

TECH-KNOWLEDGE

The Official PMG Engineering Newsletter

**FOOD & BEVERAGE
INDUSTRY**

**ENGINEERING
& DESIGN**

**SCIENCE &
TECHNOLOGY**

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BUTTER PROCESSING



Introduction

Butter is essentially the fat of milk. It is essentially a water-in-oil emulsion and is usually made from sweet cream and is salted. Salt less (sweet) butter is also available in the market. Butter can also be made from acidulated or bacteriologically soured cream. Commercial butter can be produced from both sweets as well as cultured cream. Extraordinarily little cultured butter is produced in India and the U.S.A., although in Europe and Canada, cultured butter is an important product. However, most creamery prefers to produce butter from sweet cream as it results in sweet buttermilk with better economic value than sour buttermilk that results when sour/cultured cream is churned.

Composition

Main Constituent	Normal salted butter	Indian butter
Fat	80 – 82 %	80.2%
Water	15.6 - 17.6%	16.3%
Salt	about 1.2%	2.5%
Protein, Ca, P	about 1.2%	1.0%

Process:

1. Reception of the milk-As the milk arrives, a sample is sent to the lab for initial analysis (fat, SNF, etc.); if it fits the standards, it is sent to the storing silos.
2. Separation: Milk is transferred to the separator, where it is separated into cream and skim milk. The skim milk from the separator is pasteurized and cooled before being pumped to storage. It is usually concentrated and dried.
3. Pasteurization: It is usually done at 82-88°C or more. (The high temperature is needed to destroy enzymes and micro-organisms that would impair the butter's keeping quality).
4. Ripening: Sometimes, cultures are added to ferment milk sugars to lactic acid and acquire desirable flavour and aroma characteristics for cultured butter. This is more common in European butter. Thus, ripening is the fermentation of cream with the help of a desirable starter culture, which helps develop flavour. The cream is ripened in 2 stages: 1st stage at 21°C to pH 5.5 and then 2nd stage at 13°C to pH 4.6. This step can be eliminated if sweet-cream butter is desired. So, Once the cream is pasteurized, it is transferred to the cream storage tank for ripening.

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5. Ageing and crystallizing: The cream is now transferred to the ageing tank and subjected to a controlled cooling program that gives the fat the required crystalline structure. The process is done for around 8 hrs at 14°C.

6. Churning: The aged cream is now sent to the churner. In the churning process, the cream is violently agitated for 30 min at 6-14° C to break down the fat globules, causing the fat to coagulate and form butter grains and buttermilk.

7. Draining & washing: It used to be common practice to wash the butter after churning to remove any residual buttermilk and milk

8. Salting: After washing the butter granules, they are transferred to the blending tank and mixed with Salt.

9. Packing & storage: The butter is finally patted into shape and then wrapped in waxed paper, and then stored in a cool place. As it cools, the butterfat crystallizes, and the butter becomes firm.

Note: Neutralization of cream

Churning of High acid cream may cause high-fat loss, which can be prevented by neutralization. Thus, the objectives of neutralization are to reduce the acidity in cream to a point (0.14 -0.16%) which permits pasteurization without risk of curdling, to produce butter that keeps well in cold storage

