

TECH-KNOWLEDGE

The Official PMG Engineering Newsletter

**FOOD & BEVERAGE
INDUSTRY**

**ENGINEERING
& DESIGN**

**SCIENCE &
TECHNOLOGY**

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INTRODUCTION TO INDUSTRIAL EFFLUENT TREATMENT PLANT



Introduction

Water is an essential part of any food manufacturing plant. It is used as an ingredient, coolant, CIP solvent or in many other chemical based reactions in companies. After the completion of manufacturing process, this influent gets converted into wastewater which gets expelled from industry as a byproduct which is also known as effluent. This effluent is defined as a mixture of both toxic and non-toxic materials and it generally contains 99.9% water and 0.1% solids. The main task in treating the wastewater is simply to remove most or all this 0.1% of solids.

Characterization of Wastewater

Physical Parameters of the Wastewater

Wastewater has physical characteristics such as temperature, solids, odor, and color. In plumbing work the temperature and type of solids in the wastewater are important considerations.

Chemical Parameters of the Wastewater

Wastewater contains chemicals such as nitrogen, phosphorus, and levels of dissolved oxygen as well as others that may affect its composition and pH rating. Highly acidic or alkaline wastewater is probably trade waste and will require pre-treatment before discharge to the sewer.

Biological Parameters of the Wastewater

This is the presence of microbial pathogens in the wastewater. Consists of microscopic flora and fauna which are pathogenic in nature and can transmit dangerous diseases such as typhoid, cholera and dysentery.

Components of Effluent Treatment Plant:

Preliminary level

This aims at the removal of physical waste present in the effluent. This level involves physical processes such as sedimentation, filtration, aeration, flow equalization, clarification and screening.

