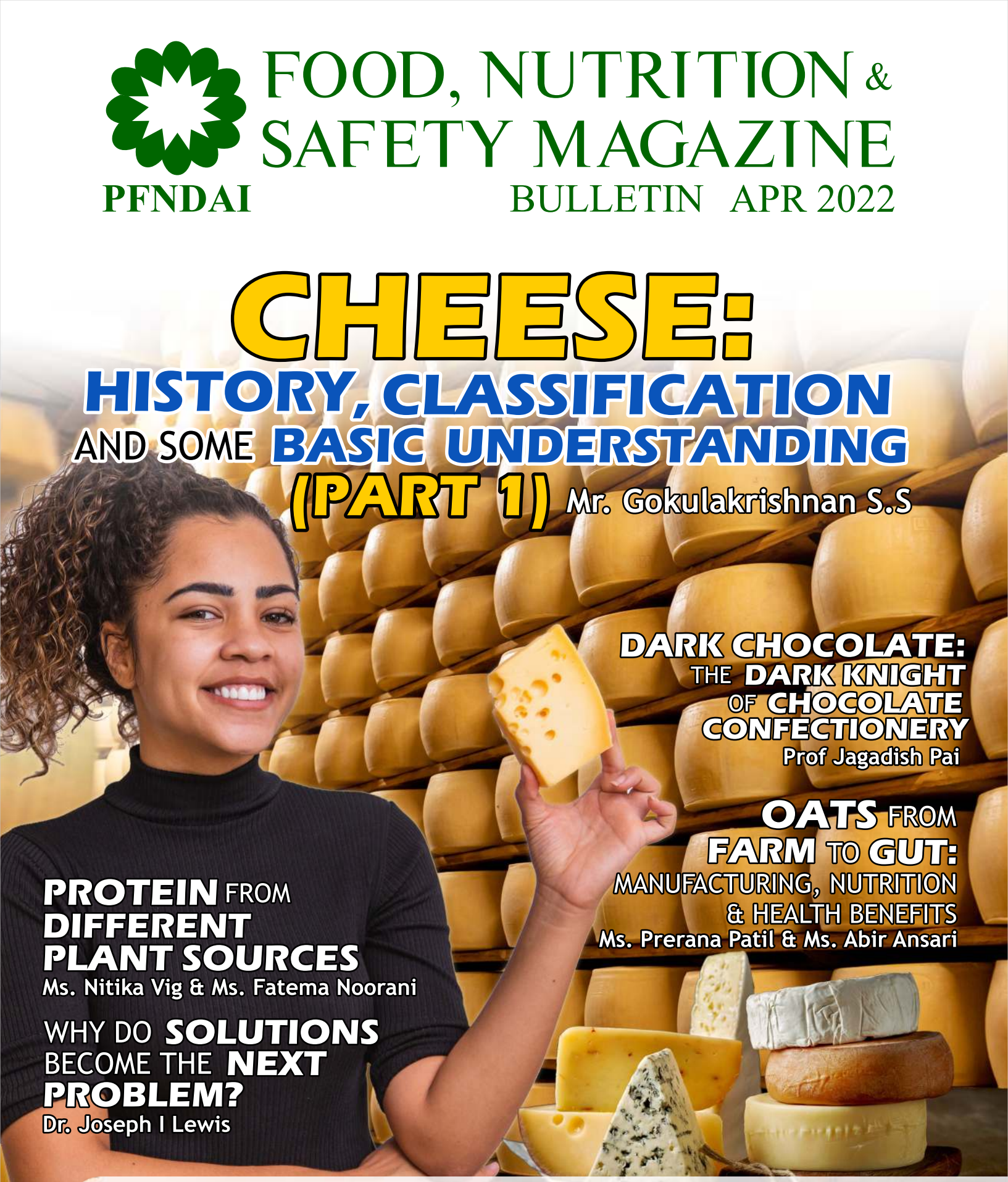
PFNDAI

FOOD, NUTRITION & SAFETY MAGAZINE

BULLETIN APR 2022



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EDITORIAL

Recently, researchers from New York University School of Global Public Health and from Tufts University in Massachusetts published an analysis in Public Health Nutrition (Pomeranz et al. 2022) reporting that online food retailers are not consistently displaying nutrition information on their websites.

They stated that the US laws are lagging behind in mandating that same labelling required for foods sold in brick-and-mortar stores be displayed on online sites. They studied 10 products across national online retailers and found that only 36.5% of products surveyed gave the required information including Nutrition Fact Panels, ingredients list, common food allergens and % juice in fruit drinks in conspicuous and legible manner. All these are necessary to be declared on labels.
On the other hand, voluntary nutrition-related claims were prominently and conspicuously displayed in 63.5% cases.

This is not just the case in the US but the Indian online retailers are doing similar things. FSSAI and state FDAs should find out if all the necessary and important information is displayed by the online retailers.

There has been a great increase in the amount of online purchases of food products during pandemic as people found it convenient to order online as many brick and mortar stores were shut due to lockdown and other restrictions. Also availability of products locally was uncertain and also banks encouraged online payments.

All this increased the sales of online purchases including food products tremendously.

We must thank the online retailers who have made the food products available and safely delivered to customers safely and efficiently. However, they must not forget that the information regarding the nutrition panel, ingredients list, warnings related to some ingredients or conditions, allergen declaration, storage conditions etc. must be displayed prominently.
Sometimes these pieces of information are shown but are not very clear or legible as the images shown are not clear.

With the ease in such display online where several images could be shown in sequence that could show all necessary information to prospective buyer. Sometimes it is seen that all the images are same and that of front of pack (FOP).

Online retailers can show much more information that brick-and-mortar stores cannot as they only have to depend on labels which can be for a very large material as well as quite small pack of food product on which the font is so small it is extremely difficult to read.

We sincerely hope that online retailers start displaying all the information. Even manufacturers should encourage and provide all the necessary information and images that are clear so consumers can easily read them. If this does not happen then FSSAI should make it mandatory for any product displayed online should have all the statutory information clearly displayed.

Prof Jagadish Pai,
Executive Director, PFNDAI

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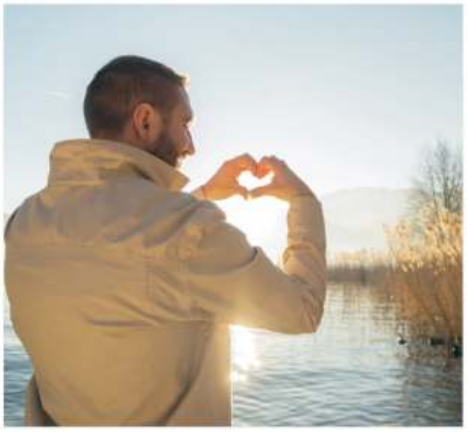







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CHEESE: HISTORY, CLASSIFICATION AND SOME BASIC UNDERSTANDING (PART 1)

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In simple words, Cheese is termed as "The Fermented Milk that we Chew "and I call it as Milk Pickle .....

Cheese is fermented product manufactured from milk, formed by the acidification and coagulation of milk using lactic acid forming bacteria and rennet or another coagulating agent.

Further, Cheese is one of the most varied and subtle foods in the world. In taste cheese can be bland, buttery, innocuous, rich, creamy, pungent, sharp, salty or lightly delicate. In texture it can be hard enough to chip off in flakes, so soft and runny that it needs to be eaten with a spoon – or at any one of a dozen points of softness and firmness between these two extremes. In aroma, cheese can be rank and overpowering enough to turn the stomach of the strongest man (and still be eaten with relish by devotees), delicately aromatic or virtually unnoticeable.

Cheese also serves as the perfect companion for wines, a superbly satisfying finale to a gourmet meal or simply as a basic nourishing foodstuff for family snacks.
The word cheese comes from Latin caseus, from which the modern word casein is also derived. The earliest source is from the proto-Indo-European root *kwat-, which means "to ferment, become sour".

The other probabilities are here below:

- Cheese from Old English – Cese
- German – Kase
- French – Fromage
- Spanish - Queso
- Italian – Fromaggio
- Cheese from Urdu – Chiz

Technically, In India FSSA defines, Cheese means the ripened or un-ripened soft or semi-hard, hard and extra hard product, which may be coated with food grade waxes or poly film, and in which the whey protein / casein ratio does not exceed that of milk. Cheese is obtained by coagulating wholly or partly milk and/ or products obtained from milk through the action of non-animal rennet or other suitable coagulating agents and by partially draining the whey resulting from such coagulation and/ or processing techniques involving coagulation of milk and/ or products obtained from milk which give a final product with similar physical, chemical and organoleptic characteristics.

The product may contain starter cultures of harmless lactic acid and / or flavour producing bacteria and cultures of other harmless microorganisms, safe and suitable enzymes and sodium chloride. It may be in the form of blocks, slices, cut, shredded or grated cheese.

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(i) Ripened Cheese is cheese, which is not ready for consumption shortly after manufacture, but which must be held for some time at such temperature and under such other conditions as will result in necessary biochemical and physical changes characterizing the cheese in question.

(ii) Mould Ripened cheese is a ripened cheese in which the ripening has been accomplished primarily by the development of characteristic mould growth through the interior and/ or on the surface of the cheese.

(iii) Unripened cheese including fresh cheese is cheese which is ready for consumption shortly after manufacture. Cheese or varieties of cheeses shall have pleasant taste and flavour free from off flavour and rancidity. It may contain food additives permitted as per regulation and shall conform to the microbiological requirements.

The word "cheese" is commonly used as a collective term for widely variable products such as matured and non-matured cheese made with rennet, acid curd cheese, fresh cheese, and even processed cheese. Most of these fit the definition established by the FAO/WHO, i.e., cheese is the fresh or matured solid or semi-solid product obtained by coagulating milk, skimmed milk, partly skimmed milk, cream, whey cream, or buttermilk, or any combination of these materials, through the action of rennet or other suitable coagulation agents, and by partially draining the whey resulting from such coagulation.

Worldwide, cheese is a major agricultural product. According to the Food and Agricultural Organization of the United Nations, International cheese exports expanded in 2020, buoyed by persistent demand from emerging markets International trade in cheese products reached 2.8 million tonnes in 2020, sustaining expansion for a fifth consecutive year by 4.1 percent, underpinned by continued solid import demand by several countries, especially the Russian Federation, Iraq, China and the Republic of Korea By contrast, imports contracted in the United States of America, Japan and Mexico. The Russian Federation increased its cheese purchases in 2020, with Belarus supplying the most. Much of the increased demand was due to a rise in national demand, as the introduction of the obligatory electronic certification "Mercury" system, new labelling regulations and the removal of cheese that flout regulatory requirements from the market have raised consumer confidence in milk products. China's cheese imports continued to increase, driven by steeply rising demand from the food service and bakery sector and western-style restaurants, supplied mainly by New Zealand and the European Union. Cheese imports by the Republic of Korea rose for the fourth consecutive year, buoyed by a steep increase in consumer demand for packaged meals containing cheese, Westernization of food habits, and rising demand from the food processing industry.

Besides, tariff reductions and increased TRQs have lowered cheese prices, boosting imports. Cheese import reductions in most countries reflect a combination of high national production, and reduced consumer purchasing power, which fall disproportionately on high-priced milk products such as cheese. Cheese exports by the European Union, the Islamic Republic of Iran and Belarus increased, while Egypt, New Zealand, Australia and the United States of America registered contractions in their sales. Cheese exports by the European Union expanded, sustained by increased imports by Japan, Switzerland and the Republic of Korea.

Increased export availabilities were also a factor, as processers channelled more milk to cheese plants with lower milk sold through the food services sector. The European Union private storage aid (PSA) scheme that allowed a temporary withdrawal of cheese from the market also boosted cheese production. Belarus further expanded cheese shipments as the Russian Federation continued to import high volumes. New Zealand's many trading partners lowered cheese imports, with only a few purchasing more in 2020, including China, the Republic of Korea, Malaysia and Thailand. Australian cheese exports declined, reflecting a slight increase in internal consumption and reduced demand from East Asia. Cheese exports by the United States of America declined, hindered by volatile domestic cheese prices and lower demand from key markets, especially Mexico, which suffered economic downturns. However, exports to other destinations such as the Republic of Korea continued to perform better. types.

Brief History

Cheese is an ancient food whose origins predate recorded history. There is no conclusive evidence indicating where cheese making originated, either in Europe, Central Asia or the Middle East, but the practice had spread within Europe prior to Roman times and, according to Pliny the Elder, had become a sophisticated enterprise by the time the Roman Empire came into being.

According to an ancient legend, it was made accidentally by an Arabian merchant who put his supply of milk into a pouch made from a sheep's stomach, as he set out on a day's journey across the desert. The rennet in the lining of the pouch, combined with the heat of the sun, caused the milk to separate into curd and whey. That night he found that the whey satisfied his thirst, and the cheese (curd) had a delightful flavour, which satisfied his hunger.

Travellers from Asia are believed to have brought the art of cheese making to Europe. In fact, cheese was made in many parts of the Roman Empire when it was at its height. The Romans, in turn, introduced cheese making to England. During the Middle Ages- from the decline of the Roman Empire until the discovery of America-cheese was made and improved by the monks in the monasteries of Europe. For example, Gorgonzola was made in the Po Valley in Italy in 879 A.D., and Italy became the cheese making centre of Europe during the 10th Century. Roquefort was also mentioned in the ancient records of the monastery at Conques, France as early as 1070.

Cheese making continued to flourish in Europe and became an established food. In fact, the Pilgrims included cheese in the Mayflower's supplies when they made their voyage to America in 1620. The making of cheese quickly spread in the New World, but until the 19th century it remained a local farm industry. It wasn't until 1851 that the first cheese factory in the United States was built by Jesse Williams in Oneida County, New York.

As population across the United States continued to grow dramatically, the demand for cheese increased and the industry gradually moved westward, centring on the rich farmlands of Wisconsin. In 1845, a band of Swiss immigrants settled in Green County, Wisconsin and started the manufacturing of foreign cheese in America. Most Wisconsin farmers began to believe that their future survival was tied to cheese, and their first factory was a Limburger plant which opened in 1868.

The wholesale cheese industry was thus born and showed phenomenal growth during the latter half of the 1800s. By 1880 there were 3,923 dairy factories nationwide which were reported to have made 216 million pounds of cheese that year valued at $17 million. This represented almost 90 percent of total cheese production that year. By the turn of the century, farm production of cheese had become insignificant. The 1904 census reported only factory output, which totalled over 317 million pounds.

As cheese demand continued to grow and spread rapidly, manufactured and processed cheese production increased dramatically. Total natural cheese production grew from 418 million pounds in 1920 to 2.2 billion pounds by 1970. Rising demand for cheese throughout the 1970s and 1980s brought total natural cheese production to more than 6 billion pounds by the beginning of the 1990s. Processed cheese also experienced a surge in consumer demand with annual production exceeding 2 billion pounds a year by the beginning of the 1990s.

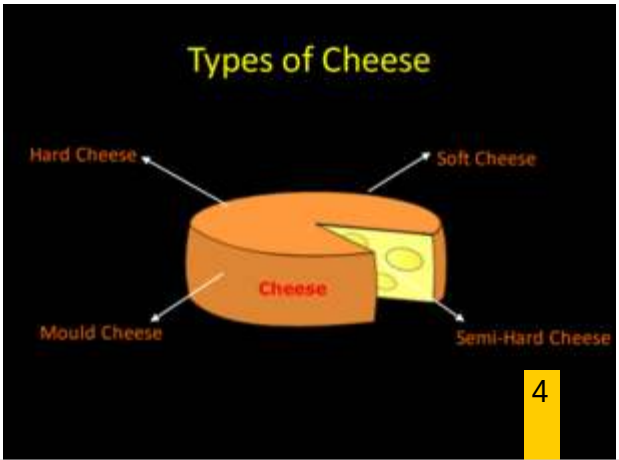
Currently, more than one-third of all milk produced each year in the U.S. is used to manufacture cheese. Recent increases in the overall demand for farm milk have in large part been due to the continued growth of the cheese industry. As consumer appetites for all types of cheese continue to expand, so will the industry.

Classification of Cheese

Cheeses are classified by different means, but the following is the main, which covers all variants in it: Some descriptions are given here below:

Soft cheeses are those with interiors that are neither pressed nor cooked.

Their texture is creamy, velvety and almost melts in the mouth because their moisture level varies between 50% and 60%. Their butterfat level varies between 20% and 26%. This percentage is higher in double- and triple-cream cheeses, which are made with milk and cream.



Soft cheeses are divided into two categories: 1) Soft cheese with bloomy rind and 2) soft cheese with washed rind

Semi soft cheese: With a 45%-50% moisture level, these cheeses contain a firmer and more compact texture than you can obtain by mechanically pressing curdled milk to extract additional whey (lactoserum). In some cases, to intensify draining, the interior is heated slightly. This category includes a wide range of cheeses that vary enormously according to the production process as well as the ripening method and duration. There are two times of semi soft cheese interior ripened and surface ripened.

Hard cheese

This is the most important category with its large number of cheeses and the popularity of its varieties. It includes well-known selections like Cheddar and Gouda. Generally, without a rind, these cheeses have a supple and elastic texture. The interior is drained and pressed to withdraw the most whey possible before being cooked or semi-cooked. The moisture level is between 35% and 45%. Some firm cheeses (like curd cheese or fresh Cheddar from Here) are not ripened, which explains their under-developed flavour. Others are interior ripened for three to six months. In some of these cheeses, “eyes” form when gas is created before the interior hardens.

