

TECH-KNOWLEDGE

The Official PMG Engineering Newsletter

**FOOD & BEVERAGE
INDUSTRY**

**ENGINEERING
& DESIGN**

**SCIENCE &
TECHNOLOGY**

CONTENTS



1. WHITE PAPER

- A. Butter Manufacturing Equipment
- B. Beverage: An Introduction to its Categories

2. INDUSTRY BUZZ

Latest Food Industry News Updates

3. WEEKS HIGHLIGHT

A Look Into The Main Events Of The Week

4. DID YOU KNOW?

Fascinating Food Facts To Expand Knowledge

2-5



6-7

8



9-13

Butter Manufacturing Equipment



Introduction

Butter is a dairy product made from the fat and protein components of churned cream. It is semi-solid at cold room temperature. Butter can taste different, ranSalt, and yellow to white solid. Butter manufacturing involves types of equipment like - Pasteurizer, Separator, Butter Continuous Making Machine, Butter Storage Tank, Butter Balance Tank, Butter Churn, Butter Trolley, etc.

Principle of Butter Making

The process of butter making is principally an inversion of the fat-in water type emulsion of cream to the water-in fat type of emulsion in butter. Butter systems are different types.

- 1.Traditional batch Method - Churning from 25-35% milkfat cream.
- 2.Continuous floatation - Churning from 30-50% milk-fat cream
- 3.Concentration process - Plastic cream of 82% milk-fat is separated from 35% milkfat cream at 55°C and this oil-in-water emulsion is inverted to water-in oil emulsion butter with no further draining of buttermilk.

Requirement of Hygienic Equipment

- All equipment should be non-corrosive, made from food-grade materials that do not impart any toxic substance to food.
- No equipment and containers made up of iron or galvanized iron are to be used in food handling, preparation, and storage.
- Equipment to be suitably designed and placed to permit ease.
- A food establishment shall be located away from environmental pollution and industrial activities that produce obnoxious odor, fumes, smoke, chemical or biological emissions, and pollutants that may cause the threat of contaminating food.
- The surroundings shall be clean, free from infestation of pests, wastes- solid or liquid
- Manufacturing premises should not have direct access to any residential premises/area

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Butter Manufacturing Process equipment

1 Raw Milk Silo Tank

Stainless Steel Tanks are used for storing the milk at 4 Deg. C for long durations. The tank provided insulation in the outer jacket. The milk inlet should be non-foaming type at the top.

2. Centrifugal Pump for Transfer Milk

A Centrifugal pump is a mechanical device. Design to move fluid using the transfer rotational energy from one to more driven rotors. The pump transfers liquid form is called a centrifugal pump.

3. Milk Pasteurizer

Milk pasteurization is the process of heating the milk to a pre-determined temperature for a specified period without re-contamination during the process. Heating milk to 71.7°C for 15 seconds to kill Coxiella. The milk to between 72°C to 74°C for 15 to 20 seconds.

4. Cream Separator

Cream Separator Machine for separating and removing cream from milk. Its centrifugal operation process is two-phase since skim milk and milk with no butterfat cream.

5. Cream Balance Tank

The cream Balance tank keeps the product at a constant level above the pump inlet. The balance used some product storage.

6. Cream Chiller

A cream Chiller is a mechanical device for chilling the product. Before further processing or storage to prevent microbial growth. The cream is chilled to around 4°C chiller using a plate.

7. Cream Pasteurizer

The cream pasteurizer in Heating and Cooling arrangement for cream pasteurizer. Pasteurized cream has comparatively more shelf life due to a reduction in microbial load. Pasteurizer internal components like – Steam control valves, Manual valves, Electrical panel, PLC-based system, Holding tube, etc.

8. Butter Churn

A device used to convert cream into butter. This is done through a mechanical process is called butter churn. The pole is inserted through the lid of the churn, or via a crank used to turn a rotating device inside the churn. Butter Churn rotator shaft with the electrical motor gearbox.

9. Butter Trolley

Butter Trolleys are used for the transportation of butter from one section to the other section is called butter trolleys.

10. Butter Cutting Machine

Butter cutting Butter block cutting M/C is designed to cut butter blocks into small pieces before homogenizing, re-packaging processes.

