

TECH-KNOWLEDGE

The Official PMG Engineering Newsletter



FOOD & BEVERAGE
INDUSTRY

ENGINEERING
& DESIGN

SCIENCE &
TECHNOLOGY

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The table below provides examples of foods with low, medium, or high GI scores.

A healthful addition to morning porridge, milk is a low-GI dairy product. The GI score for skimmed milk is 37, while full-fat milk has a score of 39. Milk is rich in calcium, which is important for bone health. Research suggests that drinking milk regularly may reduce the progression of knee osteoarthritis in women.

Low-GI foods (under 55)	Medium-GI foods (55-70)	High-GI foods (over 70)
Rolled or steel-cut oats	Brown or basmati rice	Russet potatoes
Barley	Couscous	White bread
Butter beans and peas	Whole meal bread	Cookies
Non-starchy vegetables	Rye bread	Breakfast cereals
Milk	Quick oats	Instant pasta
Sweet potatoes	Honey	Short-grain white rice
Most fruits	Orange juice	Pineapples and melons

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3. Chickpeas – 28

Chickpeas, or garbanzo beans, are a low-GI legume, with a score of 28 on the scale. Chickpeas are a good source of protein and fiber, with 11.8 grams (g) and 10.6 g per cup, respectively. They also contain key nutrients, such as calcium, potassium, and vitamin B-9, which is sometimes called folate.

4. Carrots – 39

With a GI score of 39, carrots are a healthful alternative to bread for dipping into hummus. Carrots contain beta-carotene, which is good for eye health.

5. Kidney beans – 24

With a GI score of 24, kidney beans are a versatile low-GI food. These beans are rich in protein and fiber, with 13.36 g and 11 g per cup, respectively.

6. Lentils – 32

Scoring 32 on the GI scale, lentils are a great low-GI addition to lunches and dinners. Lentils are rich in protein, with 17.86 g per cup, and fiber, with 15.6 g per cup. They are also a good source of phosphorus and potassium. An Indian dish called Dal is a wholesome and tasty way to enjoy lentils. Dal is also easy to make at home.

Many factors influence a food's GI score, including:

- **Level of processing:** More processed carbohydrates tend to have higher GI scores.
- **Ripeness:** The sugar in fruit breaks down as the fruit ripens, increasing the GI score.
- **Preparation:** The cooking process can break down carbohydrates, increasing the meal's GI score.
- **Dressing:** Using an acidic seasoning, such as lemon, lowers a meal's GI score.



Type of starch: Amylose has a lower GI score than amylopectin.

People on a low-GI diet can also enjoy foods that do not contain carbohydrates, such as the following:

- Meat
- Eggs
- Fish
- Seafood
- Olive oil
- Butter
- Herbs
- Spices
- Nuts

Conclusion

Our body has an obligatory requirement for glucose dependent on metabolic demands of our body. It is usually 200 gm/day. Our brain completely depends upon oxygen and glucose. Maintaining a constant blood glucose level is important for our health and well-being. The scoring between 0 to 100 with glucose being the reference food with a GI food value fixed at 100. It is a new system of classifying carbohydrate containing foods, according to how quickly they raise the blood sugar levels in the body.

INSIGHT ON MANUFACTURING PROCESS OF KHOA



Introduction

Among the indigenous milk products, khoa occupies first position among various Indian dairy products and it also forms a base for number of sweet delicacies. Khoa is a popular product throughout India and is called by different names in different regions like mawa, khoya, palgova, kava, etc.

Khoa is the product obtained from cow or buffalo (goat or sheep) milk, or a combination thereof by rapid drying containing milk fat content not less than 30 percent on dry weight basis of the final product. Khoa is a heat coagulated, partially dehydrated milk product which is obtained by heat desiccation of whole milk to 65% to 70% milk solids without the addition of any foreign ingredients, mostly in private and unorganized sectors of India. Due to its large-scale consumption nearly six lakh tones of khoa are manufactured annually, which is equivalent to 7% of India's total milk production.

A.Chemical and Nutritive Content of Khoa

The market samples of khoa show wide variations in chemical composition. Certain times, the market samples fail to meet the minimum legal standards also. To provide minimum legal standards in khoa, the minimum fat content of 4.4% in cow's milk and 5.5% in buffalo milk should be maintained. Khoa is a rich source of energy, about 458 Kcal per100 g of the product. The food and nutritive value of khoa is extremely high.

