and containers of varying designs, shapes, and sizes. Filling takes place through a time-lapse filler, a volumetric filler, or an extrusion filler.

Production Process

1.Mix Preparation

This is one of the most crucial steps in the production of ice cream or Frozen Dessert. The tank-stored raw materials are heated and blended to form a homogenous mix that is pasteurized and homogenized. Large production plants often have two mix tanks for each flavour with a volume corresponding to the hourly capacity of the pasteurizer, in order to maintain a continuous flow to the freezers.

2.Pasteurization and Homogenization

In large-scale production, the ice cream mix flows through a filter to a balance tank. From there it is pumped to a plate heat exchanger, where it is pre-heated to 73-75°C. After homogenization at 14 to 20 MPa (140-200 bar), the mix is returned to the plate heat exchanger and pasteurized at 83 to 85 °C for about 15 seconds.

Conclusion

Ice cream has come a long way since the first snow cone was made. Innovations in a variety of areas over the past century have led to the development of highly sophisticated, automated manufacturing plants that churn out pint after pint of ice cream. Significant advances in fields such as mechanical refrigeration, chilling and freezing technologies, cleaning and sanitation, packaging, and ingredient functionality have shaped the industry.

Warehouse Equipments



Introduction

The world is in a global business right now. Plenty of goods from electronics to consumer goods to food are traveling from New Zealand to America, from Africa to China, etc. on a day-to-day basis. Some goods move slowly, others move very quickly, but it all must move. And they need to be stored in some place or other in between the movement.

Warehousing is the process of storing physical goods before they are sold or further distributed. Warehouses safely and securely store products in an organized way to track where items are located, when they arrived, how long they have been there, and the quantity on hand.

Importance of Warehouse Equipments

Warehouses store almost everything we eventually own, from food and clothing to furniture and electronics. They are diverse and can range from a small stocking room in the back of a business to a multi-thousand square foot area. Because size and functionality differ so much in warehouse buildings, the types of equipment needed for a smooth operation may vary as well.

Contribution of Warehouses in Profit

- They can be used to buffer inventory to smooth out fluctuations in supply and demand. This is essential for maintaining a good customer relationship.
- They may be used in building up investment stock. Some commodities like coffee, pepper, etc. whose prices fluctuate on a global scale can be stocked and then sold when the price is favorable.
- A warehouse also assists in the most effective use of capital and labour within the manufacturing and supply units. It helps to keep overtime charges down and allows a company to buy and stock more supplies when prices from the supplier are more favourable.

Some Necessary Warehouse Equipments

READ MORE....



1.Dock Equipments

A loading dock or loading bay is an area of a building where goods vehicles (usually road or rail) are loaded and unloaded. Dock equipments ease out the processes of loading and unloading. Choosing the wrong dock equipment can put employees at risk. As the docking area is the junction of the receiving and shipping processes, its safety should always be the top priority.

2.Conveyor

A conveyor system is a common piece of mechanical handling equipment that moves materials from one location to another. They can speed up and/ or automate the process to save time and labour. Conveyors reduce human intervention, so they can reduce the risk of injuries. They can be expensive, but their benefits will overrule their expenses.

3.Storage Equipments

The right selection of storage equipment will help to efficiently use the space of warehousing. It will also help in easy identification and reduce the damages.

4.Lifting Equipments

They are different types of machines that help streamline transportation and storage of goods. They should be stable and adequate for the goods which are to be transported. The selection of lifting equipments should be done only after considering the type of inventory.

5.Packing equipments

Packing is one of the most important steps in the storage and transportation of any goods. Involves wrapping a product or designing a container to provide protection and ease off the transportation. Packing equipments assist the staff in packing faster and increases the productivity. They also reduce labour costs and provide consistency in the wrapping process.



Conclusion

Warehouses are an essential element in almost all businesses. However, the size of a warehouse may vary according to the business. A modern warehouse is composed of machines and humans working together to accomplish an array of processes and tasks. The warehouses are getting advanced and complex each day with the addition of artificial intelligence, automation, and robotics. So the maintenance and management of warehouse have become an important factor in the modern business.





INDUSTRY BUZZ

Masala Row: The government will thoroughly examine spice-related goods

The Union Government has chosen to conduct a thorough investigation of spice items throughout India due to concerns raised by purported detection of contamination in two Indian masala products in Singapore and Hong Kong. Despite the fact that the analysis was ordered by the national food authority, FSSAI, the government reportedly aims to dispel any doubts over the spice trade. The impact on India's about USD 700 million spice trade seemed to worry the government, and following the initial complaints from Singapore and Hong Kong, several other nations, including Australia and New Zealand, have expressed similar concerns about the quality of Indian spices.