11. Butter Packing Machine

The butter wrapping machine is designed for filling and wrapping butter etc. into Al. foil, parchment paper, or ecocline (with memory).

12. Butter Cold Room

Butter cold room temperature required - 18 Degree. for storage till intended use or dispatch. During dispatch, it is still kept at -20 to - 18 Deg. C

Beverage: An Introduction to its Categories



Introduction

A beverage is a liquid, which in addition to fulfilling a basic human need also forms a part of the culture of human society. The term beverage is derived from a French word "Beivre" which means a drink. It consists of diverse group of food products, usually liquids that include the most essential drink water to wide range of commercially available fluids like fruit beverage, synthetic drinks, alcoholic beverage, milk, dairy beverages, tea, coffee, chocolate drinks, etc. The beverages are rarely consumed for its food value, but it is vital for life. Although their prime role is to fulfill the human need, but these are part of our culture. However, there are important pre-requisite for beverages:

1. All are made from food ingredients
2. All are subject to pure food laws

Types

1. Hot drinks, such as tea, coffee, and hot malt-based products.
2. Milk drinks, including animal milk, plant-based milk and flavored milk beverages.
3. Soft drinks, which are subdivided into bottled water; carbonated soft drinks; squashes and syrups; 100% fruit juices and nectars; sports drinks; and other non-carbonated products with less than 25% fruit juice.

Alcoholic Beverages

Alcoholic drinks are aromatic liquids with a specified alcohol content. These drinks contain ethanol, that can be either non-distilled or distilled depending on the volume percentage of alcohol per liter.

1. Non-Distilled Alcoholic Beverages: They are made by the process of fermentation. Alcoholic fermentation is a complex biochemical process during which yeasts covert sugars to ethanol, carbon dioxide, and other metabolic byproducts that contribute to the chemical composition and sensorial properties of the fermented foodstuffs.

- **Beer:** It is defined as a fermented alcoholic beverage made from barley/wheat/rice, flavored with hops including *Saccharomyces* yeast and water. There are two types of beer: bottom fermented and top fermented. The former type of beers known as lager are fermented at a lower temperature (2°C – 6°C) and the later, known as ale, at a higher temperature between 15°C to 19°C. Top fermented beers are characterized by a more-fruity flavor and aromas with a malty, full-bodied flavor, while lager are by a crisp-tasting, lighter body, and less-fruity aroma.
- **Wine:** They are undistilled alcoholic beverages usually made from grapes or other fruits such as peaches, plums or apricots. These fruits undergo a period of fermentation and ageing. They usually have an alcohol content ranging between 5 to 13 percent.

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- **Distilled Alcoholic Beverages:** They are obtained by distillation of alcohol containing drinks. During distillation the aqueous part is separated from the alcohol. Because of their high alcohol percentages, these liquors are mostly packed in glass bottles so that they can be kept for an infinite time after opening.
- **Whiskey:** It is a distilled spirit fermented from grain, including corn, barley, rye, and wheat. It has 40 to 60 % alcohol by volume. It is usually colored with the addition of caramel.
- **Rum:** It is a distilled alcoholic beverage made from fermented sugarcane molasses or sugarcane juice. The base is combined with water and yeast and after fermentation it is distilled.

Non-Alcoholic Beverages

It is a potable liquid which has either no ethyl alcohol in it or the alcohol percentage is less than 0.5% by volume. It includes a gamut of drinks from hot to cold.

1. Hot Beverages: The most common hot drinks are tea and coffee, followed by drinks like hot chocolate, kombucha, just to name a few.

- **Tea:** Tea is the second most-consumed beverage in the world, following only water. Tea leaves are picked from *Camellia sinensis* bushes up to four times a year. Tea made from flushes, which include the terminal bud and two young leaves, are the highest quality teas with the finest flavors and aromas. This type of harvesting is called fine plucking.
- **Coffee:** Coffee is the most preferred hot drink in the US and Europe. The global coffee market is composed of three main types: arabica, robust, and liberica.



2. Soft Drinks: Soft drinks are sweetened, water-based beverages, usually with a balancing acidity. They are flavored by the use of natural or artificial materials, are frequently colored, and often contain an amount of fruit juice, fruit pulp or other natural ingredients.