B.Varieties of Khoa

There are three distinct varieties of khoa. They differ in their composition, body and textural characteristics and end use.

1. Pindi

This variety is identified as a circular ball of hemispherical pat with compact mass, homogenous and smooth texture. It is characterized by pleasant and cooked flavor and is generally devoid of objectionable tastes like burnt, acidic etc.

2. Dhap

It is a raw (katcha) khoa characterized by loose but smooth texture and soft grains and sticky body. Dhap variety carries highest percentage of moisture over other varieties of khoa.

3. Danedar

This is characterized by the granular texture with hard grains of different sizes and shapes embedded in viscous serum. Slightly sour milk is preferred in the manufacture of this variety as it yields granular texture.

C.Factors affecting the quality of Khoa

Type of milk:

Buffalo milk is generally used instead of cow milk for the manufacture of khoa due to its higher yield, softer body, and smooth texture. The khoa manufactured from cow milk have dry surface, yellow color, sticky and sandy texture.

READ MORE....

**Amount of free fat:**

An optimum amount of free fat is necessary for desirable body and textural properties of khoa.

Total solid level:

There is significant positive correlation between total solid level milk and instrumental hardness, gumminess, and chewiness of khoa.

Working of Khoa:

The formation of large lactose crystals can be reduced through working of khoa when compared to un-worked khoa and working results in no perceived sandiness upon storage.

D.Equipments Used for manufacturing of khoa

Khoa is generally manufactured by halwais by continuous boiling of milk in a shallow iron or stainless-steel vessel to remove moisture. Traditional method used for the preparation of khoa has several disadvantages like poor and inconsistent quality and limited shelf life of about 5 days at 30°C.

1. Continuous khoa making machine

It consists of a preheating cylinder and two cascading pans. The preheater is a steam jacketed cylinder containing rotary scrapers which rotate at 120 rpm. The cascading pans are covered steam jacketed pans with open holes provided with spring loaded reciprocating type scrapper knives operating at 30 strokes per min. The milk is taken into the preheater and heated by steam at 3 kg/cm² pressure. Here the milk is concentrated to about 30 to 35 per cent of total solids within 10 to 12 min. From the preheater, the milk enters the first cascading pan.

2. Scraped surface conical vat

A mechanized scraped surface heat exchanger with a conical vat process is developed for the batch production of khoa. Forty kg concentrated or 80 kg whole milk can be taken per batch which takes about 14 min and 50 min respectively.

**3. Contherm- Convap System**

Attempts were made to prepare khoa on Contherm-Convap system which was developed by Alfa-Laval. This unit consists of two parts, a Contherm for heating the feed to about 95°C and Convap for concentrating milk to desired milk solids level. Concentrated milk with 35- 40%T.S. at the rate of 300-350 kg per hour can be fed to the machine.

4. Thin film scraped surface heat exchanger (TSSHE)

This machine has three jacketed cylinders placed in a cascade arrangement. This facilitates easy transfer of milk from one cylinder into the other. The scrapper speeds are 40, 55 and 69 rpm for the 1st, 2nd & 3rd stage respectively. The operating steam pressures used are 2.0 & 1.7 & 1.5 kg/cm² in respective stages. One roller is used in the last stage in place of scraper blade which kneads the khoa to improve its body and texture. The first stage raises the milk solids level from initial 15 to 25 percent, the second stage to 50 percent and the third stage to 65-70 percent.

5. Inclined scraped surface heat exchanger (ISSHE)

An inclined scraped surface heat exchanger was developed for the continuous manufacturing of khoa. A scraper assembly is so built as to combines the functions of scraping and conveying. The SSHE has 3 jackets which operate at 1.0, 1.5 and 1.0 kg/cm² respectively.

Conclusion

Although so many technologies are developed for the production and storage of khoa, there is a still a need of investigation of chemical and physical aspects during manufacturing of khoa in order to understand factors responsible for quality. And all the known technologies of manufacturing of khoa should be transferred to small holder farmers who are the major contributors of milk production in India.



INDUSTRY BUZZ

Salad Days enters Mumbai to increase its presence.

The innovative healthy food company Salad Days has announced the launch of its first cloud kitchen in Andheri East, in the Chandivali neighbourhood of Mumbai. After that, the company plans to open more kitchens throughout Mumbai, concentrating on high-growth areas like Lower Parel, Khar, and Andheri West. Its objective is to get half a million subscribers in Mumbai over the next two years, and it intends to open four cloud kitchens in the initial phase of its expansion. This action aligns with the brand's broader growth strategy, which aims to establish its footprint in three significant locations in Mumbai, Bengaluru, and Delhi-NCR.