Meanwhile, the cascading effects of this dispute are putting almost half of the spice export at danger, according to an evaluation published by the economic think tank Global Trade Research Initiative.

FCI and Ingen Technologies join together to improve food supply chain operations.

The Uttar Pradesh Food and Civil Supplies Department (UPFCSD) has selected Ingen Technologies to deliver basic commodities effectively to the State's inhabitants, marking a significant step towards modernising food procurement and distribution systems. To carry out two crucial projects—food grain purchase from 40 District Authorised Purchase Centres and Fair Price Shop automation by the National Food Security Act (NFSA)—the collaboration implemented Ingen's smart GPS vehicle monitoring technology, SecuTrak.

The agreement demonstrates Ingen Tech's dedication to using technology to improve operating efficiency, increase transparency, and provide necessary goods and services on time. By tackling goals like leakage reduction and real-time delivery alerts, Ingen Tech hopes to raise the bar in logistics management while providing the people of Uttar Pradesh with actual advantages.



Food Corporation of India



The FAO Food Price Index increased slightly in April.

According to the Food and Agriculture Organisation of the United Nations (FAO), the benchmark for global food commodity prices increased in April due to increases in the price of meat and slight increases in the prices of cereals and vegetable oils, which offset declines in the costs of sugar and dairy products.

The average value of the FAO Food Price Index, which measures monthly variations in the prices of a selection of internationally traded food items, was 119.1 points in April. This represents a 0.3% increase from the corrected figure for March, but a 9.6% decrease from the same month last year.

The FAO Cereal Price Index broke a three-month downward trend with a nearly 0.3 percent increase from March.

India's top pure-play agri -e-commerce marketplace is nurture.retail.

Over one lakh of the three lakh agro retailers in the nation may be accessed through nurture.retail, the top B2B marketplace for agricultural inputs in India. The portal provides more than 3000 brands, 9000 SKUs, and 30 exclusive items in a variety of categories, including seeds, agricultural equipment, animal feed, crop protection, crop nutrition, and serving in 19k pin codes.

Through relationships with cutting-edge finance companies, it offers a full-stack solution with plug-and-play alternatives that provide formal credit to over 15,000 stores, with over 34k retailer interactions each month and direct access to manufacturers. By feeding over 400 million data points into its AI/ML system, this technology gains a profound understanding of rural needs and develops locally relevant agri-retail services and solutions.

Even the largest e-commerce companies have not yet made inroads into the most rural pin codes, where the platform has expanded its reach.



Improving food safety procedures: Optimal methods for food and beverage divisions

The hotel sector maintains excellent food safety standards in the fast-paced world of hospitality, which is critical to building visitor happiness and trust. Hotels maintain strict standards to ensure the highest levels of food safety and hygiene in all areas of their food and beverage operations as part of their dedication to excellence. This article contains best practices used by hotels to improve food safety procedures. The sector takes pride in following the regulations established by the Food Safety and Standards Authority of India (FSSAI).

Procuring premium products from recently harvested farms is a fundamental component of exceptional dining experiences. Hospitality organizations prioritize reputable suppliers who meet stringent quality and safety criteria. Through rigorous inspection procedures, these enterprises guarantee the acquisition of fresh and nutritious products, thereby establishing the groundwork for exceptional culinary offerings.

WEEKS HIGHLIGHT



4 MAY

FIRE FIGHTER'S DAY

Saluting the fearless heroes who stand tall in the face of danger. Happy Firefighter Day to our courageous first responders



6 MAY

BEVERAGE DAY

Cheers to Beverage Day, celebrating the diverse array of drinks that tantalize our taste buds and quench our thirst. From steaming cups of coffee to refreshing fruit juices, beverages unite cultures, evoke memories, and fuel conversations.

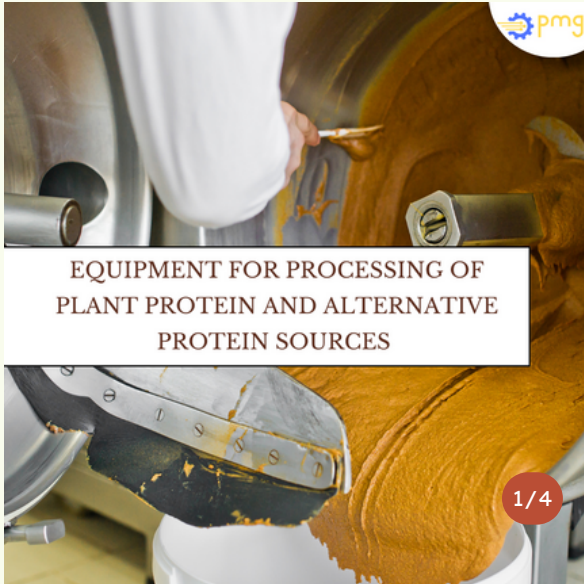


7 MAY

WORLD ASTHMA DAY

Annually, on the Tuesday of May, World Asthma Day is observed worldwide to initialpromote global asthma awareness and care.