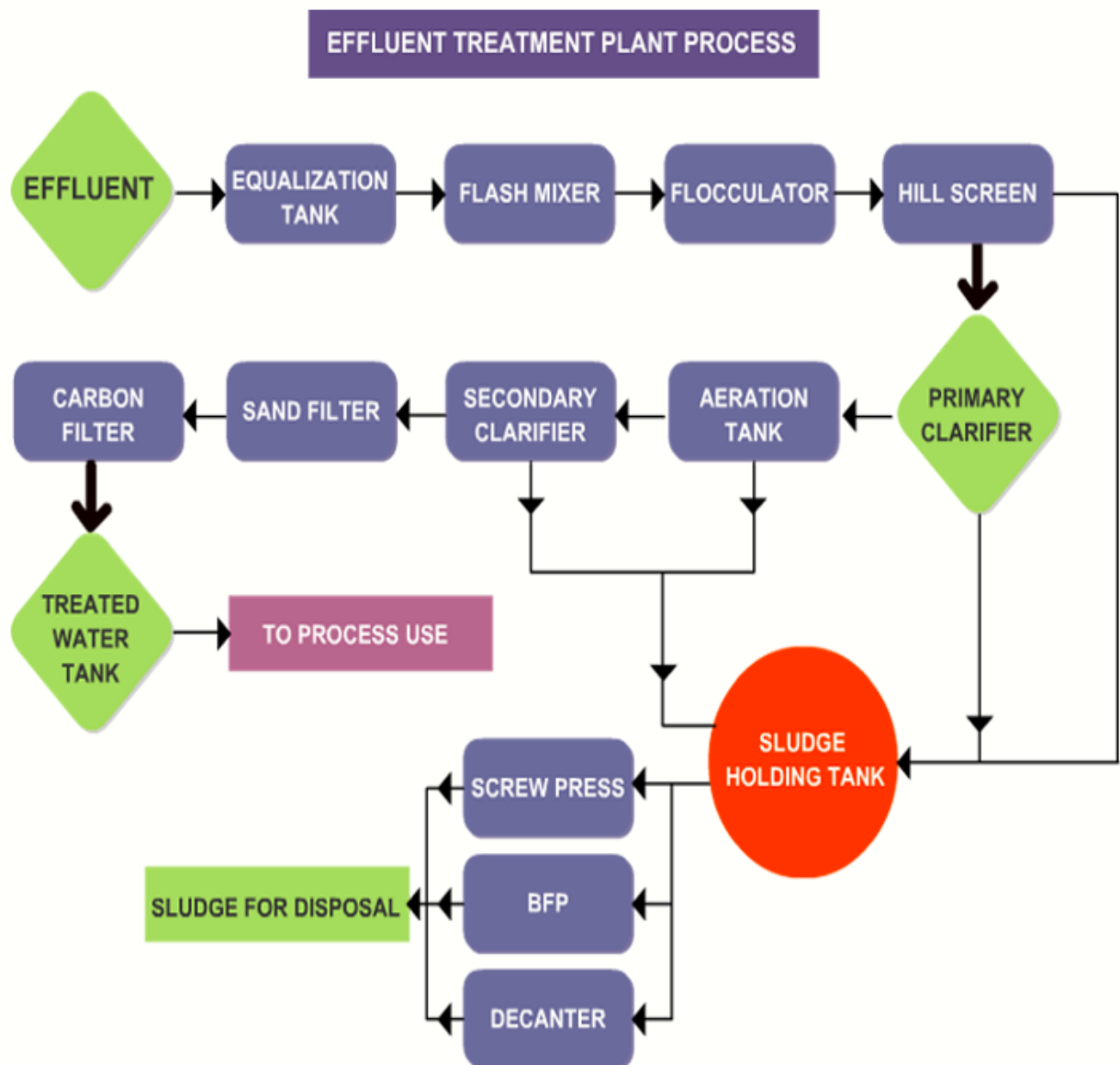
Primary level

Aims at the removal of large solids and organic matter. It involves both physical and chemical processes. The same physical processes mentioned in the first level are utilized.

Secondary level

Involves the removal of biodegradable organic materials and suspended matter. This level uses biological and chemical processes. The chemical processes are similar to level Biological processes involved are the suspended-growth process and the attached-growth/fixed-film process. The two biological processes can be used together or either one can be chosen.

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Tertiary level

This level entails the removal of suspended and dissolved materials using the physical, chemical and biological process utilized together. The processes are as discussed in previous levels. Effluent treatment plants are a critical part of the manufacturing industries and other wastewater treatment plants. They keep the environment safe from hazardous materials through strict treatment protocols.

Conclusion

Effluent of food wastes are a significant contributor to nutrient and carbonaceous and nitrogenous waste discharge. Treatment of this food processing wastewater is complex and costly because of the contaminant loadings and the variability of the different wastes encountered in a plant.



BISCUIT PROCESSING



Introduction

The word "biscuit" is derived from the Latin panis biscoctus, "twice-baked bread". Biscuit- covers a wide range of flour baked products, though it is generally an unleavened cake or bread, crisp and dry in nature, and in a small, thin, and flat shape.

Biscuits are made from a number of ingredients. Flour is the most basic and important. Different types give a range of textures and crispness. Wholemeal wheat flour is used in the "digestive," "sweetmeal," or "wheat-meal" type of biscuits. Oatmeal forms the basis of oatmeal biscuits. Rice flour and corn flour add flavor. Fats give the biscuits their "shortness." Butter and lard are the main fats, though these are augmented by vegetable and other refined fats. For fancy biscuits, sugar is an important ingredient, and introduces a range of tastes. It is added in several forms: processed as caster and Demerara sugars, syrups, honey, and malt extract. These have a range of consistencies and may help to bind together other ingredients. Aerating and raising ingredients, such as baking powder (bicarbonate of soda and tartaric acid), make the biscuit light. Flavorings are also added. These include dried fruit, nuts, chocolate (powder or chips), spices, herbs, and flavoring essences such as vanilla. The dry ingredients are bound together with eggs and milk (fresh, condensed, or dried) or water. Biscuits have a high energy content, ranging from 420 to 510 kcal per 100 g.

Process Flow Chart of Biscuit manufacturing

Step-1: Pre-Mixing

In this section all the ingredients are mixed and poured in the mixer. At this stage- type of ingredient, its order of mixing, quantity, and temperature matters. Each ingredient has its own importance and action. The variables among the ingredients are water and ammonium bicarbonate (ABC), where water is used for dough making and ABC is used to increase height of biscuits.

Step-2: Mixing

Dough formation known as mixing stage. In this step first creaming is performed, all the liquid materials are poured and mixed with sugar to make an evenly mixed liquid, then flour is poured and mixed with the creamed contents. The more we mix the harder dough becomes, less mixing results in short dough. Generally, cookies are short dough biscuits whereas crackers are of hard dough fermented type. After mixing dough with the creamed ingredients dough is formed which is fed to the moulder.