In India, FSSAI defines different cheeses as stated below: according to Regulation 5.1.6: CHEESE

Cheese (Hard) means the product obtained by draining after coagulation of milk with a harmless milk coagulating agent under the influence of harmless bacterial culture. It shall not contain ingredients not found in milk, except coagulating agent, sodium chloride, calcium chloride (anhydrous salt) not exceeding 0.02 percent by weight, annatto or carotene colour, and may contain emulsifiers and/or stabilizers, namely citric acid, sodium citrate or sodium salts of orthophosphoric acid and polyphosphoric acid (as linear phosphate) exceeding 0.2 percent by weight. Wax used for covering the outer surface shall not contain any thing harmful to health. In case the wax is coloured, only permitted food colour shall be used. Hard cheese shall contain not more than 43.0 percent moisture and not less than 42.0 percent milk fat of the dry matter. Hard cheese may contain up to 3000 parts per million sorbic acid, or its sodium, potassium or calcium salts calculated as sorbic acid, and/or 12.5 parts per million nisin either singly or in combination.

Natamycin may be used for surface treatment only, subject to the following conditions, namely:-
I. Maximum level of application shall not exceed 2 mg/dm3 of cheese surface
II. The penetration depth shall not exceed 2 mm.
III. The maximum residue level in the finished product shall not exceed 1 mg/dm3

Cheese means the ripened or unripened soft or semihard, hard and extra hard product, which may be coated with food grade waxes or polyfilm, and in which the whey protein / casein ratio does not exceed that of milk. Cheese is obtained by coagulating wholly or partly milk and/ or products obtained from milk through the action of non-animal rennet or other suitable coagulating agents and by partially draining the whey resulting from such coagulation and/ or processing techniques involving coagulation of milk and/ or products obtained from milk which give a final product with similar physical, chemical and organoleptic characteristics. The product may contain starter cultures of harmless lactic acid and / or flavour producing bacteria and cultures of other harmless microorganisms, safe and suitable enzymes and sodium chloride. It may be in the form of blocks, slices, cut, shredded or grated cheese.

a) Ripened Cheese is cheese, which is not ready for consumption shortly after manufacture, but which must be held for some time at such temperature and under such other conditions as will result in necessary biochemical and physical changes characterizing the cheese in question.
b) Mould Ripened cheese is a ripened cheese in which the ripening has been accomplished primarily by the development of characteristic mould growth through the interior and/ or on the surface of the cheese.
c) Unripened cheese including fresh cheese is cheese which is ready for consumption shortly after manufacture.
d) There are other different types of Cheeses defined in FSSAI, and the undefined may fall under Proprietary against the class they belong to.

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- Sweets.,confectionary and its products
- Bakery products
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- Food additives, preservetives and artificial sweetners
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Cheese is also classified as per the variables employed in its manufacture:

"Variety is the spice of life", so we have hundreds of cheese varieties developed through the efforts of cheese makers over many centuries. The handbook of cheese varieties and descriptions 'lists 800 varieties and describes 400 officially recognized varieties of cheese'. This is not surprising when one considers the many variables or combinations thereof that may be applied to the cheesemaking process. These variables include:

1. Milk (cow, buffalo, sheep, goat, etc.)
2. Coagulant (enzyme, acid)
3. Curd treatments (cutting, warming, pressing, etc.)
4. Ripening agents (microbes, enzymes)
5. Ripening conditions (temperature, humidity)

The great range of cheese varieties apart from variants within each variety makes classification of cheese extremely complicated. However, *International Dairy Federation (IDF)* report lists the characteristics of cheese varieties under the following heads:

Country of origin

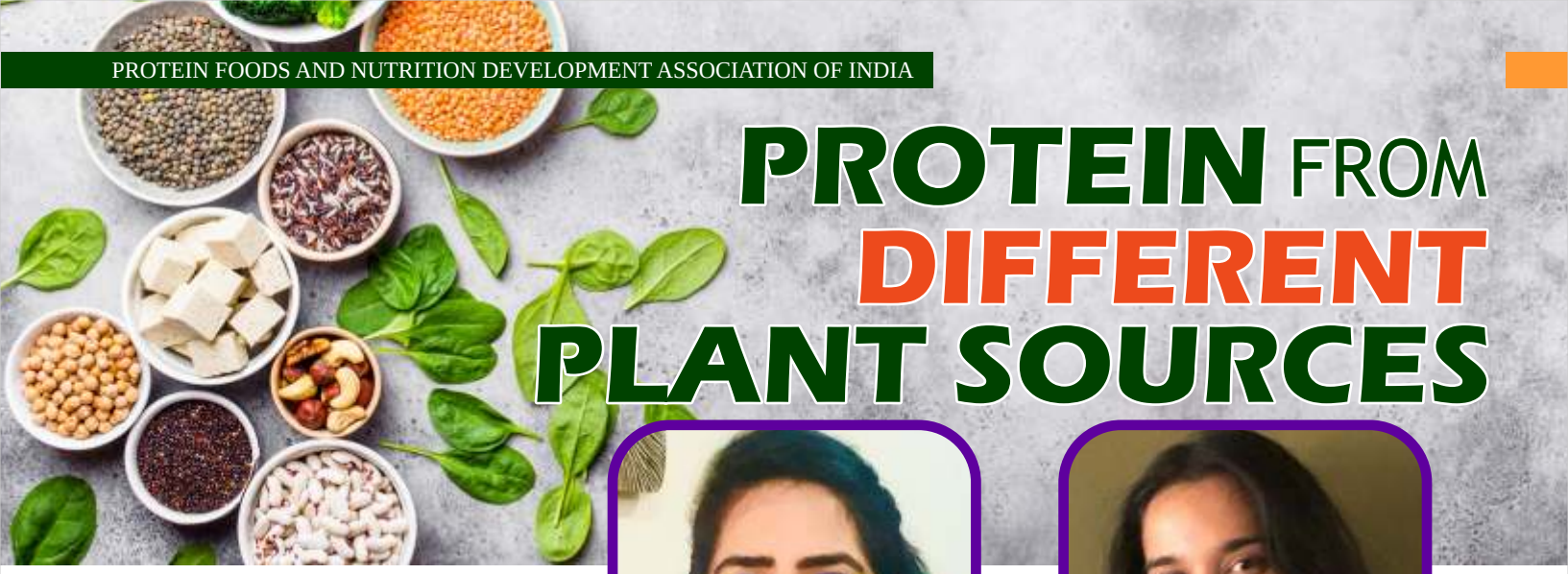
1. Raw milk; cow, buffalo, sheep, goat, etc.
2. Type of cheese: hard, semi-hard, soft, fresh, acid coagulated or whey cheese.
3. Internal characters: close or open texture, large, medium or small eyes/holes, slit openings in curd, blue or white mould ripened, colour of curds.
4. External characters: rind hard, soft, smooth or rough, smear or mould ripened, spices or herbal additions, type of coating (plastic, ash, etc.).
5. Weight of cheese: shape and sizes.
6. Fat-in-dry matter (FDM)/Fat-on-dry basis (FDB): Percentage minimum/maximum.
7. Water, percentage maximum.
8. Water-in-fat free substances (WFFS)/moisture-in-fat free substances (MFFS).

Some popular Cheeses based on the classification are given here below:

1. Soft: Brie, Camembert, Cottage Cheese, Cream Cheese, Feta, Mascarpone, Neufchatel, Ricotta, Paneer, Chhanna
2. Semisoft: American, Asiago, Baby Swiss, Blue, Brick, Gorgonzola, Havarti, Limburger, Monterey Jack, Mozzarella, Muenster
3. Firm: Edam, Gouda, Provolone
4. Hard: Cheddar, Colby, Colby Jack, Gruyere, Parmesan, Romano, Swiss
5. Specialty Cheese: Pasteurized Process Cheese, Cold Pack

Proximate analyses of some important varieties of Cheeses are given here below:

Cheese variety	Moisture (%)	Fat (%)	Protein (%)	Salt (%)	Ash (%)	pH
Blue	42.0	29.0	21.0	4.5	6.0	6.5
Brick	40.0	30.0	22.5	1.9	4.4	6.4
Camembert	52.5	23.0	18.5	2.5	3.8	6.9
Cottage-Uncreamed	79.5	0.3	15.0	0.80	1.0	4.8-5.0
Cottage-Creamed	79.2	4.3	13.2	0.80	1.0	4.8-.5.0
Cream cheese	50.0	33.5	10.0	0.75	1.3	4.6
Edam	43.0	24.0	26.1	2.0	3.0	4.6
Feta (sheep milk)	47.0	25.0	19.0	4.0	5.0	4.3
Feta(UF concentrated)	57.0	17.5	16.1	4.5	-	4.5
Blue	42.0	29.0	21.0	4.5	6.0	6.5
Brick	40.0	30.0	22.5	1.9	4.4	6.4
Camembert	52.5	23.0	18.5	2.5	3.8	6.9
Cottage-Uncreamed	79.5	0.3	15.0	0.80	1.0	4.8-5.0
Cottage-Creamed	79.2	4.3	13.2	0.80	1.0	4.8-.5.0
Cream cheese	50.0	33.5	10.0	0.75	1.3	4.6
Edam	43.0	24.0	26.1	2.0	3.0	4.6
Feta (sheep milk)	47.0	25.0	19.0	4.0	5.0	4.3
Feta(UF concentrated)	57.0	17.5	16.1	4.5	-	4.5
Stilton	72.5	0.5	11.0	<0.5	4.0	4.9
Swiss/ Emmental (Cow milk)	35.5	30.5	27.5	1.2	3.5	5.6
Swiss (Buffalo milk)	37.44	26.30	24.60	1.6	5.6	5.35
Swiss (mixed milk)	38.57	28.50	25.28	`1.43	4.86	5.33
Heat Processed (Cheddar)	40.0	30.0	23.2	1.5-2.0	4.9	5.6-5.7
Heat Processed (Swiss)	40.0	26.9	26.4	1.5-2.0	5.1	5.6-5.7



PROTEIN FROM DIFFERENT PLANT SOURCES

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Marico Limited

Proteins are large, complex molecules that play many critical roles in the body. They are known as the building blocks of body and are essential in every phase of life.

Protein is a large molecule, which is made up of hundreds or thousands of smaller units called amino acids, attached to one another in long chains. There are 20 different amino acids that can be combined to make a protein. The sequence of amino acids determines each protein's unique 3-dimensional structure and its specific function. Out of the 20 amino acids, 9 are the essential amino acids and needs to be obtained from our daily diet.

These 9 essential amino acids play a critical role in defining the quality of protein

What is Protein Quality?

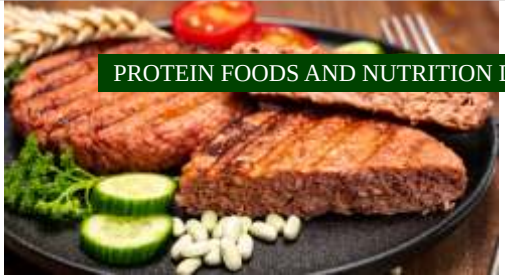
Protein quality is an index of how well a protein meets the requirements of essential amino acids, as well as the physiological needs, of the organism. Quality of protein is dependent on amino acid content, interference of non-available carbohydrates, influence of heat processing & antinutritional factors. When a protein has all nine of the essential amino acids, we call it a complete protein. When a protein is missing any of these essential amino acids, it's considered an incomplete protein. For many years, bioassays, mainly with rats, were the methods of choice to assess the quality of proteins. This value was expressed in parameters such as Protein Efficiency Ratio (PER), Net Protein Utilization (NPU) and Biological Value (BV). In 1989, a joint FAO/WHO Expert Consultation on Protein Quality Evaluation (FAO/WHO 1990) concluded that protein quality could be assessed adequately by

OBTAINED FROM NUTRITION

Essential Amino Acid
*Leucine
*Isoleucine
*Valine
Histidine
Lysine
Methionine
Phenylalanine
Threonine
Tryptophan

SYNTHESIZED BY THE BODY

Non-Essential Amino Acid
Alanine
Arginine
Asparagine
Aspartic Acid
Cysteine
Glutamic Acid
Glutamine
Glycine
Proline
Serine
Tyrosine



expressing the content of the first limiting essential amino acid of the test protein as a percentage of the content of the same amino acid in a reference pattern of essential amino acids. This reference pattern was based on the essential amino acid requirements of the preschool-age child as published in 1985. Subsequently, this percentage was corrected for the true faecal digestibility of the test protein, as measured in a rat assay. This scoring method, known as the *Protein Digestibility–Corrected Amino Acid Score (PDCAAS)*, was adopted as the preferred method for measurement of the protein value in human nutrition. Proteins with PDCAAS values exceeding 100% were not considered to contribute additional benefit in humans and were truncated to 100%.

The formula

$$\text{PDCAAS\%} = \text{True faecal protein digestibility} \times \frac{\text{Limiting amino acid in test protein (mg/g)}}{\text{Same amino acid in reference protein (mg/g)}}$$

A protein of a high quality will have a PDCAAS of 1.0 e.g., Egg white, whey, casein, and soy protein.

While this method has been used to calculate the protein quality of different foods for the past two decades, it has a limitation, the value can be overestimated, as it does not consider

- Antinutritional factors present in food
- Non-absorptive losses occurring in the large intestine

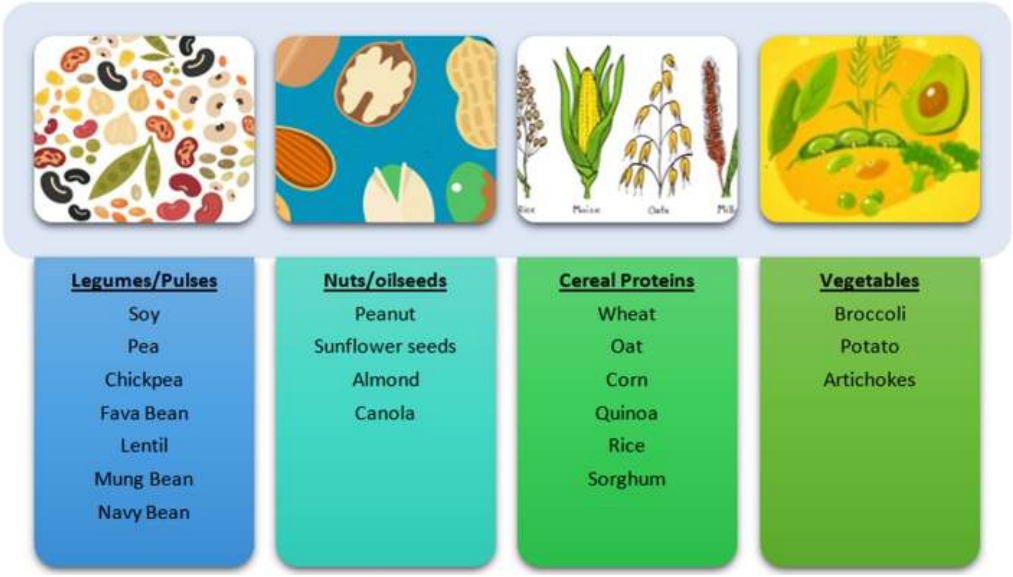
Hence, in 2011 FAO proposed changing the estimation of protein quality from PDCAAS to DIAAS (Digestible Indispensable Amino Acid Score) which measures digestibility at the end of the small intestine. However, DIAAS is under research and industries are still using PDCAAS to estimate protein quality.

Protein from different Plant sources

Basis the PDCAAS values the plant-based proteins rank much lower than the animal proteins, this is largely because plant protein sources lack few essential amino acids and contains various anti-nutritional factors. Despite of these limitations research, activists, NGOs and scientist find various plant foods as the sustainable source of protein for coming generations.

Below are the few top plant sources of proteins, which can be used to create nutritious sustainable innovations:

Plant based proteins can be categorised on the basis of their origin



1. SOY (Legume / Pulses)

Available Formats: Flour (50-60% protein), Concentrates (65-80% protein), Isolates (>90% protein)

Advantages

- PDCAAS Value: 0.99-1
- Protein content: 40%
- Rich in Phytoestrogens
- It has water binding capacity and ability to increase viscosity
- It is good for emulsification and foaming.
- Flavour Binding capacity

Disadvantages

- Limiting AA: Lysine, Methionine, and Cystine
- Anti-nutritive: Trypsin inhibitors and hemagglutinins
- Major Allergen
- Bitter/Beany note

Application

- Texturized meat replacement
- Granules and Chunks
- Beverage powder
- Creamer
- Base in frozen dessert, soup, whipped topping, dressings

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2. PEA (Legume/Pulses)

Available Formats: Flour, Concentrate, Hydrolyzed, Isolates

Advantages

- PDCAAS Value: 0.64
- Protein content: 28%
- High in Lysine and BCAA
- Fiber, protein, thiamin, folate, Phosphorus, potassium.
- Emulsification, gelling and foaming.
- Low Allergenicity

Disadvantages

- Limiting AA: Methionine and Cystine.
- Anti-nutritive: Lectins, Trypsin inhibitors and Phytic acid.
- Beany flavour
- Lower solubility and functional properties

Application

- Meat extender/texturizer
- Powders beverages
- Pasta, bakery goods, extruded snacks

3. PEANUT (OILSEED):

Available Formats: Defatted flour, Paste

Advantages

- PDCAAS Value: 0.52
- Protein content: 28%
- Source of Vitamin B &E, Manganese, Magnesium, Phosphorus, Fiber
- High gelling,
- Foaming & emulsification

Disadvantages

- Limiting amino acids: Threonine
- Aflatoxin risk
- Allergen (0.6% in the USA)

Application

- Peanut butter
- Extruded crisps
- Baked goods (including gluten-free)
- Sauces
- Protein supplement

4. MUNG BEAN (Legume/Pulse)

Available Formats: Flour, Concentrate and Isolate

Advantages

- PDCAAS Value: 0.55
- Protein content: 26%
- Rich in Fiber, Potassium, Magnesium
- High solubility and gelling.