DID YOU KNOW?



EQUIPMENT FOR PROCESSING OF PLANT PROTEIN AND ALTERNATIVE PROTEIN SOURCES

1/4



The equipment for processing of plant and alternative protein sources varies depending on the specific type of plant or alternative protein being processed, as well as the desired end product. Here are some examples of equipment commonly used in the processing of plant and alternative protein sources:

- 1. Extruders:** Extruders are commonly used in the processing of plant-based proteins such as soy, pea, and rice. The extrusion process involves heating and pressurizing a mixture of protein, starch, and other ingredients, which can then be formed into a variety of shapes and textures.
- 2. Blenders and mixers:** Blenders and mixers are used to mix and homogenize ingredients in the production of plant-based protein powders and blends.
- 3. Separators and filters:** Separators and filters are used to separate solid and liquid components in the production of plant-based protein extracts and concentrates.
- 4. Fermenters:** Fermenters are used in the production of alternative protein sources such as microbial and fungal proteins. The fermentation process involves culturing microorganisms such as yeast or bacteria to produce proteins, which can then be harvested and purified.
- 5. Centrifuges:** Centrifuges are used in the purification of plant-based protein extracts and concentrates. The centrifugation process involves separating protein from other components such as fibers and carbohydrates.
- 6. Homogenizers:** Homogenizers are used to break down plant-based proteins into smaller particles, improving their functional properties such as solubility and emulsification.

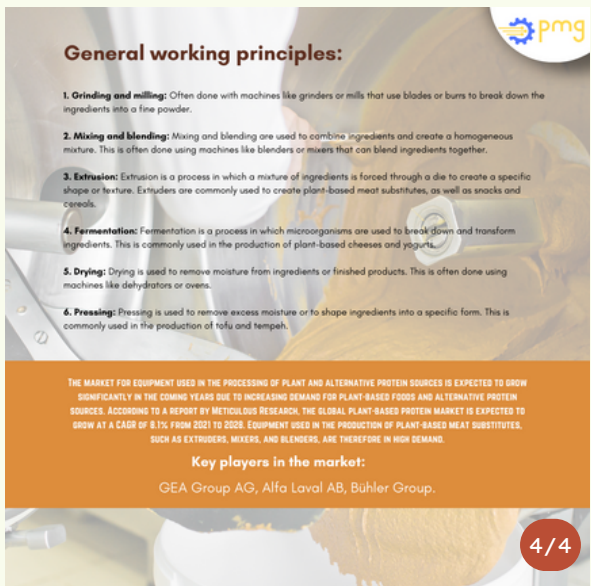
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VARIETY OF FOOD PRODUCTS THAT CAN BE PROCESSED USING EQUIPMENT:

- 1. Plant-based meat substitutes:** Extruders, mixers, and blenders are used to create plant-based meat substitutes like burgers, sausages, and nuggets from ingredients like soy, wheat, peas, and mushrooms.
- 2. Nut and seed milks:** Almond, cashew, and other nut and seed milks are made using specialized equipment like nut milk bags, blenders, and strainers.
- 3. Tofu and tempeh:** Soy-based products like tofu and tempeh are made using equipment like soy milk makers, tofu presses, and incubators.
- 4. Protein powders:** Protein powders made from plant-based sources like pea, rice, and hemp are created using equipment like blenders, mixers, and sifters.
- 5. Protein bars:** Equipment such as mixers, blenders, and presses are used to create protein bars made from ingredients like nuts, seeds, and plant-based protein powders.
- 6. Plant-based cheeses:** Equipment like blenders, mixers, and fermentation chambers are used to create plant-based cheeses made from ingredients like nuts, seeds, and tofu.

3/4



General working principles:

- 1. Grinding and milling:** Often done with machines like grinders or mills that use blades or burrs to break down the ingredients into a fine powder.
- 2. Mixing and blending:** Mixing and blending are used to combine ingredients and create a homogeneous mixture. This is often done using machines like blenders or mixers that can blend ingredients together.
- 3. Extrusion:** Extrusion is a process in which a mixture of ingredients is forced through a die to create a specific shape or texture. Extruders are commonly used to create plant-based meat substitutes, as well as snacks and cereals.
- 4. Fermentation:** Fermentation is a process in which microorganisms are used to break down and transform ingredients. This is commonly used in the production of plant-based cheeses and yogurts.
- 5. Drying:** Drying is used to remove moisture from ingredients or finished products. This is often done using machines like dehydrators or ovens.
- 6. Pressing:** Pressing is used to remove excess moisture or to shape ingredients into a specific form. This is commonly used in the production of tofu and tempeh.

