



PFNDAI

FOOD, NUTRITION & SAFETY MAGAZINE

BULLETIN OCT 2023

DAIRY INDUSTRY IN THE NEXT DECADE

Dr Atanu Jana

WHETHER A **FOOD** IS
SUBSTANDARD OR
UNSAFE: THE LAW IS NOT SILENT,
BUT QUIET FOR A REASON.

Dr Joseph I Lewis

**AGING
SUCCESSFULLY**

Dr. Shashank Bhalkar

DEHYDRATION OF
FRUITS & VEGETABLES

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FOOD SCIENCE AND
**TECHNOLOGY
EDUCATION IN INDIA**

ARE STUDENTS AND THE INDUSTRY
GETTING A RAW DEAL?

Dr V. Krishnakumar

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INDEX



COVER STORY 1

JRS India,
IFF,
Food Ingredient Specialities,
Bee Pharmo Labs,
Vasta Biotech,
Marico,
Fine Organic Industries Ltd,
Samyog Health Foods,
Mondelez,
Synergia,
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Editorial

Scientific Perspective By Dr Sesikeran

Regulatory Viewpoint By Dr Lewis

Dairy Industry in The Next Decade 1
By Dr Atanu Jana

Whether A Food Is Substandard or Unsafe: 9
The Law Is Not Silent, But Quiet for A Reason.
By Dr Joseph I Lewis

Aging Successfully 13
By Dr Shashank Bhalkar

Dehydration of Fruits & Vegetables 18
By Ms. Samreen Shaikh

Food science and technology education in India 23
Are students and the industry getting a raw deal?
By Dr V. Krishnakumar

Omega 3 Protects the Heart & Keeps Brain Alert 31
By Prof Jagadish Pai

Report on Regulatory Webinar on 35
Effectively Communicating with
Proper Labelling & Making Claims Confidently
By Ms Anuja Padte

Regulatory Round Up 40
By Dr Shashank Bhalkar

Research in Health & Nutrition 41

Food Science and Industry News 48

Regulatory News 54

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WORLD FOOD DAY & WORLD EGG DAY



October has two important days from food and nutrition point of view. One is of course World Food Day that is celebrated on October 16 every year. Just before that on second Friday of October, World Egg Day which this year falls on 13th October. I felt the two occasions can have some commonality.

Food of course is extremely important to all and we not only need to worry about the present deficiencies but in years to come we will be having increasing fear of deficiencies as unfavourable weather will cause some problems in agricultural production resulting in not just lower yields but the nutritional quality will also be affected.

One way of taking care of nutrition is by having eggs in the diet. This is of course for those who are not strict vegetarians. Even many vegetarians are okay with eggs. Some argue that since most broiler eggs in the market are unfertilised and do not make chicks when incubated.

Nutritionally they are not just good source of highest quality of protein but also have many micronutrients including vitamins A, D, E and many important B vitamins including B1, B2, B5, B6, folate and B12. They also provide fair amounts of iron and calcium. Earlier eggs were not considered healthy because of their cholesterol content but it is now acceptable that dietary cholesterol to some extent is not harmful at all and one or two eggs are recommended by national institutions.

Another advantage of eggs is that they are quite cost-effective so they could elevate the nutritional quality of diet without adding too much burden on the pocket. Indian poultry industry has grown substantially and has made efforts to distribute the eggs in different parts of the country to benefit both farmers and consumers.

As sustainability is the key word currently, egg production has excellent sustainability producing lowest amount of CO₂ among animal foods except milk. The inputs needed are also low with water and feed needed. Chickens are quite efficient in converting feed to egg so eggs will feature nicely in sustainable world.

As people already love egg preparations for breakfast and at other occasions, the egg derived ingredients are used in a variety of foods because of versatile properties. Such foods like sauces, sausages & breaded meat, pasta, salad dressings, sweets, baked goods, ice cream and others in a long list of food products use eggs to improve their texture and eating quality.

Thus, although the star of the sustainability show will be millets, but eggs will not be far behind and can perform an extremely useful role in production of sustainable and nutritious foods.

Prof Jagadish Pai,
Editor, PFNDAI





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FOOD FOR THOUGHT OR THOUGHT FOR FOOD



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The month of October is designated as World Breast Cancer Awareness month. WHO (Globocan 2020) showed that female breast cancer was the number one cancer constituting 11.7% of all cancers that occurred in that year.

When it came to patients dying due to cancer that year it was only 6.9% and less than lung, colorectum, liver and stomach suggesting a relatively better survival rates in breast cancer. Even in India among the number of new cancers in 2020 breast cancer was proportionately the highest at 13.5%, more than uterine cervical cancers which constituted 9.4%. Until late 70's, cervical cancers were the commonest in our country. It may be more than a coincidence that it was around this period that there was a significant change in

our lifestyles. Breast cancer is about a fourth (or 25%) of all cancers a woman is at risk throughout her life.



Like many other cancers the causes are multifactorial. Genetically prone women are less than 10%. A majority are associated with adverse lifestyles, unfavorable diets, very little physical activity and in a few the use of hormone replacement therapy. Staying within a healthy

body weight, reducing energy intake, consumption of whole grains, less of saturated fat, avoiding refined carbs and regular intake of a wide variety of fresh fruits and vegetables are broad guidelines to prevent breast cancer. It is also worrisome that Indian women are getting into the habit of consuming alcoholic beverages which is a risk factor. Lack of regular physical activity is a significant and evidence-based risk factor. In addition to diet, women of all ages particularly those who are in post-menopausal age should walk most days for at least 20 to 30 minutes even if they are physically occupied with household chores. The risks of developing breast cancer are slightly different depending on whether they are in the reproductive phase of life or post-menopausal. It was estimated in one study that almost 60% of breast cancer patients in India are above 50 years age.



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if this could increase the chances of getting breast cancer in those women. Limited data shows that there could be a slight increase in the risk, possibly related to some cytokines and growth factors like IGF1 and also because the predisposing factors like overweight, abdominal adiposity and decreased physical activity are also seen in diabetics.

Based on information available from across the world and considering the available strength of evidence the following recommendations would benefit most women

1. Use of whole grains and millets as partial replacement for refined cereals
2. Avoid or reduce any food that may have more sugar (recommended 5 tsps./person/day) or refined flour.
3. Prefer plant sources of protein than animal foods (legumes, pulses, beans) than red meat, processed meat and foods that use these non-vegetarian ingredients.
4. Prefer low fat or nonfat foods (e.g., low fat dairy or skimmed)
5. Soy foods are known to be beneficial in reducing risk of breast cancer and can be beneficial even in cancer survivors. The isoflavones in soy

though estrogen like have the opposite effect on breast epithelial cells.

6. Consume every day a variety of non-starchy vegetables, particularly the cruciferous variety like cauliflower, cabbage, broccoli, radish etc. and orange red ones rich in beta carotene like carrots and all varieties of greens. The recommended quantity is 400 g per day or more.

7. Fish and sources of n3 fats

8. Eat plenty of fruits particularly the ones with lots of fiber and a wide variety like pomegranate, plumes, guava, and a good colorful combination. Most antioxidants and anti-cancer bioactive substances are present in fruits and vegetables. Fruit juices lack fiber. Whole fruits are more nutritious.

9. Many of these suggestions are not directly related to prevention of breast cancer but indirectly act through better body weight, less body fat and a higher intake of anti-cancer substances present in natural foods.

We wish all women readers young and not so young to be aware and resist the temptation of an unhealthy lifestyle, regularly perform self-examination and periodic screening by professionals and stay cancer free all through their lives.

While emphasizing on advantages of ideal body weight, there is no evidence that temporary acute weight loss regimen reduces the risk. On the contrary a gradual decrease in energy intakes and a slow and steady increase in physical activity will benefit in significantly reducing the chances of developing breast cancer. Dietary advice does not override regular self-examination and systematic screening for the early detection of the disease.

Dietary recommendations are not meant only for risk reduction but also apply to breast cancer survivors to prevent chances of recurrence or another tumor on the opposite side and hence a reduced life expectancy. Since diabetes is highly prevalent in our country there has been a concern



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EMPOWERING THE CONSUMER



AUTHOR

Dr Joseph I Lewis,
Chairman, Regulatory Affairs,
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At a recent webinar, pre-conditions for effective labelling and making substantiated claims were explained in detail. Businesses were updated on the scientific and legal obligations, when placing information on a label. This makes food labels the most trustworthy piece of information for consumers. While it does help consumers make an informed choice overload and complicated information needs reviewing.

As detailed out, there is a whole list of declarations to be made; more than 20, 11 of which concern nutrients. From 2008, every food label declared 4 nutrients, energy, fat, proteins and carbohydrates (including sugars). These declarations are product centric, since only amounts were required. Since then (2020), declarations have increased from 4 to 11. Requiring products to also declare nutrients which are naturally not present e.g., oils declaring salt, protein, carbohydrates is pointless. Too much information is

overwhelming for the consumer.

Additionally nutrient amounts must now also give its percent in context of the total diet (RDA), thereby moving to another level: from product to the diet. There are several complicated calculations for the consumer to correlate product contributions to the diet. Nutrient amounts read at purchase is given by weight (per 100g or 100ml). Food is consumed by volume - not weight - conveyed by household measures (cup, tablespoon, bowl, 2 rotis). Converting from one to the other is just one of many steps. Placing a food in context of the diet which changes daily through a multitude of contributing products prepared at home or ready to eat at best is challenging. Few, if any know total nutrient intake from daily diets.

Effectively communicating with consumers is not the same as hasty oversupply. Western countries and regions commenced nutrition labelling early 1990s and introduced changes progressively over time. A single notification as late as 2020, required four changes: increase in nutrients declarations, juggling 100g/ml and serving size, percent daily

amounts, and the impending FoPNL. The latter needs research findings on exposures from packaged foods and home cooked meals for effective consumer communication. A graphical input in serving size in addition to nutrition information panel in 100g/ml is another complexity.

Other compliance challenges are with requirements crisscrossing over several regulations. General labelling regulations applicable to all foods should address the subject comprehensively. Where category profiles differ significantly a separate standard may be called for e.g., health supplements.

Then there are certain ingredients and nutrients which at threshold amounts provide nutrition and health benefits for the consumer. While labelling is mandatory, claims are not. FBOs however may choose to make these known. While the benefits claimed are to be supported by appropriate science, conveying them should be truthful and not misleading. Often this is not the case when compelling language is used to grab consumer attention.

Speakers and industry experts shared a wealth of information, opinions and advice on requirements and compliance. Labelling is a three-way conversation between a food product, the diet and the consumer. And this conversation happens at two occasions: purchase and at consumption. Conversations have context... and so should labelling.

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DAIRY INDUSTRY IN THE NEXT DECADE



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Overview of Indian Dairy Industry

India is the top milk producer in the world, handling ~ 23% of the world's milk production. The CAGR in milk production is 6.2%. In 2020-2021, milk production reached 210.0 million tons. The top milk-producing Indian states are Uttar Pradesh (14.9%), Rajasthan (14.6%), Madhya Pradesh (8.6%), Gujarat (7.6%), and Andhra Pradesh (7%).

To create and/or modernize the milk processing, chilling and value addition, infrastructure towards components milk processing, chilling and value-added products facilities under Dairy Processing and Infrastructure Development Fund (DIDF) as on 31st May, 2023, 37 projects were approved with total outlay of INR 6,776.86 crores



(www.pib.gov.in/PresReleaseDetails.aspx?PRID=1935657). An interest subsidy scheme to help Private and Small businesses invest in Dairy and Livestock feed plants - predicted to generate 3.5 million jobs. The Ministry of Food Processing Industry (MoFPI) has issued operational scheme guidelines and started an Internet-based platform for the 'Production Linked Incentive Scheme for Food Processing Industry', with outlay of \$ 1.4 billion.

Biotechnological approaches towards increased milk yield
Some of the salient steps that have been adopted to enhance milk yield include:

- Administration to dairy cows of a Genetically Engineered hormone **Recombinant bovine somatotropin (rBST)** that increases feed efficiency and milk yield. Although US FDA has cleared it and allowed sale without declaring its use, the safety has been questioned and will take some more studies to clear it.
- **Multiple Ovulation and Embryo Transfer - MOET**. Use of drugs to induce multiple ovulations in cows, subsequent collection and fertilization of eggs produced and transfer of such embryos to recipient cows.

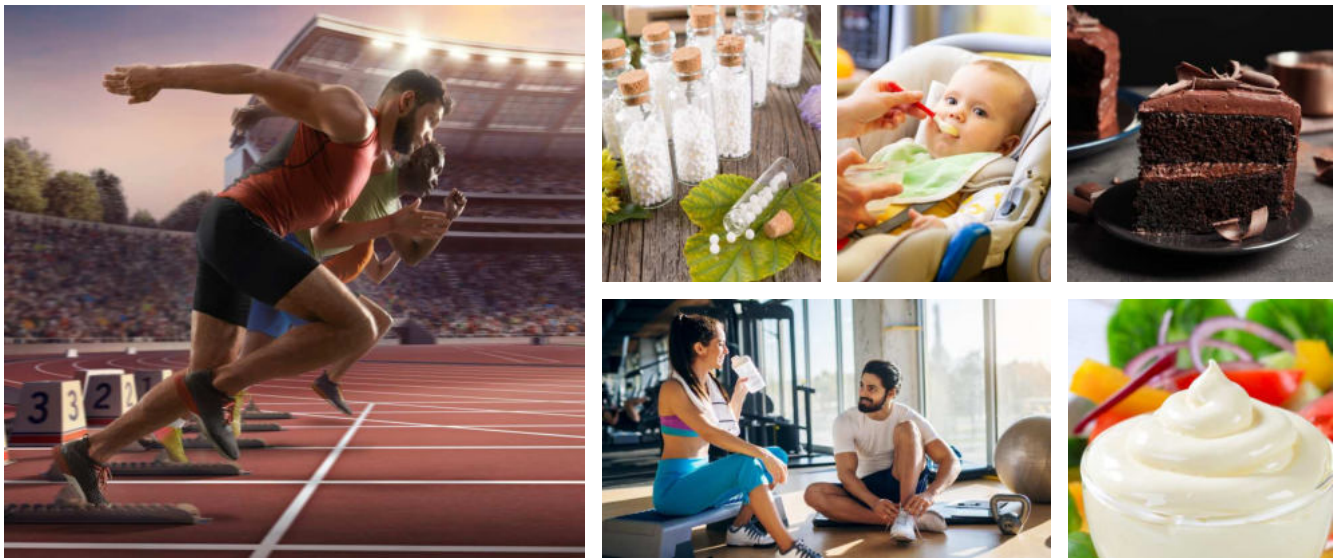
These two biotechnological approaches have been adopted in USA.





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HTST pasteurized milk.

- Membrane processes (viz., UF, RO, MF, NF) - yields retentates having protein in native state and economy in concentration of milk solids

Dairy ingredients - that adds value to dairy/food products

Owing to harnessing of newer technological approaches, newer highly adoptable dairy protein ingredients have evolved with time (Jana 2022). These include:

- **Milk Protein Concentrates** - MPC42, MPC70, MPC80 & MPC85; Milk Protein Isolate (MPI) 90 (numerical indicates protein content in powder)
- **Whey Protein Concentrates/Whey Protein Isolates** - WPC32, WPC72; WPI 92
- **Micellar Casein powder** (83% protein, 1% fat, 1% lactose, 5% moisture) Provides heat stability, viscosity, water binding in retort processed foods, including protein-fortified soups, sauces and RTE meals

Technological interventions in producing dairy foods

Some of the recent technological interventions that are being adopted in dairy industry includes:

- High Pressure Processing/Micro-particulation (yielding 'Simplese' as a fat substitute)
- Pulsed Electric Field (PEF) processing - PEF treatment has achieved a reduction in the microflora of milk providing shelf life similar to that of

- Induction heating for cheese processing - Pizza cheese has been plasticized to form the cheese mass through Induction cooker heating, providing superior recovery of milk solids in product.
- Extrusion processing - Extruder Cooker (specifically boon to produce 'Texturized dairy proteins')

Conventional Vs. Novel ingredients

Nowadays novel ingredients have been explored looking to the functions such novel ingredients are supposed to contribute in food systems. Some of the notable newer ingredients are as follows:

- Fat substitutes (Simplese, Olestra, etc.) - required to simulate milk fat in reduced-, low- or fat-free foods
- Bulking agents (Polydextrose, Pullulan, Polyols, etc.) - they help in compensating for the loss of TS through reduction in say sugar, fat and sugar, etc. in food systems.
- Intense sweeteners (i.e., Stevia, Aspartame, Sucralose, etc.); Freezing point depressant sweeteners (i.e. Glycerol, glucose, fructose, etc.)
- Anti-caking agents (Na-Al-silicate)
- Bleaching agents (Benzoyl peroxide,



Titanium dioxide, chlorophyll) - required to bleach yellow colour conferred by β -carotene to produce whiter Mozzarella cheese from cow milk

- Enzymes as food additives (β -D-galactosidase, Transglutaminase) - former enzyme to produce 'low-lactose milk'; second one to increase cheese yield

Wellness dairy foods

The repercussions of pandemic have revealed the importance of exploring for food that boosts health and immunity. Some of these include:

- Conjugated Linoleic Acid (CLA) enriched milks - serves as anti-cancerous agent
- Probiotic fermented foods - significant for gut health, immunity boosting
- Low-fat, low-cholesterol foods-Important for tackling non-communicable life-style diseases
- Low-salt dairy delicacies - to combat hypertension
- Fibre enriched dairy foods - for improved bowel movement





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2015. The US is the largest market for 'lactose-free food', accounting for 29% of global sales in 2015. Nearly three quarters of Indian population are suffering from some degree of lactose intolerance

(based on study in Lucknow).

Diets rich in linoleic acid lead to increase in the CLA levels in milk fat 2-fold. Incorporation of CLA along with soy oil in the diet of cows increased the CLA levels and simultaneously decreased SFA in milk fat. Milk from grass-fed cows has 5X greater CLA vs. milk from grain-fed animal (Dhiman et al., 2000).

Ultraviolet processing of milk

Photo-purification uses UV light to inactivate pathogens can possibly outstrip pasteurization of dairy products in future (SurePure in South Africa) (Arthur, 2014). Such technique uses radiation at germicidal wavelength of 254 nm which inactivates pathogens, including virus. Such process is claimed to provide big energy saving (heat is not required). UV treatment of fruit juice is approved by FDA in US. Figure 1 depicts the photo-purification equipment for milk processing.

In Cheddar cheesemaking, UV treatment did not inactivate enzymes for flavour and texture development; food safety standards were also achieved.