- **Ready-to-drink (RTD) products:** These drinks were typically formulated to contain around 10-11% sugar content, with about 0.3-0.5% of added acid.
- **Concentrated soft drinks:** Most concentrated beverages contain fruit juice or pulps. They are usually flash-pasteurized and chemically preserved, where permitted. Their dilutable form means that they are often held in partially filled bottles for significant lengths of time.

3. Milk Beverages: These are beverages whose primary constituent is milk. Milk beverages are generally very rich in calcium, fat, and protein. Some examples are whey-based beverages, flavored milk, kefir, milkshakes, to name a few.



INDUSTRY BUZZ

Make the switch to NPO—a seismic upheaval in the snacking sector

The recent discussions and rising knowledge about Non-Palm Oil (NPO) products show that consumers are becoming more mindful of healthier snacking options. This is creating new market trends and having a big impact on consumer behaviour.

Since its founding, Too Yumm!, the flagship brand of Guiltfree Industries Ltd., which is owned by the RP-Sanjiv Goenka Group, has provided consumers with cutting-edge, ground-breaking, and health-conscious products. Better, healthier snack options have been provided by the company, which started with the introduction of Multigrain Chips in distinctive flavours and was the pioneer in providing baked snacking goods.

Reiterating its position as a brand that has been the trendsetter with NPO in its snack collection, it has launched a new campaign dubbed "Switch to NPO" to celebrate its pioneering status.

NRAI Pune highlights the restaurant industry's commitment to ethical practices, supporting authorities.

Prominent city officials convened with the National Restaurant Association of India (NRAI) Pune Chapter to deliberate and enhance their cooperative endeavours.

Ajinkya Udane, the head of the NRAI chapter, and Saili Jahagirdar, the co-head, met with Dr. Suhas Diwase, the divisional commissioner of Pune; Amitesh Kumar, the commissioner of police; Uttamrao Shinde, the deputy superintendent of the excise department; and Dr. Rajendra B Bhosale, the Pune municipal commissioner and MLA Ravindra Dhangekar.

The NRAI Pune Chapter stressed the value of upholding the strictest standards of professionalism and dedication, as well as sticking to legitimate business methods, in their statements of solidarity and support to the authorities during these sessions. The talks emphasised that both parties wanted to make sure that Pune's restaurant business worked well.





The premier event for the food processing industry is Snack & BakeTec 2024.

Snack and BakeTec is scheduled to occur at the India International Convention & Expo Centre, Dwarka, New Delhi, on June 5-7, 2024. Given the overwhelming success of the first Snack & BakeTec and its sister trade shows, Pac MechEx and Inter FoodTech, the second edition promises even more for everyone involved in the food and beverage processing sector.

The current version will put a greater emphasis on the technology that businesses need today in order to optimise their manufacturing facilities.

The dairy business in the country employs about 80 million people, of which 56 million are women and account for 70% of the workforce. Furthermore, the majority of workers in the country's dairy business are women.



A new study reveals that lemon verbena extract may improve your quality of sleep.

A recent clinical study's findings support the benefits of lemon verbena for accelerating sleep onset and improving the quality of sleep. It has been demonstrated that supplementing with RelaxPLX, a pure extract of lemon verbena (*Aloysia citrodora*) developed by Suannutra's subsidiary Monteloeder, improves sleep patterns and increases endogenous secretion of the hormone melatonin, which induces sleep.

Lemon verbena is known for its antioxidant qualities, but it's also a mild sedative with the capacity to naturally improve sleep quality and offer emotional solace.

One of the most common complaints in the field of public health is sleep deprivation. Approximately 35% of people on the planet are impacted. The disorders that follow include restless nights, trouble falling asleep, and frequent awakenings.

DÉCLARATION NUTRITIONNELLE	
Valeurs nutritionnelles moyennes	
	pour 100 g
Énergie	1134 kJ/273 kcal
Matières grasses	21 g
dont acides gras saturés	15 g
Glucides	1 g
dont sucres	<0,5 g
Protéines	20 g
Sel	1,50 g

Most Indians, according to a study, value nutrition more than taste.

