

TECH-KNOWLEDGE

The Official PMG Engineering Newsletter

**FOOD & BEVERAGE
INDUSTRY**

**ENGINEERING
& DESIGN**

**SCIENCE &
TECHNOLOGY**

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FOOD FORTIFICATION



Introduction

Fortification has a strong history, Concept of food fortification came as a result of a particular public health need. For example, in 1924, Iodine was added to salt in order to prevent the wealth of problems that had arisen as a result of Iodine Deficiencies. By 1998, Folic Acid was added to flour, baked goods and cereal to prevent abundant Neural Tube Defects in infants—it is so effective at reducing this risk that more than 50 countries require folate fortification in certain foods. Another typical fortification is Vitamin D, which was added to milk in the early 1900s.

What is Food Fortification?

Fortification involves the process of adding nutrients to foods irrespective of whether or not the nutrients were initially present in the food to correct or reduce deficiency disorders. It is a means of improving the nutritional status of a population (or potentially a sub-population).

Fortification vs Enrichment

People are often confused between these terms, which sometimes are interchangeably used. Both fortification and Enrichment deals with the addition of nutrients but still there is a difference. Let us see what the difference is.

Fortification	Enrichment
Fortified means vitamins or minerals have been added to a food that were not originally in the food	Enriched means nutrients that were lost during food processing have been added back
An example is adding vitamin D to milk	An example is adding back certain vitamins lost in processing wheat to make white flour.

Criteria for selecting Vehicle

Safety and technical considerations are considered when deciding which foods to fortify and to what level:

- 1.It should be an edible item consumed by a large population.
- 2.There should be no change in the organoleptic properties when added.
- 3.Low cost of food product so that everyone could afford it, generally staples are preferred.
- 4.Should have good storage stability

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Types of Food Fortification:

1. Biofortification: It is the process of increasing the micronutrient content of a food crop through selective breeding, genetic modification, or by the use of enriched fertilizers. For e.g. Plants can translocate minerals from the soil to the edible portion of the crop. It is a long term and cost-effective process.

2. Home Fortification: Micronutrient powders refers to sachets containing micronutrients in a dry powder form which can be added to food, i.e. ready for consumption. For, eg. It can be done simply by sprinkling over the food or mixing it in milk to make curd, kheer etc. Thus it derives its name as Home fortification.

3. Industrial fortification: Industrial food fortification refers to adding micronutrients and minerals to industrially processed and widely consumed edible products. This type of fortification is generally done in industries like-wheat processing, rice processing and oil manufacturing.

a) Wheat fortification: Powdered vitamin and minerals are added to flour during the milling process using feeder equipment. Three types of feeders are used for fortification: Screw feeder, Revolving disk feeder and Drum pipe feeder.

b) Rice fortification: Rice fortification is complex. The leading technologies available to fortify rice are Hot Extrusion (70-110 °C), Cold Extrusion (below 70 °C), Coating, Dusting.

c) Oil Fortification: Oil fortification is the process of adding micronutrients to edible oil to increase its nutritional value. At an individual level, fortified oil can help to person meet 25-30 per cent of recommended dietary intake for vitamin A and D, according to FSSAI.



Conclusion:

Food fortification is attractive because it does not require the target groups to change their diet but can be implemented by the food industry efficiently and because it reaches large numbers of consumers through retail, it is an incredibly effective way of tackling deficiencies in densely populated urban areas. Also, it is a fantastic cost-effective process.



INSIGHT ON NON-CONFORMITY IN FOOD INDUSTRY



Introduction

The importance of quality and food safety cannot be neglected in the present business scenario due to extreme competition in open market. Many food industrialists have understood the importance of implementation of system that can eliminate non-conformance products, as these may help the company in preventing negative consequences like economical losses and helps to protect the reputation of brand. The design of food safety management system for managing non-conformance in industry may either support or hinder the effectiveness of continuous improvement policy.

A non-conformance is involved when a process or a system fails to comply with the rules or meet the required specifications of an audit standard(ISO 22000, IRC, BRC, SQC etc.). A requirement is a need, expectation, or obligation. It can be stated or implied by an organization, its customers, or other interested parties. There are many types of requirements. Some of these include food safety requirements, quality requirements, process requirements, product requirements, customer requirements, management systems requirements, and legal requirements. Whenever your organization fails to meet one of these requirements, a nonconformity occurs, and it mostly occurs in the production and manufacturing processes like Supply chain management, inventory, and material management process etc.