THE MARKET FOR EQUIPMENT USED IN THE PROCESSING OF PLANT AND ALTERNATIVE PROTEIN SOURCES IS EXPECTED TO GROW SIGNIFICANTLY IN THE COMING YEARS DUE TO INCREASING DEMAND FOR PLANT-BASED FOODS AND ALTERNATIVE PROTEIN SOURCES. ACCORDING TO A REPORT BY METICULOUS RESEARCH, THE GLOBAL PLANT-BASED PROTEIN MARKET IS EXPECTED TO GROW AT A CAGR OF 8.1% FROM 2021 TO 2028. EQUIPMENT USED IN THE PRODUCTION OF PLANT-BASED MEAT SUBSTITUTES, SUCH AS EXTRUDERS, MIXERS, AND BLENDERS, ARE THEREFORE IN HIGH DEMAND.

Key players in the market:

GEA Group AG, Alfa Laval AB, Bühler Group.

4/4

Fact 1

Processing equipment for plant and alternative protein sources encompasses specialized machinery designed for efficient extraction, separation, and refinement of proteins. This includes solvent extraction systems, membrane filtration units, and chromatography columns, each optimized for specific protein fractions.



EVAPORATORS AND CONDENSERS FOR THE SUGAR INDUSTRY



1/4



Evaporators and condensers are essential components of sugar processing plants used in the sugar industry. They are used to concentrate and purify sugarcane juice, syrup, and molasses during the sugar production process.

- Evaporators work by heating the sugarcane juice or syrup in a vessel, which causes the water to evaporate, leaving behind a more concentrated solution. The concentrated solution is then transferred to the next stage of the process, where it is further refined and processed to produce various sugar products.
- Condensers, on the other hand, work by cooling the vapor produced by the evaporator, causing it to condense back into a liquid state. This liquid is then recycled back into the process, reducing the amount of water required and minimizing energy consumption.

There are several types of evaporators and condensers used in the sugar industry, including:

1. **Falling film evaporators:** These evaporators use a thin film of juice or syrup that flows down a heated surface, which causes the water to evaporate.
2. **Batch vacuum pans:** These are large vessels used to evaporate juice or syrup in batches, producing a thick syrup that is further processed to produce sugar crystals.
3. **Plate heat exchangers:** These are compact heat exchangers that use multiple plates to transfer heat between two fluids, such as juice and steam.
4. **Shell and tube condensers:** These condensers consist of a series of tubes surrounded by a shell, with the steam flowing through the tubes and the cooling water flowing around the tubes.

2/4



Evaporators and condensers are used in the sugar industry to process various food products that are derived from sugarcane, such as:

1. **Granulated sugar:** Sugar production typically involves the use of multiple evaporators and condensers to concentrate and purify sugarcane juice, syrup, and molasses to produce granulated sugar.
2. **Brown sugar:** Evaporators and condensers are used in the production of molasses, which is then added to the sugar to produce brown sugar.
3. **Powdered sugar:** Evaporators and condensers are used to produce the granulated sugar that is used to make powdered sugar.
4. **Caramel:** Evaporators and condensers are used to produce the sugar that is used to make caramel.
5. **Syrups:** Various types of syrups are made from sugar, such as corn syrup, maple syrup, and fruit syrups. Evaporators and condensers are used to concentrate and purify the sugar solutions that are used to make these syrups.

The working principle of evaporators and condensers for the sugar industry involves the use of heat and mass transfer to concentrate and purify sugarcane juice, syrup, and molasses.

The choice of evaporator or condenser type depends on factors such as the desired level of concentration, the quality of the sugar solution, and the available resources.



3/4



Market Scope

- The increasing demand for sugar and related products, coupled with the need for more efficient and sustainable production processes, is driving the growth of this market.
- The Asia-Pacific region is the largest market for evaporators and condensers in the sugar industry, accounting for the majority of global demand. This is mainly due to the large sugarcane production in countries such as India, China, and Thailand, which are major consumers of evaporators and condensers.
- North America and Europe are also significant markets for evaporators and condensers in the sugar industry.

Key Players

- Key players operating in the evaporators and condensers market for the sugar industry include companies such as Alfa Laval AB, GEA Group AG, SPX FLOW Inc., Bucher Unipektin AG, and Dedert Corporation.
- These companies are focused on developing advanced and innovative products to meet the changing needs of the sugar industry, such as more energy-efficient and sustainable solutions.



4/4

Fact 2

Evaporators and condensers are integral components of the sugar industry, facilitating the concentration and purification of sugar solutions. Evaporators employ heat transfer mechanisms to remove water from the solution, while condensers recover and recycle vaporized water.



