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TECH-KNOWLEDGE

The Official PMG Engineering Newsletter

FOOD & BEVERAGE INDUSTRY | ENGINEERING & DESIGN | SCIENCE & TECHNOLOGY

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FRUIT PROCESSING

Introduction

Fruits are a high-moisture, generally acidic food that is relatively easy to process and that offers a variety of flavour, aroma, colour, and texture to the diet.

Food processing aims to make food more marketable and attractive to potential consumers, often giving the processed food a longer shelf-life. Fruit can go through numerous types of processing, including canning, drying, and juicing. Some types of processed fruit are fruit preserves, canned fruit, and fruit juices. Processed fruit is generally not as healthy as fresh, raw fruit.

Washing, drying, and packaging fruit is usually not considered processing. Processing begins when the fruit is turned into something other than raw fruit by cooking or preserving it. Even if this process is as simple as cutting an apple and drying it to preserve it, that apple is no longer raw fruit. Sometimes additives, preservatives, and sugar is added to processed fruit to make it look and taste better than it normally would when a customer finally opens the product to consume it.

After fruit is washed multiple times, the processing begins. As an example, if the fruit is to be turned into fruit preserves, it is first cooked until soft. A sugary syrup and sometimes additives and preservatives are added.

The fruit is then sealed into a jar, or in some cases, placed in a squeeze bottle. As another example, the fruit is dried and packaged, sometimes with sugar added depending on how sweet the fruit is naturally.

Methods of Processing

1. Canning

Canning is defined as preservation of foods in hermetically sealed containers and usually implies heat treatment as the principal factor in prevention of spoilage. Canning was invented by Nicholas Appert in 1910 so also termed as Appertization.

Preserving using a canning method involves placing food in specified canning jars that are sealed with two-piece lids. The jars are heated to a temperature that destroys harmful microorganisms and inactivates enzymes. This heating, and later cooling, forms a vacuum seal. This vacuum seal prevents further microorganisms from entering the jar and contaminating the foods during storage.

Foods that are canned:

• Low acid foods: Meat, fish, poultry, dairy fall into a pH range of 5.0 to 6.8. This large group is commonly referred to as the low acid group.

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• Acid foods: With pH values between 4.5 and 3.7. Fruits such as pear, oranges, apricots and tomatoes fall in this class.
• High acid foods: Such as pickled products and fermented foods. The pH values range from 3.7 down to 2.3, also Jams and Jellies are in this classification.

2. Freezing
Freezing is a low temperature preservation process where the product is frozen at -38 °C and stored -18 °C. Freezing is cheaper than canning and frozen products are close to fresh products and of better quality the metabolic activity and spoilage due to post harvest chemical are retarded by freezing. Through the product preserved by freezing retains their quality appreciably, the major disadvantage of the process is that the low temperature needs to be maintained during handling, transportation and storage before the product is finally consumed.

Methods of freezing:
i) Quick (0 to -40 0C for 30 min.)
ii) Sharp (-15 to -29 0C for 3-72 h)
iii) Cryogenic (-196 0C)
iv) Dehydro-freeing (50 % moisture removed)

IQF refers to Individual Quick Freezing of every particle/aggregate using fluidization in a stream of very cold air. Fluidization leads to high heat transfer co-efficient and therefore very rapid freezing and hence better quality. For example, freezing of green peas in an air blast freezer may take 3-4 h whereas it is only 10-12 min by IQF. This results in for better texture and there is no humb or block formation. Some of other important IQF products are frozen fruit dices and cut vegetables.
• Easy, convenient and the least time consuming
• Slows growth of microorganisms and chemical changes
• Preserves the greatest quantity of nutrients

3. Drying
FOne of the oldest methods of preserving food and its alternative to canning & freezing. It Slows down action of enzymes but doesn't inactivate them.

Factors:
- Surface area - The greater the faster the product dries
- Temperature - The greater the difference between the product and drying medium, the greater the rate of drying
- Humidity - The higher, the slower the drying
- • Atmospheric pressure - The lower, the lower the temperature required to remove water.