Difference between

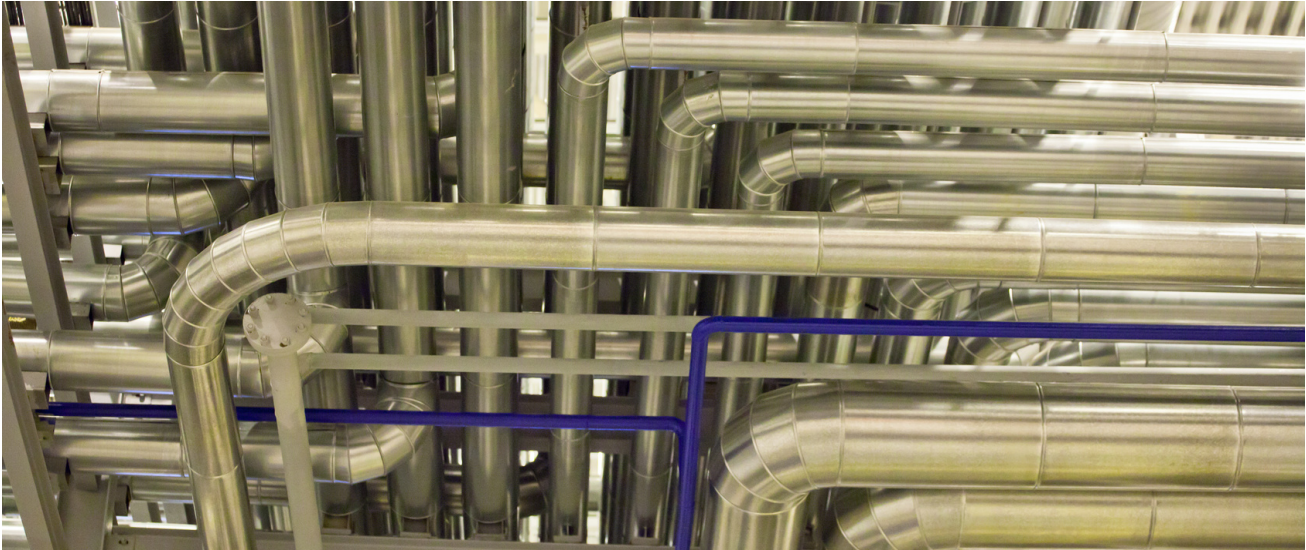


- **Butter** is the smooth, fatty substance obtained from churning cream. Butter manufacturers first pasteurise the cream. This heat treatment destroys bacteria, inactivates enzymes, and gives the cream a cooked or heated flavour.
- **Table butter** is the product made from pasteurized cream obtained from milk and milk products, with or without ripening with the use of standard lactic culture, addition of common salt, annatto or carotene as coloring matter, and diacetyl as flavoring agent.
- **White butter** is the product made from pasteurized cream obtained from milk and milk products, without ripening and without addition of any preservative including common salt, any added coloring matter, or any added flavoring agent.

Conclusion

Traditionally, butter is a product derived from cream, inverted to a water-in-oil emulsion (W/O) with a minimum of 80% fat. The butter's continuous fat phase is a complex matrix of liquid butter oil and fat crystals, forming a network that entraps the water droplets and, to a limited extent, small air bubbles. Initially, the milk is concentrated to cream followed by a pasteurization process. Subsequently, the cream follows a temperature treatment where crystallization takes place. The churning process involves phase inversion of the crystallized cream to butter granules and buttermilk. The butter granules are plasticized by the kneading and mixing process to form the butter.

PIPELINE MARKING SYSTEM IN FOOD INDUSTRIES



Introduction

In food and dairy industry settings, products and utility fluids are carried from one corner of the facility to another through a network of pipes snaking underground, overhead and along walls. At first glance, it is anyone's guess as to what the pipe is carrying — it could be raw milk, CIP fluids like acid, lye, steam etc. or simply tap water. Because of this it is important to be able to keep track of the contents in each pipe as well as its destination. For facility managers, maintenance employees working in the area and emergency responders, the proper labeling of pipes means more than staying compliant — it ensures the facility is safe and efficient. When pipes are well-marked and color coded, maintenance personnel can easily trace pipes to the source, no second-guessing of what is in the pipes occurs, emergency responders can identify contents and errors in pipe identification can be avoided or significantly reduced.

Pipeline Labeling and Coding

Markings of pipelines and piping materials are standard industry practices. Color marking will make identification easier for raw material and fluid that being transport by the pipe.