MOLASSES DESUGARING PLANTS

1/4



Molasses desugaring plants are industrial facilities that process molasses, a byproduct of sugar production, to remove impurities such as sucrose crystals, organic matter, and minerals. The process of desugaring molasses involves treating it with chemicals and/or filtering it through various materials to remove the impurities.

- The resulting product is a clarified, concentrated molasses that has a higher degree of purity and consistency, making it suitable for a wide range of industrial applications, including the production of alcohol, yeast, animal feed, and other food and chemical products.
- Molasses-desugaring plants typically employ a variety of technologies, including ion exchange, carbon adsorption, and ultrafiltration, to remove impurities from the molasses. The process can vary depending on the desired purity level and the specific requirements of the product.

Food products that are processed using molasses desugaring plants

- Bakery products: Used as a natural sweetener in a variety of baked goods
- Confectionery products: Used as a flavoring and coloring agent
- Beverages: Used as a natural sweetener and flavoring agent
- Sauces and condiments: Used as a key ingredient in sauce, ketchup, and other condiments.
- Breakfast cereals: Used as a sweetener and flavoring agent
- Animal feed: Used as a feed ingredient for livestock and poultry

2/4



Working principle

- Pre-treatment:** The molasses is first pre-treated with lime or another alkali to neutralize any acids present and adjust the pH to an optimum level.
- Clarification:** The pre-treated molasses is then heated and treated with a flocculating agent, which causes the impurities to clump together and form sediment. The sediment is then removed through filtration or centrifugation.
- Decolorization:** The clarified molasses is then treated with activated carbon or another adsorbent material, which removes any remaining impurities, including color pigments.
- Ion exchange:** The decolorized molasses is then passed through ion exchange resin columns to remove any remaining impurities, such as ash, minerals, and heavy metals.
- Concentration:** The final step involves concentrating the purified molasses by evaporating the water content to a desired level.

- The global market for molasses desugaring plants is driven by the growing demand for high-quality, purified molasses for use in various industrial applications, including the production of alcohol, yeast, animal feed, and other food and chemical products.

3/4




Market Scope

Factors driving the demand for molasses desugaring plants:

- Increasing demand for alcohol:** The global demand for alcohol, including ethanol and biofuels, is expected to continue to grow, which is expected to increase the demand for high-quality, concentrated molasses as a raw material.
- Growing demand for animal feed:** Molasses is widely used as a feed ingredient for livestock and poultry, and the growing demand for animal protein is expected to increase the demand for high-quality, purified molasses.
- Rising demand for natural sweeteners:** Molasses is a natural sweetener that is becoming increasingly popular as an alternative to refined sugar, which is driving the demand for high-quality, purified molasses.
- Technological advancements:** Advancements in molasses desugaring technology have made it possible to produce molasses of higher purity and consistency, which is expected to increase the demand for molasses desugaring plants.

Key Players

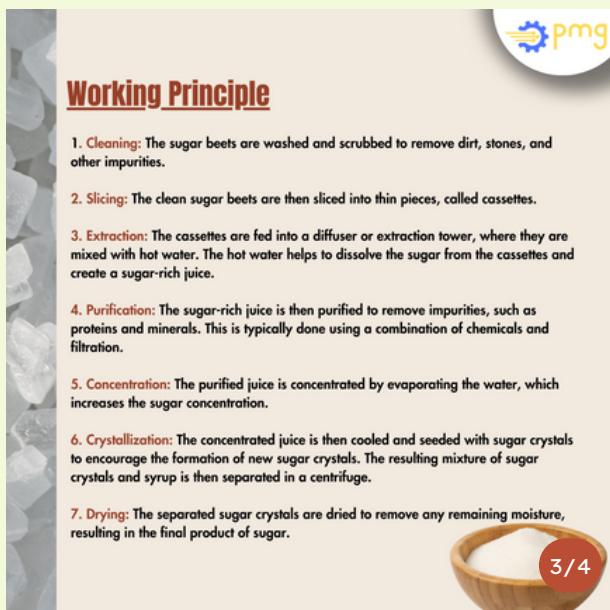
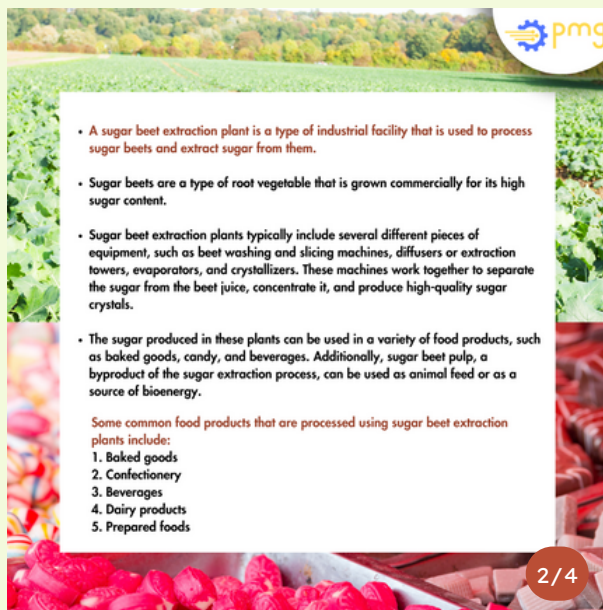
Some of the key players in the molasses desugaring plant market are as follows:

