

TECH-KNOWLEDGE

The Official PMG Engineering Newsletter

**FOOD & BEVERAGE
INDUSTRY**

**ENGINEERING
& DESIGN**

**SCIENCE &
TECHNOLOGY**

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HONEY PROCESSING



Introduction

It is the product of one of the most intelligent and industrious creatures whose miniature society is one of the most sophisticated in the animal kingdom. It is used as a food product, in religious ceremonies etc and it is also known for medicinal qualities from centuries. Honey consists of a mixture of sugars, mostly glucose and fructose. In addition to water (usually 17-20%) it also contains very small amounts of other substances, including minerals, vitamins, proteins, and amino acids. A minor, but important component of most types of honey is pollen. These components contribute to the different flavours that honey can have and make honey a nutritious food that has a high demand in many regions of the world. To understand the processing of honey, it is must understand about bees and how do they make honey.

Bees: Bee is a marvellous flying machine. She can carry a payload of nectar or pollen close to her own weight.

Caste of Bees: Honeybees have three castes: drones, workers, and queens.

Queen: Single fertile female in the whole hive

Drone: These are stingless and defenceless males that work to increase their population by mating with the queen

Workers: This class of bees performs the main role in making honey.

When worker bees fly from flower to flower, they collect nectar and when their nectar "sacs" are full, the honeybee returns to the hive. Nectar is delivered to one of the indoor bees and is then passed mouth-to-mouth from bee to bee until its moisture content is reduced from about 70% to 20%. This changes the nectar into honey. Sometimes the nectar is stored at once in cells in the honeycomb before the mouth-to-mouth working because some evaporation is caused by the 32.5°C temperature inside the hive. Finally, the honey is placed in storage cells and capped with beeswax in readiness for the arrival of newborn baby bees.

Industrial Processing

1. Receiving: Once the honey is made by the bees the honey supers are then sent to the company for processing.

2. Uncapping- To separate honey and wax from the comb, the honeycomb frames are uncapped by using a heating knife to cut the wax off. It is important to note that in some cases before uncapping the honeycombs are kept for dehumidification. It is best to remove moisture before extracting. Honey supers can be placed in a warm, low-humidity drying room which allows for a much greater surface area to be affected by warm, dry, moving air.

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3. Extracting- The process of removing honey from supers (hive box filled with honey) is called Extraction. It is done using Honey Extractor based on the principle of Centrifugal force. Honey extractors can be manually or electrically operated, depending on the scale of production. The frames are placed in a honey extractor machine which rotates the frame at speed and the honey is drained to the bottom of the machine then pumped to storage containers. The honey is collected by gravity in tanks placed often on the floor

4. Purification- The purification is carried out with two different techniques: decanting and filtration. Here, the extracted honey is passed through different sieves and enter in a raw tank, where it is kept for some time. It is then transferred through a sieve to the pasteurizer.

5. Pasteurization- Processing of honey means indirect heating of honey. Batch pasteurization/Flash Pasteurization is generally followed and is done to kill an unwanted microorganism, yeast. Excess heat will reduce the quality in term of nutrient content. So, it is must to maintain the temp.

6. Evaporation: After being pasteurized, the honey is sent to the vacuum evaporator to maintain the moisture at (18-20%) and collected in the finishing tank.

7. Filter- It is again filtered for any remains of crystals beeswax, and propolis extraneous material etc. and sent to cooling chamber which maintains its temp. to around 30° C.

8. Bottling- The filtered honey is then transferred to the bottling tank from where it is filled in bottles, packaged, and dispatched.

Hazards



1. Moisture content - too much water in honey (greater than 19-20%) causes it to ferment. Honey is 'hygroscopic', and should also be processed as soon as possible.

2. Development of HMF (Hydroxy methyl furfural)- due to high temp. or storage. This is a breakdown product of fructose that is formed slowly during storage but quickly when honey is heated. Colour can also be an indicator of quality because honey becomes darker during storage and heating. The amount of HMF present in honey is used as a guide to the age of the honey and/or the amount of heating that has taken place.

3. Contamination by insects- Careful protection is needed at all stages of processing, including insect screens on doors and windows to prevent contamination by insects. The presence of any other contaminations (e.g., particles of wax, parts of bees, splinters of wood, dust etc.) make the honey very low value.

Defects

Some honeys have a high pollen content, which makes them appear cloudy, and this may be considered as lower quality by some customers.

BLOW MOLDING IN PET BOTTLES



Introduction

Blow molding or Blow Forming is a manufacturing process in which hollow plastics are formed. Blow molded products are formed by various thermoplastic materials like LDPE, HDPE, PET, PP and PVC.