Step-3: Molding

It is a critical step in biscuit manufacturing process in terms of biscuit finishing and weight. Large weight results in losses in terms of extra weight given to the buyer. This extra weight which gets packed to maintain the written weight is known as giveaway.

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Step-3: Molding

It is a critical step in biscuit manufacturing process in terms of biscuit finishing and weight. Large weight results in losses in terms of extra weight given to the buyer. This extra weight which gets packed to maintain the written weight is known as giveaway. In a moulder there is a knife placed in between a forcing roller and a die. There are two controls present 1st knife control in all four directions up, down, forward and back, and press control in both left and right side of the roller.

Step-4: Baking (200 d.cel)

Baking consists of a number of chambers known as zone. Each zone is an independent oven with its own temperature setting. The larger the plant capacity larger will be the number of zones. Biscuit travels in a mild steel continental wire mesh inside the oven. Raising, puffing, and colouring occurs in a sequence with overlapped boundaries inside an oven. Finally, after the oven what is needed to be checked is whether the biscuit is fully baked, even texture, required height, and colour. Biscuit needs to be golden brown to dark chocolatey depending upon the variety.

Step-5: Sandwiching/Cooling (5- 10 min)

Post baking sandwiching is done for cream biscuits, whereas other varieties are sent to packing after passing through a cooling tunnel/conveyor. Sandwiching is the process in which a layer of cream is poured between two biscuits and a delicious cream biscuit is produced.

Step-6: Packing

In packing there are various types of machines which pack the biscuits according to the pack weight i.e., 50g, 100g, 150g etc. and then after complete packing in corrugated fiber carton (CFC) they are sent for loading in trucks.

Bakery products, biscuits including wafer biscuits are made from maida, vanaspati or refined edible oil or table butter or desi butter or margarine or ghee. There are various established processes commercially available and being practiced by different manufacturers. Lots of developments are evident in field of machineries and processes. Biscuits are one of the most popular snacks around the world and liked and enjoyed by people of all age groups. It can be taken with anything from a cup of tea or coffee to milk or just nibbled alone. They can be dunked or eaten as is.



INDUSTRY BUZZ

Oil dealers applaud a program designed to help the oilseeds industry become self-sufficient.

The Central Government's initiative to promote important oilseeds, including mustard, peanut, sesame, soybean, and sunflower, to attain "self-reliance" in the oilseeds sector has been applauded by the All India Edible Oil Traders Federation.

The federation's president, Shankar Thakkar, has stated that if this plan is implemented correctly, the country's oil import costs will be significantly reduced.

The Union Government claims that the "Atmanirbhar Oil Seed Campaign" is a visionary plan that includes crop insurance, value addition, adoption and establishment of market links, research for high-yielding varieties, and widespread adoption of contemporary agricultural techniques.

In her February 1 budget statement, the Finance Minister stated that the government will develop a plan to help oilseeds, including mustard, peanut, sesame, soybean, and sunflower, become "self-reliant."



Cabinet approves PDS sugar subsidy program for AAY families.

The Union cabinet, led by Prime Minister Narendra Modi, extended the Public Distribution Scheme (PDS) sugar subsidy program for Antyodaya Anna Yojna (AAY) families for two more years, ending on March 31, 2026.

The program makes sugar more accessible to the nation's poorest citizens and gives them more energy in their diets, which enhances their health. This is another sign of the Central Government's unwavering commitment to the welfare of its citizens and guaranteeing the sweetness of the poorest people's plates. Under the program, AAY families in participating states receive a monthly sugar subsidy of Rs 18.50 per kg from the Central Government. Benefits totalling around Rs 1,850 crore are anticipated to be extended under the sanction during the 15th Finance Commission's term (2020-21 to 2025-26). It is expected that the program will help 1.89 crore AAY families nationwide.





Cargill won two accolades at the CII Food Safety Awards in 2023 for excellence in food safety.

Leading multinational food and agribusiness corporation Cargill was recognized twice at the Confederation of Indian Industry (CII) Food Safety Awards 2023 for "Significant Achievement in Food Safety" in honour of its dedication to implementing best-in-class food safety procedures in India.

The 14th CII Food Safety prize presentation was held on January 31, 2024. Cargill's food safety initiatives were acknowledged in two prize categories: Large Manufacturing Food Businesses: Davangere facility in Karnataka, which produces sweeteners, and Kurkumbh plant in Maharashtra, which makes fats and oils.

A reputable platform used by the industry to assess best practices for food safety in manufacturing throughout the supply chain is the CII Food Safety Award.