Methods of drying:
- Sun drying: in Dry, warm climates
- Spray drying – Tray (air) drying
- Tunnel drying - The tunnel dryer is a machine where a container (tray) filled with the material is placed on a trolley or the material is loaded directly on the trolley, and the trolley is pushed in from the tunnel chamber entrance. The material is dried while being moved through the drying chamber.

4. Dehydration
Dehydration is the removal of moisture from fruits and vegetables by artificially produced heat under controlled condition of temperature, relative humidity and air flow. In dehydration, sufficient moisture is removed so that the product is free from spoilage; but this must be done in such a way to preserve food value as far as possible.

JAGGERY PROCESSING

Introduction

Jaggery is a kind of unrefined sugar. Raw, concentrated sugarcane juice is boiled until it becomes solid and can be formed into blocks. It has the slight bitterness of molasses and the richness of caramel.

Jaggery (Gur) has been cultivated in India for thousands of years. Known as s´arkarã (in Sanskrit), it was the only sugar known to the subcontinent, even reaching as far as other parts of Asia, and Africa. Ayurvedic texts dating back to over 5,000 years mention its benefits: boosting blood purification, improving digestion, and enhancing bone and pulmonary health. It was the Portuguese who discovered the ingredient in Kerala in the late 1600s.

Types of jaggery

There are four other kinds not made from sugar cane, but they are unusual.

1. Nolen Gur (found in Bengal – 'nolen' means new and 'gur' is the word for jaggery), is made from date palm sap;
2. Second type is made from coconut sap. In Sri Lanka they make a kind of liquid jaggery, or treacle, from the sap of the kithul (aka jaggery palm) tree.
3. In Myanmar they make jaggery out of the sap of the local toddy palm.

Potential health benefits

All kinds of health benefits are claimed for jaggery, from curing constipation to reducing blood pressure and everything in between; certainly, it contains useful vitamins and minerals not present in refined sugar. In Ayurvedic medicine it's used to treat respiratory conditions. If eaten during the winter months, when the sugarcane is harvested, and it is fresh it's claimed that eating it provides a boost to the immune system. Jaggery can be preserved into the summer but it needs to be frozen.

The darker the better - The first important thing to note is that the darker it is the richer and deeper the flavour.

Calcium	40-100 mg
Magnesium	70-90 mg
Potasium	1056 mg
Phosphorus	20-92 mg
Sodium	19-30 mg
Iron	10-30 mg
Maganise	.02-.05 mg
Zinc	0.2-0.4 mg
Copper	0.1-0.9 mg
Chloride	5.3 mg

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Production of jaggery

1. Crushing:
Two kind of crushing roller are used which is:
A)Vertical crusher B) Horizontal crusher

In vertical crusher the juice recovery is about 50-55% & also the efficiency of horizontal crusher is 55-60%. These roller are driven by diesel as well as with animal in which single oxe crush about 50kg per hour & 5HP diesel increse extraction rate upto 300kg per hour.

For jaggery production manufacturer use less technology & chemicals. The cane must be crushed within 24 hours other wise sugar will invert into different suger & not get solidified as per require. The recovery of sugarcane juice is about 50-60%, for more yield we require more efficient machines for crushing.

2. Filtration
Jaggery quality depend upon the clarity of juice it also help in storage of juice for long time. The latest economical & effective developed filter is available in RS & JRS Kolhapur is two stage filtration system fabricated from SS (304 grade) by this filter we easily remove adulterants, dust partical etc.. The first stage filter is stationay & made of stainlless steel 304 of 20 gauge sheet with 3 mm round hole strainer & has 29 holes/sq inch. Second stage filter is rotary filter with .5 mm screen size & coverd over inclined cylinder . The rotary cylinder screen revolved around its longitudinal axis& seperates out the juice impurities at lower end with the help of spirals provided inside it. The clean juice is collected in the tray placed below cylinder.

3. Moulding
The concentrated jaggery is put into the moulding frame & dry them than remove from frame.
Cubical Jaggery is an unrefined healthy sweetener produced using concentrated sugar cane juice. It is high fibre and mineral content. It is a respiratory track cleaner. Jaggery has the ability to cleanse the body and act as a digestive agent.