"The launch of our first cloud kitchen in Mumbai is a big milestone for Salad Days and sets the right tone for our growth plans for 2024," stated Varun Madan, founder and CEO of Salad Days.



The Parliament was informed of the policy that ensures farmers receive fair pricing by obtaining production at MSP.

The Government has informed Parliament that its goal in setting prices is to guarantee farmers fair prices by promising to buy their produce at MSP. Farmers may, however, choose to sell their produce on the open market or at the Minimum Support Price (MSP) to government procurement agencies, depending on which is more profitable for them.

The Ministry of Agriculture and Farmers Welfare informed Parliament that during the same period, the amount spent (at MSP values) on foodgrain procurement increased from Rs 1.06 lakh crore to Rs 2.28 lakh crore. The procurement of foodgrains increased from 761.40 lakh metric tonnes in 2014-15 to 1062.69 lakh metric tonnes in 2022-23, benefiting over 1.6 crore farmers. The ministry further stated that through the Food Corporation of India (FCI) and State Agencies, the Government provides price support for wheat and paddy to achieve the goals of the MSP Policy.





The Merck-FSSAI Memorandum of Understanding is extended.

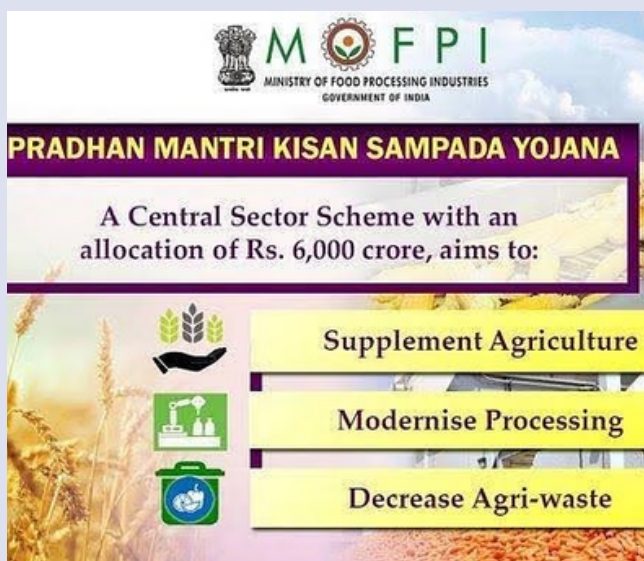
The Memorandum of Understanding (MoU) between Merck Life Science and The Food Safety and Standards Authority of India (FSSAI) has been extended. The corporation stated that this strengthened its joint efforts in running the National Food Laboratory (NFL) facility in Ghaziabad's Center for Microbiological Analysis Training (C-MAT).

This agreement supports their commitment to bolstering national food safety programs. The C-MAT will keep up various activities, such as research, method development, analytical training, and validating rapid kits in the microbiology sector.

The cabinet approves the Fisheries & Aquaculture Infrastructure Development Fund's expansion.

The Fisheries Infrastructure Development Fund (FIDF) was approved for an additional three years, until 2025-2026, by the Union Cabinet, which Prime Minister Narendra Modi leads. The approved fund size is Rs 7522.48 crore, with budgetary support of Rs 939.48 crore.

The Fisheries and Aquaculture Infrastructure Development Fund, with a total fund size of Rs 7522.48 crore, was established by the Union Government in 2018-19 to meet the infrastructure needs of the fishing industry. 121 projects with an investment cost of Rs 5588.63 crore were approved for constructing various fisheries infrastructures during the initial phase of the FIDF implementation, which ran from 2018-19 to 2022-2023.



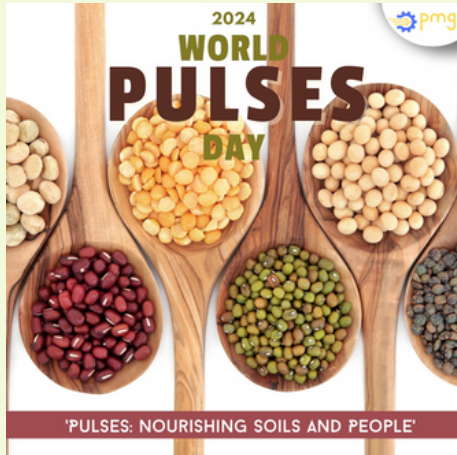
Pradhan Mantri Kisan Sampada Yojana is being implemented nationwide by MoFPI

Since 2017-18, the nationwide Pradhan Mantri Kisan Sampada Yojana (PMKSY) has been administered by the Ministry of Food Processing Industries (MoFPI). To build a contemporary infrastructure with effective supply chain management from the farm gate to the retail outlet, PMKSY is an extensive package of component schemes. It boosts the nation's food processing industry's expansion, helps farmers receive better prices, generates employment opportunities, particularly in rural areas, lowers agricultural produce waste, raises the processing standard, and improves processed food exports.