- Alfa Laval AB,
- GEA Group AG,
- Bucher Industries AG, and
- Veolia Environment SA.

4/4

Fact 3

Molasses desugaring plants utilize advanced chromatography or membrane filtration techniques to extract sucrose from molasses, a sugar production byproduct. Through precise control of temperature, pressure, and flow rates, sucrose is selectively separated, yielding refined sugar and concentrated syrup.



Fact 4

Sugar beet extraction plants utilize a series of specialized equipment for processing sugar beets into sucrose. These include cleaning stations, slicers, and diffusers to extract beet juice rich in sucrose. Subsequent steps involve clarification using lime and carbonation, followed by filtration and evaporation to concentrate the juice.



SUGAR CENTRIFUGES

1/4



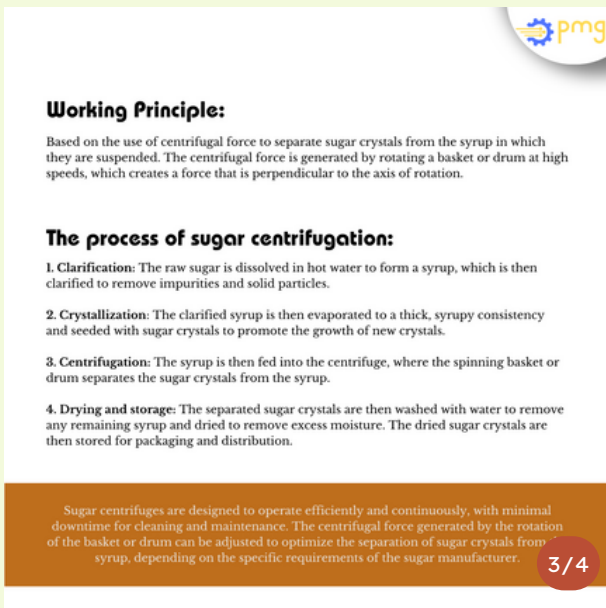
Sugar centrifuges are machines used in the sugar industry to separate sugar crystals from the liquid syrup (molasses) that surrounds them, resulting in a high-quality sugar product that is free from impurities and excess moisture. The process of separating the sugar crystals from the syrup is called "centrifugation".

- The sugar centrifuge works by spinning a basket or drum at high speeds, using centrifugal force to separate the sugar crystals from the syrup.
- The basket or drum is typically made of metal and has a mesh or perforated surface, which allows the liquid syrup to pass through while retaining the sugar crystals.

Food products that are processed using sugar centrifuges:

1. Granulated sugar
2. Brown sugar
3. Powdered sugar
4. Icing sugar
5. Caramel
6. Sweetened condensed milk

2/4



Working Principle:

Based on the use of centrifugal force to separate sugar crystals from the syrup in which they are suspended. The centrifugal force is generated by rotating a basket or drum at high speeds, which creates a force that is perpendicular to the axis of rotation.

The process of sugar centrifugation:

1. **Clarification:** The raw sugar is dissolved in hot water to form a syrup, which is then clarified to remove impurities and solid particles.
2. **Crystallization:** The clarified syrup is then evaporated to a thick, syrupy consistency and seeded with sugar crystals to promote the growth of new crystals.
3. **Centrifugation:** The syrup is then fed into the centrifuge, where the spinning basket or drum separates the sugar crystals from the syrup.
4. **Drying and storage:** The separated sugar crystals are then washed with water to remove any remaining syrup and dried to remove excess moisture. The dried sugar crystals are then stored for packaging and distribution.

Sugar centrifuges are designed to operate efficiently and continuously, with minimal downtime for cleaning and maintenance. The centrifugal force generated by the rotation of the basket or drum can be adjusted to optimize the separation of sugar crystals from syrup, depending on the specific requirements of the sugar manufacturer.