Types:

- 1) Extrusion Blow molding
- 2) Injection blow molding
- 3) Stretch blow molding

Extrusion Blow Molding:

It consists of a machine with a screw conveyor, on top is a hopper in which all the raw plastic ingredients are poured. It also consists of a heating element to melt the plastic ingredients.

Mechanism- Firstly, the raw plastic pellets are placed in the hopper, which by gravitational action comes down in the machine and is pushed forward by the Screw conveyor into the heating region where it melts. Finally, we have molten plastic/Parison; the molten material is pushed forward through a small orifice into the mold. The air is blown into the soft parison followed by a curing process; the part is then cooled and removed from the mold. Parison is a preform tube that is hollow, and it has a hole at one end.

Injection Blow Molding:

It is a non-continuous cyclic process consisting of 2 phases-

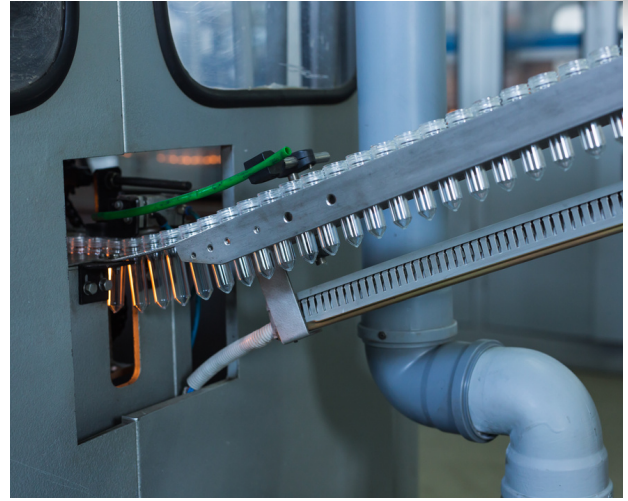
1. Parison is molded by injecting melted plastic into a steel mold cavity where it is kept hot and conditioned.
2. The parison is metered into a mold where the final curing operation takes place to form the final part.

Mechanism: It consists of a machine with hopper on the top. On the left-hand side is the Archimedean Screw to push the material in the forward direction. In the middle, there is a heating part that melts the raw material. On the right-hand side is the mold cavity formed by the molding parts maintained in the cold condition. Thus, the plastic ingredients are taken into a hopper and then the Archimedean screw is rotated to push the material in the heating region, where it melts, and at the nozzle the temperature increases to such an extent that it quickly enters the mold cavity where curing is done and finally with the help of extraction pin the article is taken out.

Stretch-Blow Molding :

First, a test-tube like preform is made using injection molding or a similar process.

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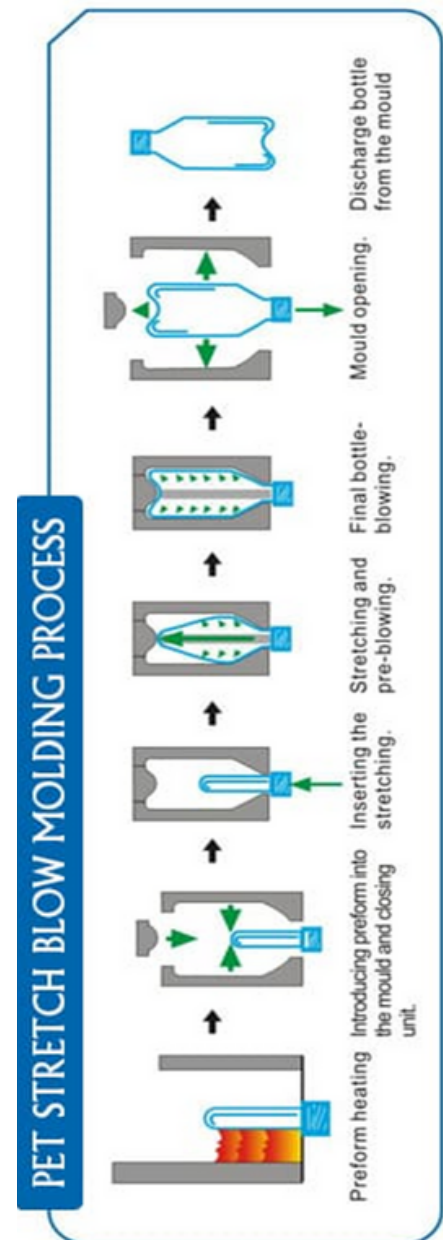


The preforms' neck is fully finished, but the diameter and length of the body portion are much smaller than the final product. The preform then undergoes a stretch-and-blow process. It is the most preferred technology for making PET bottles.

Conclusion

When looking at molding options for production purposes, there are a few different methods available. Blow molding and injection molding stands as the two most common. However, before a company decides what to go with, it is important to understand the difference between the two.