Benefits of Addressing Non-Conformance

- 1.Compliance Requirements – to meet the specific requirements of a customer, standard or regulatory obligation.
- 2.Process Improvement – recording non-conformance data can facilitate analysis leading to incremental and continuous improvement in business and operational processes.

Types of Non-Conformities

1.Product Nonconformances: These non-conformances relate to specific final product issues and defects including food safety issues. They will typically be identified from:

- a.Customer complaints
- b.Product non-conformances arising from operations, production, processing, and handling.
- c.Other third-party sources

2.Process Nonconformances: Process non-conformances usually relate to issues arising from operations, processing, equipment, and handling. They differ from most other non-conformance types in that they may not relate directly to the effect displayed. Process non-conformances may also relate to downtime, machine problems, hygiene program failures and so on.

[READ MORE....](#)



3.System Nonconformance: These non-conformances relate usually to those detects arising from internal audits of processes and systems. The internal audit system will identify failings which in turn will generate corrective actions. At this point the non-conformance will be categorized for more effective analysis, trending, and reporting.

4.Material Nonconformances: This category relates to non-conformances of materials and ingredients, as well as non-conformances regarding the quality of service from specific suppliers such as pest control contractors. Specifically, they are non-conformances against the defined specification of the material or service. For example, a delivered ingredient which is over the specified temperature or damaged could cause a material nonconformance. Similarly, if issues such as foreign matter contamination are detected in the material during utilization, these could be a cause for logging a material nonconformance.

Process Flow for Handling Non-Conformance Product

Companies may have many different procedures in place to deal with non-conforming products, but the basic process distils down to six main steps. You need to properly identify the problem, segregate it, disposition the product or service, carry out the decided disposition, and finally, decide if a corrective action is needed to prevent recurrence. Below is an explanation of the five main steps in the Non-conforming Products process.



1. Identification of Non-Conformance Product

Addressing the non-conformance may rely on knowing not only what is found, but what was expected. It is often equally important to know what the problem isn't, such as identifying if it has already been determined that this is not a repeat of a similar problem that has previously been found. Properly identifying the problem up front can prevent wasting time and resources looking at the wrong thing.

2. Marking with tags, signs, or stickers

There is no universal standard for identifying non-conforming material. A green tag would suffice just the same as a red tag. It is more important that everyone in the organization recognize non-conforming material with the marking identified in your quality assurance manual.

3. Segregation

Securing the material in a holding cage or designated cabinet specially marked for non-conforming material.

4. Containment

Whether the corrective action plan requires it to be documented or not, any non-conformance should have containment action. This is a quick response to "stop the bleeding" and is generally taken within 7 days or sooner if a product is about to be shipped out the door. This may also include alerting a customer depending on the nature of the non-conformance, quarantining an item or an immediate review of a procedure.

A close-up photograph of a green magnifying glass held over a yellow paper bag. The bag has the word 'Ingredients' and 'E 210' visible. The background is a warm orange color.

INDUSTRY BUZZ

At the GFI India ISPIC 2023 Grand Finale, six winners received Rs 12 lakh.

The India Smart Protein Innovation Challenge (ISPIC), the Good Food Institute India's (GFI India) flagship initiative, concluded its third iteration, and the State of Industry Report for Smart Protein in India was released.

"In the research, you will learn how India's cutting-edge smart protein industry, home to 113 trailblazing entrepreneurs, is poised to open up a gigantic \$4.2 billion market by 2030 and gain an intimate glimpse into how this industry is transforming food security and protein accessibility. The paper presents distinct consumer perspectives on branding, terminology, labeling, intent to repurchase, and other topics, highlighting the importance of increasing consumer knowledge and familiarity with the plant-based market.

In the Gulf, safety and quality are governed by strict regulations.

Tight regulations control the safety and quality of food products in the Gulf region, including Kuwait, Oman, Saudi Arabia, Qatar, Bahrain, and the United Arab Emirates. Respecting global norms, especially those established by the Codex Alimentarius Commission, these countries prioritize food safety during all production, processing, and distribution phases.