3/4



Market Scope:

- The market for sugar centrifuges is closely tied to the sugar industry. As such, the demand for sugar centrifuges is largely driven by the global demand for sugar.
- The global sugar market has experienced fluctuations in recent years due to various factors, including changing consumer preferences for healthier sweeteners and concerns about the health impacts.
- In addition, weather patterns and crop yields can affect the supply of sugar, leading to price fluctuations and changes in demand for sugar centrifuges.
- Despite these challenges, the market for sugar centrifuges is expected to continue to grow in the coming years, driven by the increasing global demand for sugar and the need for more efficient and cost-effective sugar manufacturing processes.
- **Advancements in centrifuge technology**, such as the development of high-speed centrifuges, are also expected to contribute to the market's growth.
- Regarding regional demand, Asia Pacific is expected to be the largest market for sugar centrifuges, driven by the significant growth in sugar production in countries such as India, China, and Thailand.
- Other regions, such as North America and Europe, are expected to see more modest growth in the sugar centrifuge market due in part to changing consumer preferences and the use of alternative sweeteners.

4/4

Fact 5

At the forefront of sugar processing technology, sugar centrifuges are indispensable in the sugar industry. Operating on the principle of centrifugal force, these high-speed machines efficiently separate sugar crystals from molasses in a continuous process. Advanced designs and materials ensure precise control over separation parameters, optimizing sugar purity and quality.

SUGAR DRYING PLANTS



1/4

A sugar drying plant is a type of industrial facility that is used to dry and remove moisture from sugar crystals, resulting in a dry and stable product that can be stored and transported.

- Sugar drying plants are typically used in the final stage of sugar production after the sugar crystals have been separated from the syrup in a centrifuge.
- Sugar-drying plants are used to produce a variety of sugar products, including granulated sugar, icing sugar, and powdered sugar.
- Sugar-drying plants are critical to the sugar industry, as they ensure that the sugar is stable and free from moisture, which can cause clumping, spoilage, or mold growth.
- Additionally, sugar-drying plants play an important role in the transportation and storage of sugar, allowing it to be transported and stored in a dry and stable form until it is ready to be used in food and beverage products.

Some common food products that are processed using sugar-drying plants include:

1. Baked goods
2. Confectionery
3. Beverages
4. Dairy products
5. Prepared foods



2/4

Working Principle

1. Sugar crystals are fed into a drying chamber, where they are exposed to hot air. The hot air is generated by a heater or boiler and is circulated through the drying chamber by fans or blowers.
2. As the hot air passes through the sugar crystals, it absorbs moisture and carries it out of the chamber.
3. The hot air and moisture are then vented out of the drying chamber, either through a dedicated vent or through the building's ventilation system.
4. The dried sugar crystals are then cooled and screened to remove any fine particles or impurities.
5. The resulting product is a dry and free-flowing sugar that can be stored and transported.

- Sugar-drying plants typically use rotary drum dryers, which consist of a rotating drum that is heated from the inside.
- The temperature and humidity of the hot air are carefully controlled to ensure that the sugar crystals are dried to the desired moisture content without overheating or burning.
- The drying time can vary depending on the moisture content of the sugar crystals and the desired moisture content of the final product.

3/4

Market Scope

- One of the major factors driving the demand for sugar-drying plants is the increasing popularity of convenience foods, which require dry and stable sugar products as an ingredient.
- Additionally, the growing demand for natural and organic foods is expected to boost the demand for sugar-drying plants that can produce high-quality, minimally processed sugar products.
- The market is also driven by the increasing adoption of automation and control systems in sugar drying plants.
- The adoption of new technologies, such as vacuum drying and spray drying, is also expected to drive the growth of the market by improving the quality and consistency.
- The Asia-Pacific region is expected to be the fastest-growing market for sugar-drying plants.
- **Key Market Players:** BMA, ThyssenKrupp AG, Fives Group, Bucher Unipektin AG, Andritz AG, Comessa, and Yamato Sanko MFG. Co., Ltd, Heinkel Drying and Separation Group, and Swenson Technology, Inc.

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Fact 6

Utilizing advanced technology, sugar drying plants employ specialized equipment to meticulously extract moisture from sugar crystals, crucial for product stability and quality. Through precisely controlled air flow and temperature regimes, moisture is evaporated from the crystals efficiently.