By the PMKSY component plans, 540 projects have been approved throughout the last three years. Of these, 399 projects have been completed, creating 86.06 LMT of processing and 22.63 LMT of preservation capacity.

WEEKS HIGHLIGHT

NON-TECHNICAL CONTENT



10 FEBRUARY

WORLD PULSES DAY

From farm to fork, pulses are a powerhouse of nutrition, sustainability, and cultural heritage. World Pulses Day 2024, honors these humble yet mighty legumes for their role in nourishing communities worldwide.



12 FEBRUARY

NATIONAL PRODUCTIVITY DAY

February 12th, marks National Productivity Day! Remember, being busy doesn't equate to productivity. True productivity involves efficient, purposeful work towards your goals.



14 FEBRUARY

VASANT PANCHAMI

The occasion of Basant Panchami, brings the wealth of knowledge.

FEBRUARY

DID YOU KNOW?



1/3



2/3



3/3

Market Scope

The market scope for pesto has been growing steadily in recent years, with increasing demand for fresh, healthy, and flavorful food products.

The major players in the Market for Pesto are:

1. Barilla
2. Nestle
3. Sacla
4. Giovanni Rana
5. Seggiano
6. Filippo Berio
7. La Famiglia Rana
8. Lucini Italia

Fact 1

Pesto, a vibrant and flavorful Italian sauce, crafted from fresh basil, pine nuts, garlic, Parmesan cheese, and olive oil, embodies the essence of Mediterranean cuisine. Its aromatic herbs and nutty undertones lend a burst of freshness to pasta, sandwiches, pizzas, and more, making it a versatile culinary delight cherished by food enthusiasts worldwide.

SOY SAUCE

1/3

Soy sauce is a salty, brown liquid condiment that is widely used in Asian cuisine, particularly in China, Japan, and Korea. It is made from a fermented paste of soybeans, roasted grain (usually wheat), brine, and sometimes other ingredients like mold or yeast.

- Soybeans are first boiled or steamed, then combined with roasted grain, such as wheat or barley, and allowed to ferment for several days to several months.
- During the fermentation process, enzymes break down the proteins and carbohydrates in the mixture, creating a complex flavor and aroma profile.
- After fermentation, the mixture is pressed to extract the liquid, which is then pasteurized to stop the fermentation process and bottled for sale.



2/3

Market Scope

- The global soy sauce market is expected to grow at a CAGR of around 5.1% from 2021 to 2026.

The major players in the global market :

1. Kikkoman Corporation
2. Lee Kum Kee
3. Higashimaru Co. Ltd.
4. Haitian Group
5. ABC
6. Foshan Haitian Flavoring & Food Co. Ltd.

SOY SAUCE
NET 150 ml 5fl.oz

3/3

Fact 2

Soy sauce, a savory condiment originating from Asia, adds depth and complexity to culinary creations worldwide. Crafted from fermented soybeans, wheat, and salt, its rich umami flavor enhances dishes ranging from sushi to stir-fries. With a centuries-old tradition, soy sauce embodies cultural heritage while continually inspiring innovative gastronomy. From its humble beginnings to global acclaim, soy sauce remains an indispensable ingredient in kitchens everywhere.

ESSENCES AND AROMAS



1/3

Essences and aromas are concentrated flavorings that are used to enhance the taste and aroma of food and beverages. They are typically made by extracting essential oils, flavor compounds, or aromatic compounds from natural sources such as fruits, vegetables, herbs, and spices.

Uses

- Used in baking and confectionery to add flavor to cakes, pastries, and candies. Ex. vanilla essence, almond essence, and lemon essence.
- Used in the production of perfumes, cosmetics, and air fresheners. Ex. lavender aroma, rose aroma, and citrus aroma.