Conlcusion

Jaggery in different forms, as manufactured and explained above, comprises of many useful minerals, vitamins and antioxidants stated earlier in this manuscript, can be taken as health supplement, which would help improving the majority population suffering due to under nutrition, and/or malnutrition, because of deficient common diet and probably, may replace sugar in making of health foods, and hence, appears to have bright future among masses and could be promoted.

INDUSTRY BUZZ

Gourmet treats from Black Vanilla Gourmet herald the festive season.

As is customary each year, Black Vanilla Gourmet by The Bennet & Bernard Company is prepared to present its magnificent items during the much-anticipated holiday season. A mouthwatering selection of richly flavored cakes, cookies, chocolates, and numerous other treats will surely make this festival season unforgettable.

The staff at Black Vanilla Gourmet is not holding back and has put their all into creating the ideal 6-course menu for their patrons to make the Christmas season even more joyous. A large selection of holiday confections (cakes, cookies, candies, almonds, etc.), fine cheese, cold cuts and meats imported worldwide, gift baskets for loved ones, and speciality cooked dinners.

The government extends until March 2025, the period for reducing oil import duties.

The Indian government has extended the lower import tariff period for edible oils till March 2025. The choice was made with the prospect of low domestic oilseed output in mind and the fact that 2024 would be an election year.

To keep local costs under control, the Government of India has issued an order to import edible oils at reduced import tax rates until March 2025, according to Shankar Thakkar, national head of the All India Edible Oil Traders Federation. The government has released a notification to prolong the import duty period for edible oils from March 31, 2024, to March 31, 2025, with no modifications to the import duty. Crude soy oil with HS CODE 15071000 is subject to a 5% duty, crude palm oil with CODE 15111000 is subject to a 7.5% duty, and 15121110 is subject to a 5% duty.

13164 MT of rice and 3.46 LMT of wheat were sold at the 26th e-auction under OMSS (D).

Weekly e-auctions of both wheat and rice are held as part of the Government of India's initiative for market intervention to control the retail price of rice, wheat, and atta. On December 20, 2023, the 26th electronic auction was held, with 4 LMT of wheat and 1.93 LMT of rice. 3.46 LMT wheat and 13164 MT rice were sold in the e-auction at a weighted average of Rs 2178.24/Qtl and Rs 2905.40/Qtl, respectively.

Furthermore, only 50 MT of wheat will be accepted for bidders with an LT electricity connection and 250 MT for those with an HT electricity connection as of the e-auction date of December 20, 2023. This action has ensured that the successful bidder processes and releases the wheat sold under OMSS (D) onto the open market to prevent stock hoarding.

Success of the Ministry of Fisheries and the Department of Animal Husbandry and Dairying

From 2014–15 to 2021–22, the livestock sector grew at a compound annual growth rate (CAGR) of 13.36%. Livestock's gross value added (GVA) contribution to the overall agriculture and allied sector climbed from 24.38 per cent in 2014–15 to 30.19 per cent in 2021–2022. 2021–2022, the livestock industry comprised 5.73% of the total GVA.

According to country's 20th livestock census, there are 303.76 million bovines (cattle, buffalo, Mithun, and yak), 74.26 million sheep, 148.88 million goats, 9.06 million pigs, and approximately 851.81 million fowl. The most significant agricultural product, dairy, accounts for 5% of the country's GDP and directly employs over eight crore farmers. India is the world's top milk producer, accounting for 24.64 per cent of the total. Over nine years, milk output has increased at a CAGR of 5.85%, from 146.31 million tonnes in 2014–15 to 230.58 million tonnes in 2022–2023.

Boba Bhai intends to open 100+ outlets nationwide by 2024 and is expanding its reach in Delhi.

The leading bubble tea company in India, Boba Bhai, has announced that it is expanding into the Delhi-NCR area in addition to Bangalore, Udaipur, and Hyderabad. The brand has increased within four months of its introduction and is available in 17 locations nationwide. Over the next 12 months, the brand intends to open more than 100 outlets nationwide.

The brand will establish itself in Malviya Nagar and Rajouri Garden in New Delhi, then move on to Sohna Road, Gurgaon. The analysis by BlueWeave Consulting, which projects the bubble tea industry to grow at a CAGR of 14.6% between 2023 and 2028, confirms that the bubble tea market has been expanding rapidly both in India and worldwide. Dhruv Kohli, the founder of Boba Bhai, said, "The bubble tea market in India is growing at a very rapid pace. Delhi's culinary diversity and youth-centric demographic perfectly align with Boba Bhai's market."