Lactose-free dairy products

Lactose intolerant persons cannot consume milk/milk products owing to presence of milk sugar - lactose. Lactose in milk or whey can be hydrolysed using β -D-galactosidase, making them amenable to be consumed by even such lactose intolerant individuals.

Globally, lactose-free dairy and ice cream products achieved 10% value gains in



Gujarat Cooperative Milk Marketing Federation (GCMMF - Marketing giant of AMUL) was the first dairy company to introduce 'lactose-free milk' in India under its AMUL brand.

Conjugated Linoleic Acid (CLA) milks

CLAs are reported to inhibit carcinogens, proliferation of leukaemia, colon, prostate, ovary and breast cancers. Dairy products are rich in CLA - especially fermented products, a product synthesized in the rumen during bio-hydrogenation of linoleic acid.

Melatonin enriched milks

Sleep disorders like insomnia can be overcome by consumption of Melatonin-enriched milk. Melatonin acts as a terminal antioxidant which can mitigate various life-style diseases. Release of melatonin is 3-4 X higher in milk, let down before sunrise

vs. milked during day time. The secretion of melatonin in different individuals varies according to their age, gender, and seasons.

The concentration of melatonin is higher in winters vs. summers. The concentration of melatonin also varies with the type of milk in line with CLA in different milks.



Membrane processes in the Dairy Industry

The integration of membrane processing (UF, NF, MF, RO) has been implemented throughout the milk and dairy processing chains.

The applications of such membrane processes include Milk reception, Cheese making, Whey protein concentration, Fractionation of protein hydrolysates, Waste stream purification and Effluents recycling and treatment.

Microfiltration - Significant membrane process

The first industrial plant of **Microfiltration** was installed in Sweden which increased the shelf life of pasteurized milk, owing to the high retention of *Bacillus cereus*; shelf life increased to 16-21 days (vs. 6-8 days for conventional) with attendant improved flavour.

Several hundreds of these systems (10,000-20,000 L/h) are currently running in Europe and North America for producing drinking milk. MF is used in an integrated protein extraction process for the manufacture of Micellar casein products and whey protein

isolates. Concentration by ultrafiltration (UF membrane pore size ~ 10,000 Da) of the milk microfiltrate directly produces **WPC** with a protein/TS ratio of 77%; can be increased to > 90% by diafiltration to produce **WPI**.

Nanofiltration - another membrane process of significance

Industrially, demineralization of whey in the range 50-95% can be achieved by electrodialysis (ED) or ion exchange (IE). NF makes it possible to achieve the concentration of dry matter (20-22% at VCR 4-5) and demineralization (25-50% and even 90% with diafiltration step) in a single operation. The process is competitive to RO and ED (Saini et al., 2019).

Commercial health-promoting dairy based probiotic products

Probiotics are defined as live microorganisms that, when administered in adequate amounts, confer a health benefit on the host. Probiotic cell counts of 10^6 - 10^8 cfu/g is perceived as adequate for reaping probiotic benefits. Probiotic foods are gaining



acceptance amongst the consumers day by day. Fermented dairy products provide an ideal atmosphere for delivering probiotic bacteria to the human body. Probiotics have been reported to be effective in treating a variety of diarrheal illnesses, modulating immunological function, prevent colon cancer, and alleviating chronic gastrointestinal inflammatory disorders.

Among food industries, the dairy industry is the largest sector where probiotics are employed in a number of dairy products viz., sour/fermented milk, yogurt, cheese, butter/cream, ice cream, infant formula, etc.

Some of the popular commercial health-promoting probiotic products mentioning the probiotic strains they are using is as under.

Sr.No.	Probiotic products	Probiotic strains
1	Amul Prolife probiotic ice cream	<i>L. acidophilus</i> , <i>L. bulgaricus</i> , <i>L. lactis</i> , <i>L. cremoris</i>
2	Yakult, Japan	<i>Lactobacillus casei</i>
3	Symbalance yoghurt, Switzerland	<i>L. reuterii</i> , <i>L. acidophilus</i> , <i>L. casei</i>
4	LGG Milk, Japan	<i>L. rhamnosus</i> GG
5	Bacilac, Belgium	<i>L. acidophilus</i> plus <i>L. rhamnosus</i>
6	Culturelle capsules, USA	<i>L. rhamnosus</i> GG
7	Crunch and Yoghurt, General Mills, USA	<i>L. acidophilus</i> , <i>L. bulgaricus</i> , <i>S. thermophilus</i>



buttermilk - can be used for standardizing milk in place of skim milk too

- Utilization of UF permeate - helps in reduction of waste water load (managing BOD)
- Utilization of Ghee residue - examples include ‘Caramel-chikki ice cream’ in which ghee residue is encased in chikki; ‘Rava buttermilk eggless cake’, etc.

showcases the market share of Indian dairy products.

The expansion of the food service industry stems on the emergence of global fast-food chains over the past two decades. Dairy products are key ingredients to pizzas. Pizza Hut (global sales US \$5 billion) and Domino’s Pizza (global sales US \$3.2 billion) play a major role in encouraging standardization of product (Pizza cheeses) and through their buying power, place downwards leverage on dairy producers’ pricing.

Ice cream novelty - Glow in the Dark

British ice cream wizard Charlie Francis created “Glow-in-the-dark ice cream” using synthesized jelly fish proteins - that allow marine organisms to produce light inside their bodies through ‘bioluminescence’.

Frozen dessert with improved dental health

The optimum Ca:P ratio needed to prevent dental mineral erosion, was said to be approximately that for tri-calcium phosphate, achieved by adding at 2.0-2.5% to the acidic agents (i.e., providing 600 µg/ml Ca and 300 µg/ml P).

Ice lollies/Sherbets/Ices utilizes acidic fruit juices and tartaric acid is used to impart desired tartness. These are deleterious to the teeth health.

Utilization of Dairy By-products

Through use of appropriate technologies, in some cases the by-products may fetch higher returns than the source from which it was produced. Few examples of utilization of dairy by-products includes:

- Utilization of Whey; source - Cheese, Paneer, etc.
- Utilization of Sweet

Dairy commodity trends

In recent years, there is increased consumption of UHT milk, use of new packaging technologies, and replacement of full cream milk with ‘Specialist milk types’. The long-life shelf capacity of UHT milk facilitates greater distances between sites of milk production and places of milk consumption. Figure 2

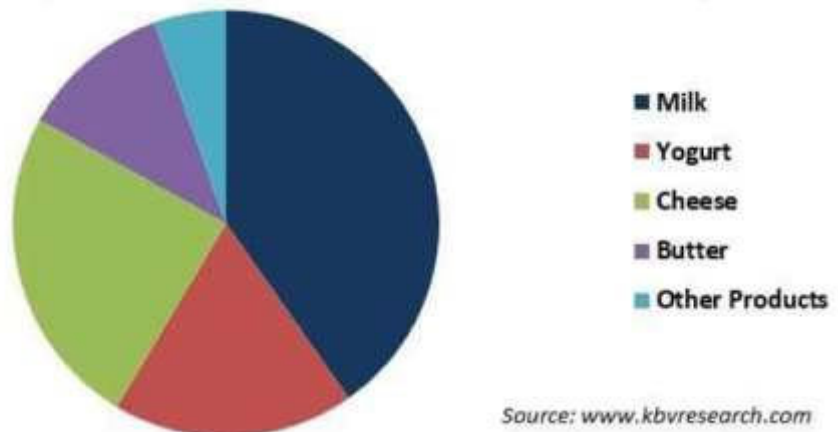


Adoption of Solar Technologies

To promote solar energy in industrial process heating, Govt. of India has implemented UNDP-GEF supported project (Sharma et al., 2017) aimed to promote and commercialize Concentrating Solar Technologies for industrial process heat applications. In Indian dairy industry context, solar process heating potential of 1.88 PetaJoules (PJ) per annum was estimated.

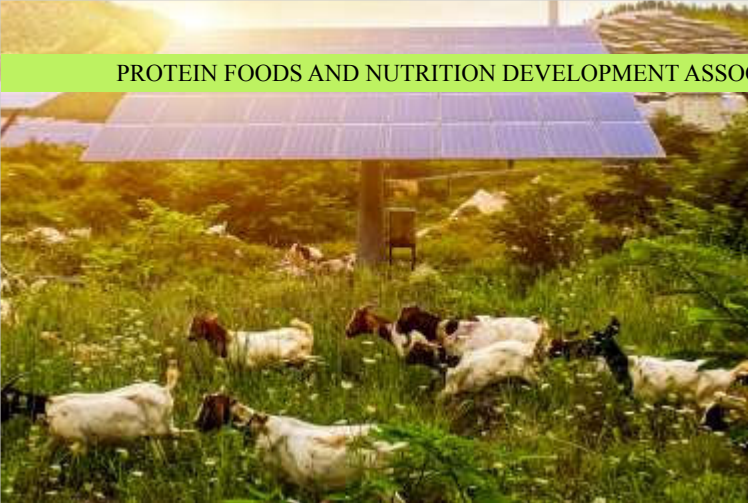
Figure 2. India’s Dairy products market share, 2020

Dairy Products Market Share, By Product Type, 2020



Source: www.kbvresearch.com

Source: www.precedenceresearch.com



pathway that would be followed include (a) Dairy evolution, (b) Green dairy, (c) Dairy based functional food, (d) Synergism of dairy with other food ingredients, (e) Dairy food



Dairy sector has large potential for solar energy-based process heating to meet its demand viz., pasteurization, other thermal energy requirements. Such solar energy-based heating is estimated to meet 20-30% of total process heating demand of milk processing in the organized dairy sector. This translates into potential for Solar collector area of > 1.62 million m² using such system.

specifically for each segment of people. India's share in international trade of dairy products will showcase an upsurge. In short, "The Prospects of Indian Dairy Industry is very Bright"

Conclusions

The India dairy market size is projected to grow from INR 124.93 billion in 2023 to INR 227.53 billion by 2030, at a CAGR of 8.94% during the forecast period (www.fortunebusinessinsights.com). The futuristic

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WHETHER A **FOOD** IS **SUBSTANDARD** OR **UNSAFE**: THE LAW IS NOT SILENT, BUT QUIET FOR A REASON.



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Whether a food is deemed to be substandard or unsafe if colouring matter exceeds the prescribed maximum limit was a submission made before a parliamentary committee. It said the law is silent; and cited clause (3zz), which reads “unsafe food” means an article of food whose nature, substance or quality is so affected as to render it injurious to health; and read with sub-clause (viii) by the presence of any colouring matter or preservatives other than that specified in respect thereof. The submitter, from an enforcement perspective then proposed an addition to the sub-clause: “if the amounts of the prescribed colouring matter which is present in the food article is not within the prescribed limits of

variability”. The rush to solve without knowing and suggesting the law is silent is presumptuous. The law is not silent, it is quiet for a reason.

Meaning emerges when texts are read as a whole, especially if they are separated. Reading something in isolation may favour a narrow or myopic viewpoint. It is relevant to recall Aristotle, when searching for meaning in a bunch of texts: “In the case of



all things which have several parts and in which **the totality is not, as it were, a**

mere heap, but the whole is something besides the parts; there is cause”. He speaks of the whole being something else besides its parts, which calls for a deeper appreciation of the whole – how it comes to be and what caused the parts to become a whole/totality. The keyword here is cause. The invitation here is to find “the cause” that will resolve the dilemma in classifying failures as substandard or unsafe.

What makes a food substandard: Section 3(zx) begins by saying “an article of food is deemed to be substandard if it does not meet the specified standard **“but not so as to”** render the food unsafe”. FDAs unhesitatingly and routinely declare failures substandard when ingredients, their components, including vitamins and minerals do not meet specified limits. Examples are percent milk solids non-fat (% SNF), or fat content in milk. In case of edible oils, it is % FFA, % moisture, SV, IV etc. Even a market sample of edible oil testing less than the minimum prescribed amount of vitamin A (4.25 µg/g) and vitamin D (< 0.05 µg/g) is classified as substandard. Mineral matter (component of foreign matter) above 0.25% is substandard.

VITAMIN D KI TAAKAT





Whole black pepper containing 17.6% (max. limit 5%), light-coloured berries is substandard. Vegetable sauce is substandard, because %TSS and % acidity fall below specified limits.

To be classified substandard two conditions must be fulfilled. One is of the food not meeting the specified standard - and the second part- in doing so it does not render the food unsafe. The key words “but not so as to” render the food unsafe” suggests where there is no cause in the failure to render the food unsafe, it may be declared substandard. Even to declare a food substandard, cause must be found.

What makes a food unsafe: Section 3(zz) cited above, lists through subsections (i) to (xii), the many ways a food “is so affected” “as to render it injurious to health. Something done must be impactful enough to make the food injurious to health. Of interest here is sub-clause (viii) “by the presence of any colouring matter or preservative “other than that specified”. The presence of unspecified food colour would so affect the food as to be injurious to health. In the

case of permitted food colours, their presence is not likely to affect the food as to render it injurious to health. It does not say anywhere that exceeding specified limits may render a food injurious to health. The additional text proposed (para 1) by the submitter is misplaced. Words ought to serve the intention, not a misplaced version of it.

Several other sections describe how a food may become unsafe. In 3(a) an adulterant can make a food fail and the failure classified as unsafe or substandard or misbranded. In 3(i) extraneous matter, which may be carried from the raw materials, packaging materials or process systems used for its manufacture or which is added to it, but such matter does not render such article of food unsafe. In 22 (4), proprietary and novel food|| means an article of food for which standards have not been specified but is not unsafe. They do not say what makes a food unsafe.

So, when does a food colour become unsafe: It is appropriate to recall Paracelsus oft quoted dictum “What is there that is not poison? All things are poison and nothing is without poison. Solely the dose determines that a thing is not a poison.” In modern times, it is the threshold concept of “no observed adverse effect level” (NOAEL) and the Acceptable Daily



Intake (ADI) arrived at after applying a 100-fold safety factor. It is defined as the daily intake of a substance which, over the entire life time of a human, appears to be without adverse effects or harm to the health of that human.

Different maximum limits are allotted to foods; sweets are permitted 100ppm and jams 200ppm. These limits are not cut off points that ‘so affect the food’ as to render it injurious to health. Foods per se are not rendered injurious to health when its specified maximum limit of colour is exceeded. A condition injurious to health exists only when the total amount of colour additive consumed from all foods on a daily basis exceeds the ADI. Exposure assessments monitor a population’s intake so that they are not put at risk. This is a preventive measure that predicts an unsafe event from happening, required u/s 16(3b) of the Act.



Why are different limits set:

The setting of limits is generally expressed as maximum limits. They are assigned for technological reasons and in quantities sufficient for purpose. And so, different foods/categories have different limits; some higher some lower. A vehicle passing a nearby school or marketplace, has a 40 kmph speed limit. However, no motorist after passing through, continues driving at this speed including on an expressway.

Limits change from 40 to 100 kmph. There is context for setting different speed limits. Likewise, different limits are set for jam(200ppm) and sweets (100ppm). These are legal limits, not safety limits. If a food is 'so affected as to' render it injurious to health by mere exceedance of 100 ppm, but not when another is permitted 200ppm, calls for sound reasoning.

The problem has arisen as a consequence of analytical laboratories classifying failure, without finding cause. For example, in the medical space, a physician consulted on an ailment or illness, after

examination, orders for blood tests, lipid profile etc., from a diagnostic laboratory managed by qualified medical professionals.

Test reports routinely show results against standard parameters/range values. No opinions are given nor conclusion drawn on whether the patient referred is diabetic, or with CHD implications. The physician on reading the lab report along with his findings arrives at cause and prescribes remedies. The functional role of a risk assessor (diagnostic lab) and risk manager (physician) is well understood and practiced. The role of the food analyst and food safety officers under a risk-based Act, needs review.

Typically test reports conclude a food unsafe if (a) it contains an unspecified colour; (b) it exceeds the prescribed limit of 100ppm; (c) the presence of a permitted colour where none is permitted. The Act is not silent, instead it loudly proclaims that finding how a food "is so affected to", or "but not so as to" render a food unsafe is necessary.



Exceeding permitted colour limits has a long history of noncompliance, so much so it is now standard practice to call for greater vigilance at festival time. If the observation is that certain foods permitted 100ppm limits fail more often than those permitted 200ppm, there is a need for examination. If increased limits are technologically justified, exposure assessments would project the increase in risk.

Finally, this article is only a perspective and not an interpretation of law. The purpose is to stimulate open and transparent discussion, particularly when amendments or changes are suggested and acted upon without understanding or explanation.



AGING SUCCESSFULLY



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Aging is an inevitable process of gradual change that occurs in the post-maturation phase of an individual. Many physiological changes occur during aging. The changes occur in all the body cells, tissues, and organs. This affects the functioning of body systems. The changes are slow and not noticeable immediately. These changes could be for the reasons which are non-modifiable and are genetic. They are also because of factors which are modifiable such as lifestyle, nutrition, and physical activity. Post retirement which is around age of sixty, these factors in individuals suddenly change. For example, people who travel a lot in their job, suddenly reduce or stop travelling after retirement. Their diet, physical activity,

in fact the whole life changes. Such a sudden change in activity might trigger the aging process.

There are many theories which try to explain aging. Aging is not predictable unlike adolescence. Some theories explain that the aging is result of injuries because of UV light over the time, wear and tear of body. Most gerontologists believe that the aging is interaction of lifelong processes. The influencing factors could be heredity, environment, culture, diet, past illness, physical activity etc.

Most of the bodily functions are on peak at thirty before the decline starts gradually. Organs start functioning less during aging. This is the result of cells dying but not being replaced. The number cells in testes, ovaries, liver, and kidney decrease markedly as body ages. However, the organs like brain do not lose many cells. The changes happen in most of the body organs. Bones become weaker

due to loss of calcium. This is the result of less calcium being absorbed. Cartilage, ligaments become thinner making joints stiff. There is a loss of muscle mass. Body fat increases and becomes virtually double that of it was in young adulthood. Increased fat can lead to health risks.

Changes in eye also happens which include loss of near vision, need of bright light, and changes in colour perception. Dryness of eyes happen. Aging leads to hearing loss. There is loss of smell and taste. Skin becomes thinner, less elastic and wrinkled. Blood flow to brain decreases affecting brain functions. Therefore, older people react slowly.