1. Blow molding is designed to produce hollow, singular containers, such as bottles. On the other hand, injection molding is used to produce solid pieces, such as plastic products like helmets.
2. Air is the worst enemy of injection molding. If air is present during the manufacturing process, it can create air pockets or bubbles. These abnormalities create weak spots in the product, ultimately leaving it defective and, likely tossed out. With the blowing method, air is particularly important. Blow molding revolves around air forced into the mold to push out and expand the product.
3. Stretch blow molding is best for PET bottles.





INDUSTRY BUZZ



FSSAI plans to make FoSCoS available in Hindi, improving user experience.

The FoSCoS (Food Safety Compliance System) Hindi version will be available from the Food Safety and Standards Authority of India (FSSAI).

According to the FSSAI, there was a demand from several sources to develop such "systems" in Hindi to improve accessibility and user experience.

"This is crucial in improving the food industry's operational effectiveness. This further demonstrates the Government's dedication to guaranteeing business facilitation, according to an FSSAI statement.

FSSAI has developed FoSCoS, a single interface for food enterprises and regulatory authorities across the country as of 2020 to streamline all the compliance and enforcement-related activities.

To satisfy the baking business, General Mills India expands Pillsbury production.

With a groundbreaking ceremony for its new facility in Nashik, Maharashtra, General Mills India, a subsidiary of Fortune 500 packaged food primary General Mills Inc., commemorates a significant accomplishment. This celebration honors General Mills' growing presence in India. By August 2024, operations at the facility, which will serve as the hub for producing Pillsbury Baking Mixes for the Indian market, are anticipated.

The new plant will be the brand's second manufacturing site for Pillsbury Baking Mixes in India. The corporation will spend about Rs 100 crore to establish this factory and furnish it with cutting-edge infrastructure and technology. With the addition of this new plant, General Mills India will be able to service the rising demand for its Pillsbury bakery solutions in India by doubling its manufacturing footprint.





Barista Coffee introduces nine additional outlets as part of its expansion drive.

A well-known company in the café sector, Barista Coffee, is excited to announce the launch of nine new locations in August 2023. This accomplishment represents the company's growth outside its current network of 380+ locations, reaffirming its prominent position as a significant participant in the country's coffee culture.

In addition to Bhawanigarh, Sangrur, Bachhuan, and Jeowal in Punjab, Hansi, Hissar, and Hansi Highway in Haryana, Gwalior in Madhya Pradesh, Shimla in Himachal Pradesh, Amazon Gurugram in Haryana, Delhi Airport T-1D in Delhi, and Shivaji Park in Mumbai are among the cities where the newly opened stores are located strategically. Over the following 18 to 24 months, the company wants to have 500 locations.



Efficiency is essential as juice producers feel the squeeze.

Orange juice is still one of the most popular soft beverages in the world. Still, the supply chain will confront record-high raw material costs in 2021, 2022, and 2023 due to difficult weather conditions in the globe's primary producing regions of Brazil and Florida. As a result, producers will need to concentrate more than ever on production efficiency to maximize margins.

The good news is that despite consumers in some regions, including Europe, turning away from fruit juices and associated goods because they are thought to be relatively heavy in sugar and calories, demand for orange juice continues to be robust. The increase in demand from food processors for the creation of smoothies and flavored water, typically considered healthier options, has made up for this decline in order.



Reduced taxes on apples, walnuts, and almonds won't interfere with domestic trade: Govt.

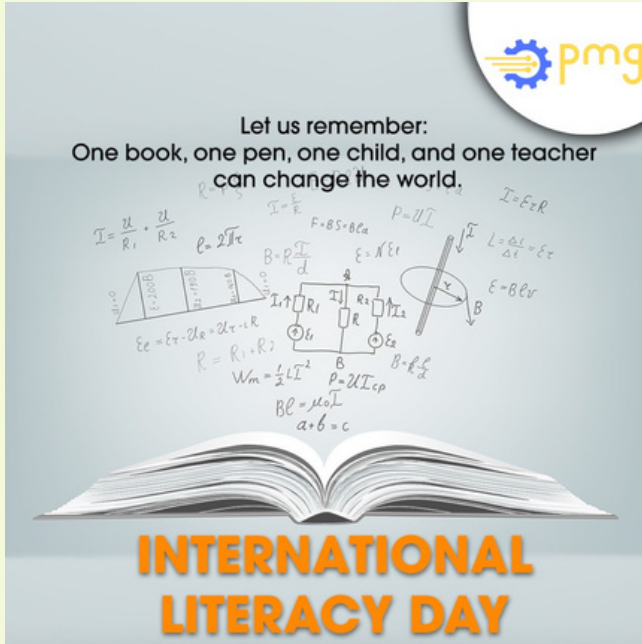
The Indian Ministry of Commerce has stated that the removal of additional duties (of 20%) on eight products of US origin will not hurt domestic trade as a result of the decision to settle six unresolved World Trade Organization (WTO) disputes between the US and India through mutually agreed solutions in June 2023 during the Indian Prime Minister's visit to the US.