Disadvantages

- Limiting amino acids: Methionine, and Cystine.
- Anti-nutritional factors

Application

- Plant-based meat
- Egg alternatives
- Starch used for noodles, jelly, crepes

5. CHICKPEA (Legume/Pulse)

Available Formats: Flour, Concentrates, Isolates

Advantages

- PDCAAS Value: 0.52
- Protein content: 22%
- High fiber, folate, iron, phosphorus
- High solubility, foaming, emulsification.
- Gritty mouthfeel in flour
- Characteristic aroma

Disadvantages

- Limiting amino acids: Tryptophan, Methionine, and Cystine.
- Anti-nutritional factors
- Regional Allergen

Application

- Meat analogues
- Plant based Dairy
- Mayonnaise
- Pasta
- Bakery

6. SUNFLOWER (Oilseed)

Available Formats: Concentrates and Isolates (By product of oil extraction)

Advantages

- PDCAAS Value: 0.6
- Protein content: 22%
- Good digestibility (96%)
- High solubility and emulsification.
- Water and fat binding capacity
- Nutty flavour

Disadvantages

- Limiting amino acids: Lysine
- Underdeveloped/utilised source

Application

- Meat analogues
- Plant-based ice cream
- Bakery
- Supplements
- Dressings

7. OAT (Cereal)

Available Formats: Oat's flour, Isolates and Concentrate

Advantages

- PDCAAS Value: 0.66
- Protein Content: 15%
- High Glutamine, B-Glucans & Avenanthramides
- Gluten-free
- High stability emulsions and gelling.

Disadvantages

- Limiting amino acids: Lysine
- Low solubility

Application

- Oatmeal
- Dairy
- Baking: bread
- Bars
- Snacks
- Breakfast cereals
- Nutritional shakes
- Dressings

8. QUINOA (Pseudo-Cereal)

Available Formats: Grain, flour

Advantages
- PDCAAS Value: 0.79
- Protein Content: 16%
- High in Lysine
- High in Manganese, Magnesium, Phosphorus & Vitamins B1, B2, B6, B9.
- High foaming, emulsification

Disadvantages
- Limiting amino acid: Phenylalanine and Tyrosine
- Allergenicity: Low, possible saponin sensitivity.
- Bitter, if saponin remains

Application
- Consumed as a grain
- Incorporated into products as a flour
- Bakery goods

9. WHEAT GLUTEN(Cereal)

Available Formats: Powder

Advantages
- PDCAAS Value: 0.43
- Protein Content: 13%
- It contains Wheat Germ Agglutinin (Lectin), Fiber (B-Glucan & Arabinoxylan), Phenolics, Sterols, Tocols & Vitamins.
- Elastic dough formation, gelling and binding.

Disadvantages
- Limiting amino acids: Lysine.
- Major Allergen

Application
- Bakery: dough improver
- Textured for meat extender/ replacer
- Seitan

10. POTATO (Vegetable)

Available Formats: Isolate and concentrate powders

Advantages
- PDCAAS Value: 0.99
- Protein Content: 7.4%
- High BCAA & Lysine, Potassium, Vitamins C & Vitamin B6
- Patatin: major storage protein
- Allergenicity: Rare
- High solubility, gelling and foaming
- Antioxidant

Disadvantages
- Metallic taste

Application
- Meatanalogues
- Ice cream
- Cream cheese
- Protein beverages
- Gluten-free foods
- Dessert

How to use the plant-based proteins?

As mentioned previously, plant-based proteins score much lesser than animal proteins because of the absence of few essential amino acids and presence of anti-nutritional factors. It is important to understand how to best utilize plant-based protein to improve their nutritional quality. Legume proteins lack in essential amino acid Methionine, while cereal proteins lack in essential amino acid lysine; combining legumes with cereal proteins may be beneficial to improve the essential amino acid profile of food. Additionally, combinations of cereal and legume proteins help in improving the functionality of foods.

Plant-based proteins also contain anti-nutritional factors, these can be inhibited/removed by processing like germination, fermentation, extrusion there by improving the quality, nutrition, and overall digestibility of the protein.

Incorporation/fortification or modification of plant-based proteins with an effective strategy can enhance the nutritional quality of plant-based proteins, opening new growth opportunities for the food industry

Hence, for effective utilization plant-based protein can be combined to achieve better protein quantity, quality, improved texture, be cost effective, improved nutrition, aroma, and flavor, make it sustainable, and increase availability.

Some synergistic combinations to explore are:
- Chickpea + Potato
- Pea + Potato
- Soy + Gluten

The right plant-based foods can be excellent sources of protein and other nutrients.

WHY DO SOLUTIONS BECOME THE NEXT PROBLEM?

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A regulation must be kept sufficiently certain for businesses to operate smoothly and confidently. This would happen if processes required u/s 18 of the FSSA are in place and strictly followed. Good regulatory practice at the pre-regulatory stage ensures the problem attracting attention is identified, its cause made known and the most effective solution applied. At the post- regulatory stage, it is monitored for effectiveness in ending the problem, if not, it is weeded out. This article however is not about ineffective regulatory measures but about unwarranted ones. Like in a game when the whistle is blown for no fault detected, play pauses: it is disturbing and even annoying. The analogy is no different with unwarranted regulatory changes; they affect business rhythms. Where no problem is identified and yet changes are made, the solution itself becomes the next problem.

There is truth in the saying don't fix what is not broken. One can also extend this truth to - don't add what is unnecessary. If the business experience is that modifying existing texts improves neither food safety nor consumer protection, both changes amount to meddling. Compliance cannot cope when the regulation does not mean what it says, and thereafter meddled with to say what it meant. Adding what is unnecessary speaks of a different kind of casualness. Changes made to texts on principal display panel (PDP) are examples where no fixing was required.

When the Principal Display Panel (PDP) is defined as "that part" of a container or package (Fig. 1), can "information required under these regulations" - about 24 declarations - be accommodated on only a part of the package? What will be declared on other parts? Even ignoring this impossibility, there is a further requirement that "all information should be grouped together and given at one place", and "online information in another place". PDP defined under PFA (1998) continued to date, until the amendment – of arrangement – was borrowed in 2009 from older texts under Legal Metrology. Under LM (2011: 2(h)] PDP is defined as the "total surface area" of the package.

Fig. 1. Principal display panel different package shapes

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Isomalt	Cargill
Maltitol	Cargill
Sucralose	Kanbo
Aspartame	Niutang
Polydextrose	Baolingbao

Taste Enhancer

PRODUCT	SUPPLIER
Yeast Extract	Biorigin

Other Products

PRODUCT	SUPPLIER
Dairy Starter Culture	Proquiga
Rennet, Nisin	Proquiga
Pullulan	Kangnaxin
Silicon Dioxide	Madhu Silica
Yeast Beta Glucan	Biorigin

Let's talk!

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When defined this way, all information can be fitted over the entire area i.e. all parts of the package, and can be reasonably grouped together and given at one place, and "online information in another". Two distinctive spatial conditions are attracted by the words "that part" (FSSAI) and "total surface area" (Legal Metrology).Because they mean different things, declarations were set according to each definition. Good practice prevailed for several decades. There was no problem until both regulatory agencies needlessly amended them with "out of context" contradictions.

Solutions cannot be imposed simply because another set of individuals, decades later, understand them differently. When the marketplace does not indicate a failure, the motivation to impose more regulations needs to be questioned. That the FSSAI definition is the global practice, is evident from the display of food packages on market shelves. The reader may refer to guidance provided to Industry (US FDA) on PDP.

Secondly, regulators should be clear whether definitions– defined differently - are intended to keep administrative oversight at arm's length from each other. While both FSSAI and LM are involved in regulating packaged items in the marketplace, FSSAI is limited to foods and not beyond. Likewise, definitions of food and drugs, settle scope between them even though both are ingested, yet drugs go beyond this limited purpose. There are unpleasant lessons from the past, where administrative oversight between PFA (MoHFW) and FPO (MoFPI) intended to be separate, instead created much anxiety for businesses due to overlapping standards. Wasn't this the reason for consolidating the multifarious acts and orders under FSSA?

Specifying height of numerals for net quantity was based on increasing "weight or volume" (e.g. 100, 500, 2.5 kg etc), under PFA (1998). This was sensible to PFA/FSSAI and for LM (PCR 2011), until the latter made a change from weight/volume to "Area of PDP". However, it exempted some of its sub-regulations if these were governed by any other law in force, while FSSAI adopted some. It is evident that administrations may choose to exempt or impose as they deem fit.

This raises concerns whether established structures and frameworks are able to contain unwarranted solutions or the constant tinkering through amendments. When structures are so fragile or porous, regulated business will always suffer unease or the perils of impending change. The reluctance to take businesses to a better place seems less important than the enthusiasm to increase complexity.

Regulators instead should assure trade that when compliance is well settled over long periods of time (1998-2020) any change will only pass through where an overwhelming benefit is presented. Merely settling turf issues through alignment is not an overwhelming benefit.

The other issue is the seemingly casual approach to regulatory drafting. Synonyms while suitable in literary works and storytelling are superfluous in legal drafts. A synonym is a word or phrase that means exactly or nearly the same as another word, or phrase. FSS (LD) 2020 introduced "Front of Pack" (FOP) to mean the "part of the package" that "faces forward" in the "principal field of vision" and is typically "the first thing" a consumer will see when "they look at the product".

The standard test for synonymy is substitution. The Labelling and Display regulation, by using FOP interchangeably with PDP confirms this. If the PDP requires that part of the package/container to be intended, displayed or presented and examined by the customer, then why will it not "face forward" and not be the "first thing" a consumer will see ? For the past several decades (since 1998), even before the FOP was introduced, the "first thing" consumers (all over the world) have been seeing, and examining is the PDP (see Fig.2).

Fig. 2. Principal display panel

... or examined by the customer under normal and customary conditions of display...

... that part of the container... intended to or likely to be displayed or presented or shown

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One can observe that not a single food package is placed in any other way, which makes one wonder about the need for introducing the synonym? It is a single recognizable feature on “that part’ of the package from which all actions follow, beginning with the sales attendant who intuitively arranges all packages without instruction and consumers unerringly examining them. When trade and consumers are not confused and businesses compliant, where is the problem requiring this solution?

The drafting and consultation process needs reform to reduce the outflow of unnecessary or defective regulatory instructions. A process with built-in safeguards and appropriate expertise should be capable of checking every outgoing text for need, purpose and outcome. Secondly, when comments are never acknowledged and there is no indication of their acceptance or rejection, stakeholders are left wondering about their worthiness in the process. To be fair the regulator while listening to

stakeholders must weigh responses for substance and reason while rejecting those without. Assigning reasons for both only strengthens the process.
But when well-reasoned inputs are disregarded and instead drafts are pursued to final notification, it raises questions of what is at play. With this foreground, Alice’s conversation in Lewis Carroll’s Alice in Wonderland is worth recalling. “When I use a word, Humpty Dumpty said, in rather a scornful tone, "it means just what I choose it to mean—neither more nor less." "The question is," said Alice, "whether you can make words mean so many different things." "The question is," said Humpty Dumpty, "which is to be master—that's all.” A forward replay of this conversation nuances the way drafts are made. The examples cited are symptomatic of the need for reforming regulatory drafting.

COMING EVENTS

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May 17 - 19, 2022
Pennsylvania Convention Center, 1101 Arch Street Philadelphia, PA 19107, USA
Informa Markets, USA
Website:
https://www.cphi.com/northamerica/en/home.html

Fi Food Ingredients Vietnam 2022
May 18 - 20, 2022
Saigon Exhibition and Convention Centre (SECC)
EMAIL:
JBlack@cmpinformation.com
WEBSITE:
https://www.figlobal.com/vietnam/en/home.html

International Conference on Clinical Nutrition & Dietary Lifestyle
May 20 & 21, 2022
ITC Richmond - Bangalore
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THAIFEX – Anuga Asia 2022
May 24 - 28, 2022
Impact Exhibition & Convention Center, 99 Popular Road, T.Banmai, A.Pakkred, Nonthaburi 11120, Thailand
DITP (Department of International Trade Promotion), Koelnmesse GmbH, The Thai Chamber of Commerce
Email : thaifex@koelnmesse.com
Website :
http://www.worldoffoodasia.com/

IFT FIRST: Annual Event and Expo
July 10 - 13, 2022
McCormick Place, Chicago and Online
Website : https://www.iftevent.org/
https://www.iftevent.org/register/registration

26th World Congress on Nutrition & Food Sciences
Sept 29-30, 2022
Theme: Nutrition & Food Sciences: Fundamentals of a Healthy Life
W :
https://www.nutritionalconference.com/

SIAL 2022
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DARK CHOCOLATE: THE DARK KNIGHT OF CHOCOLATE CONFECTIONERY

AUTHOR
Prof Jagadish Pai,
Executive Director, PFNDAI

Batman, the comic superhero, dresses like a hooded criminal but fights crime and is called Dark Knight. Chocolates are indulgent and are not considered healthful but dark chocolate and confectionery made using it have been shown to have a lot benefits. These are becoming extremely popular giving a big boost to industry.

The chocolate industry was estimated at around 178 billion dollars in 2019 just when pandemic struck, and is expected to be around 220 billion dollars by 2026 (Statista 2021). This may be partly because of dark chocolates riding on the health benefits pushing the market upwards. The global market for dark chocolate is expected to be over 80 billion dollars by one estimate (Verified Market Research 2021).

Although most Indians love chocolates and chocolate confectionery, the per capita consumption is only 200g per person compared to Europeans consuming 5 to 9 kg (Nair, FnB News 2021). However, this will be changing as Indians' love for chocolates does not stop at traditional products like chocolates and bars, cakes, pastries and brownies, cookies, coated nuts and raisins and berries, health drinks, and ice cream. It further extends to such new and hybrid products like chocolate popcorn, peanut butter and other sandwich spreads, wafers, breakfast cereals, pancakes, soy milk, and pasta. More recently some traditional Indian sweets like falooda, idli, burfi, laddu, peda, shrikhand, sandesh and many more have taken chocolate ingredients. Market experts think Indian market may reach 3.3 billion dollars by 2023.

The small market of Indian chocolate industry is growing rapidly as a variety of different products with chocolate and cocoa solids added are being marketed to the liking of consumers as well as much of recent research pointing the healthier nature of dark chocolate.

Dark Chocolate and Health Benefits

Cacao pods contain seeds or cocoa beans along with the pulp, which are taken out and fermented before drying and roasting to make the dark roasted cocoa beans. The outer shell is separated from cocoa nibs that are ground into liquid called cocoa liquor. This has cocoa solids and cocoa butter. These may be used in different proportions along with various other ingredients including sugar, milk solids, fruits and nuts etc. to make various chocolate products. (Harvard School of Pub Health 2022)

Dark chocolates contain between 50 and 90% cocoa solids, whereas milk chocolates contain between 10 and 50%. The amount of cocoa solids can affect the magnitude of benefits of dark chocolate. Higher percentage of cocoa solids means more of flavonoids and less sugar. In a 75 or 80% dark chocolate, there will be far less added sugar than in a 50% dark chocolate. In addition to having less sugar, it has the other benefits of ingredients of dark chocolate. (Cleveland Clinic 2022) Thus dark chocolate has lower added sugar and fat than milk or white chocolate in addition to abundance of beneficial antioxidants, flavonoids. Both types have similar ingredients including cocoa butter, sugar and cocoa solids. They just differ in the percentage of cocoa solids.

Dark Chocolate is Nutritious (Gunnar, Healthline 2021)

The high quality dark chocolate with high cocoa content is quite nutritious. It contains good amount of fibre and protein and is loaded with minerals. A 100g bar of dark chocolate with 70-85% cocoa contains

- 11g Dietary Fibre
- 7.79 g Protein
- 67% Daily Value of Iron
- 58% DV of Magnesium
- 89% DV of Copper
- 98% DV of Manganese

Besides, it has good amounts of potassium, phosphorus, zinc and selenium. Fatty acid profile is also good as it contains about a third of mono-unsaturated fatty acid, oleic, a heart-friendly fatty acid.

One must remember that 100g is large amount of chocolate, which also with 600 calories and good amount of sugar. Therefore, dark chocolates although healthy should be consumed in moderation. Dark chocolates also contain caffeine and theobromine, but their amounts are small.

