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FOOD, NUTRITION & SAFETY MAGAZINE

BULLETIN AUG 2022

NUTRITIONAL ROLE OF SOYA PROTEIN FOR HUMANS

Ms Rachana Negi

BUREAU OF INDIAN STANDARDS: THE NATIONAL STANDARDS BODY OF INDIA

Dr Shashank V Bhalkar

NOURISHING INDIA: UNLOCKING THE POWER OF PULSES THROUGH SMART PROTEIN

Ms Nicole Rocque

CAN WE BE ALLERGIC TO FOOD?

Ms. Prerana Patil

FRUCTO-OLIGOSACCHARIDES - MINERAL ABSORPTION AND BONE HEALTH

Dr Priyali Shah

FUNCTIONAL STARCHES FOR IMPROVING FOOD PRODUCTS: A REPORT

WEBINAR ORGANIZED BY PROTEIN FOODS AND NUTRITION DEVELOPMENT ASSOCIATION OF INDIA (PFNDAI) IN COLLABORATION WITH ROQUETTE:

Ms Nidhi Gupta

PATENTS AND THEIR SIGNIFICANCE IN THE FOOD INDUSTRY

Ms Nidhi Gupta

PROTEIN FOODS AND NUTRITION DEVELOPMENT ASSOCIATION OF INDIA

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DISPARITIES IN RECOMMENDATIONS OF NUTRIENTS: EDITORIAL

Recently International Alliance of Dietary Supplement Associations (IADSA) called for a global agreement on vitamin C recommendations. It was observed that the recommendations of different countries varied substantially. The difference between the lowest and the highest recommendations were almost three-fold. This raises doubts about the scientific validity of recommendations. Consumers also start having doubts about the authenticity of such recommendations.

Originally, vitamin C was recognised for prevention of scurvy, but it has been known to perform many important functions including protection of cells from oxidative damage and to maintain healthy skin, bones and cartilage. It also provides support to immune and nervous systems.

This has given different governments different scopes for arriving at recommendations. Some base them on prevention of deficiencies but others look for higher recommendations for other protections including for immunity etc. The case is not unique for vitamin C as one country started investigations to tackle vitamin D deficiency.

For vitamin C, EU RDA for men is 110 mg per day and 95 mg for women. For UK, the figures are 40 mg per day for both men and women. In India, until last year the figures were same as UK, but in 2021, FSSAI raised the values to 80 mg for men and 65 mg for women. This was based on a report by ICMR, NIN expert group recommendation on Nutrient Requirements for Indians stating its role not just in scurvy but also in immunity. Chinese have chosen even higher level of 200 mg/day for decreasing non-communicable disease risk.

All these are justified but consumers are not made aware of any of these things and they find suddenly changes in the values. What they used to consider adequate becomes either too less. We need to communicate not only the changes to all stake-holders but also inform them about the reasons behind.

There has been an explosion of information and also misinformation about health and nutrition in various media which has created a lot of confusion rather than clearing the doubts. Consumers have realised that there is a strong relation between health and nutrition and they have started taking things in their hands in taking precautions to prevent infections and to acquire immunity reading all sorts of advice from net.

Authentic information is necessary to be communicated to regain the confidence of consumers. It is not just regulatory authority and national institutions like NIN, but also various scientific and trade associations related to food industry have this responsibility of communicating authentic information to all including consumers. Industry should not just provide information to either fulfil mandatory declarations and for market advantage, but to create awareness among consumers so they can make an informed choice.

Prof Jagadish Pai,
Executive Director, PFNDAI

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NUTRITIONAL ROLE OF SOYA PROTEIN FOR HUMANS

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Past several decades have seen a spike in obesity rates, both in the developed and the developing countries. As per the data published by WHO in 2020 on the top 10 causes of death at a global level, 7 of the 10 leading causes in 2019 were non-communicable diseases devastating the quality of life of individuals across the globe. These global trends have lead healthcare specialists and nutrition scientists to focus more on right nutrition, balanced diet, physical activities and thus help reduce roots causes of chronic illness.