At a later stage say at seventy, short term memory, vocabulary, ability to learn new things get affected. Despite changes like stiffer blood vessels and filling of heart with blood slowly, it functions well like young heart. Because of some changes like decrease in number air sacs and

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Disease. Degenerative diseases such as osteoarthritis or osteoporosis are very common in aging. Eyes face issues like cataract or age-related macular degeneration. Hearing loss is common in advanced age.

capillaries, slightly less oxygen of air is absorbed by the lungs. Lungs are more prone to infections. Digestive system is less affected except there may be lactose intolerance developed for a few. Bladder cannot hold more urine and there is less control over urination. In men there is enlargement of prostate glands. The cells of immune system act more slowly.

Most of the bodily functions start declining in the process of aging. This results in the people are prone to some of the ailments and diseases. Cardiovascular disease occurs as a result of narrowing the arteries supplying blood to heart. Strokes happens because of obstruction of blood flow to brain because of blood clot or could be because of rupture of arteries leading to bleeding in brain. High blood pressure happens with increase in age.

Elderly people are more prone to cancer where there is abnormal growth of cells. Prevalence of Type 2 Diabetes rises after the age of 45. Neurological disorders like Parkinson's disease or Dementia are the result of brain malfunctioning. Less flow air into lungs causes Chronic Obstructive Pulmonary

Today, India is at demographic advantage in the world. According to a report published by Earnest and Young, by 2030 India's share of working age population will reach highest level of 68.9% and dependency ratio at the lowest point of 31.2%. This in turn will have huge positive impact on economy. Median age of population above 65 is just 7%.

However, this demographic dividend advantage will be lost soon. According to United Nations Population Fund, by 2050 every fifth Indian will be an elderly person. This is as a result of rise in the life expectancy because of various factors such as increased health care facility, and reduced morbidity. This throws major challenges for India to prepare herself with health and social systems to be ready. There are several challenges for a country with aging population. There is increase in dependency ratio. If the retirement age is fixed, there will be more people claiming benefits and fewer working and paying more taxes.

There must be more spending by government for healthcare

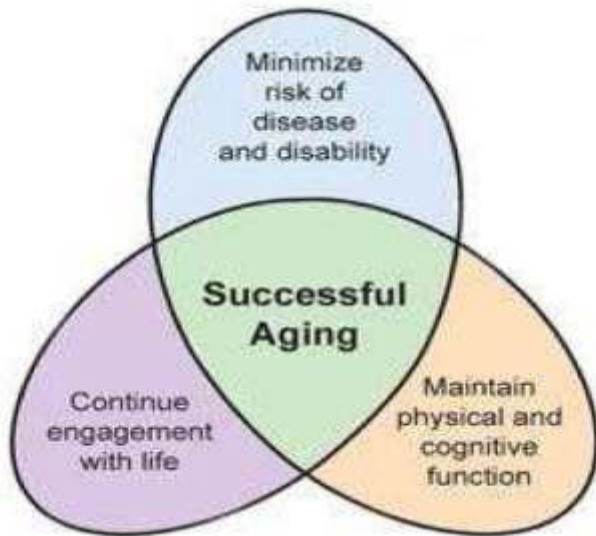
and pensions. This also means a shortage of workforce as the working population decrease. This problem of aging is not specific to India but it is global. WHO has taken note of these demographic trends and thinks the policies to be framed accordingly. UNGA declared 2021 - 30 as UN decade of "healthy aging". The aim is reducing health inequalities and improve the life of people.

"Healthy aging" or "Successful aging" refers to ability to maintain health, function, and social engagement in later life. This term is popularised by John Rowe and Robert Kahn in the article in Science in 1987. They propose that successful aging involves three factors viz. freedom from disease or disability, high cognitive and physical abilities, and meaningful interaction with others.





This is nicely explained in the following diagram.



To have healthy life for elderly which is free from disease there is need to have proper nutrition which meets needs of bodily changes with aging. Older adults need lower calories but need higher levels of some nutrients (nutrient dense foods) as compared to younger people. These nutrients are protein, vitamin D, calcium, and vitamin B12. More proteins are required to make up muscle loss during aging. Protein rich diet with resistance exercise is more beneficial. More fibre needs to be consumed to help bowel movement and thus avoid constipation or diverticular disease. In older age less calcium is absorbed and thinner skin leads to reduction of ability to make vitamin D.

Therefore, more calcium and vitamin D has to be consumed through diet or supplements. Vitamin B12 is essential for making RBCs and healthy neurological functioning. 10 - 30% people over age of 50 have reduced ability to absorb B12 from diet. Vitamin B12 in diet is bound to proteins which get separated in stomach because of the acid. Elderly produce lesser acid and therefore absorption is reduced. That is why there is need to have B12 supplements or consuming foods fortified with B12. There are other micronutrients like potassium, omega 3 fatty acids,

magnesium and iron which are important for elderly. Water forms 60% of the body weight and it is important to remain hydrated. Elderly people are prone to dehydration for various reasons. Reduced ability to detect thirst through receptors found in brain. Kidneys lose the function of retention of water. Therefore, drinking sufficient water is critical. Elderly loses the ability of taste and smell and therefore eats less leading to undernutrition. Of late, the importance of Probiotics supplementation is being understood. Aging alters intestinal microbiota where probiotics help maintain the gut health. Care should be taken to have sufficient diet which is healthy.

Exercise is equally important to remain active and healthy. This should be regardless of one's physical abilities. One may use gym or physiotherapist. Indian philosophy has always stressed upon importance of Yoga for healthy living. Yogic exercises are beneficial in many ways. They help prevent osteoporosis and strengthen the bones. Reduce anxiety, heart rate, blood pressure. Yoga improves sleep quality. Sound, long sleep is essential for healthy living. Overall balance, flexibility and mobility is improved.

High cognitive ability or mental well-being is the second aspect of Healthy aging. Physical health is dependent on mental health. As brain cells grow throughout the life, it is possible to delay cognitive decline. This could be achieved by many ways. Challenging brain by puzzle solving, and learning new hobby. By keeping busy by working as volunteer or part time or doing the work which satisfies oneself. Most important is to stay positive. Finally, it is also important to stay connected socially. Keeping in touch with old friends or making new friends, traveling when possible, staying connected with social media or even enjoying with grandchildren are some of the ways to stay socially active.





on issues of women and lived for almost ninety years. We have another living legend “Amitabh Bachhan” who is active at 80 in Bollywood. “World Senior

Thus, aging is a natural process which need not be dreaded. One can gear on in life early by inculcating right kind of diet and lifestyle to deal, which will help delay the process of aging making the life enjoyable. The people with “successful aging” remain active and are not dependent on society. In fact, they keep on giving back to society. They are “Modern Rishis” who still contribute in their fields with all the knowledge and expertise they have gained throughout the life.

They could be from any field. It could be Dr APJ Kalam who lived for more than eighty years and was very active and contributing in space science. Asha Bhosale who is very active at ninety in the field of music Or Ela Bhatt who contributed in the social field

Citizens’ Day” is celebrated every year on August 21st which is for honouring priceless contributions made by Senior Citizens.



HEALTHY AGING IS NATURE’S GIFT FOR A DISCIPLINED YOUTH

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DEHYDRATION OF FRUITS & VEGETABLES

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There are different types of food preservation methods like freezing, canning, vacuum packaging, irradiation, adding preservatives, and the most popular among all is drying or dehydrating. Drying is one of the most effective ways of preserving food, which involves the removal of water. Almost all food products, whether raw or processed, are preserved by drying. Food products can have moisture content as high as 90% or more, microorganisms grow well in food containing high moisture, therefore it is important to eliminate moisture to an acceptable level to avoid microbial growth (1).

Drying Fruits & Vegetables has been practised for long. Since fruits & vegetables contain high moisture, microorganisms are most likely to grow and spoil the product. Water is essential for biochemical reactions as well as for the growth and multiplication of microorganisms. So, to avoid this situation moisture is removed from them. Almost all types of fruits & vegetables

are preserved using the drying method. (2).

Advantages of Drying Fruits & Vegetables:

There are many advantages of drying fruits & vegetables. Dried products are nutritious, lightweight, easy to use, easy to prepare, and take less storage space. Dried fruits &



vegetables are high in carbohydrates, and fibre, and low in fat making them healthier. Drying is a healthy way to preserve fruits and vegetables. Dried fruits & vegetables do not need any refrigerated storage; they can be stored at room temperature. The shelf life of dried fruits & vegetables is very much longer as compared to the fresh ones. They are rich in many vitamins and

minerals. Dried fruits and vegetables contain a considerable number of antioxidants (3).

Dehydrated foods also maintain their nutrients for much longer than their fresh counterparts. Research shows that fresh produce loses its vitamin, mineral, and antioxidant content within a few days of refrigeration. Drying increases the fibre content of fruits & vegetables. Dietary fibre is very essential to maintain your digestive system and it helps to prevent constipation, diarrhoea, etc. In the case of fruits, when water is removed from them, the sugars that were dissolved in their juice remain in the dried flesh. This means that the dried slices of fruit will contain a high concentration of natural sugars and will have a sweet and more pleasant taste than the fresh fruits.



Processing of Fruits & Vegetables before Drying (4, 5):

Fruits & Vegetables undergo processing before drying. Pre-drying treatment is an important step as it generally improves the quality of the dried product. Pre-drying treatment helps to preserve the colour and flavour of fruits & vegetables, minimizes nutrient loss, slows down or stops the enzymatic action, & increases the shelf life. Fruits & Vegetables are first selected and sorted based on size, maturity, and ripeness, they are then washed to remove dirt, dust, and any other material, peeling (for some fruits & vegetables), cutting, blanching (for some fruits & vegetables), sulphuring, drying, packing & storage.

Blanching is an important step as a pre-drying treatment. It exposes fruits & vegetables to boiling water. It helps to reduce the number of microorganisms present on the surface. It helps to preserve the natural colour of dried products. It helps to slow down or stop the enzymatic activity that can cause loss of colour, flavour, etc. of fruits and vegetables. After the blanching is completed, the blanched products should be dipped in ice water to prevent over-blanching or further cooking. Sodium Bicarbonate is added to the blanching water when green peas or other

green vegetables are blanched. It raises the pH of the blanching water thereby preventing the green colour of chlorophyll to change into pheophytin, which causes olive-brown colour. In the case of fruits, blanching is done depending on the types of fruits.

The final step in the pre-drying treatment is colour preservation. Fruits are treated with sulphur dioxide due to their antioxidants and preservation properties. Sulphur dioxide prevents the oxidation of fruits thereby improving their colour and preventing darkening. This is generally observed in the case of sliced fruits, which often darkens due to oxidation. SO₂ also prevents Carotene and Vitamin C in fruits, which are very essential nutrients. The amount of sulphur dioxide used should be in limit so that it does not affect the flavour, colour, or nutritional value of fruits. Most of the vegetables are treated with sulphite solution to prevent browning.

Factors affecting drying rate:

Various factors affect the drying rate of fruits and vegetables. These factors include the initial moisture content of raw material, composition, shape and size of the product, the temperature of drying, humidity, pre-treatments used before drying, etc.

The temperature should be properly maintained and should be constant throughout the drying process. If the temperature is too low with very high humidity, then the product will dry slowly which

can lead to microbial growth. On the other hand, if the initial temperature is too high then a hard layer will develop on the surface of the fruits and vegetables, which will prevent the moisture to escape from the interior part and the moisture, will be trapped inside. If the temperature is too high at the end of the drying process, it can tend to scorch the product (6).

Size and shape also are important factors that can affect the drying rate of fruits and vegetables. Smaller pieces take less time to dry as compared to large pieces. Smaller size fruits and vegetables take less time to dry due to the larger total surface area for mass transfer, compared to larger pieces. The shorter drying time can also improve the quality of fruits and vegetables as the heat-sensitive nutrients are exposed to heat for a short period. Apart from the size, the shape of the product also plays an important role in affecting the rate of drying (7).

Drying rate also depends on air used for drying (8). In tray drying, if dry air is allowed to flow in and moist air is driven out the drying rate improves. So, moving air hastens the rate of drying. Air itself has moisture so less humid air with higher temperature will further increase the drying rate. Initially the rate of drying will be high. As moisture from near the surface is removed, inner moisture has to travel to surface and then be removed.





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This take longer so drying rate is reduced. Also, when free moisture is removed, the bound moisture from fruits is more difficult to remove further slowing down drying rate. When rate of drying is slowed, if the temperature of air is not reduced, surface will get heated with

undesirable changes taking place. For this vacuum drying helps remove the moisture at a faster rate even at lower temperature.

Different Drying Methods Used:

There are various types of drying methods used to dry fruits & vegetables, this includes sun drying, solar drying, tray drying, cabinet drying, tunnel drying, freeze drying, fluidized bed drying, spray drying, drum drying, vacuum drying, microwave drying, osmotic drying, etc. Sun drying is the oldest method of drying fruits & vegetables; however, this method is still in use. It takes a long time for drying. It has very little control over the process as one can't control temperature or rate of air movement.

Mechanical drying methods are faster and have better control. Tray or cabinet drying provides air and temperature control. To this if vacuum is applied, then drying can go faster and at a lesser temperature. Delicate fragrances could be protected this way.

Drum drying is used for slurries or liquids such as milk that is concentrated although it could be used for fruit juices also. The thin layer dries quickly in one revolution of the drum and the dried material is scraped off. Liquids could also be dried using spray drying which is probably fastest process.

When pieces of fruit or veg are dried, there is shrinkage and losses of vitamins and flavours. Freeze drying can minimise this. The cost of drying is high but quality of product is also very high. Thus, there are many different methods used for drying depending on the product and the quality needed.

Drawbacks of Drying Fruits & Vegetables (9):

Apart from so many advantages, there are some drawbacks to drying fruits & vegetables. In the case of sun drying, the product can be degraded by insects, rodents, etc., or can get contaminated by dust, dirt, insect droppings, etc. Thus, the quality of the dried product gets deteriorated. The quality of fruits and vegetables can also get affected during industrial drying due to increased temperature.

Shrinkage is another drawback of drying fruits and vegetables. It affects the textural quality and the taste of the dried products. The shrinkage is nothing but the deformations in the volume of products like fruits and vegetables during drying. Colour is the most important aspect of any product. During drying, many chemical and biochemical



reactions occur which may affect the colour of the fruits and vegetables. If dried fruits and vegetables are stored for too long, it can cause discolouration due to browning reactions. It should be stored in a cool and dry place away from the sunlight as per the manufacturer.

Another drawback is case hardening. It is the formation of the hard layer on the surface, which restricts the removal of inner moisture. If the food is dried at a very high temperature, then the outer layer will become hard preventing the inner water to evaporate. The temperature should be maintained properly because too high temperature leads to burning as well as heat damage or injury to the tissues. Enzymatic browning is a biochemical reaction that occurs in fruits and vegetables which can adversely affect the colour, flavour, taste and nutritional quality of fruits and vegetables. In the case of enzymatic browning, the enzyme polyphenol oxidase catalyses the oxidation reaction of polyphenols and converts it into melanin- the brown colour pigment.



The pre-drying treatments and blanching can help to prevent enzymatic browning but inactivate the enzymes. There is some non-enzymatic browning that also occurs like the Maillard reaction or ascorbic acid degradation. These can affect the colour, flavour and overall quality of the product.

Drying can also result in the loss of some nutrients. During the drying as well as the storage of dried fruits and vegetables, the time-temperature combination plays a very important role in retaining nutrition. During the pre-drying processes like washing, peeling, and blanching, water-soluble nutrients are lost. Blanching of vegetables results in loss of vitamin C, calcium, sodium, magnesium, potassium, iron, zinc, etc.

Dehydrated foods can be a healthy alternative to other snacks. The demand for dried products has increased. Consumers are looking for healthy products that mimic the properties of fresh ones. Dried fruits can be consumed as a healthy snack, whereas, dried veggies can be used in noodles, pastas, soups, etc. Dehydrated fruits and vegetables can be easily rehydrated before using them.

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Dehydration of Fruits & Vegetables

[dehydration/#:~:text=The%20important%20factors%20affecting%20the,food%20placed%20in%20the%20drier](#)



FOOD SCIENCE AND TECHNOLOGY EDUCATION IN INDIA

ARE STUDENTS AND THE INDUSTRY GETTING A RAW DEAL?



AUTHOR

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Introduction

The Indian food processing sector is one of the largest in the world, and its output is expected to reach USD 535 billion by 2025-26. The registered factory sector engages close to 2 million people, while the unregistered food processing sector supports employment to another 5.1 million workers as per

www.investindia.gov.in/sector/food-processing.

The Indian health foods segment alone will be worth USD 30 billion in the next five years, expanding at a globally highest annual growth of 20% according to Aventus, a capital investment banking company. The Indian food and beverage industry is one of the fastest-growing industries in the country. The sector is expected to show a growth of 11% p.a. from

FY2019 to FY2024, driven by rising income levels, changing lifestyles, and increasing urbanization according to maximizemarketresearch.com.

I present the above facts and figures only to show the increasing importance of food science and technology



education in India. While food can be imported, even in large quantities, the personnel required to work in the food sector will have to be groomed internally. The food industry needs food scientists and food technologists who have received good and standardized education so that they can contribute to the

success of the Indian food industry. A complete food science and technology education requires imparting scientific disciplines including chemistry, microbiology, nutrition as well as engineering, consumer psychology and other business skills to enable the overall processing of food as well as to develop new food products, processes and packaging designed to improve food safety and the quality and nutrition of foods.