On World Nutrition Day, Wonderful Pistachios, the leading pistachio producer, processor, and distributor of California Pistachios in India, revealed the results of a recent international survey that provides insight into the snacking preferences of urban Indians. Over 12,400 respondents from 10 countries participated in the study, which was commissioned by Material, a renowned international research firm. It identified a new behavioural trend in which urban Indian consumers choose nutrition over taste when it comes to snacking. The increasing inclination towards nutritious snacking highlights how crucial a balanced diet is to one's overall health.

The study examined the snacking behaviours of 2,415 shoppers from six Indian cities, which accounted for almost 35.9 million consumers, exclusively for the India market. Surprisingly, more urban Indians (58%) than the global average of 52% stated they base their food purchases more on nutritional value than flavour. With more than 60% of urban buyers preferring nutrition in their meals, Delhi and Ahmedabad lead the way.

WEEKS HIGHLIGHT

NON-TECHNICAL CONTENT



National Wine Day!

A toast to the artistry of grapes, each sip a symphony of flavors crafted by nature's hand and human skill.

The color of red wine comes from the grape skins, not the juice. During fermentation, the skins are left in contact with the grape juice, imparting the rich red hues and complex flavors characteristic of red wines.

25 MAY

NATIONAL WINE DAY

Overflowing with gratitude for the moments shared and the glasses raised on Wine Day 🍷✨ Let's continue to savor every sip and cherish every moment. Cheers to the journey ahead!"

JUNE

DID YOU KNOW?



Frozen cake is a type of cake that is stored and served at a very low temperature, typically below freezing point. It is made by layering sponge cake or other types of cake with various fillings and toppings, and then freezing the entire cake until it is firm.

- Made in advance and stored in a freezer until they are needed, making them a convenient option for events and gatherings and decorated with a variety of frostings and toppings and can be served in individual slices or as a whole cake.

Major players in the Market

- Sara Lee Frozen Bakery
- Rich Products Corporation
- Rich Products Corporation
- General Mills, Inc.
- Pepperidge Farm
- Tastykake



Commercial Production

1. Mixing and Baking:

Mixed, and the batter is poured into cake pans. The cake pans are then baked in ovens.

2. Cooling:

Removed from the oven and allowed to cool. This is an important step, as it allows the cakes to firm up and become more stable.

3. Decorating:

Decorated. This may involve adding frosting, whipped cream, fruit, or other toppings to the cakes.

4. Freezing:

Frozen to preserve their freshness and quality. They are typically flash-frozen, which involves placing them in a very cold environment for a short period to quickly freeze them.

5. Packaging:

Packaged for sale. This may involve wrapping individual slices or packaging entire cakes in boxes or other containers.

Fact 1

Frozen cakes undergo stringent preparation methods before rapid freezing below -18°C to halt microbial growth and maintain texture. Vacuum sealing prevents moisture loss and freezer burn, preserving product quality. Advanced freezing techniques minimize ice crystal formation, ensuring cake texture remains unchanged. These precise procedures guarantee retained taste, texture, and quality, providing consumers with convenient and indulgent dessert options.

FROZEN BREAD AND ROLLS



1/3

Frozen bread and rolls are pre-baked bread products that have been frozen to preserve their freshness and extend their shelf life. They are typically sold in supermarkets and food service establishments and can be reheated at home or in commercial kitchens before consumption.

Market Scope

The global frozen bakery products market was valued at \$14.7 billion in 2020 and is projected to reach \$21.2 billion by 2026, with a CAGR of 6.1% during the forecast period.

Major players in the Market

Grupo Bimbo
Dawn Foods
Rich Products Corporation
General Mills
Nestle SA

2/3

Commercial Production

- 1. Mixing:**
Mixed together in a large mixing bowl or mixer.
- 2. Proofing:**
Proofing and helps to develop the flavor and texture of the bread.
- 3. Shaping:**
Shaped into the desired form, such as loaves or rolls.
- 4. Baking:**
Baked in an oven until it is fully cooked and has developed a golden-brown crust.
- 5. Freezing:**
Frozen to preserve their freshness and quality. They may be individually quick-frozen or placed in packaging for freezing.
- 6. Packaging:**
Packaging entire loaves in boxes or other containers.