It quickly communicates essential information to everyone in a facility, improving overall workplace safety and productivity. If color codes are ignored, employees are at a higher risk of causing an accident that may result in physical harm as well as damage to facility. For example, if a worker opens a pipe that is not identified correctly, he or she may expect clean water but instead open a valve to find toxic chemicals. Painting your equipment, including machines, water lines and chemical lines, according to color coding standards allows you not only to protect your valuable assets against environmental factors but also to standardize the visual communication for statuses, cautions, hazards, etc., eliminate guesswork, simplify tasks, and improve safety and productivity by minimizing the risk of errors and workplace accidents.

Below is the color-coding guide for industrial applications. The American National Standards Institute (ANSI) and Occupational Safety and Health Administration (OSHA) have developed a comprehensive collection of standards to guide the use of "safety" colors, signs, and symbols in industrial environments.

Regulations

Pipe Markings is not a complicated process, especially if industry standards are used. There are many standards out there from a variety of sources such as:

[READ MORE....](#)



1. ASME/ANSI A13.1 – Scheme for the Identification of Piping Systems
2. BS 1710 – Specification for Identification of Pipelines and Services
3. IS 2379 – Pipelines Identification Color Code
4. PFI ES-22 – Recommended Practice for Color Coding of Piping Materials

The ASME Standard for Pipe Identification is a widely used guideline in determining pipe identification requirements. The ASME A13.1-2007 editorial notes indicate that, "A13.1 is intended to establish a common system to assist in identification of hazardous materials conveyed in piping systems and their hazards when released in the environment." This standard explains colors, text, size, and placement of pipe marking labels.

Components of Pipeline Markings

1. Bold text/ Legends: For identification of the pipe's contents by name. (Additional details, such as temperature or pressure, may also appear.)
2. Color coding: For communicating the general category of the contents.
3. Flow direction arrows: To show which direction the pipe's contents flow.
4. Pictograms: Common warning symbols to alert people to potential dangers.

Pipe Marking Size Requirements

The color of pipe markings is typically the most important and visible aspect of the label, but it is not the only one. ANSI also has standards regarding how large a pipe marking label should be and the size of the lettering on the label. This is especially important when creating custom labels for a facility.



Pipe Diameter	Pipe Marking Size
0.7" - 1.3" (18-33mm)	should have labels that are at least 8" (200mm) in length and lettering that is at least 0.5" (13mm) in height
1.4" - 2.4" (34-61mm)	should have labels that are at least 8" (200mm) in length and lettering that is at least 0.7" (19mm) in height
2.5" - 6.7" (62-170mm)	should have labels that are at least 12" (300mm) in length with lettering that is at least 1.3" (32mm) in height
6.8" - 10" (171-254mm)	should have labels that are at least 24" (600mm) in length with lettering that is at least 2.5" (64mm) in height
greater than 10" (254mm)	should have labels that are at least 32" (800mm) in length with lettering that is at least 3.5" (89mm) in height

These standards are important because they will help ensure that the pipe markings are as visible as possible, even from a distance.

Best practices

Whether pipes run through walls, are on a boat or carry, pipe labels need to be seen clearly and withstand a variety of elements. Pipe labeling can save lives, reduce injury, and prevent extensive damage in a facility. Facility managers, safety managers, employees and maintenance workers should not be kept in the dark when it comes to what is inside a pipe, especially if it is hazardous. Kicking off a pipe labeling project or revamping current practices can drastically increase the safety of a workplace and ultimately keep workers informed and more efficient.

A close-up photograph of a clear glass filled with whisky, garnished with a slice of orange and a sprig of rosemary. The background is dark, making the glass and its contents stand out.

INDUSTRY BUZZ

The world's first whisky standard was introduced by BSI, streamlining the value chain.

The British Standards Institution (BSI) has released a new standard, BS 8636, for whisky producers, claiming it to be the first-ever whisky standard in history and establishing a new bar for excellence in the alcoholic beverage sector. With 242 million cases sold in 2022, India became the largest Scotch whiskey market by volume. It primarily relied on whisky, accounting for nearly two-thirds of its \$53 billion in alcoholic beverage sales.