Dark chocolate is loaded with biologically active compounds that act as antioxidants. These include polyphenols, flavanols and catechins etc. One study showed that cocoa and dark chocolate had more antioxidant activity than many other fruits including blueberries and acai berries. (Crozier et al. 2011)

Following are some of the health benefits of dark chocolate. (Brooks 2022)

Help Prevent Heart Disease and Lower Risk of Stroke

A systematic review in 2020 in Eur. J of Preventive Cardiology (Krittanawong et al. 2020) found that eating chocolate once a week was associated with 8% lower risk of blocked arteries. Another study with 188,000 veterans who regularly ate 1 oz chocolate showed lower risk of coronary artery disease. (Ho et al. 2021)

Dark chocolate lowers LDL cholesterol in overweight and obese persons (Lee et al. 2017). Studies have shown relation between

chocolate intake and cardiovascular health. Consumption of chocolate and cocoa is associated with lower blood pressure and with lower risks of strokes and cardiovascular mortality. (Hooper et al. 2012)

Researchers suggest that dark chocolate maintain heart health. One study showed that eating dark chocolates more than five times per week lowered risk of heart disease by 57% (Djousse et al. 2010).

May Improve Cognition, Prevent Memory Loss and Boost Mood

Studies show that consuming dark chocolate with high percentage of cacao, such as 70% may benefit brain.

Research finding presented in a conference found that 48g of 70% cacao chocolate increased neuro-plasticity, the brain's ability to have positive effects on memory, cognition and mood. (Science Daily, 2018)

Another study (Berk et al. 2018) found that memory and learning could be enhanced by chocolate consumption as flavonoids tend to accumulate in areas of brain responsible for these functions. Another study (Jackson et al. 2019) linked consumption to reduced risk of clinical depression.

Improve Blood Sugar Levels & Reduce Risk of Diabetes

Eating chocolate everyday may not sound a good way to prevent diabetes. However, there are studies showing healthy amounts of dark chocolate rich in cacao may improve ability to metabolise glucose. One study (Shah et al. 2017) found that flavonoids in dark chocolate could reduce oxidative stress which is the primary cause of insulin resistance. This improved body's sensitivity to insulin, showing that cacao in dark chocolate may be useful in slowing the progression of type 2 diabetes. Another study (Crichton et al. 2016) showed that those consuming dark chocolate at least once a week had half the risk of developing diabetes compared to those who rarely consumed chocolates. More research is needed determine whether chocolate consumption certainly reduce diabetes risk.

Good for Gut and May Help with Weight Loss

Research suggests that dark chocolate may help control appetite, which may in turn help in weight loss. Dark chocolate with over 70% cocoa has high levels of dietary fibre of over 11%. This has both the effect on feeling full faster and not being hungry for a longer time. This certainly helps weight loss or not gaining excessive weight.

Dietary fibre from dark chocolate also has an effect on gut microbes as prebiotic and promotes growth of health providing probiotics (Hayek 2013). Thus dark chocolate with fibre and other substances not only promote good bacteria like Bifidobacteria and Lactobacillus species but also suppress undesirable ones like clostridia. This change in gut microbiota has effect on several health factors related aging, oxidative stress, blood pressure and atherosclerosis, diabetes, cancer and central nervous system disorders.

Fights Free Radicals and May Play Role in Cancer Prevention

Dark chocolate antioxidants may protect against certain types of cancer though minimising damage caused by free radicals, which attack cells. This may lead over time to some diseases including cancer. Research shows that flavanols in cocoa beans are antioxidants and they may reduce damage to cells. Damaged cells can lead to cancer development. (Simon 2020)

Good for Skin

Dark chocolate is rich in copper, iron, magnesium and manganese which support collagen formation which helps in keeping skin health. Also the antioxidants in dark chocolate may protect skin from UV rays of sun. Study in 2009 (Williams et al.) showed that eating dark chocolates high in flavanols conferred significant protection to human skins against harmful UV effects.

Making of Dark Chocolate

Chocolate production starts with harvesting cocoa trees, Theobroma cacao that mostly grows in wet lowland tropics in Central & South America, West Africa and Southeast Asia. In India, cultivation is done in Southern states.

Cocoa beans grow in large seedpods that sprout off the tree trunks and branches. Pods are harvested when ripe and are split open to remove cocoa beans with pulp, which are fermented in a basket. Beans are bitter initially but as pulp ferments, flavour seeps into beans making them pleasant tasting.

Beans are roasted which turn them dark and enhances their flavour. Roasting loosens the shell from kernels so can be easily separated to get broken kernels called nibs. The nibs are then heated and ground to form a thick paste called liquor. The chocolate liquor can be pressed to separate the liquid cocoa butter from the solid that is pressed into a cake that can be made into cocoa powder. Chocolate liquor, cocoa powder and/or cocoa butter may be used in different proportions to make various chocolate products and confectionery after adding various ingredients like milk products, fruits, nuts, sugar with lecithin and flavour.

Dark chocolate is made with combinations of chocolate liquor, cocoa butter and some sugar and vanilla (Wockenfuss 2022). The mixture is pressed under heavy steel rollers to smooth out texture. It then goes through conching process wherein the mixture is heated, mixed and ground to create a silky texture. The chocolate is then tempered by cooling slowly, which allows it to retain smooth shine when hardened and moulded.

Process of Making Chocolate from Farm to Bar

As dark chocolates need to have over 50% chocolate solids (from liquor, butter or powder) different manufacturers may add various ingredients to different varieties or flavours and make them pleasanter.

This may be done by adding more sugar and many other ingredients like raisins, nuts etc. Different types of dark chocolate products are available in Indian market. Some with around 50% cocoa products give the maximum flexibility of adding other ingredients and sugar.

They add besides sugar caramel, fruits like raisin, cranberries, orange peels & nuts like almond, apricot kernel, hazel nut & cashew nut, egg white, honey, coffee and even some dairy products.

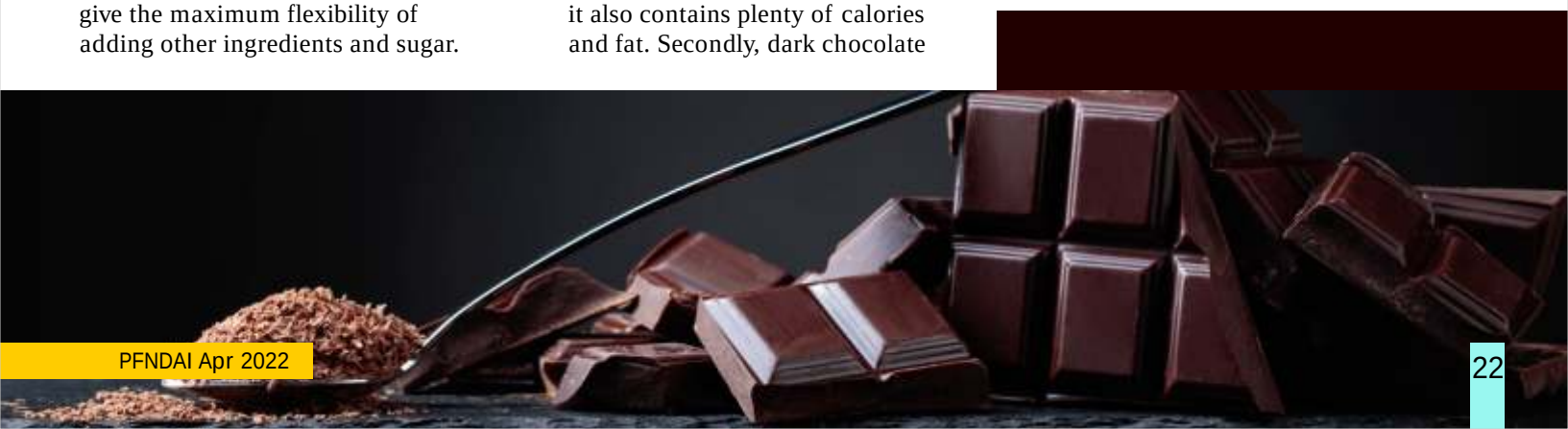
Finally

Now that there are so many health benefits of chocolate, chocolate lovers must be wondering the more they eat it, the healthier they would get. Well there are things that must also be considered before starting the chocolate binge.

Although dark chocolate is healthy, it also contains plenty of calories and fat. Secondly, dark chocolate containing cocoa nearer 50% leaves plenty of room for sugar to make it tastier. It may also contain some good ingredients like fruits and nuts, which may well be healthy.

Many studies showing health benefits of dark chocolate have generally used 20 – 30 g dark chocolate per day (Marengo 2019). Dark chocolate with higher percentage of cocoa solids typically contain less sugar but more fat, but flavanols are plenty in those with at least 70% cocoa solids. Some recommend the serving size of dark chocolate to be about 30 to 60g (Cleveland Clinic 2022).

Higher cocoa also has more caffeine, which gives bitter taste. Some people have sensitivity to caffeine although the amount is much less than coffee. Since higher cocoa chocolates are very bitter, it may be better to start with lesser amount of 50% cocoa solids and work upward to 70% or higher. All the while it must be kept in mind that moderation is always recommended.



OATS FROM FARM TO GUT: MANUFACTURING, NUTRITION & HEALTH BENEFITS

AUTHORS

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Oats is one of the healthiest grains. It has a very well-balanced nutritional composition. Oats are a great source of carbohydrates, good quality proteins, lipids especially unsaturated fatty acids, vitamins, minerals, and phytochemicals. So, in the quest to eat healthily, Oats have grabbed a lot of attention because of their numerous benefits on health. As it is said, breakfast is the most important meal of the day, introducing oats in your breakfast will not only give you additional benefits but also keeps you energetic and full throughout the day. But before the oats reach our plates it has to go through various processes. Let's delve deeper into this.

Oats manufacturing

Oats are an important crop worldwide with a production of 22.65 million tonnes in the year 2021-2022 [USDA 2022]. In India the oats production is increasing in Punjab, Haryana, UP and small areas in MP, Orissa, Bihar, West Bengal [NIFTEM 2018].Oats grow well in a wide range of soil conditions from sandy loam to heavy clay soils with good drainage. The crop thrives in cool moist climates and is sensitive to hot dry weather.

Oats are an ideal low-input crop that, when included in rotations with other crops, encourage crop diversity resulting in reduced soil erosion, control of plant diseases, insects, and weeds, providing value beyond the direct value of the crop [Menon 2016].

Oats are fully mature and ready to harvest after 3-5 months of sowing. Harvesting oats is usually done by the direct heading of standing grain as soon as the crop is ripe. Harvest is accomplished by one of two methods; swathing or direct combining. After harvesting oats are processed to convert into a product that is easy to cook.

The quality of the oat products that we get can be greatly affected by the storage conditions of raw oats. Hence, the ideal storage conditions for oats are 0•65 water activity (approximately 13% moisture in the kernels) between temperatures 5 and 200C.

Manufacturing of the oats involves many steps depending upon the end use. Here are some of the steps involved in manufacturing the oats [Decker 2014], [Rasane et al. 2015]-

1. Cleaning and Grading-

Cleaning includes several processes to remove foreign matters. Magnetic separators remove any metal objects, a series of rotating screens can remove straw, sticks, stones, and dry stoner removes the high density but similarly sized particles like rocks and other grains. After cleaning, different graders can be used to separate the oats into different categories based on their weight and density. Grading helps in increasing milling efficiency.

2. De-hulling

Cleaning and grading are followed by de-hulling. Hull constitutes about 28-32 % of the total grain. De-hulling is the process of removing the hull as it is highly indigestible. For this purpose, a rotating disk with numerous fines is used. This continues until 85% of oats are de-hulled and not beyond that to avoid breakage. Overall de-hulling produces hulls, groats (hulled kernels), un-hulled oats, and broken groats which are further separated using aspiration, cylinders with the rough interior, paddy separators, and perforated drum separators. Then the un-hulled oats are sent back to the de-huller.

3. Kilning-

Oat is a grain that is rich in fats [6-8 %]. In an intact kernel, the lipids and lipid digesting enzymes are properly compartmentalized to avoid their interaction. But, during milling, this compartmentalization is destroyed and they interact resulting in off-flavours. To avoid this, these enzymes need to be inactivated through heat treatment using kilning process. For kilning groats are placed in a long vertical column. First steam along with the air is injected for inactivating the enzymes and then groats are subjected to dry heat to remove access moisture and maintain the groat quality. The kilning process also helps in accelerating the Millard reaction resulting in nutty flavour and caramel colour.

The final products of milling include whole groats, broken groats, and powdered fines. Whole groats can be used in the production of beverages, breakfast cereals, granola bars, infant foods, oat milk, etc. These different final products can be further processed to convert into oat-based food products. This may include the following methods-

1. Cutting-

Rotary granulators can be used for producing steel-cut oats. This consists of a rotating perforated drum with knives on the outside. These knives cut the groats extending through the perforations. Each groat is cut two to four times. These steel-cut oats are then separated based on weight and density. They can be used in Irish oatmeal, which take longer cooking time.

2. Flaking-

Flakes can be produced by flattening the oat groats by passing through rollers. But, subjecting the groats exiting from kilning can result in crushing. So, to avoid this 3-5% moisture is added to the groats before rolling. Achieving proper moisture with very little temperature rise can help in retaining nutrients. The thickness of the flake can vary with the distance between the rollers depending upon the end use. It ranges from< 0.4 mm to 1.2 mm. After rolling the flakes are passed through an airstream to remove excess moisture. This whole process may cause pre-gelatinization which helps in reducing cooking time. They can be used in preparing Quick-cooking oatmeal.

3. Flour-

Pin or hammer mill can be used for producing flour. But, the flour may form lumps due to the high-fat content of oats so, an air stream is used to avoid this. The final product has two fractions i.e. course and fine. Coarse particles are nothing but bran which is rich in vitamins, minerals, fibres, protein, etc. The vibrating sifters are used for removing these courser particles. Flour can be used in the production of bakery products like bread, biscuit, cookies.

4. Oat bran-

The courser fraction of oat flour contains the bran. It is higher in fibre, proteins, vitamins and minerals, fat. Oat bran contains atleast 16 percent of dietary fibre. They are used as fat substitutes in meatballs, dairy, and bakery products.

5. Oat hulls-

Oat hull constitutes 28-32 percent of oat and hence accounts for a large portion. Oat hull contains 30–35 % fibre, 30–35 % pentosans, 10–15 % lignans, protein, and ash. Finely ground hulls can be used as animal feed and as a food ingredient. Recently they are being used as biomass for power generation.

6. beta-glucan concentrates-

Oat grains can be processed to fractions with higher beta-glucan by removing starch from oat bran. Various enzymes that can degrade starch, protein, and lipid can be used for concentrating beta-glucan. Beta-glucans can increase viscosity hence used as a fat replacer in certain foods. They can be used as fat substitutes and stabilizers in ice creams.

By incorporating these different fractions of oats we can get the nutritional benefits of oats.

Nutrition and health benefits-

1. Incredibly nutritious food grain

Oats are considered one of the healthiest grains found on earth. This is because it contains a broad spectrum of nutrients that you need to stay healthy.

Oats are packed full of Carbohydrates, Protein, Dietary Fibre, Many useful Vitamins and Minerals, Antioxidants, and So on...! (Fit&FlexGranola)

They are also gluten-free which makes them suitable for people with gluten intolerance. However, there are some chances of contamination during the cultivation and processing stage if stored with other food grains that may contain gluten. (Meeks 2022)

2. Improves gut health

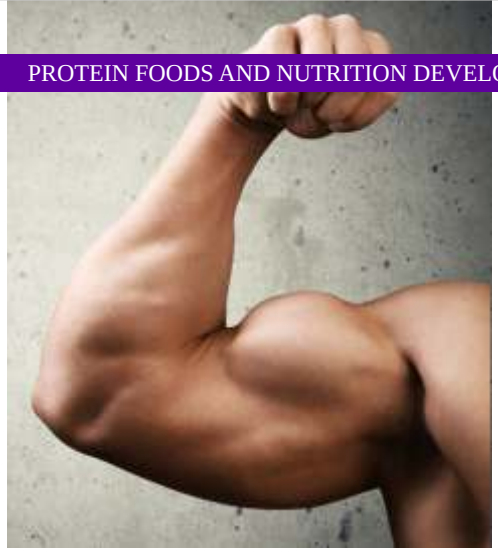
Dietary fibre is complex carbohydrates that our body can't digest yet plays a very significant role in the digestion of other nutrients.

Oats are high in beta-glucan, a type of soluble fibre. This fibre, in the gut, reduces the absorption of LDL, bad cholesterol, binds with them, and removes them out of the body through stools. (Meeks 2022)

They are also well known for promoting the growth of good bacteria in the gut. (Fit&FlexGranola)

3. Enhance muscle growth

Generally, oats are consumed with milk, yogurt, or in combination with other cereal and millet products, which in all, can serve a high range of protein.



Although a bowl full of oats i.e 50 grams can provide you approx.5 to 7 grams of protein, which is important for daily growth. (Rasane et al. 2015)

4. Good for your heart

Avenanthramides and ferulic acid, the two most abundant antioxidants present in oats have a lot to do with heart health. From a clinical point of view, Avenanthramides possess anti-inflammatory properties, help in the dilation and relaxation of blood vessels. (Meeks 2022)

Many studies support regular consumption of whole grains like oats to regulate blood pressure and prevention from coronary artery diseases.(Whitehead et al. 2014)

5. Boon in diabetes

Making the right food choices is a big concern among diabetics!