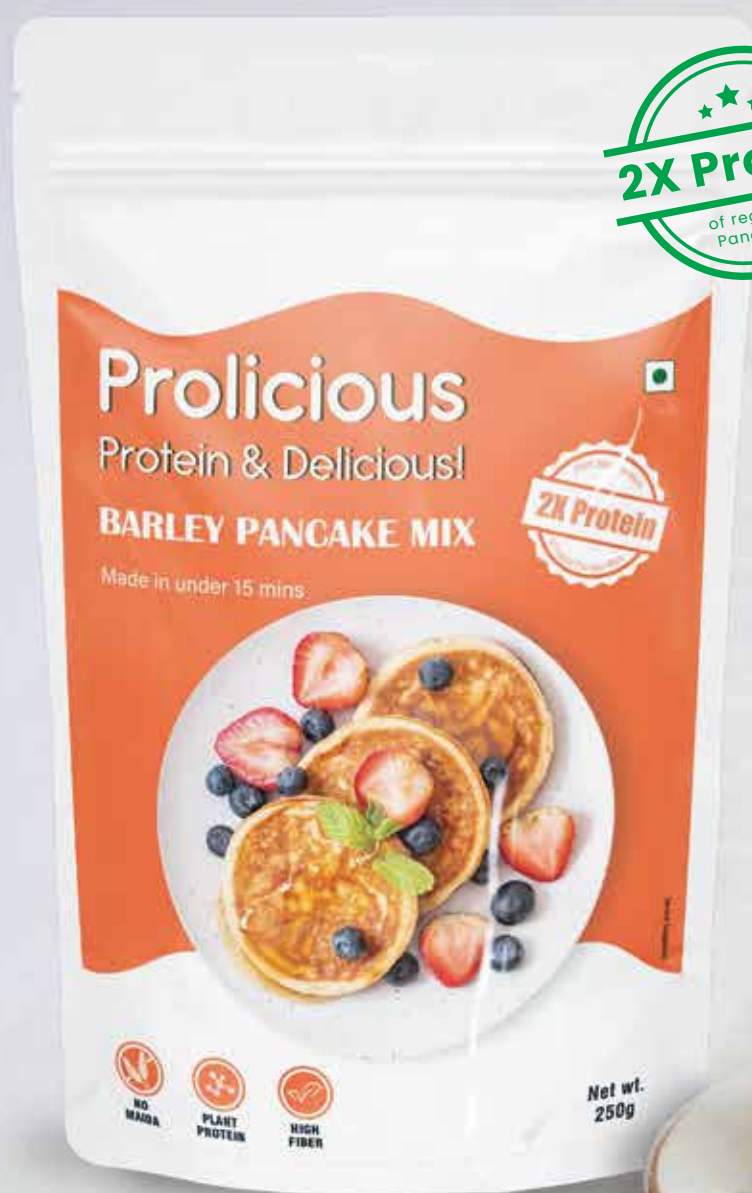
University education in India

To understand the situation better, let us look at the Indian university education scenario and then the student population in food-related education.

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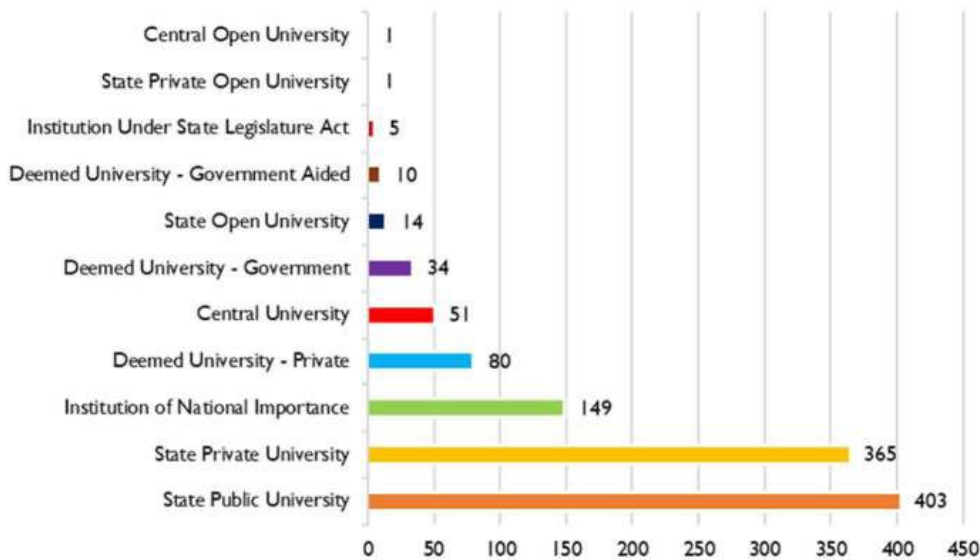
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Indian universities can be split as follows:

Number Of Registered Universities - by type, Total Universities - 1113



Source: GIRACT, based on AISHE Report 2020-2021; Department of Higher Education; Ministry of Education; Government of India

Thus, there are more than 1000 universities in India with many colleges in most universities offering numerous courses. Hence, it is a vast and complex area that needs to be examined carefully. There are public universities in every state of India except in Meghalaya, Mizoram, and Nagaland. West Bengal has 37 universities, and tops the chart for the number of universities in a particular state. State universities can be found in the Union Territories of Chandigarh, Delhi, Jammu and Kashmir, Ladakh, and Puducherry.

The following chart, showing the number of students across universities, highlights the enormous scale of the issue at hand.

Food science and technology education in India

It is generally accepted that ICT in Mumbai was the pioneer in food science and technology education in India. According to the website of this Institute, the Department of Food Engineering and Technology (FETD) was established in then UDCT in 1943 offering Bachelor of Science (Tech) in Chemistry of Foods and Drugs. Later in 1949, a full-fledged B.Sc. Tech. degree course in Food Technology was started. Since then, numerous colleges, institutes and universities have commenced studies in food science and technology,

DISCIPLINE		MALE	FEMALE	TOTAL	% PASS-OUTS
Arts		4988246	5417424	10405670	
Pass-outs		908169	1135968	2044137	20%
Science		2312602	2505224	4817826	
Pass-outs		504531	604498	1109029	23%
Engineering & Technology	Agriculture Engineering	14357	7814	22171	
Pass-outs		3087	1427	4514	20%
Engineering & Technology	Food Technology	9231	7961	17192	
Pass-outs		1782	1538	3320	19%
Engineering & Technology	Dairy Technology	2291	947	3238	
Pass-outs		538	263	801	25%
Home Science		7053	67089	74142	
Pass-outs		1729	14629	16358	22%
Fisheries Science		4038	3660	7698	
Pass-outs		756	750	1506	20%

Source: GIRACT, based on AISHE Report 2020-2021; Department of Higher Education; Ministry of Education; Government of India





often using the term science and technology in an interchangeable manner.

It suffices to say that the various courses in food science and technology across India require a much closer attention now, particularly since the number of colleges offering such courses is expanding rapidly even as parents spend significant sums of money to educate their children in the hope that they will find good jobs in the food industry.



A cursory discussion with the food industry majors in India revealed two primary concerns against food science and food technology graduates applying for a job in food and food ingredient companies. The first one related to the non-standardization of courses, degrees and universities, leading to significant difficulties in the job selection

process. The second complaint is about the need to train these youngsters in the factory atmosphere since they lack the knowledge about the practical aspects of the food industry; and after receiving the training for about a year, many tend to leave the company in question for

higher-paying jobs in the food sector. These issues possibly discourage companies to hire youngsters who are freshly out of college.

For example, as per <https://collegedunia.com/courses/bachelor-of-science-bsc-food-technology> the degree offered is a Bachelor in Science (B.Sc.) but the specialisation is in technology. Such types of degrees may well cause a confusion amongst potential employers, particularly when the courses offered are also significantly different. Many scholars, associations and institutions have attempted to remedy this situation in India. For example, Santanu Basu has highlighted this problem in his blog <https://www.linkedin.com/pulse/food-technology-academic-programs-india-historical-perspective-basu%3FtrackingId=wuxPmPGG7wlmB%252By2P7zihA%253D%253D/?trackingId=wuxPmPGG7wlmB%252By2P7zihA%3D%3D>

What is the difference between food science and food technology? The New Mexico State University website explains the difference between food science and food technology through the

following sentences “Food science is the science of food. Food scientists study the physical, microbiological, and chemical make-up of food. Food scientists also develop new foods, add value to raw food commodities and improve the quality and safety of foods. Food technology is the application of food science to the selection, preservation, processing, packaging, distribution, and use of safe food.”



While defining food science, <https://www.bachelorsportal.com/disciplines/298/food-science.html> says that a degree in food science is an interdisciplinary programme that teaches a student how to apply the principles of biology, chemistry, and physics to the study of food, and that it focuses on understanding the nature of food and the changes it undergoes during production, processing, packaging, storage, and consumption. It goes on to say that the most popular specializations in food science are food chemistry, food microbiology, food engineering, nutrition science and sensory analysis.



and distribution of food products, and that, food technology includes various techniques and processes that are used to transform raw materials into food. This website claims that there are 317 Food Technology colleges in India, out of which 159 are private, 129 are public and the rest are public-private.



Regarding food technology, <https://www.shiksha.com/engineering/colleges/food-technology-colleges-india> indicates that Food Technology is the branch of science that deals with techniques in production, processing, preservation, packaging, labelling, quality management,

Students in food-related university education

The standard classification of Indian and International university education in the field of food science and technology is given below:

The scale of the issue at hand can be highlighted once again through the following table that shows the number of students by gender across undergraduate, post-graduate and Ph.D. programmes in food-related studies across universities/institutes/colleges in India. It is to be noted that the recruitment numbers are increasing year-on-year.

Indian Standard Classification of Education: Fields of Education (InSCED-F) 2014

55	Engineering & Technology
5510	Food Technology
5507	Dairy Technology
59	Home Science

International Standard Classification of Education: Fields of Education and Training (ISCED-F) 2013

072	Manufacturing and processing
0721	Food Processing
072	Manufacturing and processing
0721	Food Processing

Source: Indian Standard Classification of Education - InSCED-F 2014

International Standard Classification of Education: Field of Education and Training (ISCED-F)2013

Enrolment at Under-graduate Level in Major Disciplines/ Subjects

Discipline	Male	Female	Total
Engineering & Technology Food Technology	9231	7961	17192
Engineering & Technology Dairy Technology	2291	947	3238
Home Science	7053	67089	74142
Fisheries Science	4038	3660	7698
Total	22613	79657	102270

Source: GIRACT, based on AISHE Report 2020-2021; Department of Higher Education; Ministry of Education; Government of India

Enrolment at Ph.D., M.Phil. & Post Graduate Level in Major Disciplines/ Subjects

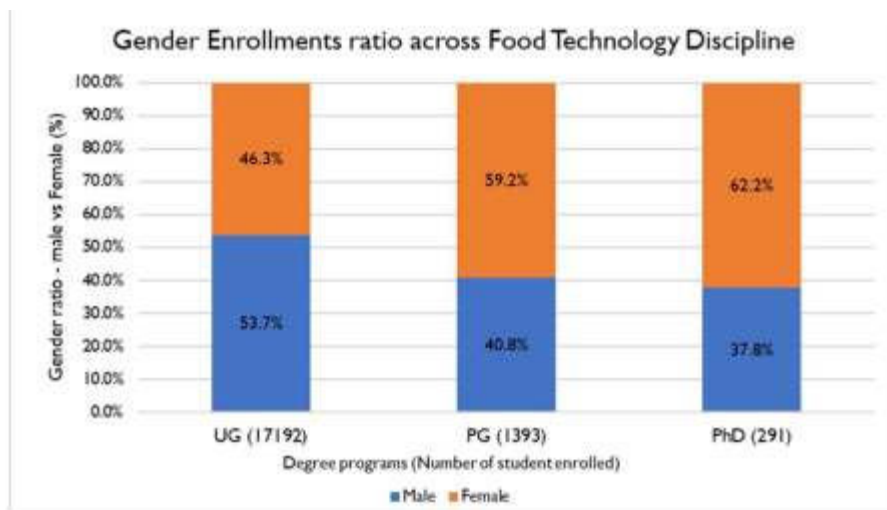
Discipline		PG Male	PG Female	PG	M.Phil Male	M.Phil Female	M.Phil	Ph.D Male	Ph.D Female	Total
Agriculture	Agriculture	17198	9527	26725	17	7	24	3246	2456	5702
Engineering & Technology	Agriculture Engineering	950	507	1457			0	213	125	338
Engineering & Technology	Food Technology	568	825	1393			0	110	181	291
Engineering & Technology	Dairy Technology	148	53	201			0	15	9	24
Home Science	Home Science	642	9321	9963	1	23	24	38	830	868
Home Science	Nutrition	257	2910	3167	1	1	2	23	112	135
Hospitality and Tourism	Food Production							3	1	4
Veterinary & Animal Sciences	Dairy Science	72	10	82				16	7	23
Total		19835	23153	42988	19	31	50	3664	3721	7385

Source: GIRACT, based on AISHE Report 2020-2021; Department of Higher Education; Ministry of Education; Government of India

It is interesting to note that while at the UG (undergraduate) level, the gender ratio is half-half, it increases in favour of women in PG (post-graduate) and even further at the Ph.D. level.

colleges were relatively homogenous within each degree offered, the number and types of degrees appear to be significantly large. For this exercise, 3 popular websites that students use to

merit, but no justification is provided for the ranking order. However, it is interesting to observe the list of relevant degrees offered by the colleges mentioned in the three websites, <https://collegedunia.com/science/food-technology-colleges.com> <https://www.shiksha.com/engineering/colleges/food-technology-colleges-india.com> <https://zollege.in/engineering/food-technology-colleges.com>



While we observed that the eligibility, curriculum and research focus across the

select courses were examined. These websites claim to rank the colleges according to their

We then analysed the job requirements from selected large food producers as well as the courses offered by some of the leading institutes/universities, the following can be summarised as what the food industry expects as a minimum knowledge base from a candidate applying for a food scientist/technologist job:

Subjects

Industry requirements in syllabus

Basic Sciences	These form the foundation of food technology and include subjects like chemistry, biology, and physics, which are essential to understanding the principles behind food processing, preservation, and safety.
Microbiology	This subject focuses on the study of microorganisms in food, including food spoilage, foodborne pathogens, and the role of microorganisms in fermentation processes.
Food Chemistry	Students learn about the chemical composition of different food components such as carbohydrates, proteins, fats, vitamins, and minerals, as well as reactions that occur during food processing.
Food Processing	This is a core area where students learn about various food processing techniques like canning, freezing, drying, and pasteurization, along with the equipment and machinery used.
Food Engineering	This subject covers the engineering aspects of food processing, including heat transfer, mass transfer, and unit operations involved in food production.
Food Quality and Safety	Topics include food quality evaluation, food safety regulations, HACCP (Hazard Analysis and Critical Control Points), and food standards.
Food Analysis	Students learn about various techniques for analysing food components, including proximate analysis, sensory evaluation, and instrumental methods.
Food Preservation	This subject covers the methods of food preservation such as refrigeration, freezing, canning, and drying, as well as emerging technologies like high-pressure processing and pulsed electric fields.
Food Packaging	This involves the study of packaging materials, design, and their role in preserving food quality and safety.
Food Product Development	This area focuses on creating new food products, improving existing ones, and considering consumer preferences and market trends.
Food Biotechnology	Students learn about the application of biotechnology in food production, including genetic modification, enzyme technology, and fermentation processes.
Nutrition	Understanding the nutritional value of different foods and their impact on human health is a key aspect of food technology.
Food Laws and Regulations	An understanding of the legal and regulatory framework governing food safety and labelling is crucial.
Food Marketing and Management	This aspect covers the business and management aspects of the food industry, including marketing strategies and supply chain management.
Industrial Training /Internship	Many programs include a mandatory internship or industrial training period to provide hands-on experience in food production facilities.
Research Project	Some courses require students to undertake a research project in their final year.



As can be seen, the industry expects the fresh graduates to have a fair knowledge of the industry. While attempts are being made to inculcate this knowledge amongst the students, these efforts can be streamlined and centralized so that students obtain the necessary tools required by the food industry. This will address the industry concern that they need to spend considerable resources over a significant period of time to train fresh graduates. The Institute of Food Technologists (IFT), based in Chicago, USA, has a history of involvement in improving food science education that dates back 80 years. The Education Division of the IFT has been active in presenting symposia and hosting oral and poster sessions for individual papers at the Annual Meeting. The Education Division also approves food science undergraduate degree programs in the US. A similar structure in India will help in standardizing food science and technology education to a large extent.

Conclusions

The Indian education system is complex and large, and food-related post-school education attracts an increasingly large number of students.

While degrees offered appear to be consistent within, too many degrees do not help potential employers. This will have to be addressed by all the key stakeholders together in a consensual manner so that students and employers can benefit from more standardized education in this area. Since the scope is vast and the degrees range from food science, food technology, dairy technology, food engineering, food management and various combinations of these, it is important that some level of standardization within each of these degrees as well as across these degrees becomes the primary objective of all stakeholders concerned. The number of degrees offered in this field are just far too high, and that is certainly not helpful to either the students or the employers. A standardized and recognized ranking system of colleges in this area will also be very useful for students.

Students require able counselling regarding the colleges, degrees, and elective courses that they should opt

for. There is also a need for ranking of only food science and technology colleges/institutes/universities (similar to NIRF). The industry and the government should join hands with the academic world to create such a win-win atmosphere. In addition, more focus needs to be applied to bridging the knowledge gap of the students regarding the basic tenets of the industry. They need to have a reasonable grip of the various aspects of the industry and its dynamics.

I am not fully conversant with the existing system in India, but it is clear that there is room for improvement in the area of how students can choose high quality and standardized education to food science and technology through able counselling. While many previous attempts have been made in this direction, I believe that it is currently even more important to have a meeting of the key stakeholders - government, academia and the industry - to discuss ways of bringing such a structure in place which will go a long way in helping both students and the food industry in India.

I want to thank Kishore Kumar, Senior Research Analyst at F1rst, for his contribution regarding the data analysis.



OMEGA 3 PROTECTS THE HEART & KEEPS BRAIN ALERT



AUTHOR

Prof Jagadish Pai,
Editor, PFNDAI

Introduction

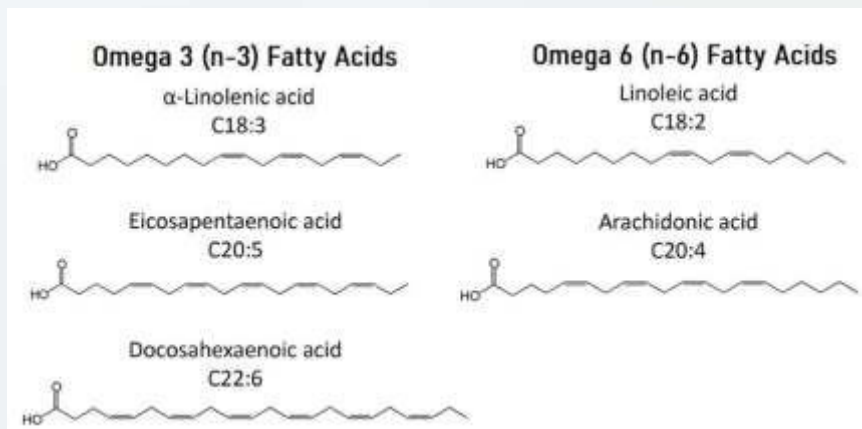
There has been much research as well as development in the area of omega 3. It has kept scientists busy and industry planning various products from dietary supplements to food products fortified with omega 3. Even common people have become quite aware of this magic component of food that apparently can support a large number of health benefits. It has touched not just infants and children but even elderly with their ailments. Even regulators have decided to have regulations regarding their daily intake after studies have shown its importance as essential component of daily diet.