Theuns Kotze, managing director of assurance for BSI India, Middle East, Turkey, and Africa, responded to FNB News by stating that the BSI's BS 8636 standard is ready to strengthen and streamline India's whiskey value chain, resulting in a more streamlined and dependable process.

Assam and QCI struck an agreement to enhance the food safety ecosystem.

A Memorandum of Understanding (MoU) was signed by the Assam Government and the Quality Council of India (QCI) to enhance the state's food safety environment. According to sources, the MoU aims to develop high-quality infrastructure through a framework for conformity assessment based on stakeholder capacity building.

In the opinion of state officials, the MoU represents a significant step in achieving excellence in the state's food safety and quality standards. The MoU will support the development of infrastructure linked to food safety in Assam, as well as quality certification, accreditation, and training to guarantee customers receive high-quality goods and services.





Bühler increases its manufacturing capacity as it marks 30 years in India.

Bühler, a Swiss technology company, marks the 30th anniversary of starting up shop in India by announcing the expansion of its manufacturing operations there. Bühler India will soon start producing a more comprehensive range of key product portfolios for the grain milling, food, feed, and advanced materials industries to meet the demands of a thriving home market and customers overseas.

With its production infrastructure, R&D groups, application centers, and training facilities, Bühler India has developed into one of the Bühler Group's top worldwide technological hubs. Today, 600 people work for Bühler India, which produces high-quality grain and food processing machinery for domestic and overseas clients.



Maverick & Farmer celebrates International Coffee Day over three days.

From September 30 to October 2, the artisanal coffee company Maverick & Farmer celebrates everything coffee with various sensory activities at its cafés in Ulsoor and Koramangala. The event will feature special coffee mixology sessions, a course on "Making South Indian Filter Coffee Sexy," workshops on home brewing and kombucha brewing, a home barista competition, and live acoustic performances.

The company, created entirely from scratch, hosted the first-ever coffee mixology in India the previous year, and this year's mixology session looks even more exciting thanks to some rather out-there variations on the beverage. Coffee lovers can create their own distinctive, artistic interpretation of coffee at the event by combining and matching their favorite flavors and components.



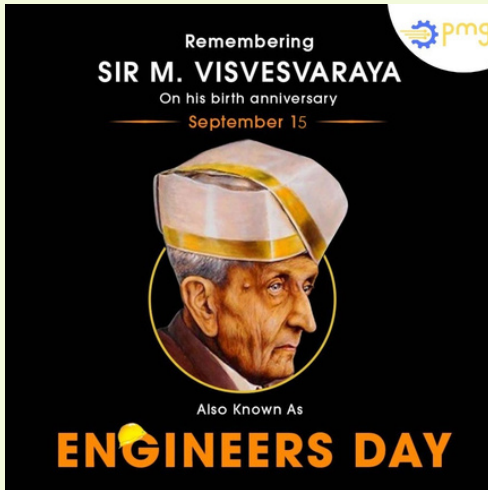
Consumers in Jharkhand can now enjoy fresh goods from ITC's Aashirvaad.

Aashirvaad Svasti, a well-known dairy brand in east India owned by ITC Ltd., recently announced the expansion of its fresh dairy product line to Jharkhand. With its introduction in the state, Aashirvaad Svasti is poised to surprise consumers in Jharkhand with a variety of dairy products, including Select milk, Creamy milk, Toned milk, as well as Curd, Paneer, Lassi, Mishti Doi, and Peda. The brand enjoys a strong consumer franchise across Bihar and West Bengal. The company wants to spread the benefits of fresh dairy products among consumers throughout the state by launching its portfolio in Ranchi and other cities.

This milk is homogenized, which guarantees that the milk cream is uniformly distributed throughout the milk, making it thicker and tastier and staying true to its brand proposal of "Doodh Ki Malai Doodh Mein." To ensure complete openness, consumers may now, for the first time, check the quality rating of their milk packet every day thanks to the "Doodh ka Report Card," a novel innovation in the sector.