Oats and oats products are healthy food to include in a diabetic diet as they help reduce insulin resistance. Loaded with fibre, oats are very filling and do not affect blood sugar level. (Fit&FlexGranola)

Obesity or being overweight is another concern in diabetes while early weight management may reduce the chances of type 2 diabetes later in life. Fibre may aid weight loss naturally as it gives a feeling of fullness and decreases hunger pangs.(Nordqvist 2018)

6. Prevents the risk of colon cancer

Colon cancer is quickly rising among the young generation. This could be because of two major reasons – the diet lacking in fibre and an extremely sedentary lifestyle.

Many leading researchers have found an intact relationship between whole grain consumption and reduced risk of colorectal cancer. (Hrustic 2017)

Moreover, the bran and germ of oats are filled with anti-carcinogenic compounds. Antioxidants, several vitamins, and minerals are some anticarcinogenic compounds that work against the development of cancer. (Raman 2019)

7. Boosts Immunity

Right from the COVID outbreak, immunity plays the foremost role in people's lives for keeping health on track. More prominence is given to foods that are convenient, safe, and healthy at a time.

A diet lacking immune-boosting nutrients could manifest such acute to severe diseases. Oats are enriched with zinc, selenium, copper, iron, antioxidants, polyphenols. All these nutrients help boost the immune responses to fight against infections.

Beta-glucan fibre strengthens the intestine by suppressing the growth of harmful bacteria whereas nurtures healthy ones that are useful for digestion. (Chen et al 2021)

Take away

Serving all these amazing health benefits, oats also taste delicious. When cooked as oatmeal or porridges, gives a mushy mouthfeel, which is liked by some people. The instant oats varieties available in the market are more often preferred as it takes less cooking time and tastes well.

The highly nutritious grain can also be added in the diet during pregnancy, lactation, weaning stages of babies. A pack of oats can be your easy-to-hop food to satiate mid-night hunger cravings. (Fit&FlexGranola)

REGULATORY ROUND UP

By
Dr. N. Ramasubramanian,
Director, VR FoodTech,
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Dear Readers

Please find below FSSAI notifications, advisories, orders, etc since the last round up.

A new Health Supplement and Nutra regulation – FSS (Nutra) Regulation, 2022 has been operationalized with effect from 01 April 2022. This regulation supersedes FSS (Health Supplement, Nutra) Regulation, 2016 and an notified in September 2021. The new regulation is a more cogent and comprehensible version of the superseded ones. The new regulation does not make a material difference – in the sense that there is no need for any reformulation, recategorization, etc. However, a certain label declaration has to be made on FOP which was not so in the earlier version. Hope FSSAI gives due consideration in terms of timelines.

The new version greatly simplifies certain aspects like claims, etc. For example, the old regulation had very confusing provisions with regard to types of health claims, scientific evidence to make such claims, etc. All these have been simplified by aligning with the FSS (Advertisement and Claims) Regulation, 2018. Nutraceutical ingredients are renamed as Molecules/isolates/extracts other than vitamins and minerals. However, it is disappointing to note that Molecules/isolates/extracts (except enzymes) are not permitted in Health Supplement category. It would have been more appropriate to remove the "Nutraceutical" category as this term is not used commonly in regulatory parlance.

Lactoferrin.

FSSAI cautions FBOs regarding the unauthorized usage of FSSAI logo and issuance of FoSTaC training certificates by persons posing as FSSAI officials.

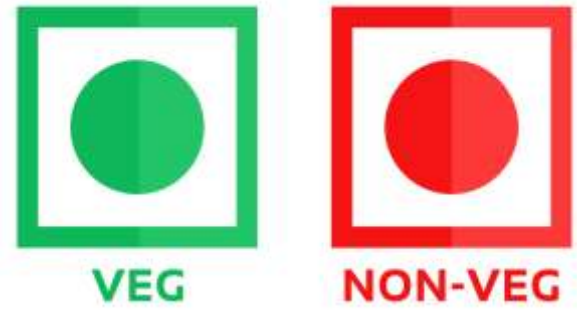
Amendment in Legal Metrology (Packaged Commodity) Rules, 2011. The amendment brings in more clarity in Unit Sale Price declaration especially in cases where it is same as that of MRP.

Latest list of FSSAI approved and NABL accredited testing laboratories.

FAQ on Licensing and Registration.

FSSAI vide its letter dated 08 April 2022 has prohibited the use of terms like “ORS” (Oral Rehydration Salts) and synonymous terms like 'ORSL', 'ORSL Rehydrate’, ‘Electro Plus ORS' etc on products under the categories like Ready to Serve Beverage, Non-Carbonated beverages. According to the letter, products for oral rehydration are drugs and governed by Drugs and Cosmetic Act and Rules and the FBOs should desist from making such claims.

FSSAI places restriction on the sample size for analysis in the case of high priced imported alcoholic beverages. Similar restrictions are placed in case of



In a second reminder, FSSAI informs that Veg, Non – Veg logo to be diligently followed and percentage of non vegetarian is not the criteria for assigning Non – Veg logo. Even a very small quantity of non - vegetarian ingredient would make the product non vegetarian. Special attention to be paid to compound ingredients. All ingredients within the compound ingredient are to be considered for Veg, Non – Veg logo declaration though the individual ingredient within the compound ingredient is not declared on the label on account of exemption.

A Standard operating procedure has been issued for converting license issued under FLRS to the new FOSCOS system. FBOs having state license for products covered under FSS (Health Supplement, Nutra) Regulation 2016 to migrate to Central licensing.

Enforcement of FSS (Food for Infant Nutrition) Regulation, 2020 has been extended from 01 April 2022 to 01 October 2022.

FSSAI has authorized soap manufacturers to collect used cooking oil from food business operators. A process of approval of such collectors has been defined.

Department of Consumer Affairs has sought Public Consultation for declaring the quantity of edible oil, vanaspati, ghee in terms of weight in the pre-packages.

RESEARCH IN HEALTH & NUTRITION

Moderate coffee could aid gut health and protect against certain cancers, reviews reveal

21 Jan 2022 Nutrition Insight

Coffee may have a number of protective effects against gallstones and certain liver diseases, while stimulating digestive processes, according to a scientific review. The beverage may also reduce the risk of endometrial cancer, according to separate analysis.

In a review of 194 research applications funded by the Institute for Scientific Information on Coffee, moderate coffee consumption (three to five cups per day) appears to be associated with a reduced risk of gallstones and pancreatitis. "The review has shone a light on the still limited amount of research on some aspects of digestion," study conductor Astrid Nehlig, emeritus research director at the French National Institute of Health and Medical Research, tells NutritionInsight. "Contrary to some assumptions, coffee consumption is not overall linked to bowel or digestive problems. In some instances, coffee has a protective effect against common digestive complaints such as constipation."

Coffee impacting microbiota

As coffee goes through the gastrointestinal tract, it appears to have three main impacts, the review notes.

Firstly, the beverage stimulates the production of the digestive hormone gastrin and hydrochloric acid. Both of these help break down food in the stomach. Coffee also stimulates the secretion of cholecystokinin, a hormone that increases the production of bile which is involved in digestion, the researchers say.

Secondly, consumption was also found to induce changes in the composition of the gut microbiota, mainly at the population level of bifidobacteria. "This research topic is still recent, quite incomplete and generates large interest. In fact, a 'healthy' microbiome still needs to be defined. The data summarized in this review could help serve as a basis for future research on the topic. It can explain to the consumer that drinking coffee is positive for the composition of gut microbiota, which is pivotal in a large number of health processes," Nehlig adds.

Tackling colon issues

Lastly, the data reviewed suggests that coffee may stimulate motility in the colon as much as cereals, 23% more than decaffeinated coffee or 60% more than a glass of water and it may be linked to a reduced risk of chronic constipation.

"All research articles and reviews reporting that the replacement of water with coffee, as soon as the patients can drink, has only positive effects and improves all outcomes concerning the functioning of the colon and the length of hospitalization. These studies, better than any other research, demonstrate that drinking coffee positively affects the gastrointestinal tract and clearly colon function."

Beyond the gut

The findings published in Nutrients also suggest that coffee has protective effects against liver diseases, including hepatocellular carcinoma. The researchers note the beverage may have a possible protective effect against gallstones. A separate review highlights that higher coffee consumption is linked to a lower risk of endometrial cancer. Individuals in the highest category of coffee intake had a 29% lower relative risk of developing endometrial cancer than those in the lowest category.

Caffeinated coffee was highlighted as potentially offering better protection than decaffeinated coffee, according to the findings, published in the Journal of Obstetrics and Gynaecology Research. Researchers reviewed 24 studies on coffee intake with 9,833 new cases of endometrial cancer occurring in 699,234 individuals.

Studies have historically shown conflicting results on whether coffee can aid or harm health. A Chinese study revealed coffee could be linked to lowering stroke risks by 32%, however experts noted too much could increase the risk of a stroke. A study carried out in Australia highlighted that two cups of coffee a day could lower the risk of Alzheimer's disease.

By Andria Kades

Add K2 to vitamin D, urge experts following latest COVID-19 inflammation investigation

18 Jan 2022 Nutrition Insight

An investigation of hospitalized COVID-19 patients has revealed that vitamin D and K status impacts inflammation induced by the disease.

"The findings add a new layer to previous research on the important interaction between the vitamins D and K, particularly in focusing on inflammation level and lung function," Dr. Trygve Bergeland, vice president of Science at Kappa Bioscience, tells NutritionInsight. The vitamin K2 manufacturer Kappa Bioscience sponsored the trial, held at Canisius-Wilhelmina Hospital, Netherlands. Bergeland adds that it has been known for some years that vitamin D induces the expression of inactive vitamin K-dependent proteins in the body and that supplementation of vitamin D alone can lead to vitamin K deficiency.

"The focus within the scientific community has mostly been around bone and cardiovascular health. However, this has started to center around immune health."

"Based on our current data and previous work, I strongly suggest that vitamin K2 should be added to D supplementation, particularly against the background of the ongoing pandemic," Dr. Rob Janssen, pulmonologist and translational researcher at the Canisius-Wilhelmina Hospital, Netherlands, also tells NutritionInsight.

Examining the role of interleukin

Pathology during COVID-19 infection is partly rooted in an overactive inflammatory response with an essential role for interleukin (IL6). Both vitamins D and K have been suggested as potential modulators of this process.

"IL-6 is a key cytokine in COVID-19, and IL-6 correlated much stronger with vitamin K than D status." Vitamin D has been demonstrated to downregulate IL-6 before the COVID pandemic, he continues.

"However, vitamin K may also suppress IL-6 production, both indirectly through its activation of the immune inhibitory proteins growth-arrest-specific gene 6 (Gas6) and protein S, or directly by inhibiting phosphorylation of IKK / that is required for activation of nuclear factor (NF) B."

Assessing vitamin K status and inflammation

The research group assessed vitamin D and K status by measuring circulating 25-hydroxyvitamin D (25(OH)D) and desphospho-uncarboxylated Matrix Gla-Protein (dp-ucMGP), respectively in 135 hospitalized COVID-19 patients. Comparing good and poor disease outcomes of COVID-19 patients, vitamin 25(OH)D levels were not significantly different. IL-6 levels were considerably higher in patients with poor outcomes compared to patients with a good outcome. The levels of extra-hepatic vitamin K status were associated with IL-6 levels. In contrast, vitamin D levels were only borderline statistically significantly correlated with IL-6. An association was also found between IL-6 and elastic fibre degradation. Contrary to vitamin K status, vitamin D did not correlate with elastic fibre degradation.

Vitamin D and vitamin K combination is vital

Commenting on previous advice that supplementation with vitamin D is essential in reducing the risk of COVID-19, Janssen states: "There are many vitamin D proponents from scientists and medical doctors to influencers and eminent politicians, advocating the distribution of vitamin D among the general population to reduce the burden of COVID-19."

However, administration of vitamin D without K may not be without risk, as vitamin D increases the demand for K, he continues. "This may cause further vitamin K depletion, which could be harmful in patients with moderate or severe COVID-19 who are without exception already vitamin K deficient."

Previously, a team of researchers from Bispebjerg Hospital in Denmark discovered a potential connection between vitamin K levels and COVID-19 symptom severity and mortality.

By Nicole Kerr

Vitamin K2 may counteract side effects of prolonged medication in children

Researchers urge vitamin K2 supplementation in children, pregnant and lactating women

13 Jan 2022 Nutrition Insight

Children can benefit the most from vitamin K2 supplementation, with pregnant and lactating women important demographics too, according to a new paper published in Children. The Poland-based review found that modern diets and pediatric therapeutics have resulted in significantly decreased K2 intake resulting in "serious health implications."

NutritionInsight speaks with Katarzyna Maresz, co-author of the paper, who is also president of the International Science and Health Foundation. "In the paper, we uncovered evidence that K2 provides a treatment option to counteract the negative effects that prolonged medication has on K status," she says.

Supplying K2 from birth

The review performed in collaboration with Jagiellonian University Medical College also suggests vitamin K2 in the form of MK-7 should be considered for pregnant and nursing women and children, due to its lack of adverse effects. The paper highlights that low vitamin K status is much more frequent in newborns due to both endogenous and exogenous insufficiencies. With human milk relatively poor in this nutrient, breast-fed infants are at particular risk of a bleeding disorder called vitamin K deficiency bleeding, the authors write.

K2 rising through the ranks

Vitamin K2 activates K-dependent proteins that support many biological functions, including bone mineralization, the inhibition of vascular stiffness, the improvement of endothelial function, the maintenance of strong teeth, brain development, joint health and optimal body weight.

The first child-specific K2 products were introduced to the market a few years ago, Vik shares. And more child-specific products are hitting the market, including three recently introduced products in Brazil for children and babies.

K2 may support medical treatments

Maresz explains that supplementation is especially useful in children who are chronically prescribed antibiotics or glucocorticoids. A signi?cant number of pediatric patient visits each year-end with the prescription of antibacterial drugs, she says, and this affects vitamin K levels in children.

It has been shown that there are changes in gut microbiota due to antibiotics that alter intestinal vitamin K production. The level of K2 in the liver is lowered in people on antibiotics, especially on the cephalosporins, due to impairment in the recycling of vitamin K, details Maresz.

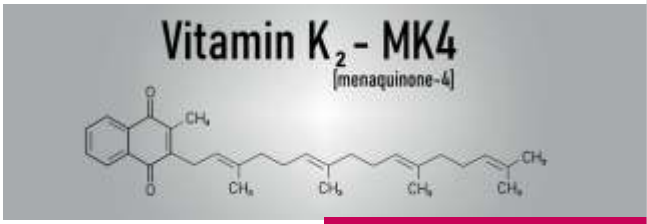
"In seriously ill patients, K2 protection is suggested to prevent morbidity and mortality." For children who suffer from chronic diseases, the immunosuppressive and anti-in?ammatory properties of oral corticosteroids constitute an inevitable treatment option, she continues. "Their prolonged use may lead to various adverse drug reactions, with osteoporosis considered a particular complication of chronic childhood illnesses cured with glucocorticoids. She notes that a separate review established that vitamin K2 combined with alfacalcidol has a bene?cial effect on bone mineral density in children treated with glucocorticoids for a longer time.

What dosage to take?

For Dr. Vik, this publication serves as a substantial argument for a K2-specific Recommended Daily Intake (RDI), something that the company has long pursued. "This is particularly as the publication illustrates the overwhelming impact K2 deficiency has on child populations, and it illustrates how parents' deficiencies feed into the state of their children's health," he says.

Maresz underscores that recommendations for a daily intake of vitamin K, in general, differ depending on the country and source. "The current adequate intake level of vitamin K for pregnant and nursing women is 90 mcg of vitamin K in general (viewed as vitamin K1)."
This only takes into consideration coagulation factors and does not reflect what is required for bone and cardiovascular support. Other research suggests that 45 to 50 mcg/day of K2 as MK-7 is an appropriate intake range for children. "Thus, a consensus aimed at determining the adequate intake for vitamin K, which includes K2, should be established by authorities and not ignored," she concludes.

By Missy Green



Omega 3s could benefit sarcopenia patients

12 Jan 2022 Nutrition Insight

Omega 3 supplementation may have positive effects in sarcopenia patients, a DSM-led scientific review and meta-analysis has revealed. The findings highlight that EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) can impact body muscle mass and strength, aiding patients with sarcopenia.

"As our muscle mass decreases as we age, improving intake of these omega 3s, possibly via supplements or specialized nutrition products, may be particularly beneficial for this population group," Dr. Barbara Troesch, senior scientific affairs manager of global medical nutrition and pharmaceutics at DSM, tells NutritionInsight. "Given the importance of muscle mass and function for overall health and well-being, this might consequently help to maintain quality of life and may reduce the severity of recent cost increases within healthcare settings." Sarcopenia, defined as a loss of muscle mass, strength and function, is a major public health concern in senior adults, Troesch notes.

Specialized nutrition offerings

According to DSM, many people do not meet omega 3 intake recommendations and have a low omega 3 status, despite the nutrient's potential benefits. "Less than 20% of the world's population achieve the recommended intake of EPA and DHA, set by most expert bodies at 250-500 mg per day," notes Troesch.