Many supplements have appeared in the market with varying quantities of different omega 3 fatty acids and food products even having vegetarian omega 3 added for those who do not want to consume foods, ingredients or

even substances derived from animal sources. Total global market currently is between 1.5 to 5.5 billion US\$ and growing rapidly (1, 2). Scientists are trying to find new health benefits and developers finding new ways of fortifying food products with omega 3 and newer and more

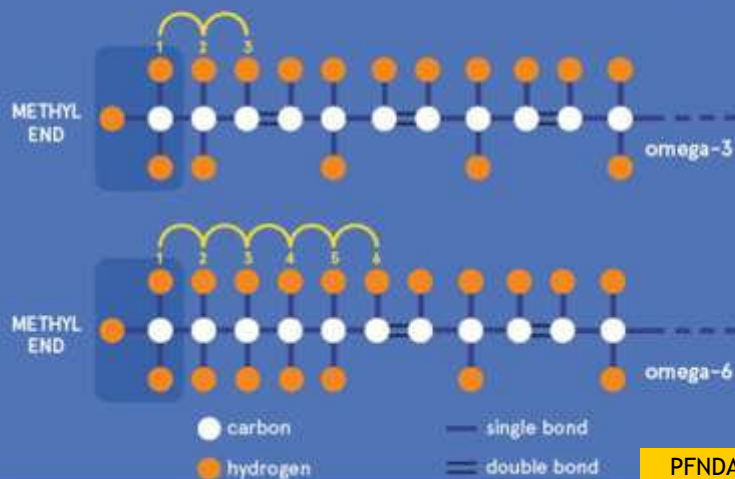
acceptable ways of preparing dietary supplements containing omega 3.

Health Benefits of omega 3
Omega 3 (n-3) and omega 6 (n-6) are most common polyunsaturated fatty acids in our diet. Following are some examples and the structure of the PUFA.



WHAT ARE OMEGA-3 & OMEGA-6 FATS?

omega-n refers to the number (n) of the carbon atom with the first double bond from the methyl end



Veg DHA Omega-3 Throughout the Life Cycle



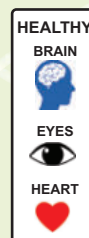
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Both omega 3 and 6 are fatty acids as they cannot be made by our body and it is necessary to consume them in diet. However, some of the longer ones can be made in body from smaller ones e.g., alpha linolenic acid (ALA) can be converted to eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). However, their conversion is not very efficient, so the EPA and DHA may be conditional essential. Similarly linoleic acid (LA) may be made into arachidonic acid (AA).

EPA is 20 carbon fatty acid with main function being producing eicosanoids that help reduce inflammation. It also reduces symptom of depression. DHA is 22 carbon fatty acid that makes about 8% of brain weight contributing to its development and function. ALA benefits heart, immune system and nervous system.

Omega 3 fatty acids have many common benefits such as helping manage cholesterol, triglyceride and blood pressure levels, help support mental health, help reduce weight, decrease liver fat, support infant brain development and fight inflammation. (3)

Although, omega 6 fatty acids produce eicosanoids that are pro-inflammatory, they play a key role in immune system. They are also important components of cell membranes and are precursors to

substances involved in regulating blood pressure and inflammatory response. Humans can produce all the fatty acids needed except the omega 3 and 6. If they can get LA and ALA, then they can make others in the series using the same enzyme delta-6-desaturase. The only problem would be if one is in high amount in diet compared to the other, then due to competition, the other would be deprived of it. Over the years, in our diet, intake of omega-6 has increased and intakes of omega-3 has decreased. There needs to be a balance of the two.

Diet provides LA and ALA from plant and seed oils, although commonly LA is much more than ALA. The latter is obtained from soybean & rapeseed oils and some nuts. EPA and DHA are found in oily fish like salmon, mackerel and herring while AA can be obtained from animal sources, meat and egg. People who eat fish and seafood do not have the deficiency of omega-3 as they do not have to depend on ALA making EPA and DHA. But those who do not eat fish the amount of dietary ALA is very important (4).

FSSAI have recommended the ratio of omega 3: omega 6 to be consumed in the diet to be ranging between 1:5 to 1:10. Oils rich in omega 3 are named mustard, flaxseed, soybean and fish oils, whereas those rich in omega 6 being corn, soybean, sunflower and groundnut oils (5). EFSA proposed adequate intake for

LA 4% and ALA 0.5% of total energy and for EPA and DHA was set at 250 mg a day. The latter could be achieved by eating fatty fish once or twice a week and by replacing sometimes common vegetable oils with rapeseed oil (4).

Stability of Omega 3
Because of high unsaturation, omega 3 fatty acids are not as stable compared to saturated fatty acids. They are affected by temperature, time and oxygen while being cooked. Different cooking methods such as boiling, cooking in sauce, steaming, baking, microwave heating, pan frying and deep fat frying etc. were studied for the losses of omega-3 fatty acids.

Higher temperatures for longer times would certainly cause greater losses and these fatty acids like all polyunsaturated fatty acids are susceptible to higher temperatures for longer times. Frying uses very high temperatures about 200°C causing most losses, while pan frying was better than deep fat frying (6, 7, 8). Frying may also dilute the omega 3 composition in food as frying oil gets absorbed into the food.

For those who do not eat fish and seafoods, they may either have to depend on edible oils having good amounts of ALA or depend on fortified foods or supplements for their intake of omega 3. Although there are some algae that contain DHA, most supplements and fortificants are fish oils.





There are certain challenges for using the fish oils in food fortification as they are not miscible in most foods that contain mostly water. Second problem is that these fish oils have fish odour which may not be commonly acceptable even for some who eat fish. Thus, fortification is a challenge especially for water containing foods with milder flavours.

Fortification of Foods with Omega 3 (9)

There are two ways in which fortification may be achieved. One is to add omega 3 while preparing the food products such as cookies, nutri-bars, milk products, infant formula or health food products. Secondly, to give in feed of animals and birds so they provide foods derived from them that are rich in omega 3 fats.

Consumers find dairy products fortified with omega 3 fatty acids quite appealing. There are two ways of fortifying dairy products. One is by feeding cow diet with flax seed or oil that has high levels of omega 3 fatty acids. The milk would contain higher level of omega 3. Another way is adding omega 3 nutrients while preparing the products. As omega 3 fats are not stable and may have some odours unacceptable to consumers, encapsulation is carried out so they are protected. Microencapsulated salmon oil with gum Arabic and maltodextrin in water was spray dried and this was used to fortify yoghurt successfully (10).

For bakery products, fats containing omega 3 fatty acids would enable fortification. Cookies and cakes also could be produced using eggs and daily ingredients having omega 3 fats. Infant formula could be fortified with omega 3 rich oils from plants, fish or algae. Many food products are being fortified with different micronutrients so adding omega 3 to that list would not be difficult.

Microencapsulation provides an effective means to prepare the fortified food products with acceptable sensory properties. However, the cost of microencapsulation may be more than the nutrient being fortified.

Meat products are poor in omega 3 fatty acids. Supplementing feed with flaxseed oil or marine oil from fish or algae containing high omega 3 fatty acids will incorporate them in meats (11). Eggs are conveniently supplemented with omega 3 by modifying hens' diet with flaxseed or marine oils (12).

Thus, there are many innovative ways in which fortification of food products could be done using either omega 3 fats or the ingredients containing these which may be directly added to foods or through animals that produce foods which would be rich in omega 3 fatty acids.

As more health benefits appear for omega 3, it is advisable to either consume the foods high in them such as

flaxseeds, chia seeds, soybean oil, walnuts, marine fish etc. There are now foods available that are fortified with omega 3 such as ALA, EPA and DHA which will not have any flavour problem associated.

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REPORT ON REGULATORY WEBINAR ON EFFECTIVELY COMMUNICATING WITH PROPER LABELLING & MAKING CLAIMS CONFIDENTLY



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between the message given and received. Food labels are made to protect the consumer by providing accurate information.

However, sometimes, regulatory requirements result in an information overload for the consumer, diluting the label's primary objective. Consumers usually buy products based on the MRP and use-by date. There is a need to create awareness among consumers about technical nutrition information. From the FBOs' perspective, there are issues with providing too much information within a defined space, resulting in logistical problems.

Ms. Dolly Soni, Manager of Marketing & Projects, Seminar Convenor, PFNDAI then introduced all the speakers for the day.



Protein Foods & Nutrition Development Association of India had organized the regulatory webinar on 25th August 2023.

Dr Shashank Bhalkar, Executive Director of PFNDAI welcomed the Members and gave a brief on the topic of Labelling and claims. He emphasized the importance of food labelling. Consumers make buying decisions based on the label which is the first means of communication between the producer and the buyer. A good label should effectively communicate information to minimize gaps



Dr Jospeh I Lewis, Chairman, Regulatory Affairs Committee, PFNDAI gave

a talk on the Introduction: Purpose of Food Labelling: Does Regulation Accomplish It? In his talk

he explained the audience that A food label is a three-way conversation between a food product, the diet and the consumer. And this conversation happens at two occasions: purchase and at consumption. Labels are intended to empower consumers to make informed choices. Currently, with the overload of information, much of which is too complex, understanding a label is not easy. An edible oil pack has 12-14 nutrient amounts declared, four of which are zero. Is it necessary to inform them that all oils do not contain carbohydrates, protein, sodium (salt): every time they buy the same product?



Every packaged product mention amounts of fat, saturated fat, sugar and salt per 100g or ml. This is information at purchase. The next stage is information at consumption. Consuming food is by volume - not weight - conveyed by household measures (cup, tablespoon, bowl, etc). All foods including home preparations and packaged foods contribute nutrient amounts to the daily diet. A consumer now needs to make two calculations: convert nutrient amounts given in weight (on label) to volume (household measure) as eaten: and then check the percent contribution of each eating occasion/serving with the total nutrient intake (fat, salt, sugar) in the diet. If this sounds complicated, then labels are not effectively communicating with consumers?

ingredients should be listed based on weight or volume, the necessity of disclosing food additives, and the specific naming requirements for ingredients. Additionally, she discussed the disclosure requirements for the percentage of ingredients in mixtures or combinations and the declaration of compound ingredients. She also briefed on the Principal Display Panel where she mentioned that the area of the main display panel on packaging must meet certain requirements based on the shape of the package. For rectangular packages, it must be at least 40% of the height multiplied by the width of the panel with the largest area. For cylindrical, round, oval, or nearly oval packages, it must be at least 40% of the product of the height and average circumference. For packages of any other shape, it must be at least 20% of the total surface area. If the package has a capacity of 10 cubic centimetres or less, the required information can be printed on a card or tape firmly attached to the package.

Products Ltd presented on Front of the Pack (FOP) Labelling-Choice VS Direction. Mr Sunil began his talk by providing an overview of the Consumption Survey conducted by NIN, in which he highlighted the sources of food intake. During a discussion on the key factors of diet and physical activity, it was mentioned that unhealthy diets and physical inactivity are among the main causes of major non-communicable diseases. According to recent data on physical activity and inactivity patterns in India for the year 2021, more than 60% of Indians do not engage in any physical activity.

In 2020, Edu Sports conducted an annual survey on school health and fitness, which included 1,49,833 children between the ages of 7 and 17 from 364 schools across 250 cities and towns. The survey revealed that 50% of the children had an unhealthy Body Mass Index (BMI) level. He explained nutrition labelling which describes food content. It helps manufacturers market products and consumers make healthy choices. Nutrient declaration and ingredients list are on the back while the nutrition facts are on the front of the pack. In the end of his presentation, he gave an overview on FOPL.



Ms Meenu Yadav, Principal Manager, Technical Regulatory Affairs Marico Limited presented on Labelling and Display Regulations. In her presentation she gave a brief on the Evolution on the Labelling and Display Regulations since 2020. During her talk, she outlined the guidelines for listing ingredients on retail labels. She covered topics such as the appropriate title for the list of ingredients, the order in which

Mr Sunil Adsule, AVP Regulatory Affairs, Reliance Consumer Products Ltd and Ms Nidhi Agarwal, Regulatory Affairs Manager, Reliance Consumer



Ms Nidhi in her presentation spoke on the recently published FOPL draft labelling where she briefed on the INR (Indian Nutritional Rating) Logo & Pictorial Display Format. She further spoke on HFSS The term "HFSS" refers to processed foods with high levels of saturated fat, total sugar, or sodium. To be classified as HFSS, such products must contain at least 10% of their total energy from saturated fat, at least 10% of their total energy from total sugar, and no more than 1mg of sodium per 1 kcal. This concept is based on the daily dietary intake goal to maintain a healthy diet. However, it cannot be applied to design single foods, as neither naturally available nor processed foods can meet this requirement. As a result, 80-90% of pre-packaged food products are classified as HFSS. During the presentation, Mr Adsule discussed the FOPL-Points to Consider, which included promoting a healthy lifestyle, distinguishing between diet and food approaches, focusing solely on prepackaged food, utilizing a restrictive approach, providing pointers to generate evidence,

and identifying contributory factors to FSS intake from all sources.

The last talk was by, **Dr B. Sesikiran**, Chairman, Scientific Advisory Committee, Hon. Scientific Director, PFNDAI, Former Director, NIN, (ICMR) on How to Make Claims that Withstand Challenges? In his presentation, Dr Sesikiran provided a comprehensive overview of the various types of claims that can be made concerning a product. These claims encompass ingredient-related claims, including those that pertain to immune-boosting nutrients; quantity-based claims, such as the product being rich in specific ingredients; substance-disease relationships, such as products that are diabetes-friendly; novel process-based claims, such as nano particulate curcumin; traditional evidence-based claims, including the efficacy of Chyavanaprash in improving immunity, and product-related claims, such as products that



reduce cognitive decline. He discussed claim display locations, including on-product labels (FSSAI), online platforms (ASCI), print/visual media (FSSAI/ASCI), social media (ASCI), and social media with celebrity/influencer endorsements (ASCI). When discussing the claim of a novel process for an ingredient, such as nano particulate curcumin, it is important to provide evidence to support the process. If the product is made using a unique or novel process, then evidence should be provided through established patents or research studies that support the product. He spoke about a traditional evidence-based claim that Chyavanaprash improves immunity. The method of preparation and composition should follow acceptable traditional publications. If a different or product-specific claim is made, it should be substantiated with data from respective research studies. He also briefed on the Evidence Based Review System and the steps in Evidence based review (USFDA). In the end of presentation, he gave a brief overview of Label Claims.



After all the presentations there were few questions from the audience which were answered by the respective speakers.

There was a panel discussion held which was Moderated by **Dr Jasvir Singh**, Director Regulatory Affairs, AMETI International Flavors & Fragrances. The panellists for the session were **Mr Phani Kumar** Head Quality & Regulatory, Zydus Wellness, **Mr Dinesh Pandey** Head R&D, Dabur India Ltd, **Ms Shipra Sehgal** Manager- Scientific Affairs and Regulatory Affairs, Mondelez International & **Mr Kiran Desai** Manager - Labelling & Regulatory Compliance, General Mills.

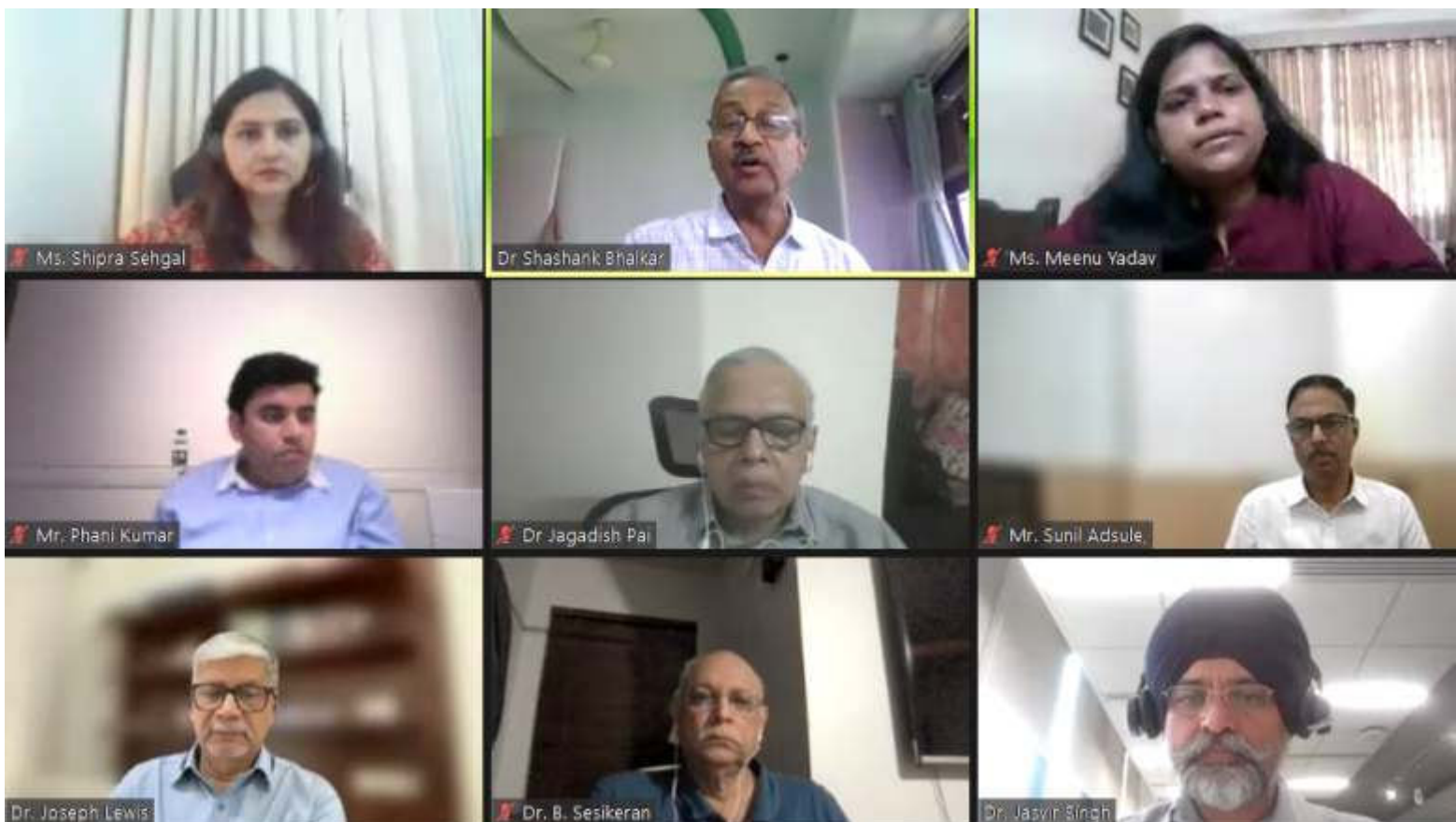
During the panel discussion, the moderator directed a few

questions towards each panellist regarding labelling and claims. Examples of such questions include: What type of supportive evidence is required for a product claim? For nutrition labelling, Codex, US and EU provide a single daily intake value for nutrients for all individuals in the population above a certain age group (e.g., 36 months in Codex), but FSSAI has multiple values. What is the global practice? Can a product make a product claim based on scientifically proven benefits of its ingredients if used in the same combination and dosage as in the clinical studies? What kind of supportive evidence is required for a product claim. In the Labelling and Display



regulation - Health supplements, Nutraceuticals and Foods for Special Dietary Uses (FSDU) in tablet and capsule format, with respect to macronutrients, when sources of energy are insignificant. The term "insignificant" is not defined. The panel members answered to the respective question which were taken up by Moderator.