WEEKS HIGHLIGHT

25 DECEMBER

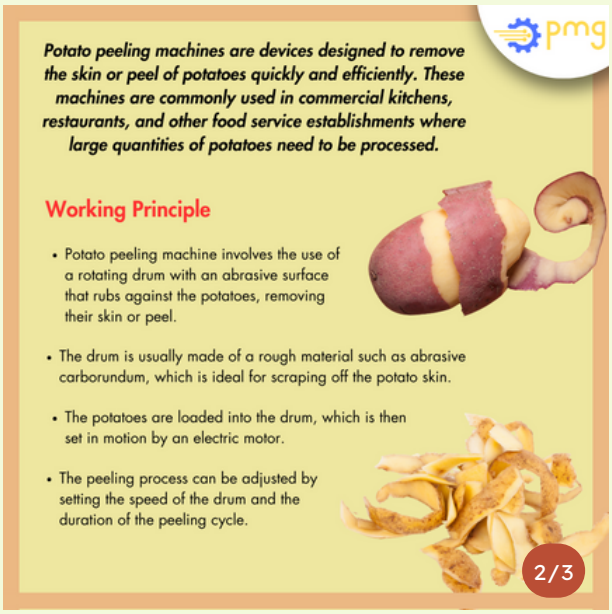
INTERNATIONAL HUMAN SOLIDARITY DAY

Christmas is celebrated annually on December 25th to commemorate the birth of Jesus Christ in Christian tradition. It serves as a time for families, communities, and societies to unite, partake in traditions, exchange gifts, and share in the spirit of joy and giving.

DID YOU KNOW?

Fact 1

Frozen meat cutters revolutionize food preparation by effortlessly slicing through frozen meats, optimizing efficiency in commercial kitchens. These advanced tools offer precision and speed, ensuring uniform cuts and maintaining product quality. They are indispensable in the food industry, enhancing productivity and meeting the demands of modern culinary practices.



Fact 2

Potato peeling machines streamline food preparation by efficiently removing the outer skin from potatoes, saving time and labor in commercial kitchens. These machines utilize rotating abrasive surfaces to peel potatoes rapidly and consistently, ensuring a uniform product. With adjustable settings to accommodate different potato sizes, these machines contribute to increased productivity, improved kitchen workflow, and consistent quality in food establishments, ultimately enhancing overall operational efficiency.

Fact 3

Cutter discs are essential components in various cutting machinery, offering precision and efficiency in slicing through diverse materials. Engineered with advanced materials and innovative designs, these discs ensure optimal performance, durability, and safety, making them indispensable for industries ranging from manufacturing to food processing, contributing to seamless operations.

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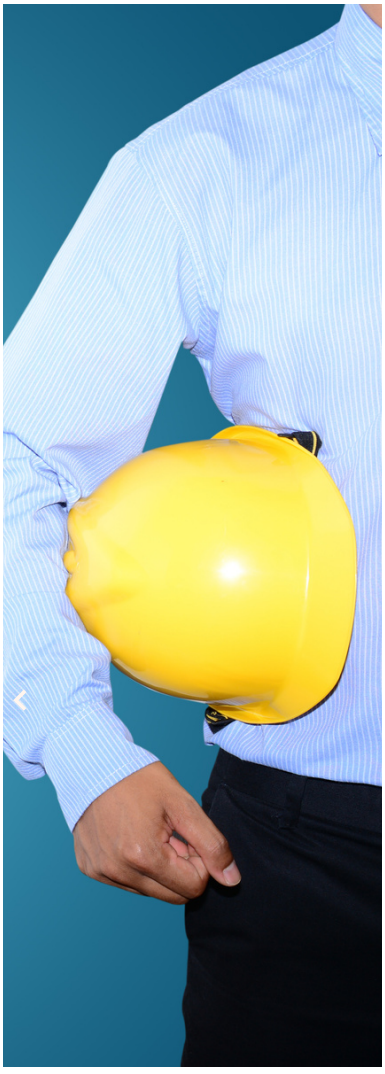

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