2/3

Market Scope

The global market for flavors and fragrances was valued at \$28.2 billion in 2020 and is expected to reach \$37.3 billion by 2026, growing at a CAGR of 4.6% during the forecast period.

The major players in the Market for Essences and aromas are as follows:

1. Givaudan SA
2. Firmenich SA
3. International Flavors & Fragrances Inc.
4. Symrise AG
5. Mane SA
6. Takasago International Corporation
7. Robertet Group
8. Sensient Technologies Corporation
9. Frutarom Industries Ltd.
10. Kerry Group

3/3

Fact 3

Essences and aromas, encapsulate the concentrated forms and characteristic scents of substances. Essences are potent extracts capturing the essential fragrance or flavor of natural sources like fruits and herbs. Aromas, whether natural or synthetic, play a vital role in how we perceive and enjoy various products, from food and beverages to perfumes.

CHUTNEYS

1/3

Chutneys are a type of condiment that originated in the Indian subcontinent and are now popular in many other parts of the world. They are typically made from a combination of fruits, vegetables, herbs, spices, and vinegar or lemon juice. Chutneys are often sweet, sour, and spicy all at the same time, and they can range in texture from chunky to smooth.

Commercial Production

1. Sourcing ingredients:

Used in chutneys can vary depending on the recipe but typically include fruits, vegetables, spices, and herbs.

2. Processing:

Once the ingredients have been sourced, they are washed, cleaned, and chopped or ground. The ingredients may be cooked or roasted before being processed. The processed ingredients are then mixed with spices, salt, sugar, and vinegar to create the desired flavor and texture.

3. Packaging:

After the chutney is made, it is packaged into jars, bottles, or other containers.

2/3

The market for chutneys includes various players such as:

1. Major food manufacturers: Companies such as Unilever, Nestle, and Kraft Heinz have a significant presence in the chutney market with their various brands of chutneys.
2. Regional players: In India, there are several regional players in the chutney market, such as Bedekar, Mother's Recipe, and MTR, who specialize in making chutneys that cater to local taste preferences.
3. Small-scale producers: There are also many small-scale producers of chutneys, who sell their products through local markets, farmer's markets, and online marketplaces.
4. Organic and artisanal producers: Increasingly, consumers are seeking out artisanal and organic chutneys made from locally sourced ingredients.

3/3

Fact 4

A tantalizing blend of flavors originating from the Indian subcontinent and embraced worldwide. Crafted from a symphony of fruits, vegetables, herbs, spices, and tangy accents like vinegar or lemon juice, these condiments tantalize the palate with a harmonious fusion of sweet, sour, and spicy notes. From chunky to smooth textures, chutneys redefine culinary excellence in every bite.

OTHER SEASONINGS AND SEASONING SAUCES

1/3

Types

1. Soy Sauce:

Used in Asian cuisine to add flavor to stir-fries, marinades, and dipping sauces.

2. Fish Sauce:

Made from fermented fish and has a strong, salty flavor. It is commonly used in Southeast Asian cuisine to add depth of flavor to dishes such as curries and noodle soups.

3. Hot Sauce:

Made from hot peppers, vinegar, and other spices, hot sauce is used to add heat and flavor to a wide range of dishes, from eggs to tacos to wings.

4. Curry Powder:

Including turmeric, cumin, coriander, and chili powder, curry powder is used to flavor dishes such as curries, stews, and soups.

2/3

5. BBQ Rubs:

Used to coat meats before grilling or smoking, BBQ rubs can include ingredients such as paprika, chili powder, garlic powder, and brown sugar.

6. Seasoned Salt:

Used to add flavor to a wide range of dishes, including meats, vegetables, and snacks such as popcorn.

Major players in the Market for Seasoning Sauces

1. McCormick & Company
2. The Kraft Heinz Company
3. Unilever
4. Conagra Brands
5. Nestle
6. Tabasco
7. Goya Foods

3/3

Fact 5

Elevate your dishes with a dash of flavor! Explore our array of tantalizing seasonings and sauces, perfect for every culinary creation. From zesty marinades to aromatic spice blends, we've got your taste buds covered. Unleash the power of diverse flavors and transform your meals into culinary masterpieces. Taste the difference with our premium seasonings and sauces today! [#FlavorfulDelights](#) [#CulinaryMagic](#)



PMG ENGINEERING

About PMG

Delivering End-to-End Engineering
Design & Construction Management in
Food & Beverage Industry



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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- MEET THE EXPECTATIONS OF ALL STAKEHOLDERS
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