The webinar ended with Ms. Dolly thanking the speakers, panellists, and attendees.





Protein Foods & Nutrition Development Association of India
Organized Webinar on
**Effectively Communicating with Proper Labelling
& Making Claims Confidently**



Dr. Joseph Lewis



Dr. B. Sesikeran



Ms. Meenu Yadav



Dr. Jasvir Singh



Mr. Sunil Adsule



Mr. Phani Kumar



Ms. Shipra Sehgal



Mr. Kiran Desai



Mr. Dinesh Pandey



Dr. Jagadish Pai



Dr. Shashank Bhalkar



Ms. Dolly Soni

REGULATORY ROUND UP

Dear Readers,

Following are notifications /orders since the last Round Up.

Two orders in the month are good initiatives by Food Authority. One is about bringing gender equality for women and transgenders and the other is ease of doing business.

[FSSAI Order on Empowering Women and Transgender Entrepreneurs in Food Business](#)

This order is a welcome step by the Food Authority and will help to provide equal opportunity to Women and Transgender entrepreneurs in Food business.

The order suggests the officials to process the application of this special category on 1:1 ratio with regular applications on the FoSCoS system. That means the applications will be processed expeditiously for this category. Annexure 1 of the order gives “User manual” which will be helpful for accessing and utilising this provision.

[Streamlining the FSSAI License Application Process for Relabeller Kind of Business \(KOB\)](#)



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This order helps to reduce delays in grant of licence to Re labellers. In the present process, Re labellers (FBOs), are

asked questions related to manufacturing although they have valid NOC from the FSSAI licenced manufacturer. This causes delays in grant of licence. FoSCoS system ensures that the contract manufacturer has same product category or sub category endorsed in its license. With this order, the scrutiny of application of the Re labeller license will be only limited to his or her information and not for the compliance related to contract manufacturer. In addition, contract manufacturer will include a disclaimer that the NOC does not authorise him or herto manufacture products unless they are endorsed in his or her license.

This is a very good initiative for ease of doing business where small scalere labellers, many of whom are start-ups, will be benefitted.

[Compliance of few Quality parameters for Bajra flour,](#)

[Jowar flour, multigrain flour, and Mixed millet flour re operationalised](#)

This order is about keeping in abeyance compliance of few quality parameters, Asthe data provided by stakeholders is under consideration, date of enforcement of parameterslike ‘Alcoholic acidity’ and ‘Total dietary fibre’ is kept in abeyance for six months (till 31.12.2023) for these items. Provision for moisture content in the direction dated 15.02.2023 is re operationalised with effect from 27.07.2023.

[Re operationalisation of regulations regarding standards of Fortified Rice Kernels](#) The regulations regarding Fortified Rice Kernel (FRK), Vitamin and Minerals premix for FRK and rice flour used for FRK, which were earlier notified on 25.05.2022 and several times re operationalised, are again re operationalised for six months from 23.06.2023 or till final notification, whichever is earlier.

[Re operationalisation of standards of Crude solvent extracted Corn \(Maize\) oil](#) These standards were first notified on 31.05.2022. The standards are operationalized till 20.12.2023

RESEARCH IN HEALTH & NUTRITION

How heat treatment affects a milk alternative made from rice and coconut water

Science Daily July 31, 2023

Whether they're made from soybeans, almonds, oats, or just sourced straight from the cow, milk products must go through heat treatment to prevent harmful bacterial growth and keep them safe.



But understanding how these processes affect new, plant-based milk formulations could make the beverages more pleasant to drink as well. Researchers reporting in ACS Omega have discovered how pasteurization and sterilization affects the look and feel of one such drink made from coconut and rice.

Despite the ubiquity of dairy-based foods, many people have some form of lactose intolerance -- up to 36% of Americans, according to the National Institutes of Health. As a result, many turn to lactose-free, plant-based alternatives, some of which have added health benefits. For example, one drink under development combines rice flour and coconut water: Rice is hypoallergenic and high in

fibre, and coconut water is hydrating and low in calories. To understand how heat treatment might alter this beverage, Jorge Yáñez-Fernández, Diana Castro-

Rodríguez and colleagues wanted to test the formulation against two different high-temperature processing steps.

The team used three versions of the beverage, containing either 2%, 5% or 8% rice flour, with coconut water comprising the rest. These were heated either by pasteurization in a water bath at 140 degrees Fahrenheit or by sterilization in an autoclave at almost 250 degrees Fahrenheit. After these treatments, the team found that the starches in the rice flour gelatinized and underwent the Maillard reaction, producing a slightly darkened colour and stickier fluid for all three versions. Additionally, the drinks' acidities increased, and there were fewer sugars, which may alter the way they taste. The team plans to use these results to inform future research into similar, dairy-free, "functional beverages," including those that could one day contain probiotic, lactic-acid bacteria.

Food allergy in infancy linked to childhood asthma and reduced lung function

Science Daily July 25, 2023

Having a food allergy as a baby is linked to asthma and reduced lung function later in childhood, according to a world first study.

The research, led by Murdoch Children's Research Institute and published in the Lancet Child & Adolescent Health, found that early life food allergy was associated with an increased risk of both asthma and reduced lung growth at six years of age. Murdoch Children's Associate Professor Rachel Peters said this was the first study to examine the relationship between challenge-confirmed food allergy in infancy and asthma and poorer lung health later in childhood. The Melbourne research involved 5276 infants from the HealthNuts study, who underwent skin prick testing to common food allergens, including peanut and egg and oral food

challenges to test for food allergy. At six years, children were followed up with further food allergy and lung function tests.





The study found by six years of age, 13.7 per cent reported a diagnosis of asthma. Babies with a food allergy were almost four times more likely to develop asthma at six years of age, compared to children without a food allergy. The impact was greatest in children whose food allergy persisted to age six as opposed to those who had outgrown their allergy. Children with a food allergy were also more likely to have reduced lung function. Associate Professor Peters said food allergy in infancy, whether it resolved or not, was linked to poorer respiratory outcomes in children. "This association is concerning given reduced lung growth in childhood is associated with health problems in adulthood including respiratory and heart conditions," she said. "Lung development is related to a child's height and weight and children with a food allergy can be shorter and lighter compared to their peers without an allergy. This could explain the link between food allergy and lung function. There are also similar immune responses involved in the development of both food allergy and asthma.

"The growth of infants with food allergy should be monitored. We encourage children who are avoiding foods because of their allergy to be under the care of a dietician so that nutrition can

be catered for to ensure healthy growth."

Food allergy affects 10 per cent of babies and 5 per cent of children and adolescents. Children with a food allergy should be managed by a clinical immunology or allergy specialist for ongoing management and education.

Omega-3 fatty acids appear promising for maintaining lung health

Science Daily July 20, 2023

Omega-3 fatty acids, which are abundant in fish and fish oil supplements, appear promising for maintaining lung health, according to new evidence from a large, multi-faceted study in healthy adults supported by the National Institutes of Health.

The study provides the strongest evidence to date of this association and underscores the importance of including omega-3 fatty acids in the diet, especially given that many Americans do not meet current guidelines. Funded largely by the National Heart, Lung, and Blood Institute (NHLBI), part of NIH, the study results were published in the American Journal of Respiratory and Critical Care Medicine. "We know a lot about the role of diet in cancer and cardiovascular diseases, but the role of diet in chronic lung disease is somewhat understudied," said corresponding author Patricia A. Cassano, Ph.D., director of the Division of Nutritional



Sciences at Cornell University in Ithaca, New York. "This study adds to growing evidence that omega-3 fatty acids, which are part of a healthy diet, may be important for lung health too."

Researchers developed a two-part study investigating the link between omega-3 fatty acid levels in the blood and lung function over time. In the first part, the researchers conducted a longitudinal, observational study involving 15,063 Americans from the NHLBI Pooled Cohorts Study -- a large collection of NIH-funded studies that helps researchers to study determinants of personalized risk for chronic lung disease. The participants studied were generally healthy when the study began, and the majority had no evidence of chronic lung disease. They comprised a racially diverse group of adults, with an average age of 56 years, and 55% were female. The researchers followed participants for an average of seven years and up to 20 years.





The longitudinal study showed that higher levels of omega-3 fatty acids in a person's blood were associated with a reduced rate of lung function decline. The researchers observed the strongest associations for docosahexaenoic acid (DHA), an omega-3 fatty acid that is found at high levels in fatty fish such as salmon, tuna, and sardines. DHA is also available as a dietary supplement. In the second part, the researchers analysed genetic data from a large study of European patients (over 500,000 participants) from the UK Biobank. They studied certain genetic markers in the blood as an indirect measure, or proxy, for dietary omega-3 fatty acid levels to see how they correlated with lung health. The results showed that higher levels of omega-3 fatty acids -- including DHA -- were associated with better lung function.

Scientists find that a special omega-3 lipid might prevent fatty liver disease

Science Daily July 18, 2023

Long-running research by Duke-NUS Medical School into the omega-3 transporter protein *Mfsd2a* has shown that it plays a key role in a specific mechanism that prevents the

liver from storing too much fat from food. Published in the *Journal of Clinical Investigation*, this latest study by Duke-NUS and collaborators from Singapore General Hospital (SGH) signals the possibility that a dietary supplement could be developed to help prevent non-alcoholic fatty liver disease (NAFLD).

Eating too much fatty food increases the risk of many health problems, including cardiovascular disease, obesity, diabetes and NAFLD. The excess fat that accumulates in the liver during the onset of NAFLD leads to inflammation and progressive deterioration and scarring, called cirrhosis of the liver. The rate of NAFLD is remarkably high in Singapore, affecting around 40 per cent of adults compared to 27 per cent globally.

One type of fats called phospholipids are essential for making cell membranes and actually protect the liver against the harmful effects of dietary fat. "For over a decade, the researchers at Duke-NUS have been studying *Mfsd2a*, which transports the phospholipid lysophosphatidyl choline (LPC) into cells," said Dr Chin Cheen Fei, first author of the study and Research Fellow with Duke-NUS' Cardiovascular & Metabolic Disorders (CVMD) Programme. "Our findings show

that LPC lipids, particularly those containing polyunsaturated fatty acids such as omega-3 fatty acid DHA, could become a means of long-term prevention for NAFLD," said Dr George Goh, Senior Consultant at SGH and one of the collaborators of the study. "Our study is the first to suggest the potential of dietary LPC supplementation in protecting the liver against damage caused by a high-fat diet."

The researchers noted that the liver has a significant demand for phospholipids in general, which increases when challenged with fatty foods. NAFLD takes years to develop and can progress to non-alcoholic steatohepatitis and cirrhosis, so supplements taken over that period could offer protection. "Our study emphasises the importance of taking a proactive approach to keeping the liver healthy," said Professor David Silver, the senior author of the study and Deputy Director of the CVMD Programme. "Overnutrition with fatty foods can cause cardiovascular disease, obesity, diabetes and NAFLD. The prevalence of NAFLD is of major importance to the general population, which is becoming increasingly aware of this problem."





An early breakfast may reduce the risk of developing type 2 diabetes

Science Daily July 18, 2023

Eating breakfast after 9 a.m. increases the risk of developing type 2 diabetes by 59% compared to people who eat breakfast before 8 a.m. This is the main conclusion of a study in which ISGlobal, an institution supported by "la Caixa" Foundation, took part and which followed more than 100,000 participants in a French cohort. The results show that we can reduce the risk of diabetes not only by changing what we eat, but also when we eat it.

In this study, a team from ISGlobal joined at team from INSERM in France to investigate the association between meal frequency and timing and the incidence of type 2 diabetes among 103,312 adults (79% women) from the French NutriNet-Santé cohort. Participants filled in online dietary records of what they ate and drank over a 24-hour period on 3 non-consecutive days, as well as the timing of their meals. The research team averaged the dietary records for the first two years of follow-up and assessed the participants' health over the following years (an average of seven years).



There were 963 new cases of type 2 diabetes during the study. The risk of developing the disease was significantly higher in the group of people who regularly ate breakfast after 9 a.m., compared to those who ate breakfast before 8 am. "Biologically, this makes sense, as skipping breakfast is known to affect glucose and lipid control, as well as insulin levels," explains Palomar-Cros. "This is consistent with two meta-analyses that conclude that skipping breakfast increases the risk of type 2 diabetes," she adds.

The research team also found that a late dinner (after 10 pm) seemed to increase the risk, while eating more frequently (about five times a day) was associated with a lower disease incidence. In contrast, prolonged fasting is only beneficial if it is done by having an early breakfast (before 8am) and an early dinner. "Our results suggest that a first meal before 8 am and a last meal before 7 pm may help reduce the incidence of type 2 diabetes," concludes Manolis Kogevinas, ISGlobal researcher and co-author of the study. In fact, the same ISGlobal team had already provided evidence on the association between an early dinner and a lower risk of breast or prostate cancer.

Taken together, these results consolidate the use of chrononutrition (i.e., the association between diet, circadian rhythms and health) to prevent type 2 diabetes and other chronic diseases.



Scientists build a healthy dietary pattern using ultra-processed foods

Science Daily July 11, 2023

Scientists at the USDA Agricultural Research Service's (ARS) Grand Forks Human Nutrition Research Center led a study that demonstrates it is possible to build a healthy diet with 91 percent of the calories coming from ultra-processed foods (as classified using the NOVA scale) while still following the recommendations from the 2020-2025 Dietary Guidelines for Americans (DGA). The study highlights the versatility of using DGA recommendations in constructing healthy menus.

"The study is a proof-of-concept that shows a more balanced view of healthy eating patterns, where using ultra-processed foods can be an option," said ARS Research Nutritionist Julie Hess at the Grand Forks Human Nutrition Research Center. "According to current dietary recommendations, the nutrient content of a food and its place in a food group are more important than the extent to which a food was processed."





In the study, scientists used the NOVA scale to determine which foods to classify as ultra-processed. The NOVA scale first appeared in literature in 2009 and is the most commonly used scale in nutrition science to classify foods by degree of processing. According to the NOVA scale, foods can be classified into four groups depending on their degree of processing: (1) Unprocessed or minimally processed foods; (2) Processed culinary ingredients; (3) Processed foods; and (4) Ultra-processed foods.

To test if ultra-processed foods can be used to build a healthy diet, ARS scientists and collaborators created a menu with breakfast, lunch, dinner, and snacks using MyPyramid as a guide for a seven-day, 2,000-calorie food pattern. The menu consisted of foods categorized as ultra-processed by at least two NOVA graders. The foods included in the menu also aligned with 2020 DGA recommendations for servings of groups and subgroups of fruits, vegetables, grains, protein foods, and dairy. Scientists selected food products that have lower levels of saturated fats and added sugars while still containing enough micronutrients and

macronutrients. Some of the ultra-processed foods used in this menu included

canned beans, instant oatmeal, ultra-filtered milk, whole wheat bread, and dried fruit.

"We used the Healthy Eating Index to assess the quality of the diet as it aligns with key DGA recommendations," said Hess. "The menu we developed scored 86 of 100 points on the Healthy Eating Index-2015, meeting most of the thresholds, except for sodium content [exceeded recommendations] and whole grains [below recommendations]." Scientists will continue researching this concept, understanding that observational research indicates that ultra-processed products could be associated with adverse health outcomes. This research shows that there is a role for a variety of foods when building a healthy diet and that more research is needed in this field, especially intervention studies. Details of the study were published in *The Journal of Nutrition*.

Not eating enough of these six healthy foods is associated with higher cardiovascular disease and deaths globally
Science Daily July 6, 2023

A study led by McMaster University and Hamilton Health Sciences researchers at the Population Research Health Institute (PHRI) has found that not eating enough of six key foods in combination is associated with a higher risk of cardiovascular disease (CVD) in adults.

Consuming fruits, vegetables, legumes, nuts, fish and whole-fat dairy products is key to



lowering the risk of CVD, including heart attacks and strokes. The study also found that a healthy diet can be achieved in various ways, such as including moderate amounts of whole grains or unprocessed meats. Previous and similar research has focused on Western countries and diets that combined harmful, ultra-processed foods with nutrient-dense foods. This research was global in scope and focused on foods commonly considered to be healthy.

The World Health Organization estimates nearly 18 million people died from CVD in 2019, representing 32 per cent of all global deaths. Of these deaths, 85 per cent were due to heart attacks and strokes. PHRI researchers and their global collaborators analysed data from 245,000 people in 80 countries from multiple studies. The results were published in the *European Heart Journal* on July 6. Researchers derived a diet score from PHRI's ongoing, large-scale global Prospective Urban and Rural Epidemiological (PURE) study, then replicated that in five independent studies to measure health outcomes in different world regions and in people with and without prior CVD.





"Previous diet scores -- including the EAT-Lancet Planetary Diet and the Mediterranean Diet tested the relationship of diet to CVD and death mainly in Western countries. The PURE Healthy Diet Score included a good representation of high, middle, and low-income countries," said Salim Yusuf, senior author and principal investigator of PURE. As well as being truly global, the PURE Healthy Diet Score focused on exclusively protective, or natural, foods. "We were unique in that focus. The other diet scores combined foods considered to be harmful -- such as processed and ultra-processed foods -- with foods and nutrients believed to be protective of one's health," said first author Andrew Mente, PHRI scientist and assistant professor at McMaster's Department of Health Research Methods, Evidence, and Impact.

"There is a recent increased focus on higher consumption of protective foods for disease prevention. Outside of larger amounts of fruits, vegetables, nuts and legumes, the researchers showed that moderation is key in the consumption of natural foods," he said. "Moderate amounts of fish and whole-fat dairy are associated with a lower risk of CVD and mortality. The same health outcomes can be achieved with moderate consumption of grains and meats -- as long as they are unrefined whole grains and unprocessed meats."