A Rs 100 cr state-of-the-art fruit processing plant in Parala is opened by HP CM.

At the recent opening of the state-of-the-art fruit processing plant in Parala, Theog, in the Shimla district, Chief Minister Thakur Sukhvinder Singh Sukhu of Himachal Pradesh said that the plant will mark a significant turning point in the growth of the region and its fruit industry. The plant was constructed at an estimated cost of Rs 100.42 crore. According to the Chief Minister, this factory will manufacture juice, vinegar, and wine while ensuring the produce grown locally is fairly compensated. He went on to say that the plant will expedite manufacturing the finished goods. Speaking to the crowd, Sukhu stated that this year's catastrophe from intense rains had wreaked havoc and severely damaged the state's connection roads, particularly in the apple belts.



Plant-based substitutes for meat that have layers of fat and marbling

In the traditional meat category, requirements include bacon with layers of both flesh and fat and marbled steaks. Still, there are few options available in the plant-based alternatives area. This is especially true for plant-based goods that have a natural, fibrous structure in addition to marbling or fat layers. Planteneers, a pioneer in plant-based food, and Handtmann, a maker of filling and portioning systems, are teaming up to address this.

Planteneers' functional systems and Handtmann's equipment enable producers of plant-based meat substitutes to create marbled pieces with a delicate fibrous structure. The only things needed are the relevant system solutions from Planteneers' FieldMeat and FieldTex series and a recently created adapter for Handtmann's well-known filling and portioning systems.

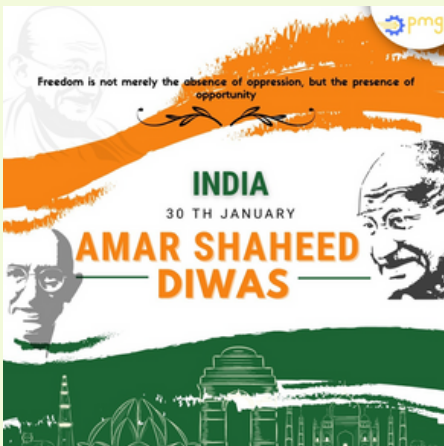
WEEKS HIGHLIGHT



26 JANUARY

REPUBLIC DAY

Republic Day is a poignant reminder of India's democratic spirit and constitutional values. Celebrated on January 26th, it commemorates the day when the Constitution of India came into effect in 1950, transforming the nation into a sovereign republic. This occasion symbolizes unity, diversity, and the collective journey towards justice, liberty, and equality. As we unfurl the tricolor, let's reflect on the principles that bind us as a nation.



30 JANUARY

AMAR SHAHEED DIWAS

Amar Shaheed Diwas on January 30th commemorates the sacrifice of Mahatma Gandhi and countless other freedom fighters who laid down their lives for India's independence. It serves as a solemn reminder of their unwavering dedication to justice and freedom.

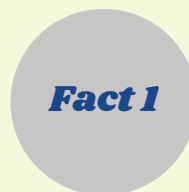


1 FEBRUARY

INDIAN COAST GUARD DAY

Honoring the Indian Coast Guard's legacy of safeguarding maritime boundaries since its inception on February 1, 1977, under the Coast Guard Act, 1978, epitomizing excellence in law enforcement and rescue operations at sea.

DID YOU KNOW?



Figs, the luscious fruit with a sweet and chewy texture, have captivated taste buds for centuries. Packed with essential nutrients like fiber, vitamins, and minerals, figs offer not only a delightful taste but also numerous health benefits. Whether enjoyed fresh or dried, these versatile fruits complement both savory and sweet dishes, adding a unique and sophisticated flavor profile to culinary creations.





Fact 2

"Dried vegetables offer convenient nutrition with extended shelf life. Packed with vitamins, minerals, and fiber, they provide a healthy option for meals, snacks, and emergency preparedness. Their lightweight nature makes them ideal for camping, hiking, and travel. From savory soups to flavorful stir-fries, dried vegetables add depth and nutrition to a variety of dishes while minimizing food waste and maximizing convenience."

DRIED MUSHROOMS

1/3

Dried mushrooms are mushrooms that have been dehydrated to remove most of their moisture content, resulting in a shelf-stable product that can be stored for long periods.

- Drying mushrooms not only extends their shelf life but also intensifies their flavor, making them a popular ingredient in a variety of culinary dishes.