Because most people are Muslims, there is a noticeable emphasis on making sure that food products adhere to Islamic dietary requirements, which has resulted in the development of robust Halal certification procedures. One essential component is accurate labeling, as laws require detailed information about components, nutritional value, and expiration dates. Owing to the country's significant reliance on food imports, strict rules are in place for entering goods, and compliance with them is checked thoroughly.





Dubai World Culinary: Traveling the globe via cuisine.

Dubai, the shimmering jewel of the United Arab Emirates, is well-known for its stunning architecture, abundant way of life, and rich cultural diversity. Welcome to Dubai's World Cuisine, a distinctive dining experience where culinary customs from around the globe come together. Due to Dubai's prominence as a worldwide center for travel and business, the city boasts rich cultures and gastronomy from visitors worldwide.

"A Taste of Tradition in Dubai": Emirati Cuisine

The rich legacy and customs of the United Arab Emirates are reflected in the exquisite Emirati cuisine, which has its roots in the Arabian Peninsula's desert culture. Al Harris, AlMachboos, Luqaimat, Balaleet, and Majboos are the signature dishes.

Food innovation: Ingredients listed on the label.

Clean-label items are in more demand as consumers become more health-conscious in this day and age. Foods with a clean label have few, easily recognizable components and are devoid of chemicals, artificial additives, and preservatives. The food industry is changing due to this trend, forcing producers to look for novel, natural ingredients to replace artificial additives.

This piece will explore the realm of clean-label production, the different elements that are now available to us, and how they are changing the way we create and eat food. Here are a few instances of clean-label culinary ingredients that are frequently seen in stores.



Standards for crude solvent-extracted corn (maize) oil are re-operationalized by FSSAI.

The FSSAI has released a directive regarding re-operationalizing requirements for crude solvent-extracted corn (maize) oil. According to the order, the standards were re-operationalized for a six-month term starting June 20, 2023.

The clauses in the draft amendment regulations are undergoing final notification, which could take additional time to finalize and publish in the Indian gazette, according to a statement from the FSSAI. It has been decided to re-operationalise the provisions for crude solvent extracted corn (maize) oil as specified with effect from June 20, 2023, for six months or until final notification of the draft regulations, whichever is earlier, to enable the FBOs to import the crude corn (maize) oil.

WEEKS HIGHLIGHT

NON-TECHNICAL CONTENT



13 OCTOBER

WORLD EGG DAY

World Egg Day celebrates the nutritional value and versatility of eggs in global cuisine. This annual event promotes awareness of the vital role eggs play in providing a protein-rich, affordable food source while highlighting their importance in various culinary traditions worldwide, contributing to healthier diets and sustainable agriculture.



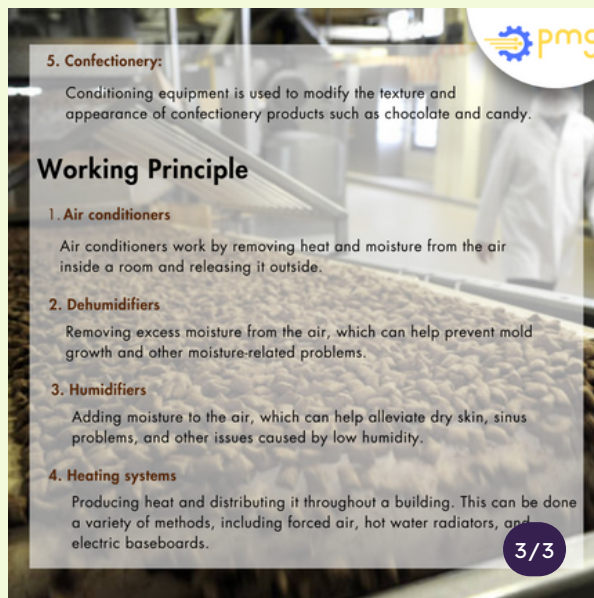
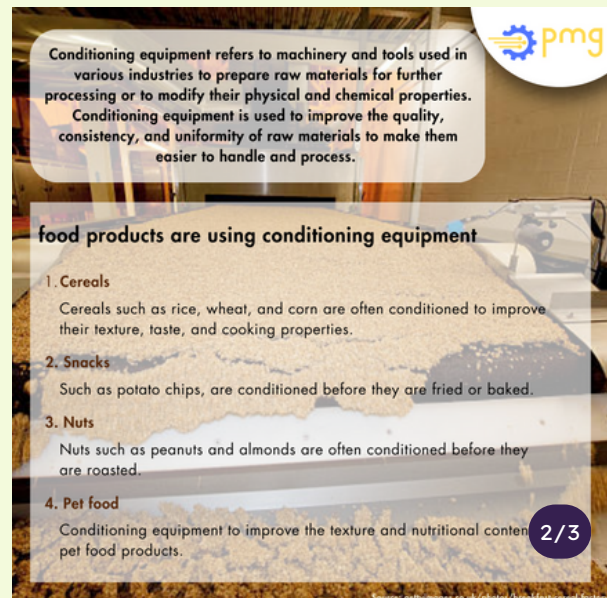
16 OCTOBER