WEEKS HIGHLIGHT

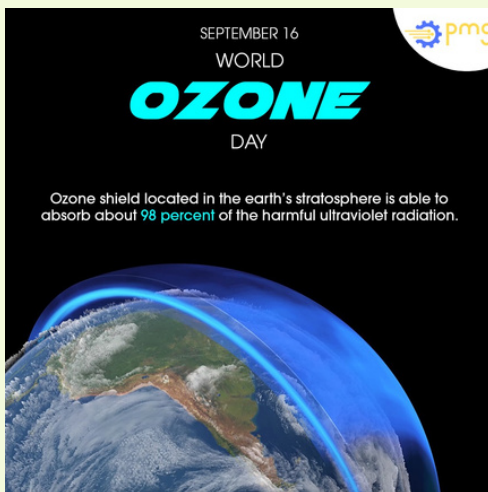
NON-TECHNICAL CONTENT



15 SEPTEMBER

ENGINEERS DAY

To acknowledge and applaud the engineers, Engineer's Day is observed nationwide on September 15 each year. On the anniversary of his birth, it is observed to honour Sir Mokshagundam Visvesvaraya's outstanding accomplishments. It serves as a reminder of the essential designs and constructions that have contributed to the seamless operation of our world.



16 SEPTEMBER

WORLD OZONE DAY

The majority of the UV light from the Sun is absorbed by the Earth's stratosphere's ozone layer, also known as the ozone layer. Every year on September 16, people throughout the world celebrate World Ozone Day in an effort to raise awareness of the ozone layer's deterioration and identify potential ways to protect it.



18 SEPTEMBER

WORLD WATER MONITORING DAY

America's Clean Water Foundation (ACWF) created World Water Day in 2003. Water monitoring involves testing and evaluating water sources on a regular basis while keeping an eye out for trends and data processing-related issues. The purpose of World Water Monitoring Day is to inform the public about the need of safeguarding their water sources by conducting regular tests.

SEPTEMBER



18 SEPTEMBER

WORLD BAMBOO DAY

World Bamboo Day is a day of celebrated on september 18 to raise global awareness of bamboo. Bamboos are a diverse group of perennial flowering plants that are evergreen. Bamboo is a versatile material that is used for building materials, as a food source, and as a raw product, and it is frequently depicted in the arts, such as in bamboo paintings and bamboo working.



19 SEPTEMBER

GANESH CHATURTHI

In India, especially in the states of Maharashtra, Madhya Pradesh, Karnataka, Kerala, Odisha, Telangana, Andhra Pradesh, Tamil Nadu, and Goa, the festival honours Ganesha as the God of New Beginnings, the Remover of Obstacles, and the god of wisdom and intelligence.



21 SEPTEMBER

INTERNATIONAL DAY OF PEACE

Every year on September 21, the world observes the International Day of Peace ("Peace Day"). The United Nations General Assembly has designated this as a day to strengthen the ideals of peace by observing 24 hours of nonviolence and cease-fire. The theme of International Day of Peace 2023 is "Actions for Peace: Our Ambition for the Global Goal."

DID YOU KNOW?



Fact 1

Okara is a nutritious byproduct of soy milk production. It is often referred to as "soy pulp" or "tofu dregs." Okara is created during the process of making soy milk and tofu from soybeans.

POTATO PRODUCTS

1/3

Potato products are popular all over the world and can be found in many different cuisines. They are a good source of carbohydrates, fibre, and vitamins, and are often used as a side dish or snack.

Potato Products

1. French fries
2. Potato chips
3. Mashed potatoes
4. Hash browns
5. Potato wedges
6. Potato dumplings
7. Potato croquette
8. Roasted potatoes

2/3

Market Scope

- The market scope for potato products is significant, as potatoes are a widely consumed in many cuisines around the world.
- The market scope for potato products is significant and is expected to continue to grow due to the increasing demand for convenient
- **The major players in the market include:** McCain Foods Limited, Lamb Weston Holdings, Inc., J.R. Simplot Company, Intersnack Group GmbH & Co. KG.