Plant based diets, specifically plant-based proteins have received unparalleled interest from researchers and consumers due to its potential health benefits as well as for their positive environment impact.
The sources of protein could vary from animal or plant depending on dietary preference of an individual. However, soya bean (Glycine max) is the most studied source of quality plant protein compared to any other sources available. Soya beans are a species of legumes native to East Asia, but now are widely grown around different parts of the world. The protein component of soya bean is the edible portion extracted from whole soya beans in multi-step process. Soya bean contains approximately 30%-40% of protein while the rest is lipids, dietary fibre, and moisture content (Michelfelder 2009).

Figure 1: Soya bean and soya bean products.

Two groups of protein found in soya beans are globulin (salt soluble) and albumin (water-soluble). The availability and purity of these protein is improved by removal of indigestible and lipid portion while processing. Depending on the desired product, soya protein may take form of soya protein isolate (SPI); soya protein concentrates (SPC) or soya flour for its application in different food products.

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Table 1: Protein quality of different food sources.
Source: (Pingxu Qin, 2022)

Protein	PDCAAS	Limiting Amino Acid(s)	Digestibility (%)
Soya	0.92-1.00	SAA	95-98
Pea	0.66-0.91	SAA, Trp	83-90
Barley	0.76-0.50	Lys	76-83
Milk	1.00	None	84-94
Whey	0.90-1.00	His	98-100

Markers for Quality of Soya protein:

Protein quality is marked by the composition of amino acids and its digestibility in the human body when consumed. Animal protein such as meat, egg, milk, and milk products are known to have all the essential amino acids namely histidine, leucine, isoleucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine. The PDCAAS score which stands for protein digestibility corrected amino acid score is the most frequently used marker to evaluate quality of protein in human foods (Mathai, 2017). Animal protein in general have high digestibility (>95%), whereas overall the plant proteins are regarded as "incomplete sources of proteins" due to the absence of one or the other amino acids in a single source. Soya protein is well identified for not only the quantity but also the quality of the protein compared to any other plant-based protein available in the market today. Table 1 summarizes the PDCASS of animal sources like whey, milk and plant protein sources like soya, pea, and barley. The PDCASS of soya ranges from 0.9-1, comparable to that of dairy sources.

Recently the Food and Agriculture Organization (FAO), recommended moving to DIAAS score (digestible, indispensable amino acids score). The DIAAS value of soya protein is 0.9, which is well above the minimum value of 0.75 recommended by FAO for nutrient claims to be made for high quality protein (FAO 2013)

The amino acid profile of soya bean is well rounded off compared to other plant protein. It contains adequate quantity of essential amino acids like histidine, isoleucine, leucine, lysine, phenylalanine, threonine, tryptophan and valine. Only the combined amount of sulphur amino acids, methionine and cystine are low in soy proteins. Soya protein being an excelled source of lysine can be incorporated in the meals of population where protein malnutrition is prominent (Erdman & Fordyce 1989)

Although the high nutritional value of soya bean is determined by amino acid composition of the protein, its complete nutritional potential is attained only after an appropriate heat treatment is applied. The heat liable factors, also called as anti-nutritional factors interfere with the availability of proteins in the final product. In addition to this, there are heat-stable factors, which are not destroyed by the heat but impacts nutritional quality of soya protein by relatively minor extent. Trypsin inhibitors are one of the common anti-nutritional factors that are known to inhibit the soya protein digestibility. However, they are destroyed by simple cooking (moist heat treatment) and only pose a problem when the seeds are consumed raw or are heat treated insufficiently.

Role of soya protein in health and nutrition

Proteins have been regarded for its ability to assist in weight management, to increase HDL cholesterol, to increase satiety and enhance the absorption of calcium in bones. Therefore, an adequate level of protein consumption is essential for every individual. WHO has established an international recommendation on dietary protein intake of 0.83g/kg of body weight/day.

In the recent update of the 'dietary guidelines', the US-government's evidence based nutritional guidance to promote health, reduce the risk for chronic diseases and the prevalence of obesity through improved nutrition, recommends increasing soya intake through fortified beverages and other soya products (Dietary Guidelines for Americans 2020).

A healthy vegetarian dietary pattern can be achieved by incorporating protein foods from plants. Compared with the Healthy U.S.-Style Dietary Pattern, the healthy vegetarian dietary pattern is higher in soya products (particularly tofu and other processed soya products); beans, peas, and lentils; nuts and seeds; and whole grains. An industry-sponsored newsletter is devoted to the popularization of information on soya foods (Soy Connection).