WORLD FOOD DAY

World Food Day, celebrated annually on October 16th, raises awareness about global food insecurity and the importance of achieving zero hunger. It highlights the need for sustainable agriculture and equitable access to nutritious food for all. World Food Day serves as a call to action, urging individuals, communities, and governments to work together to eliminate hunger and improve food security worldwide.

OCTOBER

DID YOU KNOW?



Fact 1

Conditioning equipment encompasses a variety of exercise machines and tools designed to enhance cardiovascular fitness, muscle strength, and endurance. From treadmills and stationary bikes to rowing machines and battle ropes, these devices cater to diverse fitness goals, enabling individuals to work towards improved overall health and physical performance.

STARCH



STARCH

General provisions and staple foods

1/3

Starches are widely used as raw ingredients in producing general provisions and staple foods. Some common uses of starches in food production include thickening, binding, texture modification, shelf-life extension and for nutritional value.

- Common starches used in the food industry include cornstarch, potato starch, tapioca starch, and wheat starch. These starches can be modified through various processes, such as chemical or enzymatic treatment, to achieve specific properties, such as improved solubility or stability.

Market scope

- Starches are widely used as a critical raw ingredient in producing many food products. The demand for starches in the food industry is driven by factors such as population growth, changing consumer preferences, and increasing demand for convenience foods.
- Some of the key applications of starches in general provisions and staple foods include bakery products, pasta and noodles, confectionery products, meat products and dairy products.
- Key players in the market:** Cargill, Ingredion Incorporated, Archer Daniels Midland Company, Tate & Lyle PLC, Roquette Frères Other notable players in the market for starches include Grain Processing Corporation, Avebe, Emsland Group, and Beneo

2/3

Commercial production

1. Extraction

The first is the extraction of starch from the raw material (usually corn, wheat, or potatoes) which is separated from the other components of the plant by washing, grinding, and screening.

2. Purification:

Purified to remove any impurities such as proteins, lipids, and fiber, typically done by adding water to the starch slurry and separating the starch from the other components using centrifugation or filtration.

3. Modification:

This involves physical or chemical treatments such as heat treatment, acid hydrolysis, or enzymatic conversion. Used in a wide range of applications, from thickening and stabilizing agents in food products to binders in paper products.

4. Drying and Packaging:

Starches are typically dried using hot air or drum drying techniques and then packaged in bags or containers for distribution.

The specific production process for starches may vary depending on the raw material used and the intended application of the final product.



3/3

Fact 2

Starches, derived from sources like corn, wheat, and potatoes, are versatile carbohydrates in the food industry. They serve as thickeners, binders, and texture modifiers, enhancing the quality and palatability of numerous food products. Starches play essential roles in stabilizing, retaining moisture, and encapsulating flavors, making them a fundamental ingredient for achieving desired textures and taste experiences in a wide range of culinary applications.

CEREAL STARCH PRODUCTION PLANTS

1/3

Cereal starch production plants are industrial facilities that extract starch from various types of cereal grains, such as corn, wheat, rice, and potatoes. The extracted starch is then used in a wide range of industries, including food and beverage, paper and textiles, pharmaceuticals, and cosmetics.

Stages

1. Cleaning and preparation

The grains are cleaned to remove any impurities and prepared for processing.

2. Soaking

The grains are soaked in water to soften them and initiate the process of starch extraction.

3. Grinding and separation

The softened grains are ground into a slurry, and the starch is separated from the other components of the slurry, such as fiber and protein.

4. Purification and drying

The extracted starch is purified to remove any remaining impurities and then dried to produce a final product.