The PURE Healthy Diet Score recommends an average daily intake of: Fruits at two to three servings; vegetables at two to three servings; nuts at one serving; and dairy at two servings. The score also includes three to four weekly servings of legumes and two to three weekly servings of fish. Possible substitutes included whole grains at one serving daily, and unprocessed red meat or poultry at one serving daily.

A mango a day? Eating the popular fruit could have significant health benefits, tout experts

28 Jul 2023 Nutrition Insight

At the American Society for Nutrition's Annual Conference, the National Mango Board has presented two funded studies evidencing mangoes' potential to reduce vascular issues in overweight and obese adults. Nutrition Insight spoke with Dr Mee Young Hong, the primary investigator for both studies and professor at the School of Exercise and Nutritional Sciences in the College of Health and Human Services at San Diego State University, US. We dive into details about the compounds in mango that provide these benefits.

"Some of the vitamins and bioactive compounds that make up the beneficial matrix of mangoes include vitamins C and A, mangiferin, gallic acid, gallotannins, quercetin,

anthocyanins and carotenoids. The fibre in mangoes also contributes to this beneficial matrix and minerals, such as magnesium and potassium." Mango is considered a superfruit, as it is nutrient-dense while low in calories. The researchers say three-quarters of a cup contains 70 calories and over 20 vitamins and minerals. "Mangoes have been shown to improve glycemic control, reduce inflammation, increase gut microbiome diversity and facilitate weight management by promoting satiety. Improvements in these areas can lead to better health outcomes for chronic diseases such as diabetes and cardiovascular disease," shares Young Hong.

The participants were given either a 100-calorie mango snack or the equivalent amount of low-fat cookies for 12 weeks. After the 12 weeks, a four-week break was given and the groups switched their daily snack. After 12 weeks of eating mango, the first study showed reduced oxidative stress and vascular cell

adhesion molecule-1 (VCAM-1) and increased superoxide dismutase (SOD). The second study showed an increase in the antioxidant enzyme glutathione peroxidase (GPX).





“SOD and VCAM-1 play opposite roles as risk factors for vascular issues. While the SOD enzyme reduces risk by breaking down charged oxygen molecules called superoxide radicals, which are toxic, the VCAM-1 gene causes cells to stick together along the vascular lining, leading to increased risk for issues,” details Young Hong. “To achieve good vascular health, we want to see these two compounds move in opposite directions - SOD up and VCAM-1 down - which happened in the study. Additionally, GPX acts by converting hydrogen peroxide to water in the body, thus reducing the harmful oxidative effects of hydrogen peroxide.”

Vitamins and minerals

Stroke and other vascular diseases are the third leading cause of death in the US. Young Hong says that including more fruits, such as mangoes, plays a crucial part in diets and overall public health. “Mangoes contribute a variety of nutrients, phytochemicals and bioactive compounds to the diet - including 50% of the daily value for vitamin C, 15% for folate and 15% for copper. Mangoes are also a predominant source of the bioactive compound mangiferin. It’s likely the unique matrix of vitamins and

bioactive compounds synergistically working together that resulted in our findings,” Young Hong concludes.

By Beatrice Wihlander



Link found between childhood television watching and adulthood metabolic syndrome

Science Daily July 24, 2023

A University of Otago study has added weight to the evidence that watching too much television as a child can lead to poor health in adulthood.

The research, led by Professor Bob Hancox, of the Department of Preventive and Social Medicine, and published this week in the journal *Pediatrics*, found that children who watched more television were more likely to develop metabolic syndrome as an adult. Metabolic syndrome is a cluster of conditions including high blood pressure, high blood sugar, excess body fat, and abnormal cholesterol levels that lead to an increased risk of heart disease, diabetes and stroke.

Using data from 879 participants of the Dunedin study, researchers found those

who watched more television between the ages of 5 and 15 were more likely to have these conditions at age 45. Television viewing times were asked at ages 5, 7, 9, 11, 13 and 15. On average, they watched just over two hours per weekday. “Those who watched the most had a higher risk of metabolic syndrome in adulthood,” Professor Hancox says. “More childhood television viewing time was also associated with a higher risk of overweight and obesity and lower physical fitness.”



“Screentime may also promote higher energy intake, with children consuming more sugar-sweetened beverages and high-fat dietary products with fewer fruit and vegetables. These habits may persist into adulthood.”

The results are important because screen times have increased in recent years with new technologies. “Children today have far more access to screen-based entertainment and spend much more time being sedentary. It is likely that this will have even more detrimental effects for adult health. These findings lend support to the World Health Organisation recommendation that children and young teenagers should limit their recreational screen time.”



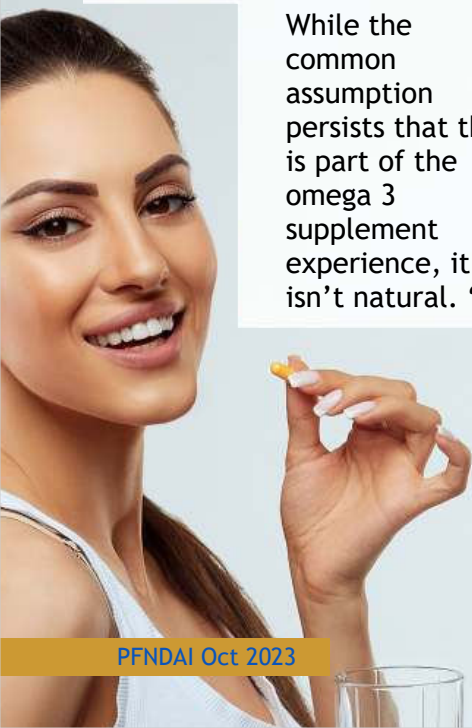
Fish oil supplement without the unpleasant aftertaste

27 Jul 2023 Nutrition Insight

Netherlands-based wellness brand Arctic Blue has slashed the unpleasant fishy taste and indigestion that omega 3-based supplements usually have with the release of their new product.

“The unpleasant taste and fishy burps that follow aren’t normal. They indicate that the sensitive unsaturated Omega-3 fats have become damaged and have oxidized, resulting in a taste deviation,” says Ludo van de Wiel, founder and CEO of Arctic Blue. This makes the supplements less effective and reduces their quality. “The issue is the taste. Omega 3s usually come from fish and people take for granted the common aftertaste or fishy smell that arises after ingestion. The burps are the worst part,” says Van de Wiel.

While the common assumption persists that this is part of the omega 3 supplement experience, it isn’t natural. “It



FOOD SCIENCE & INDUSTRY NEWS

doesn’t need a lot of artificial flavouring or fake ingredients to make it palatable. All we add is a very slight orange flavour.”

Arctic Blue’s fish oil supplement is Marine Stewardship Council (MSC) certified. The oil is mainly harvested in Norway and Alaska, along with algae-based vegan alternatives and marine collagen, harvested from cod trimmings and processed at sea.

The brand’s fish oils have an agreeable flavour profile and are sourced from the Arctic (Norway and Alaska) and other related products.

Edited by Inga de Jong

Financing sustainable nutrition in Africa for “stable and peaceful societies”

24 Jul 2023 Nutrition Insight

The UN’s Food and Agriculture Organization (FAO) has released a sustainable nutrition report to tackle the growing issue of food insecurity and hunger on the African continent, as “it has been worsening considerably since 2019.”

The report highlights the need for investments while addressing their global importance. The estimated nutrition-specific future financing needs have increased from US\$7 billion to US\$11

billion annually between 2022 and 2030 because of the escalation of malnutrition. The FAO states that donor countries worldwide should “fulfil their commitments to nutrition” and increase the budget to meet the nutrition-relevant actions targeting health, education, agriculture, climate and humanitarian programs. The report also stresses increasing existing national budgets and exploring new mechanisms for including nutrition in national programs for universal health coverage, social protection and financing food systems and climate resilience.



Hunger is expensive

Mainly living in rural areas, over 430 million Africans live in extreme poverty, and 80% of the population cannot afford a healthy diet, stresses the organization. The economic impact of malnutrition is high, with between 7 to 16% of repetitions in school resulting from stunting, meaning that these children achieve less in school education. The report details that child malnutrition - especially stunting and underweight - also represents 3 to 16% of the annual GDP.



“We must therefore invest in nutrition because adequate nutrition is at the interface for progress in health, education, employment, empowerment of women and reduction of poverty and inequality, and can lay the foundation for peaceful, secure and stable societies,” reads the report. “Unfortunately, current investments are not comparable to the scale of the nutrition problem. This fact is reflected in the 2020 Global Nutrition Report, which observes that among 48 low-income countries, average government spending on ‘nutritional deficiencies’ is just US\$1.87 per person, representing the lowest expenditure for any disease category tracked,” it continues.

Investing in nutrition can generate a US\$16 return for each US\$1 invested and reducing malnutrition could increase the overall economic productivity and GDP per capita by 11%, argues the report. It further exemplifies that, for 15 countries in Africa meeting the 2025 World Health Assembly target for stunting, US\$83 billion would be added to national incomes.

Result of underinvestment

Measures against malnutrition have been slow and uneven progress resulting from decades of underinvestment. The report stresses the need for a holistic approach to be adopted and nutrition must be a priority in development

finance by all countries and international organizations. Additionally, nutrition-sensitive development investments are essential to complement and support direct nutrition initiatives, reads the report.

Climate in focus

Investing in resilient food systems to tackle the increased threat of climate change is also high on the list. “Strategies to respond to climate change through adaptation and mitigation should also consider the impact of climate change on nutrition and explicitly address nutrition in the climate financing agenda.”

By Beatrice Wihlander

Melatonin presents promising solution for reducing fresh produce postharvest losses

20 Jul 2023
Nutrition Insight

As food security continues to be an escalating global concern, experts are pointing to melatonin’s potential for extending the shelf life of fruits and vegetables and minimizing losses between harvest and consumption. Losses that experts say are the equivalent of US\$400 billion annually, as well as 8-10% of global greenhouse gas emissions.

Melatonin, a hormone naturally present in plants, has been linked to various

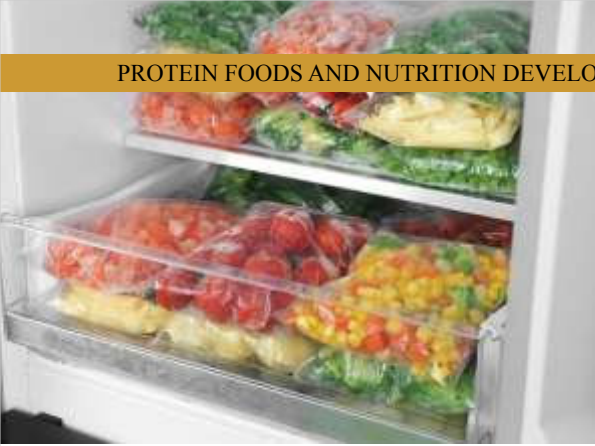
physiological processes, including stress resistance and growth regulation. Researchers have found that the common sleep aid ingredient could help prevent chilling injury - a common postharvest problem that occurs when plants are stored at temperatures below 0°C. “Fruit and vegetables are not only challenging to grow, preserving them is immensely difficult and this is a crisis affecting nations all over the world, so we need to find the solution to keep producing food from the Earth in a sustainable way,” says lead researcher and professor at Edith Cowan University, Dr Zora Singh explained.

“Melatonin is a safe alternative to hazardous chemical treatments, without any adverse effects on the consumer’s health.”

Chilling injury significantly contributes to produce losses. Moreover, the researchers reveal that chilling injury poses a significant threat to

the quality and longevity of fresh produce, particularly for tropical and subtropical fruits and vegetables. “The average storage temperature for subtropical fruits and vegetables usually ranges from 4-8°C while 10-20°C is the optimum temperature to avoid chilling injury in tropical horticultural produce.”





“You will often see abnormal ripening, sunken spots, pitting, hardening of flesh and browning of peel and pulp in cold-stored fruits, while browning of tissues, translucency and water-soaked lesions in the vegetables - that is what we call chilling injury,” Singh underscores.

The study suggests that melatonin application may hold the key to preventing or reducing the detrimental effects of chilling injury and the ECU team believes that harnessing melatonin’s properties could revolutionize the way fresh horticultural produce is stored and preserved.

Edited by William Bradford Nichols

Small marine fisheries hailed as nutrient solution for remote coastal communities, study finds

17 Jul 2023 Nutrition Insight

Coastal communities in many of the world’s developing nations rely on small-scale fisheries for 15-30% of their nutrient intake.

However, researchers from the World Wildlife Fund (WWF), the University of California Santa Barbara (UCSB) and Harvard University have found that an average of 50% of

those living in these communities have an inadequate intake of essential nutrients. Nutrient shortfalls in these populations include iron, zinc, calcium, fatty acids (DHA + EPA), vitamins A and B12, iodine, selenium and fatty acids.

“There are a total of 41 nutrients sourced from the diets that are essential for physiological functioning and that our body cannot manufacture in sufficient amounts. In many communities around the world, people frequently suffer from a variety of nutrient-deficiency diseases,” Daniel Viana, marine conservation scientist at WWF and co-author of the study, tells Nutrition Insight. “Not eating enough vitamins, minerals and other compounds can lead to heart disease, diabetes, cancer, osteoporosis, among others.”

Small-scale fisheries harvest thousands of different species, presenting a myriad of options for supplying nutrients. “Different species carry different nutrients and have the potential to address specific needs of populations,” Viana explains. For example, bivalves (oysters, mussels, etc.) are particularly rich in iron and vitamin B12, while pelagic fish (e.g., tuna, sardines) are rich in Vitamin D and omega-



3 fatty acids. The new data provides valuable context for the more than two billion people worldwide who cannot access nutritious food. The researchers combined multiple global databases to quantify the importance of small-scale marine fisheries to the national-level nutrient supply of coastal populations.

The study published in Scientific Reports demonstrates that more than 20 nations across Africa, the Pacific, the Caribbean and Asia obtain more than 30% of their essential vitamins and nutrients from small-scale fisheries catch. It demonstrates the significance of small-scale fisheries for nutritionally vulnerable coastal populations, emphasizing how effective fisheries management can contribute to public health. These communities have access to staple foods such as rice, wheat, corn and cassava, while aquatic foods are often their only protein staple.





Small-scale fisheries contributed about 32% of the overall global seafood nutrient supply, 17% of the nutrient supply from animal-sourced foods and 10% from all foods.

Catch from the small-scale fisheries sector can contribute to human nutrition through direct seafood consumption and fisheries-derived income redirected toward purchases that improve nutrition. Seafood is more affordable than beef or chicken, making it valuable to coastal communities with limited access to broader food markets.

Small-scale fisheries catch is particularly important in populations that need access to diverse and rich diets. The researchers analysed the relative contributions of marine small-scale fisheries to nutrient supply at national levels relative to other seafood-producing sectors, animal-sourced foods and all other foods.

By Inga de Jong

WWF recommends the B2B sector can play a vital role in ensuring that food is directed to those in need and improving infrastructure and technology to facilitate this. “Much of the global fisheries catch (and nutrients) is diverted from food insecure to food secure countries. Improving access of aquatic foods to nutritionally vulnerable populations will be key to addressing global malnutrition challenges,” Viana explains.

“Today, about 35% of fish caught is wasted. By-products that are discarded during processing can represent between 30-70%. Developing new technology and infrastructure related to reducing food waste and enhancing food quality and safety can play a key role in reducing food and nutrition insecurity.”

Besides filling micronutrient gaps in vulnerable communities, seafood helps displace the consumption of less healthy meats. Two servings per week can reduce the risk of non-communicable diseases and prenatal and child mortality, notes the study. This will improve the quality of life and life expectancy. A healthy body needs consistent access to small quantities of essential micronutrients for proper physiological and immune function.



Functional food movement: Priorities shift to emotional wellness and cognitive focus, say suppliers

05 Jul 2023 Nutrition Insight

Historically, the target demographic for health food

and nutrition was centred on older generations.

Now, more than ever, there is greater awareness that what we eat and drink might impact our health later in life. This means younger generations are proactively and preventatively seeking products that can help maintain health in a world where overall well-being is continually prioritized as consumers want to be in their best shape, physically and mentally.

Food Ingredients First speaks with experts from Kerry, ADM, Givaudan, Bioiberica and Kaneka Nutrients Europe, who share their thoughts on this evolving space.

“The demand for functional foods is increasing as consumers prioritize experiences that support their well-being, encompassing physical, mental and emotional health,” says Mieke Acda, regional product manager for Naturals & Nutrition at Givaudan Taste & Wellbeing. People are proactively seeking ways to enhance their health through everyday foods, recognizing the link between diet and well-being. This shift in consumer focus has led to a growing interest in functional foods that offer targeted health benefits beyond basic nutrition,” she comments.





Vaughn DuBow, global director of marketing for Microbiome Solutions at ADM, says that “one-size-fits-all” strategies for health are quickly being phased out in favour of more customized approaches to balanced wellness, with many consumers turning to functional solutions that are convenient and can fit into their everyday lifestyles. At the same time, the definition of wellness differs from consumer to consumer. Many understand that their needs are unique, motivating them to seek functional offerings that reflect their personal goals.”

As individuals become more informed about the health impact of specific nutrients, they seek foods that can support their health goals. Acda believes this trend is driven by the desire for convenient and accessible solutions that “integrate seamlessly into their daily routines, ultimately enabling consumers to take charge of their health through the foods they consume.”

Filip van Hulle, general manager at Kaneka Nutrients Europe, cites market research that suggests “48% of consumers are making proactive choices regarding

their health and wellness. Functional food solutions are increasingly catching the attention of health-conscious consumers,” he explains. Moreover, Kaneka sees a rise in consumer interest in holistic health solutions across the supplements and functional foods spaces.

Meanwhile, Mathieu Millette, scientific director of RD&A ProActive Health at Kerry, comments on the shift to a more hands-on approach to health and nutrition. “Globally, nearly two-thirds (65%) of consumers say they take a proactive approach to their health, frequently looking for functional ingredients in their favourite food and beverage products. This trend has accelerated in the COVID-19 and post-COVID era,” he explains.

By Elizabeth Green

Protein for performance: Experts spot opportunities in increasingly crowded sports nutrition market

03 Jul 2023
Nutrition Insight

Almost half of European consumers use protein products, according to Innova Market Insights.

Additionally, practically all (99%) of whey protein sports nutrition launches claimed to be a high source of protein - an important health claim for consumers, outlines the market research company. Nutrition Insight sits down with professionals from Arla Foods Ingredients, Unibar and Fonterra to discuss developments in the market segment.