Some of the recent studies in soya protein highlighting its health benefits:

Healthy lipid profile and cardiovascular health:

A study published in The Journal of Nutrition (van Nielen et al. 2014) found that partly replacing meat at meals for four weeks with 30 grams of soya protein from soya-based meat alternatives and soya nuts resulted in greater blood sugar stabilization and showed clear advantages for improving insulin sensitivity. This study also showed a 4 percent decrease in total cholesterol and 9 percent decrease in LDL (the bad) cholesterol.

The study was conducted in postmenopausal women with abdominal obesity. As per a literature review (Messina 2016), in addition to lowering LDL-cholesterol, consumption of optimum soya protein marginally decreases triglyceride levels (~5%) and increased HDL-cholesterol (~1%-3%). Soya protein products rich in isoflavones have demonstrated potent effects on reducing cholesterol levels in both animal and human trials, and such beneficial effects are significantly enhanced when consuming soya protein in the diet compared to purified bioactive compounds (Pingxu Qin 2022).

Weight management:

The potential benefits of soya protein consumption in obesity and fat loss have been well studied in animals and humans. Stimulation of fatty acid oxidation in muscles, restriction of enzyme responsible for fatty acid production, enhancement of plasma adiponectin and enhanced fecal matter excretion are some of the impacts inter-related with reduced obesity and soya protein consumption (Trigueros, 2013).

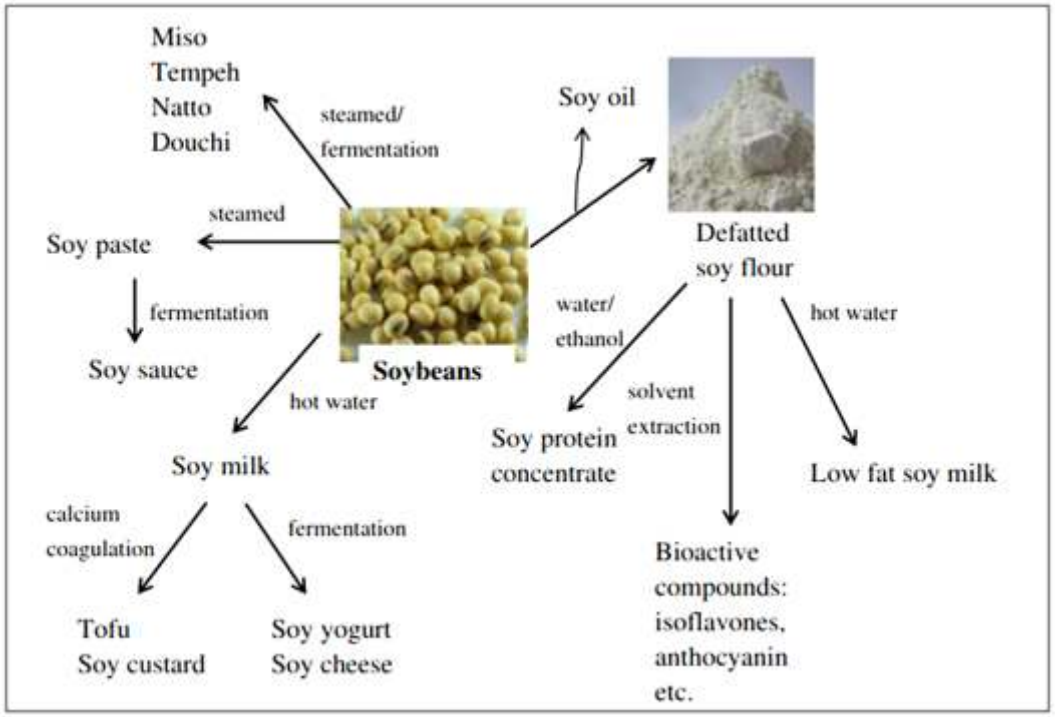
One of the underlying mechanisms of soya products are that they rich in isoflavones which helps in prevention of hyperlipidemia and obesity through activation of peroxisome proliferator-activated receptors, thus enhancing lipid metabolism and anti-diabetic benefits (Mezei, 2003). Clinical studies of post-menopausal women who consumed meals consisting of soya bean products every day for three days showed gained less belly fat than those who consumed regular diet (Cheng, 2007)