In response to the US's state protectionist measure of raising tariffs on specific steel and aluminum items, additional charges of 20% each on apples and walnuts and Rs 20 per kilogram on almonds were placed on US products in 2019. These other duties were in addition to the Most Favoured Nation (MFN) duty.

The US agreed to grant market access to steel and aluminum items via exclusion. Thus, India withdrew these additional taxes it had placed on goods of US origin.

WEEKS HIGHLIGHT

NON-TECHNICAL CONTENT



8 SEPTEMBER

INTERNATIONAL LITERACY DAY

International literacy day: In order to raise awareness of the value of literacy, UNESCO designated September 8 as International Literacy Day. To raise awareness of the significance of literacy learning spaces in creating inclusive education for everyone, the theme for this year is "Transforming Literacy Learning Spaces."



14 SEPTEMBER

हिन्दी दिवस

हिन्दी दिवस प्रति वर्ष 14 सितंबर को मनाया जाता है। इसका उद्देश्य विश्व में हिंदी के प्रचार-प्रसार के लिये जागरूकता पैदा करना तथा हिन्दी को अन्तरराष्ट्रीय भाषा के रूप में पेश करना है।

SEPTEMBER

DID YOU KNOW?



Commercial Production

1. Ingredient preparation

Ingredients for pasta are flour, water, and sometimes eggs. These ingredients are mixed in a large mixing bowl to form a dough.

2. Dough processing

Kneaded by hand or machine to develop the gluten and create a smooth texture.

3. Extrusion

The dough is then passed through an extruder, which shapes the pasta into various forms such as spaghetti, penne, or fusilli.

4. Drying

Dried for several hours at room temperature or in a special drying chamber to remove excess moisture and preserve the pasta for longer periods.



- Pasta is a Italian noodle made from a dough of flour, water, and sometimes eggs. It comes in various shapes and sizes, such as spaghetti, penne, linguine, fusilli, and many more.
- Pasta is a staple food in Italian cuisine, and it has also become popular worldwide. Served hot or cold and paired with various sauces, meats, vegetables and cheeses.



Market Scope

- The market scope for pasta is quite broad and diverse. Pasta is a popular food item worldwide and is consumed in various forms and preparations.
- Healthier and more nutritious pasta options, such as whole-grain and gluten-free varieties.
- **The major players in the market include** Barilla Group, Nestle SA, De Cecco, Nissin Foods Holdings Co. Ltd., and New World Pasta Company.

Fact 1

Pasta, a beloved Italian staple, transcends cultures with its versatile appeal. From classic spaghetti and meatballs to exotic fettuccine Alfredo, pasta offers a canvas for culinary creativity. Its comforting, carb-filled goodness satisfies cravings and nourishes the soul. Whether served in a rustic trattoria or a modern kitchen, pasta remains a timeless, universally adored dish.

RICE

1/3

Rice is a cereal grain and a staple food for many of the world's population. It is one of the world's most widely consumed and important food crops.

Source

1. carbohydrates
2. vitamins
3. minerals
4. Vitamins B
5. Iron

2/3

Market Scope

- The market was valued at around \$491 billion in 2020 and is expected to grow at a CAGR of approximately 5% during the forecast period (2021-2026).
- Geographically, the market is segmented into North America, Europe, Asia-Pacific, South America, and the Middle East and Africa.
- **The major players in the rice market** include Ebro Foods SA, LT Foods Limited, KRBL Limited, The SunFoods LLC, The Rice 'n Spice Intl Ltd., Amira Nature Foods Ltd., The RiceTec AG, The Hain Celestial Group, Inc., McCormick & Company, Inc East End Foods plc.

3/3

Fact 2

Rice, a staple grain, sustains billions worldwide, its versatility unmatched. From fragrant jasmine to nutty brown, it graces tables globally. Cultivated in paddies, it's a dietary cornerstone, offering sustenance, energy, and comfort. Steamed, fried, or simmered, it adapts to diverse cuisines, a blank canvas for flavors.



Fact 3

In the food industry, semi-finished products play a pivotal role by providing convenience and consistency. These partially processed ingredients, such as pre-chopped vegetables or pre-cooked pasta, streamline meal preparation for both consumers and food manufacturers. They ensure quality standards, reduce cooking times, and enable culinary creativity, making them essential elements in modern food production and preparation.



PMG ENGINEERING

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