“Protein remains one of the most important ingredients in the sports nutrition space. Animal protein, led by whey and dairy, powers on thanks to its key advantages: high

quality, nutrient density, familiarity, versatility and taste and texture benefits,” says Birgitte Kynde Ravn, Sports Nutrition and Health Foods industry marketing manager at Arla Foods Ingredients. “Sports nutrition consumers love whey protein for all kinds of reasons, but they’re also interested in novel sources such as insects, fungi and proteins produced by fermentation.”





movement away from traditional milky powder shakes toward clear options, notes Ravn. “This is very much a ‘whey game’ - around 75% of clear shake products contain whey. The ‘mainstreaming’ of protein is also one of the drivers behind the ongoing healthy snacking trend and the increasing demand for high-protein snacks. That’s why they’ve long been the protein of choice for sports nutrition consumers, who look to them for enhanced endurance, muscle protein synthesis and faster recovery.”

Innova Market Insights data suggests strong growth and innovation in the protein sector were starting to slow in 2021, as the number of new protein products launched globally had declined that year. At the same time, the data reveals that protein claims have been leading sports nutrition launches for the last five years.

“With a crowded protein shelf and a stable but arguably stagnant sports nutrition category, it was clear that there is a need to innovate to drive differentiation and growth in this space,” comments Wilkinson. She adds that Nutiani’s consumer insights research showed active consumers indicate stress and mental well-being as a crucial health concern, pointing to the bridging between the protein and mood categories.

Fonterra set up a year-long Athlete Incubator Project as consumer research to inform future performance nutrition innovations.

“Perhaps one of the most significant learnings was that the top performing concept was the brain and body powder that contained both whey protein for muscle health and strength and broad-spectrum phospholipids for focus, cognition and stress,” explains Wilkinson.

By Jolanda van Hal

“We know that the protein market is becoming increasingly crowded as it becomes more mainstream, and as a result, some consumers are becoming more price sensitive,” adds Paige Wilkinson, global marketing manager of Active Living at Fonterra. She explains three key challenges to address in the sports nutrition market: launching products that stand out on a crowded protein shelf, building consumer loyalty beyond price point for protein products and managing mental well-being claims in sports nutrition.

Whey proteins are well known for their nutritional quality, rapid absorption and premium content of essential and branched-chain amino acids. Arla Foods Ingredients sees a



REGULATORY NEWS

Aspartame appraisal: “No immediate action required” but reformulation likely as consumer concern continues

20 Jul 2023 Nutrition Insight

Although aspartame’s safety and daily intake have been reaffirmed, discussions about how this may affect the F&B industry and consumers are ongoing. Food Ingredients First discusses the impact of the recent WHO evaluations on companies, the public scrutiny of aspartame and a possible IARC reassessment with scientists and industry experts.

The International Agency for Research on Cancer (IARC) classified aspartame as “possibly carcinogenic to humans.” At the same time, a risk assessment by the WHO and FAO Joint Expert Committee on Food Additives (JECFA) reaffirmed the current maximum daily intake of 40 mg/kg of body weight for aspartame. The leak of the IARC classification has been hailed as confusing to consumers and likely stoked up public concern, Kevin McConway, emeritus professor of Applied Statistics at the Open University, tells us. Now that JECFA’s risk assessment has been made public, he

expects the IARC’s classification should have minimal effects on companies using aspartame. “Nearly all the media coverage I saw, after the official release, did get across what the IARC assessment means and that there’s no real evidence of carcinogenicity at normal consumption levels.”

Industry implications

Since the current daily intake value continues to be considered safe, the industry need not take any action immediately, adds Pradeep Bhide, Ph.D., professor at Florida State University College of Medicine, who studies mental health effects of aspartame. “However, I would not be surprised if a gradual shift away from aspartame begins in the near future.” Bhide expects reformulation is a likely outcome of the IARC classification, though he does not expect companies to take action immediately due to JECFA’s conclusion. Moreover, the FDA has released a statement saying it “disagrees with IARC’s conclusion that these studies support classifying aspartame as a possible carcinogen to humans.” The organization adds that FDA scientists identified significant shortcomings in the studies on which IARC relied after

reviewing the information IARC used in 2021 when it was first made available.

Informing consumers

Jamie Cartwright, partner at international law firm Charles Russell Speechlys, discusses potential labelling requirements, emphasizing that aspartame’s health implications must be communicated well to consumers. He explains that in the EU, products using aspartame already need to include the phrase ‘contains a source of phenylalanine.’ At the same time, legislation in California imposes obligations to provide risk warnings in consumer products, especially regarding cancer or congenital disabilities.

“While some consumers may still wish to consume aspartame, many will be reluctant to ingest a sweetener classified as ‘possibly carcinogenic,’” David Tsvion, CTO and deputy CEO of DouxMatok, tells us. He expects the latest WHO learnings on non-sugar sweeteners and the IARC classification may cause food companies to find alternatives to aspartame that are clean label and natural. “We expect that most food companies will not be able to ignore such declarations on one of their ingredients.”



“The spokesperson further says it has introduced legislation to restrict the placement and promotion of such products in supermarkets to discourage unhealthy food choices.

“Our salt reduction program has reduced the amount of salt in bread by around 20%, and our voluntary sugar reduction program has reduced the amount of sugar in foods popular with children, including breakfast cereals and yogurt. Our Soft Drinks Industry Levy has also nearly halved the sugar in soft drinks. We have also introduced calorie labelling on food sold in restaurants, cafes and takeaways to empower people to make informed personal choices about their lifestyle,” says the DHSC.

Pete Wilde, professor of food structure, colloids and digestion at Quadram Institute Bioscience, UK, highlights that most food processing classification systems, including NOVA, do not consider nutrient composition. This means processed foods with a healthy nutrient profile or energy density will be considered UPF. It is good to see that SACN has listed several potential mechanisms or hypotheses underpinning the impact of UPFs on health, including high energy density, low nutrient and fibre content, lack of food structure or matrix,” Wilde notes.

He further argues that there is often very little difference in these factors between artisanal or homemade versions of food compared with commercially manufactured versions.

Recently, an expert panel gathered to discuss UPF and claimed that there is no proven relationship between the degree of processing and the healthiness of a food product. “Therefore, their health impact is likely to be similar, but only the latter would be regarded as UPF and therefore less healthy,” says Wilde.

By Beatrice Wihlander

WHO recommends mandatory regulation of junk food marketing to protect children from HFSS products

04 Jul 2023 Nutrition Insight

The World Health Organization (WHO) has released new guidance recommending countries implement comprehensive mandatory policies to protect children of all ages from the marketing of foods and non-alcoholic beverages that are high in saturated fatty acids, trans-fatty acids, free sugars and/or salt (HFSS).

“Aggressive and pervasive marketing of HFSS foods and beverages is responsible for unhealthy dietary choices,” flags Dr Francesco Branca, director of the Department of Nutrition and Food Safety of WHO. “Calls to responsible marketing practices have not had a meaningful impact. Governments should establish



strong and comprehensive regulations.” Food marketing is also increasingly recognized as a children’s rights concern, given its negative impact on several of the rights enshrined in the United Nations Convention on the Rights of the Child.

More than a decade after member states endorsed WHO’s recommendations on marketing foods and non-alcoholic beverages to children in 2010, children continue to be exposed to powerful marketing of HFSS foods and non-alcoholic beverages, consumption of which is associated with negative health implications, such as obesity, tooth decay and diabetes.

The latest recommendations are based on the findings of recent evidence reviews, including how exposure to and the power of food marketing affects children’s health, eating behaviours and food-related attitudes and beliefs. Notably, food marketing is being slated as a threat to public health as it continues to negatively affect children’s food choices, intended choices and dietary intake. It can also negatively influence the development of children’s norms about food consumption, warns WHO.



McConway adds that IARC made it clear there is a lack of sufficiently clear evidence on whether there is a link between aspartame and cancer in humans. “Even the JECFA summary report, while clearly saying that there’s no convincing evidence of carcinogenicity of aspartame consumption below their previously recommended high maximum limit, points to weaknesses in the evidence base. It’s unclear when or even if further research will happen.” Aspartame is one of the most rigorously researched ingredients in the food supply, with more than 100 studies and 90 credible global scientific and regulatory food agencies, Robert Ranking, president of the Calorie Control Council, previously told us.

By Jolanda van Hal



Fortification of infant formula in China through HMO regulatory approval

13 Jul 2023
Nutrition Insight

As one of the largest producers of human milk oligosaccharides (HMOs) in the world, DSM-Firmenich is confirming expansion plans into the stringent Chinese infant formula market.

The company has submitted its GlyCare 3'-sialyllactose (3'-SL) and 6'-sialyllactose (6'-SL) ingredients to China's National Health Committee and the China National Center for Food

Safety Risk Assessment. The ingredients join the company's other submissions - lacto-N-neotetraose (LNnT) and 2'-fucosyllactose (2'-FL) - through regulatory Nutrition Fortifier (NF) dossiers. HMOs are highly potent ingredients and essential elements found in breast milk.

They have been shown to play significant roles in promoting infant nutrition and well-being by contributing to the health of the gut, enhancing immune function and potentially aiding cognitive development.

“The authorization process in China is stringent and highly challenging to navigate, comprising multiple rounds of technical review by scientific and regulatory experts, as well as a rigorous approval process that safeguards the safety and benefit of nutrition fortifiers intended for infants and young children,” says Annette Lau, the global regulatory affairs manager, ELN at DSM-Firmenich.

“We continue to take positive strides in the region - first with the favourable progression of our 2'-FL and LNnT nutrition fortifier regulatory submissions, and now the submission of 3'-SL and 6'-SL.”

Edited by William Bradford Nichols

Ultra-processed foods debate heats up again as SACN releases statement report

12 Jul 2023 Nutrition Insight

The Scientific Advisory



Committee on Nutrition (SACN) has released a position statement on ultra-processed foods (UPF) and evaluated its current classification systems, sustainability practices and production methods. The committee also reviewed existing evidence on levels of food processing and its implication on health.

SACN says food processing plays several roles in our food system, such as making inedible foods edible, prolonging shelf life, modifying the nutritional composition and increasing the convenience and palatability of products. However, the definition of processed foods is a debate still ongoing as there is no global definition of UPF, although it is associated with adverse health outcomes due to usually being high in energy, saturated fats, sugar and salt while lower in fibre. Foods of this nature have therefore been consumed more, and due to low manufacturing and marketing costs, it's more easily accessible.

Nutrition Insight speaks with a Department of Health and Social Care (DHSC) representative about the report. “We have noted the SACN's position statement on processed foods and health, which aligns with the firm action we are taking against foods high in saturated fats, salt or sugar.

The recommendation is also based on a systematic review of the evidence on policies restricting food marketing, including contextual factors.

Edited by Elizabeth Green



FSSAI steps up efforts for organic food testing

By Bizz Buzz | 4 Sept 2023

In a bid to make organic products comply with the stipulated standards, Food Safety & Standards Authority of India (FSSAI) has directed its notified laboratories “to take the necessary steps to enhance the infrastructure and scope of the testing for organic products.”

The FSSAI has asked the notified labs to make an application to the Agricultural & Processed Food Products Export Development Authority (APEDA) for authorization, official sources told Bizz Buzz.

The food safety authority has directed the labs to apply to the National Referral Laboratory of APEDA for the proficiency testing programme and competence assessment in order to qualify for pre-export testing of organic products. The labs have been also instructed to apply for organic products to compulsorily include this specific category within the FSSAI-NABL integrated scope. The NABL or

National Accreditation Board for Testing and Calibration Laboratories is an accreditation body. It is one of the constituent boards of the Quality Council of India, an autonomous body under the Department for Promotion of Industry & Internal Trade (DPIIT), Ministry of Commerce and Industry.

The FSSAI had notified Food Safety and Standards (Organic Foods) Regulations in 2017 with the aim to benefit farmers by way of increasing their income. These regulations recognize two systems of certification: the Participatory Guarantee System implemented by the Ministry of Agriculture and the Farmers Welfare & National Programme for Organic Production implemented by the Ministry of Commerce & Industry. The regulations ensure integrity of organic food products and help in controlling unscrupulous practices in the market. All organic food products should be certified. Organic food that is marketed through direct sales to the end customer by a small original producer or a producer organization is exempted from certification. As per the FSSAI, a small original producer or a producer organization is one whose annual turnover is up to Rs12 lakh.

Evolving Regulatory Framework for Novel Food in India

25 August 2023, by Praveen Raju & others, Spice Route Legal

Increased connectivity

around the world has started a new wave in the market for novel foods.

Novel foods such as genetically modified foods and food products, cell-based meat, eggs, and dairy alternatives, as well as plant-based and fermentation-derived proteins, have entered the Indian market. Therefore, it becomes important to understand the regulatory framework put in place for novel foods.

Under the Food Safety and Standards (Health Supplements, Nutraceuticals, Food for Special Dietary Use, Food for Special Medical Purposes, Functional Food, and Novel Food) Regulations, 2016 ("2016 Regulations"), novel foods are defined as: 1. Foods with no history of human consumption for the last 30 years in the country of origin or 15 years in India, 2. Ingredients used in the food with no history of human consumption for the last 30 years in the country of origin or 15 years in India, 3. Use of new technology with innovative engineering process altering the composition or structure or size of food significantly.

In the Indian plant-based food market, several players like Good Dot and One Good feature a wide range of novel food products including soy milk, coconut milk, almond cheese, and plant-based meat alternatives, among others.





innovative plant-based dairy products that cater to consumers' tastes and dietary needs, particularly those with lactose intolerance. However, the current



The Indian food industry believes that harmonising food safety standards will boost its global market presence.

Despite being a leading food production country, India's international presence in this sector remains limited. However, the integration of technologies like Blockchain, IoT, and AI can ensure accurate and consistent food safety practices throughout the value chain, thereby addressing the existing challenges.

During the India Food Safety Conclave, Dr Sridevi Annapurna Singh, director of CSIR-CFTRI, Mysuru, highlighted the need to ensure safety practices from agriculture to post-harvest stages. Careful examination of seeds, soil, water, fertilisers, and monitoring the moisture content of produce is essential to mitigate food injuries to health. Instances of unsafe food contaminated at various stages have highlighted the importance of maintaining strict safety protocols.

According to statistics from the World Health Organization, one in ten individuals worldwide falls ill due to food safety issues.



Plant-based alternatives are gaining popularity worldwide with start-ups like Zero Egg and Vly Foods offering a multitude of products. Besides, Eat Just, a Californian company, made history in December 2020, when its cultivated chicken became the first cultured meat product to receive regulatory approval in Singapore.

The Food Safety and Standards Authority of India ("FSSAI"), on 11 September 2017, notified the Food Safety and Standards (Approval of Non-Specified Food and Food Ingredients) Regulations, 2017 ("2017 Regulations"). Under the 2017 Regulations, prior approval is required for certain articles of food or food ingredients, before its introduction in the market.

In addition, the 2016 Regulations govern eight categories of foods including novel foods. The regulations provide a list of ingredients and additives that are allowed to be used in specified food categories. The Food Business Operators ("FBO") intending to manufacture, import or sell the specified foods are required to adhere strictly to these regulations.

Plant-based foods, such as burgers made from plant-based meat, are gaining global popularity due to their eco-friendly nature. Indian companies are also developing

legal regime for novel foods in India is fraught with challenges. The FSSAI has wide discretion in the regulatory process at various steps. For example, FSSAI has the discretion to provide extra steps of assessments such as safety assessments like clinical trials on the Indian population. There are no specific guidelines for these clinical trials as of now. Further, the requirement of post-market surveillance is also specified by FSSAI on a case to case basis with no guidelines for FSSAI to determine the need for post-market surveillance. Moreover, no specific timeline is defined in the 2017 Regulations for the prior approval of novel foods, leading to delays for FBOs. Thus, these wide discretions of FSSAI create uncertainty and make the regulatory mechanism cumbersome.

Novel foods are still facing challenges due to their high cost which restricts their accessibility and consumer acceptance. However, ongoing research aims to make them healthier and more desirable alternatives to conventional foods.

Food Industry Calls for Harmonised Standards to Boost Global Market Presence

by Business World Online Bureau 24 June 2023



Microbiological contamination, food additives, veterinary drug residues, toxic metal content, environmental factors, and allergens are all factors contributing to unsafe food.

Dr Sridevi Annapurna Singh emphasised the need for India to accelerate its efforts in food safety through the implementation of a rapid food safety management system, robust packaging and labelling practices, and efficient testing and validation protocols.

From ingredients to ideals -- How clean label is reshaping product development

By Deniz Ataman 12-Jul-2023 - Food Navigator USA



The food as medicine movement continues to shape food and beverage with clean and simple ingredient labels that promote healthier food choices and provide important information to individuals with specific dietary needs, while enhancing transparency and trust between consumers and food manufacturers.

Between plant-based proteins, dairy alternatives and meat alternatives, organic,

sustainable and clean label are driving consumers' dietary and lifestyle preferences, Linnea Halter, marketing coordinator, Global Organics, explained to FoodNavigator-USA. As consumers look to make more informed choices about the food they consume, brands have the opportunity to establish transparency, functionality and nutrition starting with ingredients. Labels with fewer and recognizable ingredients are often perceived as nutrient-dense and provide essential vitamins, minerals and dietary fibre, mirroring whole foods.

These familiar ingredients are shaping Global Organics' portfolio, Halter explains, as the company features "cane sugar and other sweeteners, chocolate and cocoa, coconut, fruits and vegetables for organic products" and free from artificial additives, preservatives and GMOs. Brands are meeting consumers at the label with familiar ingredients, clearly communicated dietary and functional attributes (and free-from ingredients) on packaging and ingredient provenance, building trust and consumer confidence.

"We focus on sourcing ingredients from certified organic farms that also implement fair trade practices to ensure sustainability and

social responsibility. Our company seeks certifications such as USDA Organic or Fairtrade to provide consumers with assurance that their products are traceable and meet specific standards," she elaborated.

The perception of clean and simple ingredients also extends to sustainability and social responsibility, Halter explained. "Transparency and traceability build trust," she says, explaining how the company performs supplier audits, supply chain mapping, documentation and record keeping, certifications and collaborations with suppliers to ensure a clean label.

The company's longtime partner, Native, is the first Regenerative Organic Certified (ROC)sugar producer. "ROC goes beyond traditional organic agriculture to enrich the farmland and lives of local communities. By focusing on soil health and biodiversity, integrating sustainability at all levels of their operation and ensuring social fairness to farm workers, Native's Green Cane Project has been long recognized as the model for sustainability," Halter added. Functional food and beverages are expected to grow from \$216.4 billion in 2022 to \$324.4 billion by 2027, according to data by BCC Research. The fast-evolving healthy aging market offers brands an opportunity to develop products that improve aging and cognitive function.