3/3

Fact 2

Employing advanced preservation techniques, frozen bread and rolls undergo meticulous preparation to uphold quality. Advanced cryogenic or blast freezing techniques ensure controlled freezing rates, minimizing ice crystal formation and preserving their structural integrity and texture. These processes guarantee superior quality and extended shelf life.



Frozen small pastries are a type of frozen bakery product that typically includes items such as croissants, Danish pastries, and other sweet or savory baked goods. These products are typically made with buttery doughs that are layered and rolled to create flaky, rich pastries with a variety of fillings.

Market Scope

The global market for frozen bakery products, including frozen small pastries, was valued at USD 15.6 billion in 2020 and is expected to grow at a CAGR of 5.7% from 2021 to 2028, according to a report by Grand View Research.

Major players in the Market

- Nestle SA
- General Mills Inc.
- Kellogg Company
- Conagra Brands Inc.
- McCain Foods Limited
- Dr. Oetker GmbH
- Pepperidge Farm Inc.
- Lantmannen Unibake International



Commercial Production

1. Preparation of the Dough:

Production of frozen small pastries is the preparation of the dough. The ingredients are mixed and kneaded to form a smooth dough.

2. Filling:

Filling, which can be sweet or savory, is then placed on top of each piece of dough.

3. Shaping:

Shaped into the desired shape, which can be round, square, or any other shape depending on the pastry.

4. Freezing:

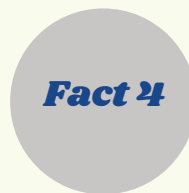
Freezer to freeze. This process can take a few hours or overnight, depending on the type of pastry and the freezing equipment used.

5. Packaging:

Packaged in bags or containers.

Fact 3

Employing advanced preservation techniques, small frozen pastries undergo meticulous preparation to uphold quality. Vacuum sealing prevents moisture loss and freezer burn, ensuring product integrity. Advanced freezing techniques minimize ice crystal formation, preserving pastry texture. These precise procedures guarantee retained taste, texture, and quality, providing consumers with convenient and indulgent options.



Frozen dumplings undergo meticulous preparation before rapid freezing to ensure quality and texture preservation. Vacuum sealing prevents moisture loss and freezer burn, ensuring product integrity. Advanced freezing techniques minimize ice crystal formation, maintaining dumpling texture. These precise procedures guarantee retained taste, texture, and quality, offering consumers convenient and delicious options with extended shelf life.

FROZEN FLOUR-BASED DESSERTS



1/3

Frozen flour-based desserts are desserts that are made with flour as one of the main ingredients and are frozen to be served as a frozen treat. Examples of frozen flour-based desserts include ice cream cones, waffle cones, and cake cones, which are all made with flour as the main ingredient.

Frozen flour-based desserts include:

1. Crepes:

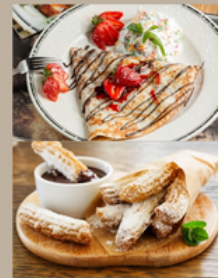
Made with flour, eggs, milk, and sugar, which can be filled with sweet or savory fillings and served frozen.

2. Churros:

A Spanish fried dough pastry that is often coated in sugar and cinnamon and served frozen.

3. Baked Alaska:

Made with layers of cake and ice cream, covered in meringue, and baked until the meringue is lightly browned, then frozen before serving.



2/3

4. Profiteroles:

Filled with ice cream and drizzled with chocolate sauce, which are often frozen before serving.

5. Doughnut ice cream sandwiches:

Sandwiched between two halves of a glazed doughnut and then frozen.



Major players in the Market

- Nestle
- Unilever
- General Mills
- Kellogg Company
- Conagra Brands
- Dr. Oetker



3/3

Fact 5

Frozen flour-based desserts undergo meticulous preparation before swift freezing, ensuring quality preservation. Advanced cryogenic methods rapidly lower the temperature to inhibit microbial growth and maintain texture. Vacuum sealing prevents moisture loss and freezer burn, maintaining product integrity. Precise control over freezing parameters minimizes ice crystal formation, preserving dessert texture and taste. These technical processes guarantee optimal quality and shelf life for consumers.



PMG ENGINEERING

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Design & Construction Management in
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for FOOD and BEVERAGE Industry with SINGLE POINT ACCOUNTABILITY

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