Industry experts previously flagged that consumers are still lacking sufficient knowledge on omega 3 supplements in terms of dosage and form, despite the popularity of the ingredient with consumers seeking cardiovascular and brain health. "Muscle wasting diseases such as sarcopenia are inherently linked to inflammation. It is assumed that chronic, low-grade inflammation tends to increase as we age, while chronic diseases and their treatments can also trigger an inflammatory cascade," underscores Troesch.

Vitamin C has also been spotlighted as a source of maintaining muscle mass in older ages, a UK study previously highlighted. People with the highest amounts of vitamin C in their diet or blood had the greatest estimated skeletal muscle mass compared to those with the lowest amounts. Omega 3s may offer cognition benefits as EPA and DHA may decrease brain inflammation and preserve the function of neuron membranes, Troesch notes. Evidence indicates a positive link between omega 3s and cognitive function as well as reduced risk of dementia, she adds.

By Andria Kades

Doubling prenatal choline could benefit children's attention, US study finds

04 Jan 2022 Nutrition Insight

Children whose mothers consumed double the recommended amount of choline during their pregnancy performed better on a challenging task requiring sustained attention, a US study has revealed.

"Our findings suggest population-wide benefits of adding choline to a standard prenatal vitamin regimen," says Barbara Strupp, professor in the division of nutritional sciences and department of psychology at Cornell University and co-senior author of the study.

Few studies with human subjects have evaluated the effect of maternal choline supplementation and this is the first study to follow the children to school age, note the researchers. The study observed children aged seven on an attention task. "Choline is absent from most prenatal vitamins and more than 90% of expectant mothers consume less than the recommended amount," the researchers highlight.

Choline impacting attention

The current recommended adequate intake level for choline is 450 mg per day, including for pregnant women. However, the figure was set in 1998 and is based on the amount of choline needed to prevent liver dysfunction in men, the researchers note.

As part of the study, all women consumed a prepared diet with a specified amount of choline throughout the third trimester of pregnancy. Half of the participants consumed 480 mg of choline per day, which slightly exceeds the recommended adequate intake level. The other half consumed a total of 930 mg choline per day, just over double the recommended intake level.

"When tested at seven years of age, the children of women in the 480 mg per day group showed a decline in accuracy from the beginning to the end of a sustained attention task, while those from the 930 mg per day group maintained a high level of accuracy throughout the task," notes the study. The findings on the children parallel the effects of maternal choline supplementation and deprivation in rodents, using a similar sustained attention task. The study was published in The Federation of American Societies for Experimental Biology Journal.

Upping choline intake

Choline is found in egg yolks, lean red meat, fish, poultry, legumes, nuts and cruciferous vegetables. A US study previously revealed that adding 84 g of mushrooms to the diet can increase choline levels by 5 to 6%. Studies on the impact of choline have been ongoing for decades on rodents, which highlight that adding extra choline to the maternal diet produces long-term cognitive benefits for the offspring.

"In addition to improving offspring attention and memory throughout life, maternal choline supplementation in rodents has proven to be neuroprotective for the offspring by mitigating the cognitive adversities caused by prenatal stress, fetal alcohol exposure, autism, epilepsy, Down syndrome and Alzheimer's disease," the study adds. "By showing that the beneficial effects of prenatal supplementation endure into childhood, these findings illustrate a role for prenatal choline in programming the course of child cognitive development," notes Richard Canfield, co-senior author.

Edited by Andria Kades

Prolonged vitamin D intake reduces autoimmune disease risk in older adults up to 39%

Omega 3s also appear to impact disease risk when taken in combination with vitamin D

27 Jan 2022 Nutrition Insight

Vitamin D may significantly reduce the chances of developing an autoimmune disease (AD) in older adults, with mixed results for omega 3s from fish oil.

The findings are "of clinical importance," given there are no other known effective therapies to reduce rates of AD. Researchers at Brigham and Women's Hospital found that US adults over 50 taking 2,000 IU per day of vitamin D had a 22% reduction in AD over a 5.3-year trial period compared to placebo. "This is the first direct evidence we have that daily supplementation may reduce the incidence," says senior author Dr. Karen Costenbader of the Brigham's Division of Rheumatology, Inflammation and Immunity. "Until now, we have had no proven way of preventing AD, and now, for the first time, we do."

Fishy outcomes?

Study participants who took 1 g of omega 3s daily – either in combination with vitamin D or alone – witnessed a 15% reduction in AD incidence compared to the placebo groups. This result was not considered significant unless researchers included "probable cases" data. Probable case participants had evidence of AD but lacked proper documentation. Including them showed a reduced incidence of developing AD with fish oil supplementation alone by a significant 18%.

A subgroup analysis also reveals that the beneficial effect of omega 3 fatty acids on autoimmune disease prevention was greater among those with a family history of autoimmune disease.

Supplements take time

The study authors write that while fish oils had no significant impact on AD risk over the total 5.3-year period, their effect increased over time. This was also the case for vitamin D alone and in combination with omega 3s. When only the last three years of the trial were considered, the vitamin D group had 39% fewer confirmed cases than the placebo, compared to 22% fewer cases when examining the whole period. Moreover, combined vitamin D and omega 3s supplementation decreased autoimmune disease by about 30% versus placebo alone when looking at the last three years of the study. This is in contrast to a 15% reduction over the entire 5.3-year period.

Scale of these diseases

AD, such as rheumatoid arthritis, polymyalgia rheumatica, autoimmune thyroid disease and psoriasis, are a leading cause of morbidity and mortality as people age. "AD is common in older adults and negatively affects health and life expectancy," says Jill Hahn, lead author on the study and post-doctoral fellow at the Brigham. However, preclinical studies have hinted that supplements, including vitamin D and omega 3 fatty acids, may have beneficial effects.

By Missy Green

DHA levels modulate immune response during pregnancy, study finds

24 Jan 2022 Nutrition Insight

A 1,000 mg dosage of docosahexaenoic acid (DHA) in pregnant women affects the inflammatory immune responses linked to childbirth. This is according to a study conducted by several US universities that found this supplementation may reduce preterm birth risk as DHA has anti-inflammatory properties.

During pregnancy and childbirth, the maternal immune system experiences modifications. Early inflammatory immune responses, while necessary for the start of labour, are linked to a higher risk of preterm birth and other complications.

Investigating inflammatory immune responses

Researchers discovered that a larger daily intake of DHA affects the levels of two proteins – the receptor for advanced glycosylation end products (sRAGE) and interleukin 6 (IL-6) – which could explain why it can reduce preterm birth risk.

Researchers measured five proteins involved in inflammatory immune responses.

They assessed the levels of these proteins and DHA levels in blood samples obtained at study enrolment – between 12 and 20 weeks of pregnancy – and delivery from 902 participants, of whom 437 took 200 mg per day of DHA and 465 received 1,000 mg per day.

Other characteristics that potentially influence preterm birth risk were taken into account, including DHA level at study enrolment, smoking history, race and ethnicity, history of preeclampsia (pregnancy-related high blood pressure issues) and BMI.

These study results follow previous research that also examined the interaction between preterm birth rates and DHA supplementation.

Preterm birth and sRAGE levels

Participants who had greater sRAGE levels at the start were more likely to have longer pregnancies and deliver at term. sRAGE levels typically drop between early pregnancy and labour and multiple studies have reported low sRAGE levels in persons who had spontaneous preterm births.

The scientists observed smaller decreases in sRAGE levels between study enrolment and delivery for participants receiving 1,000 mg per day of DHA, compared to those receiving 200 mg per day. This suggests that the higher DHA dose supports a more robust production of sRAGE, which could decrease inflammation during pregnancy.

Higher IL-6 levels at birth were linked to a higher risk of delivering after 37 weeks of pregnancy in the study population. Those who received the greater DHA dose showed a significantly bigger increase in IL-6 levels than those who took the lower amount between enrolment and delivery.

Reducing preterm births

A separate Lancet-published study revealed that pregnant women in the US should take DHA supplements to prevent preterm birth risk. When ingested before and during pregnancy, a blend of myo-inositol (a type of sugar), probiotics, riboflavin, zinc and vitamins D, B6, and B12 can reduce the risk of premature birth, Nestlé research found.

Edited by Nicole Kerr

Eating protein from a greater variety of sources may lower risk of high blood pressure

by American Heart Association

Medical Xpress MARCH 10, 2022

Eating a balanced diet including protein from a greater variety of sources may help adults lower the risk of developing high blood pressure, according to new research published today in Hypertension, a peer-reviewed journal of the American Heart Association.

Nearly half of the U.S. population has hypertension, or high blood pressure—one of the leading contributors to cardiovascular disease. When left untreated, high blood pressure damages the circulatory system and is a significant contributing factor to heart attack, stroke and other health conditions.

"Nutrition may be an easily accessible and effective measure to fight against hypertension. Along with fat and carbohydrates, protein is one of the three basic macronutrients," said study author Xianhui Qin, M.D., of the National Clinical Research Center for Kidney Disease at Nanfang Hospital, Southern Medical University in Guangzhou, China.

There is a strong association between poor diet quality and increased risk of cardiovascular disease and death from cardiovascular disease. In its 2021 dietary guidance to improve cardiovascular health, the American Heart Association advises people eat healthy sources of protein, mostly from plants and may include seafood and low-fat or fat-free dairy products, and, if desired, lean cuts and unprocessed forms of meat or poultry. The American Heart Association recommends eating one to two servings, or 5.5 ounces, of protein daily.

The study authors analyzed health information for nearly 12,200 adults living in China who were part of at least 2 out of 7 rounds of the China Health and Nutrition Survey from 1997 to 2015 (surveys taken every 2-4 years). Participants' initial survey was used as a baseline, while data from their last round was used as a follow-up for comparison.

Participants were an average age of 41 years, and 47% were men. The survey measured dietary intake in three consecutive 24-hour dietary recalls and a household food inventory. A trained interviewer collected 24-hour dietary information over 3 days in the same week during each round of the survey.

Participants were given a protein "variety score" based on the number of different sources of protein eaten out of 8 reported: whole grains, refined grains, processed red meat, unprocessed red meat, poultry, fish, egg and legumes. One point was given for each source of protein, with a maximum variety score of 8. The researchers then evaluated the association for new onset hypertension in relation to the protein variety score.

New-onset hypertension was defined as systolic (top number) blood pressure greater than or equal to 140 mm Hg and/or diastolic (bottom number) blood pressure greater than or equal to 90 mm Hg, taking blood pressure-lowering medicine, or self-reporting that a physician diagnosed high blood pressure since their last survey visit. Average time to follow-up was 6 years.

The analysis found:
• More than 35% of the nearly 12,200 participants developed new-onset high hypertension during follow-up.
• Compared to participants with the lowest variety score for protein

intake (less than 2), those with the highest variety score (4 or higher) had a 66% lower risk of developing high blood pressure.
• For each of the 8 protein types, there was a window of consumption amount where the risk of hypertension was lower. Researchers described this as the appropriate level of consumption.
• When total quantity of protein intake was considered, the amount consumed was divided into five categories (quintiles), from least to most intake. People who ate the least amount of total protein and those who ate most protein had the highest risk for new onset of hypertension.

"The heart health message is that consuming a balanced diet with proteins from various different sources, rather than focusing on a single source of dietary protein, may help to prevent the development of high blood pressure," Qin said.

A limitation of the study is its observational design. Because researchers used prior health information, they could not definitively prove protein intake of any kind or quantity caused or prevented new-onset hypertension.

FOOD SCIENCE & INDUSTRY NEWS

FAO and WUR step up joint efforts

December 14, 2021 (Wageningen University)

The Food and Agriculture Organization of the United Nations (FAO) and the Netherlands' Wageningen University & Research (WUR) have enhanced their cooperation on innovative approaches to improve lives while safeguarding natural resources in line with the 2030 Agenda for Sustainable Development.

Mobilizing science and innovation to leave no-one behind

The new agreement covers a wide range of activities including improving agrifood economics; ensuring sustainable animal production and health, as well as sustainable fisheries and aquaculture; mitigating the impacts of the climate crisis; safeguarding biodiversity and the environment; improving food security and nutrition; and strengthening agrifood systems and food safety.

The two parties committed to strengthening capacity building, facilitating knowledge exchange, and providing resources to advance common goals.

The agreement was signed by FAO Director-General QU Dongyu and the President of the Wageningen University and Research Executive Board Louise O. Fresco.

"Science and innovation, technology and application are needed to deliver on common goals of better production, better nutrition, a better environment and a better life for all by transforming agrifood systems to make them more efficient, inclusive, resilient and sustainable, to nourish people, nurture the planet and ensure equitable livelihoods," Qu said.

"A focused and strengthened framework between FAO and Wageningen University and Research will allow our partnership to better align efforts and resources for greater impact in meeting the 2030 Agenda for Sustainable Development Goals," he added.

"This Memorandum of Understanding builds on the long-standing relationship between FAO and Wageningen University and Research. We are excited to see a strengthening and acceleration of the collaboration between us, that aims to tackle the challenges that the world is currently facing. By joining forces, WUR and FAO will be able to facilitate the science-policy dialogue and, where feasible, to create impact for sustainable development at both national and global level," Fresco said.

FAO and WUR will work to strengthen dialogue on science, including by developing knowledge and expertise and bringing to bear the foremost science-based evidence on emerging technologies for agrifood systems.

The joint efforts will specifically focus on zoonoses research which has become crucial due to the COVID-19 pandemic. The Early Recognition and Rapid Action in Zoonotic Emergencies is a new ambitious WUR wide research and investment framework which builds a solid scientific foundation on animal-human interactions under the One Health approach. FAO looks to engage in the initiative to assist its Members in preventing future pandemics and mitigating their impact.

Another key area for cooperation is aquaculture. FAO and WUR are beginning collaborations on the sustainable development of fisheries and aquaculture value chains. For example, in the African, Caribbean and Pacific States under the project FISH4ACP, the collaboration is providing expertise on multistakeholder partnerships, contributing to food security and increased nutrition, economic prosperity and job creation.

In continuation of inland fisheries work in Africa, WUR and FAO are developing a document on balanced harvesting management of inland fisheries, as well as a new project to enhance species recognition and specimen measurement of fish in the Nile Basin using artificial intelligence.

"Powerful forces" driving wellness economy, on track to hit US$7 trillion by 2025

06 Dec 2021 Nutrition Insight

Research from the Global Wellness Institute (GWI) reveals that the global wellness economy grew to US$4.9 trillion in 2019 and then fell to US$4.4 trillion in the pandemic year of 2020. Notably, the COVID-19 pandemic continues to play a significant role in shaping the meaning of "wellness."

However, with a consumer "values shift" underway, the wellness market is predicted to increase 10% annually through 2025. The report also gives insight into how the personal care sector experienced a decline in consumer spending, whereas the nutrition sector saw an increase.

"The wellness economy will grow to US$7 trillion in 2025 because the forces that have been driving it remain as powerful as ever: an expanding global middle class, an aging population and rising chronic disease," says Katherine Johnston, a senior research fellow at GWI. "However, the pandemic has brought new shifts, and a global 'values reset.' 'Wellness' now means far more than a facial or spin class, with a growing focus on mental well-being and the importance of work-life balance, social justice, environmental sustainability, the built environment and public health."

The pandemic's effects

These consumer spending and shopping habits will likely return after the pandemic. Most personal care and beauty product businesses are switching to digital and omni-channel strategies. However, the pandemic has also heightened shifts in this sector related to the broader concepts of wellness and the wellness economy.

The report adds that emerging evidence indicates pandemic-induced "zoom dysmorphia" is sending more people to seek cosmetic procedures or consultations on acne, wrinkles, and hair loss.

There is also increasing consumer interest in cosmeceuticals, dermatological supplements, and functional beauty beverages, even though many of these products are not yet backed up by rigorous scientific evidence.

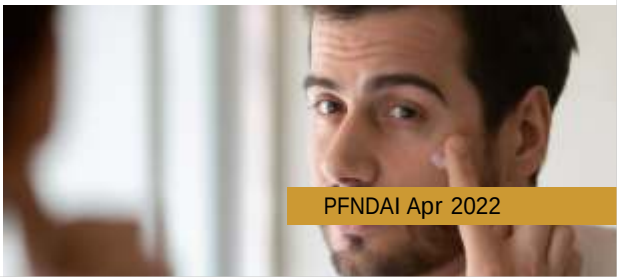
Tracking the nutrition market

In contrast to the difficulties faced in personal care, the GWI report notes the COVID-19 pandemic has launched a new wave of interest in cooking, eating and nutrition. Consumers are more aware that a healthy diet strengthens immunity. Additionally, the pandemic has caused consumers to be more aware of the food-health connection.

The healthy-labelled F&B sector is the largest segment, representing 72% of the market in 2020. This segment includes a wide variety of processed and packaged F&B that are specifically positioned, marketed, or labelled with health and wellness claims, including low-sugar/low-fat/low-carb products; functional products with added nutrients; products that are "free-from" gluten/lactose/dairy/meat; products marketed as "naturally healthy"; and organic products.

GWI's analysis shows that the smallest segment tracked is weight loss products and services, representing 14% of the market in 2020. This segment encompasses packaged F&B precisely positioned to target weight management. Taking a look at nutrition, Nestlé and the US-based Tufts University recently launched the Global Nutrition and Health Atlas (GNHA), a new online platform that provides free access to global nutrition and health data for over 190 countries. Additionally, Tufts University developed a nutrition profiling system called the Food Compass.