2/3

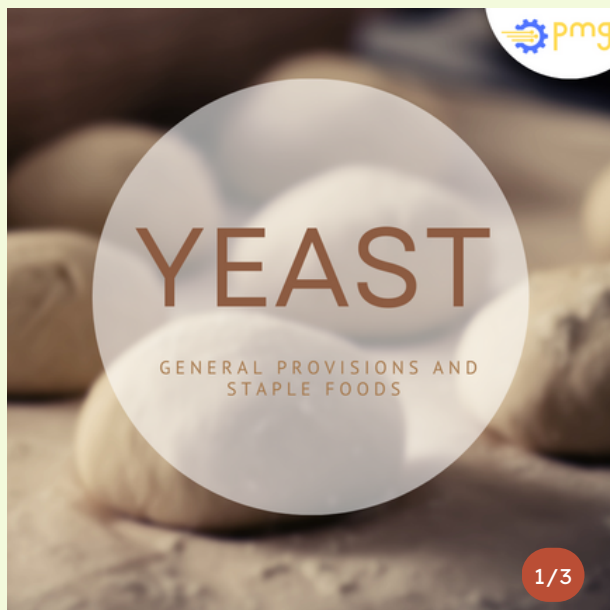
Market Scope

- The global cereal starch production plant market is primarily driven by the increasing demand, such as food and beverage, paper and textiles, pharmaceuticals, and cosmetics.
- North America and Europe are also significant markets for cereal starch production plants, with the United States and Western Europe being the major producers and consumers of cereal starch.
- The major key players operating in the global cereal starch production plant market include Archer Daniels Midland Company, Cargill, Inc., Ingredion Incorporated, Tate & Lyle PLC, Roquette Frères, and AGRANA Beteiligungs-AG.

3/3

Fact 3

Cereal starch production plants are vital facilities in the food industry, specializing in the extraction and refinement of starch from various cereal grains like corn, wheat, and rice. These plants employ advanced processing techniques, such as wet milling and drying, to yield high-quality starch used in various food and industrial applications. Quality control and sustainability practices are paramount in these operations to meet consumer demands and environmental standards.



Fact 4

Yeast, a microscopic fungus, plays a vital role in various aspects of biology and industry. It's crucial in baking, brewing, and fermentation processes, converting sugars into alcohol and carbon dioxide. In biology, yeast serves as a model organism for genetic research. Its versatility and significance make yeast a fundamental microorganism with diverse applications in both scientific and culinary fields.

COLD SMOKE EQUIPMENT

1/3

Cold smoke equipment is a specialized culinary tool used to infuse foods with smoky flavor without applying heat. It typically consists of a smoking chamber or generator that produces cool or ambient temperature smoke, allowing chefs and food enthusiasts to impart smokiness to ingredients like cheese, fish, meat, or vegetables without cooking them.

Products

1. Cheese

Enhance the flavor of cheeses like cheddar, gouda, and mozzarella, adding a smoky depth to their profiles.

2. Fish

Salmon, trout, and other seafood can be cold smoked to create delicacies like smoked salmon or mackerel.

3. Vegetables

Tomatoes, peppers, and garlic can be cold smoked to add a smoky element to sauces, dips, or roasted dishes.

4. Butter

Used in cooking or as a spread, adding a unique smoky twist to dishes.

2/3

Principle

1. Smoke Generation

Cold smoke equipment typically includes a smoke generator or source. This source can be fueled by various materials like wood chips, sawdust, or wood pellets.

2. Smoke Chamber

The generated smoke is then directed into a sealed chamber or container where the food items are placed. (temperatures below 100°F (37°C)).

3. Airflow Control

To ensure a consistent flow of cool smoke, cold smoke equipment may incorporate fans or ventilation systems to control the circulation of smoke within the chamber.

4. Monitoring and Safety

To monitor both the smoke generation and the internal temperature of the chamber to maintain the desired conditions.

5. Ventilation and Filtering

Filtration systems to remove any excess particulates from the smoke before it exits the chamber.

3/3

Fact 5

Cold smoke equipment is essential for adding smoky flavor to food without cooking it. It operates at lower temperatures, typically below 100°F (37°C), ensuring the food remains uncooked while infusing it with a rich smokiness. Ideal for cheese, fish, and meats, cold smoke equipment offers a versatile and flavorful culinary enhancement for various dishes.



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