Fact 2

Potato products encompass a diverse array of culinary creations, from crispy and golden French fries to creamy mashed potatoes, savory potato chips, and delectable potato pancakes. These versatile spuds have found their way into countless global cuisines, offering a delightful range of tastes and textures that cater to a wide palate. Whether fried, baked, or mashed, potato products continue to be a beloved and indispensable part of our culinary landscape.

3/3



Fact 3

Raw ingredients in food are the basic, unprocessed components that are used to prepare a wide range of dishes and food products. These ingredients are typically natural, whole foods that can be combined, cooked, or processed to create various meals and food items. Raw ingredients can come from plants, animals, or minerals, and they provide the essential building blocks for cooking and food manufacturing.

FRUIT CONCENTRATE



Concentrates are products processed to remove water and reduce their volume. The resulting concentrated product is typically thicker and more potent than the original. Concentrates can be made from various food products, including fruits, vegetables, and animal products.



- Fruit concentrates: used as a sweetener or flavoring agent, such as juices, jams, and baked goods. Common fruit concentrates include apple, grape, and orange concentrates.
- Vegetable concentrates: used as flavoring agents or to add nutritional value. Examples of vegetable concentrates include tomato paste, onion powder, and garlic powder.
- Animal concentrates: made by processing animal parts, such as bones, into a thick liquid or powder. Often used to add flavor or nutrition to soups, stocks, and other savory dishes.
- Concentrates are popular in the food industry because they are easier to transport and store and have a longer shelf life. They can also be used as a cost-effective alternative to fresh ingredients.

Market Scope

- Fruit and vegetable concentrates are the market's most popular types of concentrates, with apple, grape, and orange concentrates being the most commonly used.
- Animal-based concentrates such as chicken, beef, and fish concentrates are also gaining popularity, as they are used in the production of soups, sauces, and stews.



Major market players

1. Archer Daniels Midland Company
2. Cargill, Inc.
3. Ingredion Incorporated
4. Tate & Lyle PLC
5. Kerry Group PLC
6. Döhler GmbH
7. Agrana Beteiligungs-AG
8. Frutaron Industries Ltd.
9. SunOpta Inc.
10. Diana Food (part of Symrise AG)

Commercial production

1. **Harvesting:** The raw material, such as fruits, vegetables, or animal parts, is harvested at the peak of ripeness and transported to the processing facility.
2. **Washing and sorting:** The raw material is washed to remove any dirt or debris, and then sorted to remove any damaged or diseased parts.
3. **Crushing or grinding:** The raw material is then crushed or ground into a pulp or paste.
4. **Filtering:** The pulp or paste is then filtered to remove any solids or impurities.
5. **Concentrating:** The filtered liquid is then concentrated by removing the water through evaporation or other methods. This increases the concentration of the desired flavor, sweetness, or nutrition.
6. **Pasteurizing:** The concentrated liquid is pasteurized to eliminate any bacteria or pathogens that may be present.
7. **Packaging:** The concentrate is then packaged in airtight containers, such as cans, bottles, or drums, for distribution and storage.

3/3

Fact 4

Fruit concentrate is a processed form of fruit juice that has had a significant amount of its water content removed, resulting in a thick, syrupy liquid. This reduction in water content serves several purposes, including prolonging the shelf life of the fruit product and making it more convenient for transportation and storage. Fruit concentrates are commonly used in the food and beverage industry to add fruit flavor and sweetness to various products.



PMG ENGINEERING

About PMG

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Meeting Global Benchmarks

In ENGINEERING DESIGN and PROJECT MANAGEMENT
for FOOD and BEVERAGE Industry with SINGLE POINT ACCOUNTABILITY

Process Engineering | Project Management | Mechanical | Electrical | Automation | Food Safety

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- MAKING CUSTOMERS THE INDUSTRY LEADERS
- ENGINEERING MUST CREATE BUSINESS VALUE
- MEET THE EXPECTATIONS OF ALL STAKEHOLDERS
- OPTIMAL ENGINEERING

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