By Nicole Kerr



'Drink your peas!' Benefits of supplementing cow milk with plant protein

Science Daily December 15, 2021

Scientists from the Department of Food Science and Technology at The Ohio State University (Columbus, Ohio, USA) have developed a novel method of supplementing cow milk with vegetable protein using readily available current dairy processing equipment.

A new report in the January 2022 issue of the Journal of Dairy Science presents the study, which may open opportunities to create new functional, multi-sourced dairy products that could help bolster declining fluid milk sales in the United States.

Approximately 80% of the protein in cow milk takes the form of casein, which naturally binds together to form large spherical molecules suspended in the water component of milk. However, protein does not readily dissolve in water; one end of the casein protein is attracted to water (hydrophilic) and the other is repelled by it (hydrophobic).

When the proteins join together, the exterior of the resulting large molecule, called the casein micelle, is made up of the water-attracted end of the protein, while the core of the casein micelle is the water-repellent side.

This structure allows casein micelles to carry most of the vitamins and minerals, such as calcium -- which, like proteins, do not dissolve easily in water -- that make milk such a nutritious part of the diet.

"Our research team used these unique features of casein micelles to turn them into transporters of additional protein from a plant-derived source, in this case, peas," mentions first author Abigail Krentz, MS. The casein micelle has been used similarly before, to add extra vitamins and minerals to milk, as well as to enrich the nutritional content of low-fat foods.

Lead investigator Rafael Jiménez-Flores, PhD, observes, "Plant-based proteins, such as those in peas, can be challenging to use in foods because of their low solubility and undesirable off-flavours. Pea protein, in particular, can be a challenge to use in food systems because of its low solubility and undesirable bitterness."

Why peas, then? Jiménez-Flores explains, "Pea protein has become popular due to its balanced amino acid composition and branched-chain amino acids that assist in muscle development. Pea protein is a non-allergenic, gluten-free, and cost-effective plant protein."

Pea protein also has a high percentage of hydrophobic proteins (65% to 80%), which the researchers determined made it a good model to represent plant-based proteins.

In order to turn casein micelles into transporters of extra nutrients, the micelle has to be broken open, the nutrients incorporated, and the micelle structure reassembled.

Past research has accomplished this using ultra-high pressure and other specialized techniques, but this study achieved its results using readily available dairy processing equipment that could be easily reproduced in any dairy facility.

As the dairy industry struggles to maintain consumer attention in the midst of declining fluid milk sales, the demand for plant-based protein is growing due to consumers' desires for healthy high-protein products that are also environmentally conscious.

This research combines these goals and offers potential for innovations with other plant-based proteins or nutraceuticals with low solubility, allowing the dairy industry to provide highly nutritious new products that also meet evolving consumer preferences.

NHS gamifies healthy eating for UK children with app-centric campaign

10 Jan 2022 Nutrition Insight

The UK government is targeting children's health with a multimedia campaign, Better Health, which includes new features for the NHS Food Scanner App. The move highlights how technology and policy can be synergized to address the rising obesity crisis – worsened by the COVID-19 pandemic.

"With advertising promoting unhealthy foods to kids, it's not surprising that parents say they've often found it hard to resist pestering from their children for more unhealthy snacks," says Dr. Alison Tedstone, chief nutritionist at the Department of Health and Social Care (DHSC). "That is why the NHS Food Scanner App is a great tool to help families make quick and easy healthier swaps."

Families can scan the barcodes of purchased products and the app will suggest healthier alternatives to help them make an easy swap next time they shop.

The campaign is part of the government's Obesity Strategy, which has dedicated £100 million (US$139 million) to support children, adults and families achieve and maintain a healthier weight.

Comfort eating backfires

The campaign follows a "record rise" in obesity among children since the start of the pandemic. Campaigners from organizations like Sustain have been leading calls for concrete action on child obesity.

According to the DHSC, one in four (27.7%) children of reception school age (ages 4 to 5) are overweight or obese; this rises to four in ten (40.9%) in Year 6 (ages 10 to 11). Evidence shows that families purchased food more during lockdowns, and this remained above normal levels even once lockdowns ended.

Additionally, a survey conducted with Netmums – a parenting website featuring in a film supporting the campaign – found that nearly six in ten (58%) parents give their children more sugary or fatty snacks than before the pandemic.

"We all comfort ate our way through the pandemic, and I know my kids ate far more treats than usual," notes Annie O'Leary, Netmums editorial director.

Last week, the DHSC also announced a Better Health marketing campaign for adults, aiming to help people prevent risks of developing serious illness and help reduce the risk of being hospitalized with COVID-19. Families can scan the product barcodes from their shop, and the app will suggest healthier alternatives.

Gold standard for trust

The survey also revealed that nearly two-thirds (64%) of parents said they often worry about how healthy their children's snacks really are.

Meanwhile, almost 90% of parents said they would benefit from an app that would help them make healthier choices for their children.

"The NHS is the gold standard in terms of trustworthiness. Hopefully, this means millions of families will be downloading it and using it ASAP," notes O'Leary.

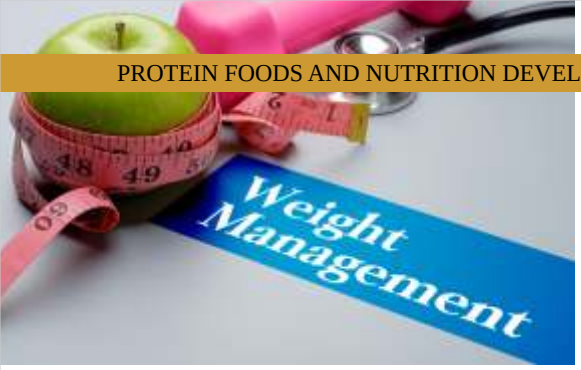
The app uses a "Good Choice" badge to help signpost people to healthier food and drinks in line with the government's dietary recommendations for added sugar, saturated fat and salt.

This gamification of making healthy choices is likely to appeal to children, with dietician Dr. Linia Patel noting the "fun" side of it. Industry movers have also turned toward apps to help encourage healthy choices.

Last summer, Sainsbury's launched The Great Big Fruit and Veg Challenge, which uses fun, interactive targets.

Meanwhile, a year-long collaboration between supermarkets and food manufacturers previously revealed that "gamified" campaigns for collection tokens can help attract children to healthy foods. Other apps for weight loss include Feast, which encourages mindful eating, and Nutrisystem, which offers personalized plans.

Edited by Katherine Durrell



Weight management transformed by pandemic, tech breakthroughs and male interest, experts highlight

20 Jan 2022 Nutrition Insight

Weight management has evolved far beyond just losing weight, now including lifestyle changes encompassing healthy eating and mental health. NutritionInsight speaks to experts from Lallemand Health Solutions, Mibelle, ADM and Kemin on how the space is changing and technology is shaping the sphere.

"For a long time, weight management products have been a seasonal market, as products were often marketed and promoted in January, right after the Christmas holidays to resonate with the 'good resolutions' of the new year, then throughout the first half of the year," says Camille Binachon, product manager, Lallemand Health Solutions.

However, 2020 marked a turning point in this trend linked to the COVID-19 pandemic, she says. Using data from Google searches, "weight loss" would usually reach peak interest in January.

In 2020 however, the highest peak was observed in May and the number of searches stayed high throughout the year, she notes.

Holistic approach?

The pandemic has "pushed consumers to question and take control of their diets and lifestyles," notes Miguel Martinho, global strategy and business development manager, Kemin Human Nutrition and Health.

"Health consciousness has increased dramatically and if appearance can act as a trigger, the idea of looking and feeling healthy is driving the future. Most of us have changed our eating and drinking habits."

"Comfort food, moments of escapism to help managing stress and indulgent behaviors have grown during the pandemic. This helped to create a notion that the products associated with those moments tend to be less healthy and with higher calorie intake."

He continues that this consciousness is helping consumers to commit to losing weight, or having better control of their diets, once the pandemic fades away..

Consumers are increasingly taking a proactive approach to support their well-being and are recognizing that their physical, mental and emotional health are all interconnected, highlights Christian Leighton, global marketing director, microbiome solutions, ADM. The pandemic has driven this mindset forward, he adds.

"Evolving weight wellness trends today are less centered on cutting calories or the number on the scale. Instead, consumers want to take holistically-minded steps to maintain a healthy weight that will contribute to general well-being today and into the future."

Varying ingredients and formats

In trying to offer a holistic solution, Mibelle highlights the Santa herba extract found in its SantEnergy Nu supplement. According to Olufeso, the item fits into the holistic approach space as it contributes to healthy aging.

Additionally, it aids in weight management by significantly reducing weight and body fat, while showing caffeine-like energy boosting effects.

"Demand for supplements with plant extracts has risen in the last years and we also see this trend in the weight management space," she highlights.

"A big part contributing to this trend is the increasing health awareness of consumers and the growing trend in going more natural and veganism. Consumers today have many possibilities to do their own research on diets, weight control products and supplements and are thereby much better informed."

Apart from the changes shaping weight management trends, consumers are also turning to a range of different offerings they seek to explore.

"Consumers are adopting functional foods, beverages and dietary supplements into their everyday routines. Openness to discovery presents an opportunity for new supplement entries to the marketplace, including different and enjoyable formats from drops and mints to gummies and shakes," notes Leighton.

Gut solutions

According to Leighton, COVID-19 has also spurred a growing trend in metabolic health, reflected in a growing awareness of links between the microbiome, healthy weight and metabolic health. As a result, consumers are seeking out products like probiotics, he notes.

"Moving forward, we will see shoppers gravitating toward targeted solutions that showcase strain-specific probiotic inclusions as they consider what will best support their unique and specialized needs."

Lallemand's breakthrough clinical study on probiotic strain L. rhamnosus HA-114, found that individuals who had the item reduced binge eating and cravings. The probiotic has a "positive impact on eating behaviour by promoting a well-balanced brain-gut axis communication to support weight management efforts," says Binachon. Feelings of stress, anxiety and depression also improved.

Changing gendered perceptions

For the most part, women are seen as the target consumers in the space, as they tend to face more pressure about their health and looks, Olufeso adds. With age, women experience a slowing down of their metabolism, which can lead to an increase in weight gain, she says.

Citing the Center for Responsible Nutrition, Martinho highlights 77% of women take dietary supplements versus 68% of men. Nonetheless, the scales may be tipping, as probiotic supplements for weight loss seem to be attracting men, Binachon notes.

"Men show a strong online engagement compared to women, meaning they leave more post-purchase reviews online and seem to be more satisfied by the products than women."

Driving personalization

The impact of technology appears to act as a double-edged sword for weight management, according to Martinho.

"Technology does have a dual effect: increased time spent using technology, usually through digital screens, adds several health challenges that can be mitigated with a healthy diet and complemented with dietary supplements."

On the other hand, technology can help deliver personalized solutions, driving the future of the industry, he adds. According to Leighton, 75% of US dietary supplement users are looking for personalized products directly suited to their needs.

"Genetic testing is one way for people to learn more about their personalized needs, and there is growing consumer interest in genetic testing for nutritional purposes."

Utilizing technology

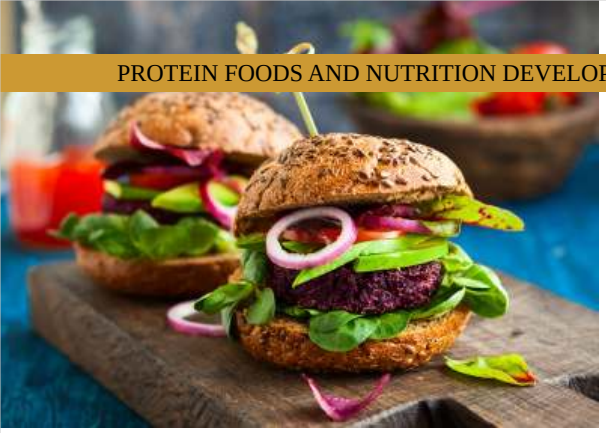
Technology can also impact the quality and variety of products offered to consumers, Leighton highlights. As cutting-edge solutions brought forth by new technologies and innovations hit the marketplace, consumers will expect more from their purchases, from both a functional and sensory perspective.

"New technologies related to formulation, such as 3D printing, are providing consumers with more convenient, tailored ways to consume the benefits they seek."

Advancements may also present challenges, such as hindering the stability of functional ingredients through processing conditions, while new innovations are helping manufacturers ensure efficacy, Leighton continues.

ADM leverages heat-treated microbial strains, such as HT-BPL1, which is the heat-treated counterpart to BPL1 (Bifidobacterium animalis subsp. lactis CECT 8145). It can withstand different formulation processes, Leighton outlines. "This makes it easier for formulators to incorporate microbiome-supporting solutions into various applications, such as beverages, gummies and baked goods. With their unique formulation benefits, heat-treated strains, referred to as postbiotics, are paving the way to more personalized products."

By Andria Kades



"Formula reengineering" responds to consumer demands for better-for-you foods, highlights roundtable

13 Jan 2022 Nutrition Insight

Food fortification and reformulation are both popular ways to ensure that essential nourishment is included in foods to improve dietary content, while less healthy elements are reduced.

NutritionInsight speaks to industry experts who detail the key drivers for ingredient fortification and reformulation while shedding light on trending offerings.

"Nutritional reformulation is essential for the readjustment of processed foods to reduce salt, sugar and saturated fat or increase the content of fruits, vegetables and fiber to meet consumers' needs for food health," details Sherry Tao, marketing planner at Angel Yeast.

Nutritional fortification has the advantage of increasing food's nutrient density and making it more acceptable for persons with nutritional deficits, she affirms.

"The benefit of formula reengineering is that it can optimize the nutritional ratio of food and make it healthier. Also, it is essential to verify food safety for the fortification and reformulation processes."

Consumers' nutritional needs

In detailing the demands from consumers, marketing executive at Vaneeghen, Snezhana Kirina, states that "the biggest driver for the growth in recent years is that consumers are more aware of their nutritional needs."

Innova Market Insights' data reveals that the top ingredient used in F&B with mineral or vitamin claims was vitamin C. "Additionally, health is something that is top of mind for most people.

One ingredient in demand is kale, which is rich in iron. And, of course, it's very good for brain development in immunity and implementation," says Kirina.

The drive for fortified and reformulated foods is explained by Kirina, who adds that formulators are now "opening their eyes." "They want to improve their formulations to something that makes a difference in the world."

Kirina adds that safety, quality ingredients and bioavailability are essential during ingredient formulation and fortification. Concerning trends, healthy brain development and immunity remain key.

Insight into emerging trends

Innova Market Insights emphasizes that COVID-19 is driving consumers' renewed interest in maintaining a healthy lifestyle, often reducing their sugar intake. The demand for natural sweeteners is rising due to consumer demand for clean and natural products.

Recent examples in this space include Ingredion's erythritol polyol sweetener which is marketed under the brand Erysta.

Also, DouxMatok's Incredo Sugar is a sugar-based solution that enables 30 to 50% sugar reduction.

Additionally, Innova Market Insights reports that consumers have personalized health strategies:

• Reductionism: Limiting or reducing products/ingredients that are bad for their health (for example, products high in sugar, fat and salt).

• Naturalism: Choosing natural products to avoid additives and preservatives as much as possible.

• Functionalism: Choosing products that positively boost nutrition or benefit the body's functions (for example, products high in protein or superfoods).

Taking a look at the market researchers 2022 Top Ten Trends, "Gut Glory" is listed as the sixth trend for this year and it details that "the microbiome has the potential to be a game-changer in how consumers manage their health, with advancing knowledge of probiotics, prebiotics, postbiotics and symbiotics. These ingredients can be added to products to increase health benefits.

Additionally, Innova Market Insights highlights that "connecting ingredients that boost the gut microbiome with those that target other areas offers holistic solutions to multifaceted concerns. If it's good for the gut, it's helping the whole."

Minerals from seaweed

David O'Leary, managing director at Marigot, a natural ingredients company focusing on minerals from seaweed, details how the company formulates minerals for its Aquamin brand.

The components are harvested from the northwest coast of Iceland and can be used to fortify foods.

"We harvest the mature from the seaweed material, making sure that the life cover continues to grow uninterrupted. Only the mature form is collected, thereby ensuring sustainability for generations to come."

The material is then taken and processed. He explains that the powder attained from this processing is then used in the fortification of beverages and dietary supplements.

O'Leary adds that magnesium is "very much on-trend at the moment" for multiple health areas around cognition, sleep, rest, bone, health and calmness. "Also, there are multiple benefits, where magnesium is being sought after for lifestyle, nutrition and healthy aging," he adds.

In looking at the benefits of magnesium , he states that it is suitable for healthy aging as proteins are very effective when combined with certain minerals.

In terms of muscles, magnesium and protein are beneficial for lifestyle nutrition around age-related muscle loss, preventing sarcopenia in senior citizens.

Nutritional yeast for improved mineral content

Angel Yeast currently offers nutritional yeast flakes called Nutritional Yeast Flakes VitB derived from specially selected pure strains of Saccharomyces cerevisiae and obtained by a patented process.

According to the company, it can be added to foods and is a good source of complete protein, B vitamins, dietary fibre, minerals and trace minerals.