Commercial Production

1. Harvesting:

Mushrooms are harvested at the peak of their growth when they have reached the desired size and texture.

2. Cleaning:

The harvested mushrooms are cleaned to remove any dirt, debris, or other contaminants.

3. Slicing:

Mushrooms are sliced into uniform pieces to ensure even drying.

4. Drying:

The sliced mushrooms are dried using a variety of methods, including air-drying, sun-drying, or using specialized equipment such as tunnel dryers or freeze dryers.

2/3

5. Sorting and grading:

The dried mushrooms are sorted and graded based on their size, color, and quality.

6. Packaging:

The dried mushrooms are packaged in a variety of formats, including bulk bags, jars, or individual packets.

Major players in the market for dried mushrooms include:

1. Ajinomoto Co., Inc.
2. Monterey Mushrooms, Inc.
3. Mitoku Company, Ltd.
4. Nikkei MC Aluminum Co., Ltd.
5. Shandong Qihe Biotechnology Co., Ltd.

3/3

Fact 3

Dried mushrooms offer a concentrated burst of umami flavor, enriching dishes with their intense earthy essence. Their versatility extends from savory sauces to hearty soups and risottos, providing depth and complexity. With a long shelf life and easy storage, they are a pantry staple for elevating culinary creations. From porcini to shiitake, dried mushrooms are nature's flavorful treasure awaiting culinary exploration.

3. Maintenance:

The truffle trees require regular maintenance, including watering, fertilization, and pruning.

4. Truffle harvesting:

Truffle growers use specially trained dogs or pigs to locate the truffles that grow underground.

Major players in the Market

- Urbani Truffles
- Sabatino Tartufi
- Plantin
- TruffleHunter
- Gourmet Attitude
- Regalis Foods
- Black Diamond French Truffles
- Truffle Kerfuffle



1/3

Truffles are a type of edible fungi that are highly valued for their distinctive aroma and flavour. They are a type of underground mushroom that grows in close association with the roots of certain trees, including oak, hazel, and beech trees. Truffles are irregular in shape and have a rough, warty surface. The flesh of a truffle is dense and firm, with a distinctive musky aroma and an intense, earthy flavour.

- Used in small amounts as a flavour enhancer in a wide range of dishes, including pasta, risotto, and meat dishes.
- Due to their unique flavour and rarity, truffles are also one of the most expensive food items in the world.

Steps

1. Site preparation:

Selected based on several factors, including soil quality, climate, and the presence of suitable host trees.

2. Host tree planting:

Typically oak or hazelnut trees, are planted in the prepared soil.

2/3

3. Maintenance:

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3/3

Fact 24

Truffles are a type of fungi that belong to the Tuber genus. Edible truffles are usually found underground and are harvested by foragers or trained animals, like truffle-hunting dogs or pigs. The most sought-after species include the white truffle (*Tuber magnatum*) and the black truffle (*Tuber melanosporum*). Truffles are used to add a unique and earthy flavor to various dishes, such as pasta, risotto, and sauces.



HERBS AND SPICES

1/3

Herbs and spices are plant-based ingredients that are used to flavor and season food.

1. Herbs:

Used for culinary and medicinal purposes. Common culinary herbs include basil, thyme, rosemary, oregano, and parsley.

2. Spices:

Used for culinary and medicinal purposes. Common culinary spices include cinnamon, cloves, ginger, turmeric, and cumin.

Both herbs and spices have been used for thousands of years in cooking, medicine, and perfumery. They can be used individually or in combination with other herbs and spices to create complex and interesting flavors in dishes.



2/3

Market Scope

The market scope for herbs and spices is quite extensive, as they are widely used in the food and beverage industry, as well as in the pharmaceutical and personal care industries.

The major players in the Market for Herbs and spices are as follows:

1. McCormick & Company, Incorporated
2. Givaudan SA
3. Firmenich SA
4. Takasago International Corporation
5. Olam International Limited
6. Sensient Technologies Corporation



3/3

Fact 5

Herbs and spices: nature's flavorful treasures, enriching cuisines worldwide with their aromatic essence and healing properties. From the robust warmth of cinnamon to the zesty kick of ginger, these botanical wonders elevate dishes, tantalize taste buds, and offer myriad health benefits. Whether infusing soups, seasoning meats, or brewing teas, herbs and spices add depth, complexity, and vitality to every culinary creation.



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- MEET THE EXPECTATIONS OF ALL STAKEHOLDERS
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