SUGAR BEET PREPERATION PLANTS

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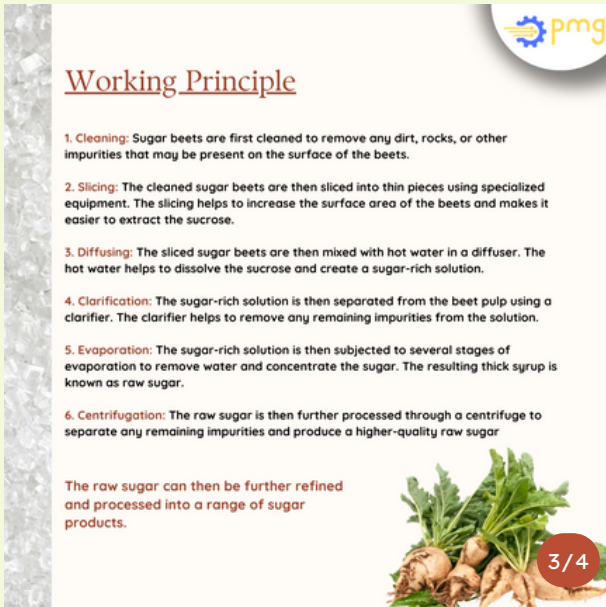
Sugar beet preparation plants are facilities that are used to process sugar beets into raw sugar. Sugar beets are a type of root vegetable that contains high levels of sucrose, which can be extracted and processed into sugar. Sugar beet preparation plants typically involve several stages of processing, including cleaning, slicing, diffusing, and evaporation.

- Sugar beet preparation plants require specialized equipment, including slicing machines, diffusers, evaporators, and clarifiers, as well as a range of pumps, piping, and storage tanks.
- The specific equipment and processes used in sugar beet preparation plants may vary depending on the size and capacity of the plant, as well as the specific requirements of the customer.

Some of the food products that may be produced using sugar from sugar beet preparation plants include:

1. Confectionery:
2. Beverages
3. Dairy products
4. Baked goods
5. Processed foods

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Working Principle

1. **Cleaning:** Sugar beets are first cleaned to remove any dirt, rocks, or other impurities that may be present on the surface of the beets.
2. **Slicing:** The cleaned sugar beets are then sliced into thin pieces using specialized equipment. The slicing helps to increase the surface area of the beets and makes it easier to extract the sucrose.
3. **Diffusing:** The sliced sugar beets are then mixed with hot water in a diffuser. The hot water helps to dissolve the sucrose and create a sugar-rich solution.
4. **Clarification:** The sugar-rich solution is then separated from the beet pulp using a clarifier. The clarifier helps to remove any remaining impurities from the solution.
5. **Evaporation:** The sugar-rich solution is then subjected to several stages of evaporation to remove water and concentrate the sugar. The resulting thick syrup is known as raw sugar.
6. **Centrifugation:** The raw sugar is then further processed through a centrifuge to separate any remaining impurities and produce a higher-quality raw sugar.

The raw sugar can then be further refined and processed into a range of sugar products.

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Market Scope

- The global market for sugar beet preparation plants is driven by the growing demand for sugar and other sweeteners in the food and beverage industry.
- The market for sugar beet preparation plants is also driven by increasing awareness of the health risks associated with excessive sugar consumption.
- Europe is currently the largest market for sugar beet preparation plants, with countries such as France, Germany, and Poland among the leading producers.
- The Asia-Pacific region is also expected to experience significant growth in the market, driven by the increasing demand for sugar and sweeteners in countries such as India, China, and Indonesia.
- The market for sugar beet preparation plants is highly competitive, with several large players operating in the industry.

Some of the key players in the market include BMA AG, Fives Cail Group, ANDRITZ AG, and ThyssenKrupp AG.

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Fact 7

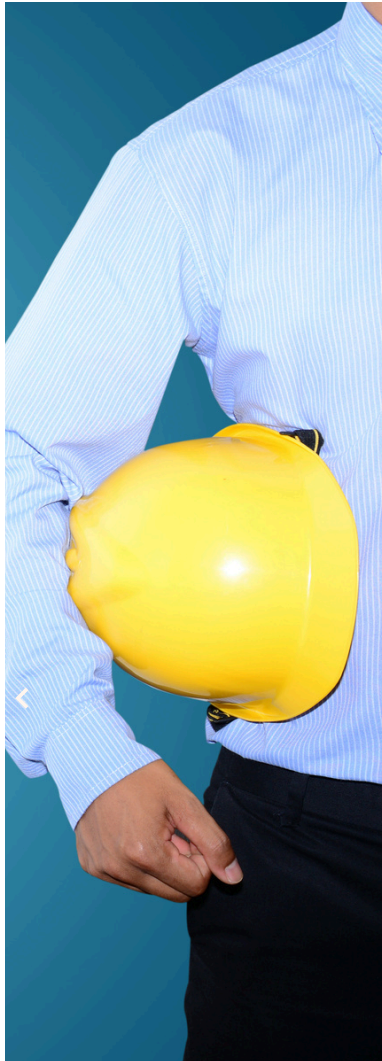
Utilizing cutting-edge technology, sugar beet preparation plants meticulously process raw sugar beets into extractable juice. Through a series of advanced techniques including cleaning, slicing, and pulping, the beets are meticulously prepared for extraction. Innovative methods such as diffusion or hot water extraction are employed to maximize juice yield.



PMG ENGINEERING

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