The nutritional yeast is made from primary-grown inactive yeast without additives or preservatives and is pegged as a "purely natural food." It is marketed as having a "nutty, cheesy flavour."

The yeast can be added to hot popcorn or garlic bread, stirred into juices or smoothies, or used as a seasoning for salads, salad dressings, soups, sauces, dips and stews.

Fortification also plays a crucial role in keeping people from poorer regions healthy. For example, DSM previously gave insight into solutions for malnutrition and how fortified rice is cost-effective and safe.

REGULATORY NEWS

Titanium dioxide ban comes into force, companies have six months to adjust

10 Jan 2022 Nutrition Insight

The ban on titanium dioxide (TiO2) as a food additive has come into force across the EU this month, after it was deemed as "not safe" by the European Food Safety Authority (EFSA). The decision by the EFSA last year was not met with any objections by either the European Parliament or the Council of the EU, Dr. Nina McGrath, area lead for content production, European Food Information Council (EUFIC), tells NutritionInsight.

As a result, "producers will deal with a six-month phasing out period, during which companies will need to work on reformulating their products if they want to keep them on the market. After this time, a full ban on marketing foods containing titanium dioxide as an additive will apply across the EU," she adds. The additive is used as colour in the food and nutrition industries.

Implementing the ban

According to McGrath, regulations do not leave any discretion to member states in implementing EU law, as they are legally binding. "It is the responsibility of each member state to ensure implementation and enforcement of the regulation in their country."

France banned the use of the additive in 2020, leading companies such as Lonza to launch Vcaps Plus White Opal, its first commercially-available titanium dioxide-free semi-opaque capsule for food supplements. The move followed several lobby groups urging the European Commission to prohibit TiO2.

The French Agency for Food, Environmental and Occupational Health & Safety last year called for a uniform approach to screening nano-materials like TiO2. The methodology proposed specific adaptations related to regulatory definitions, particle size measurements, dissolution properties and hazard identification.

Wide-ranging use of TiO2

Also known as E171, TiO2 is used as a colour in the nutrition industry, including as an opacifier in capsules. It is used in soups, sauces, sandwich spreads and processed nut products, among others, EUFIC notes. It is also used in candy, chewing gum, cake icing and white sauces. In cosmetic and skincare products, titanium dioxide is also used as a pigment, thickener and as a sunscreen ingredient.

Notably, the item is also used in medicinal products for both humans and animals in the EU, underscores McGrath.

"At the moment, these products will remain in use to avoid shortages that could affect public and animal health. However, the new regulation banning the use of TiO2 as a food additive includes a review clause according to which the Commission will need to re-evaluate the situation with respect to use of the TiO2 in medicinal products within three years of the regulation entering into the force."

Buildup to the ban

The ban came as a result of an EFSA review of the item. The body is responsible for the periodic re-evaluation of food additives that have been approved for use in the past.

"During the re-evaluation, the main concern raised was about the potential genotoxicity of titanium dioxide (e.g., its ability to damage genetic material in our cells.) While this updated assessment could not confirm a definite genotoxic effect, the EFSA panel concluded they did not have enough evidence to rule out concerns about potential genotoxicity," highlights EUFIC.

The review body noted it also did not have sufficient data to calculate a safe daily intake level of TiO2 and moved to its ban.

Industry adapts

The move to ban TiO2 was not met by huge surprise by industry, as the item was under global review for "considerable time," Döhler previously told FoodIngredientsFirst. This has long sparked a demand for alternatives as companies have been working toward reformulations.

As a result, industry has been phasing out artificial dyes and turning to plant-forward foods. Items such as blue spirulina, yellow turmeric extract, and red elderberry extracts have been spotlighted for their potential.

The turn to more natural items is reflective of Innova Market Insights Top Ten Trend, number two: 'Plant-Based: The Canvas for Innovation' as consumers consider plant-based alternatives to be healthier and better for the planet.

By Andria Kades

Claim and substantiation considerations for cognitive health products

When cognitive performance products target an aging population, claims and substantiation requirements become more complicated.

Jim Lassiter | Oct 23, 2020 Natural Products Insider

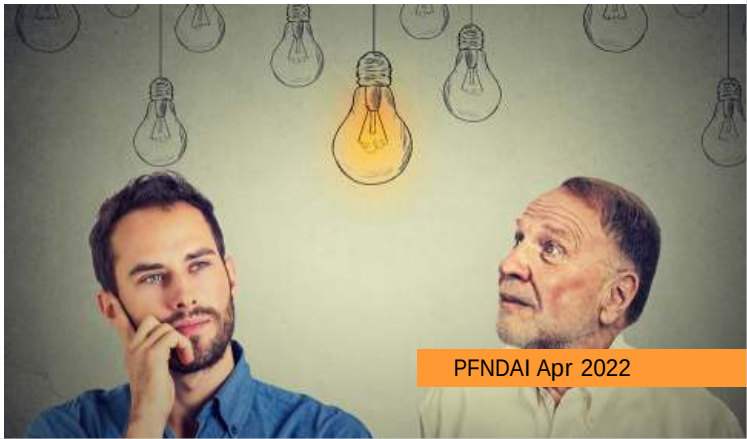
Once the formulation of a cognitive health product geared toward aging is solid, brand holders need to weigh what can be said about it.

This gets into the realm of limitations regarding claims, along with the requirement for substantiation. As this discussion applies to products intended to counteract the effects of aging, the limitations fall largely in the dangerous realm of interpretive assessment (and the required substantiation). Aging is a natural process.

Some of the results of aging include mental declination. This should not be confused with any aberrative physiologic occurrence; the slowing of mental activity is "normal" cognitive decline.

The challenges lie in crafting claims—as well as the context in which the claims are presented, since this is a vital factor in interpretive regulatory assessment—to present the age group, targeted benefit and intent without crossing the invisible line into areas such as senile dementia or Alzheimer's disease. Discussion of improvement in cognitive performance is a very safe area on its own. Blending in age is where the invisible line comes into play. This, in turn, leads to the substantiation requirements.

When demonstrating the potential effects of a dietary supplement in improving cognitive performance, certain considerations must be made, regardless of whether designing or reviewing a study. First it is important to know that a healthy population is used. The ideal would be healthy, older individuals—but those are not an easy find (completed studies, not older people). Most importantly, a legitimate, standardized measure must be applied.



The evaluation of any study intended to demonstrate cognitive improvement must meet the same scientific rigor as any other determination. The demonstration of the performance must also be less equivocal owing to the inherently subjective nature of the endpoint measurement. Complete and thorough evaluation of the substantiation must be performed against all aspects of formulation using the substantiation. Clear, concise presentation using the appropriate subjects is key.

To read this article in its entirety, check out the Healthy aging: Cognitive health – digital magazine.

India approval of hemp for food set to spur new product development

By Pearly Neo
31-Dec-2021 Food Navigator Asia

To the delight of hemp-based product manufacturers in India, the country's food safety authority Food Safety and Standards Authority India (FSSAI) finally approved hemp seeds and related products for use as food, the first time that hemp products have been recognised as food in India.

Previously, various 'first generation' hemp products (hemp seeds, hemp oil, hemp powder) had already been circulating in the country, but were regulated under the Ministry of Ayurveda, Yoga, Naturopathy, Unani, Siddha, Sowa-Rigpa and Homoeopathy (AYUSH) and not recognised as food.

This turn of events has been a long time coming and local industry players are confident that this will boost the Indian hemp sector to unparalleled heights.

"The journey has been a long one, and now we have finally been rewarded, 4.5 years since we first started working with hemp seeds," Health Horizons CEO Rohit Shah said.

"These new guidelines will help the Indian hemp industry to flourish and grow to be at par for exports to other countries, helping the billion-dollar hemp opportunity in India to grow much faster."

One of the primary areas where growth is expected is in 'second-generation' products, with hemp product manufacturers moving beyond the powders, seeds and oil to develop energy bars, pastas, shakes, chocolates and more.

"Hemp foods revolve around nutrition and sustainability, [traits] that are currently big trends in the F&B sector –the first generation products were already seeing much traction due to their versatility to be used everywhere from beverages to bakery, and now we expect to see more value-added products hitting the market as the regulations have allowed hemp as food," Shah added.

"The hemp industry is set to grow at an unparalleled scale over the next decade, -and] with this new regulation FSSAI has brought much-needed organisation to the industry [to help it to flourish].

"I also believe there is a need for favourable cultivation policies to support this new regulation though – The socio-economic impact this will have on each individual in the hemp supply chain is significant, and farmers will benefit from better pricing, and consumers will benefit with better quality produce and value added products."

Plant-based product labelling – different fates in different markets

By Pearly Neo
31-Dec-2021 Food Navigator Asia

Whilst the plant-based product trend appears to be rising rather uniformly in most countries across the Asia Pacific region, the same definitely cannot be said for the uniformity of regulations and policies revolving around the governance, or at least guidance, of the sector.

This is similar to guidelines set by China at the end of 2020, which also approved the use of traditional meat and dairy terms for the plant-based sector.

Several other markets have not been quite so lucky though – one of these being India, where the government moved to ban the use of conventional dairy terms such as 'milk' for plant-based dairy products in September this year.

According to FSSAI Executive Director (Compliance Strategy) Inoshi Sharma who signed the order for the ban, the regulatory provisions for this in India fall under existing FSSAI regulations.

"This directive is applicable to all [plant-based product firms], whether they are operating online or offline," she said.

The ban was since stayed after five local companies – Drums Food International, Hershey India, IstoreDirect Trading, Rakyan Beverages and Veganarke Enterprises – which manufacture plant-based dairy products attempted to fight back in court and managed to obtain the stay on the ban. Justice Rekha Palli, the judge who issued the stay, described the ban as 'coercive'.

As of end-2021, the matter is still pending a final conclusion but this hurdle appears to not have deterred various Indian plant-based dairy firms from going ahead and launching new products, such as alt foods which launched its plant-based sorghum, millet, amaranth and oat drink in December2021. Of note though is that the product is being called a 'plant-based drink' which consumers are asked to 'use it like milk' , perhaps in an attempt to avoid needing to make label changes if the ban goes through.

Down Below, Australia is also having a hard time of it as although there are no formal bans in place, Minister for Agriculture David Little proud has been less than willing to give the nod to the use of conventional meat and dairy terms for plant-based labelling, even previously hosting roundtables for the plant-based sector to discuss this with meat and dairy industry representatives.

The Ministerial Forum on Food Regulation previously twice declined to change current regulations to ban the use of conventional meat and dairy terms, but earlier this year the Australian government launched a public inquiry into the subject, drawing heated debate from both sides of the fence. Unsurprisingly, the meat and dairy industry maintained that using conventional terms would be 'misleading' , whereas plant-based representatives maintained that current qualifiers such as 'vegie' and 'meat-free' are 'fit-for-purpose' with no evidence of consumer confusion.

The public inquiry committee will present its report on or before the end of February 2022, which is likely to again cause a ripple in the industry either way.

Should ecommerce retailers be responsible for providing nutritional labelling?

By Elizabeth Crawford 20-Jan-2022- Food Navigator USA

After discovering online grocery retailers fail to consistently provide key nutritional and allergen information for products on their websites, researchers are calling on FDA, USDA and FTC to close online labelling "gaps" by requiring ecommerce sites – not just product manufacturers – to clearly display this essential information.

"Historically, retailers were not responsible for providing [Nutrition Facts, allergen and other ingredient information], as it is required on product labels," but the rapid rise of ecommerce grocery sales before and during the pandemic "raises questions of which entity along the supply chain is responsible for ensuring that consumers can access required product label information and which regulatory agency has authority to require it," researchers from the NYU School of Global Public Health and the Friedman School of Nutrition Science and Policy at Tufts University argue in a study published today in Public Health Nutrition.

They argue that current regulations requiring product manufacturers to prominently displace the Nutrition Facts, Ingredient List, allergen warnings and other essential safety information on packaging allows brick-and-mortar shoppers to easily access information that is critical to their health and safety.

However, they note, since these regulations were passed how consumers buy food has shifted dramatically, with online grocery sales in the US tripling from 3.4% to 10.2% of total grocery sales from2019 to 2020. In these cases, consumers are not able to pick up and examine each item – rather they rely on ecommerce retailers to make this information readily available.

According to their research, online retailers are falling woefully short of providing FDA-required food labelling.

'Present, conspicuous and legible' nutrition labelling rarely offered online

A review of 10 major products ranging from cereal to bread to drinks to other common kitchen staples sold across nine online retailers found Nutrition Facts Panels, ingredient lists, common food allergens and the percent of juice in fruit drinks was "present, conspicuous and legible for an average of only 36.5% of the products surveyed, ranging from 11.4% for potential allergens to 54.2% for ingredient lists."

Specially, the researchers found the Nutrition Facts Panel was present, conspicuous and legible for45.7% of the ten products across the retailers and the ingredient list was present, conspicuous and legible for 54.2% of all observations.

"The least consistently disclosed required information was common food allergens, not present for 63.5% of products that contain common allergens," the researchers note.

Likewise, the percent of juice was not present for 38.3% of fruit drinks, the study notes.

Marketing claims abound

Much more often, marketing claims that can mislead consumers about a product's healthfulness were more prominently displayed or promoted, according to the research, which found voluntary nutrition-related claims were "prominently and conspicuously displayed" on average 63.5% of the time across retailers and products.

"Online retailers also displayed such claims directly in the webpage texts themselves across 38.8% of products," the study adds – cautioning that retailers ability to track and target individuals "means that the information could be withheld from shoppers to promote specific brands."

The researchers further warn that "the failure of online food retailers to consistently disclose required information may implicate health and safety concerns for consumers who depend on it, as in the case of allergens, [sodium] or sugar; and others who may benefit from its provision."

A call to action

Given these risks, they call on the Food Drug Administration, the US Department of Agriculture and the Federal Trade Commission to revise current regulations to specify that "at a minimum" online retailers should make required nutrition information panels "immediately visible and legible under ordinary purchase conditions online."

They add that each agency already has authority to clarify and enforce these disclosures.

FDA approves qualified claim for magnesium and blood pressure

By Hank Schultz 11-Jan-2022 – Food Navigator USA

FDA has approved a qualified health claim for the ability of magnesium supplements to lower blood pressure. It's a welcome development that's been a long time coming, industry experts say.

To be more precise, the US Food and Drug Administration said yesterday it would not "object to the use of certain qualified health claims regarding the consumption of magnesium and a reduced risk of high blood pressure (hypertension)." This is the standard formula for the 'approval' of such claims.

To be compliant, claims for this effect must use the following language:
"Inconsistent and inconclusive scientific evidence suggests that diets with adequate magnesium may reduce the risk of high blood pressure (hypertension), a condition associated with many factors."

"Consuming diets with adequate magnesium may reduce the risk of high blood pressure (hypertension). However, the FDA has concluded that the evidence is inconsistent and inconclusive."

"Some scientific evidence suggests that diets with adequate magnesium may reduce the risk of high blood pressure (hypertension), a condition associated with many factors. The FDA has concluded that the scientific evidence supporting this claim is inconsistent and not conclusive."

Hailing a victory
Despite the fact that the wording of such claims makes them problematical for use on labels, the official recognition of magnesium's benefits has been seen as a victory for the industry.

"I'm delighted to learn that the FDA will allow the use of certain qualified health claims regarding magnesium and high blood pressure. Major kudos and Mahalo to Hawaii-based Andrea Rosanoff, PhD., the director of the Center for Magnesium Education & Research. Her team has been submitting data to the FDA for many years to make this claim possible," said Patrick Sullivan, Jr founder ad CEO of Jigsaw Health, which concentrates on magnesium products formulated with the company's MagSRT ingredient.

The Council for Responsible Nutrition, which participated in the submission of the petition on behalf of Rosanoff's magnesium centre, also lauded the development.

"We are pleased FDA recognizes the role of magnesium in reducing the risk of hypertension in addition to this essential nutrient's many other functions in the body," stated Andrea Wong, PhD, CRN's senior vice president of scientific and regulatory affairs. "CRN's contribution to the petition is an example of our continued commitment to scientific research to advance regulatory and nutrition policy change."

Sullivan noted that data from the company's recent Scottsdale Magnesium Study, which concluded in 2019, mirrors the evidence submitted to FDA that swayed the move on the qualified health claim. He said the study showed that MagSRT decreased participants' systolic blood pressure by 11% over a 90-dayperiod, dropping from an average of 145 to 129, and, significantly, those values returned to baseline by 30days after supplementation was ended.

"We chose not to publish this blood pressure data because — on the advice of regulatory counsel — we were concerned that even though we had good data, the FDA may penalize us for attempting to make a 'drug claim' "for Jigsaw MagSRT," Sullivan said.

Consultant Mark Miller, PhD, said blood pressure is a multifaceted phenomenon, and qualified health claims are called 'qualified' for a reason, so he advised caution on getting too enthusiastic about the development.

"The Qualified Health Claim by the FDA is an acknowledgment from the FDA that there is some evidence for a role of magnesium in reducing the risk for hypertension. However, the tepid nature of Qualified Health Claims may be confusing to consumers. They are not as compelling or evocative as an Authorized Health Claim." Miller said.

"Hypertension has so many contributing components to it, but magnesium may offer benefits by competing with calcium to limit vascular contractions and attenuating the outflow of the sympathetic nervous system. As such it has value, but proceed with caution," he added.