Bone health:

Soya protein products could potentially benefit in bone health and prevent the risk of osteoporosis, as they are naturally rich in calcium and isoflavones. Various researches suggest this beneficial effect through consumption of soya protein foods as part of diet rather than single ingredient (Lanou, 2011). One of the strongest subjects of bone health benefits has been menopausal status of women. The research review by Atmaca and colleague inferred the positive effect on postmenopausal women, due to impact of soya on marker of bone mineral density and bone turn over (Atmaca et al. 2008).

Research review indicates majority of the bone health outcomes from soya foods were observed in Asian populations in China, Japan, and US. The food consumed by these population are traditional soya food, whole soya bean, soya milk, fresh or fermented bean curd and other fermented soya products (Zhang, 2008). Although the optimum amount of soya food for bone health benefits is not clear, but dietary pattern results suggest likelihood of the indicated benefits through its regular consumption through different sources available.

Figure 2: Flow diagram of soya bean processing to commercial soya products.
Source: (Kuan-I Chen, 2012)



Soya protein application in food industries: (Bookwalter 1978)

The unique functional properties of soya protein such as emulsification, solubility, water absorption, texturization and antioxidation contributed enormously to the food systems. Soya protein is utilized as whole beans, soya flour, grits, concentrates, isolated and textured protein through specific manufacturing processes. Soya milk is atypical soya protein product, consumed as one of the most popular non-dairy substitutes. Soya bean foods are typically divided into two: non-fermented and fermented. Non-fermented products include fresh or dehydrated soya beans, sprouted soya beans, soya milk and its products, soya flour, tofu and yuba.

Fermented soya products include miso, soya sauce, natto, tempeh and fermented tofu. Soya milk is obtained from water soaked and ground soya beans that are cooked at varying temperatures. Filtering yields a protein-rich soya base that naturally consists of soya protein, oil, fibre, sugars, water, and bioactive compounds. Soya bean can be processed to produce textures mimicking meat and dairy food products. Additionally, micronutrients are added to make soya-textured products nutritionally equivalent to its animal substitute.

Soya-based infant formulas (SNIF) are used for infants allergic to milk proteins. The US Food and Drug Administration (FDA) has also accepted SNIF as safe for use as sole source of nutrition. Soya protein concentrate contains 70% protein on an average and is used either for its functional properties in baked foods or dairy based foods or for nutritional benefits in health care products. Soya protein isolated are pure form of soya proteins which is composed of approximately 90% protein with applications like soya protein concentrates.

Plant-based protein products are growing worldwide, and such trend is expected to continue to rise as more research report the benefits of plant foods for human health. Soya is one of the plant protein sources, which has been consumed from centuries as a substitute to animal protein sources by diverse population, vegans, vegetarians, and Asians. Soya protein is the best quality protein among other plant protein sources and comparable to some animal-based protein sources. Industrial manufacturing process further enhances the availability of protein and destruction of anti-nutrient factors associated with soya foods. Several clinical researches have demonstrated the potential of consumption of food containing soya protein for lowering the prevalence of chronic diseases and obesity. Soya protein rich in isoflavones has shown significant health improvement for women during their menopause phase. With advances in research, there is a greater potential of soya protein to be explored for human nourishment and disease risk reduction.

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NOURISHING INDIA: UNLOCKING THE POWER OF PULSES THROUGH SMART PROTEIN

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India is no stranger to malnutrition, and over the last two years, the Covid-19 crisis has only aggravated this challenge.

Research has estimated that pandemic-induced disruptions in nutrition in low- and middle-income countries (LMICs) across the globe could result in an additional 9.3 million children suffering from wasting (low weight for height) and 2.6 million children suffering from stunting (low height for age). Both these problems are particularly severe in India (19.3% wasting and 35.5% stunting), with the country suffering the most from the global burden of childhood stunting. As per the latest data on malnutrition from the National Family Health Survey, 2019-20 (NFHS-5), India continues to have challenges on a wide range of nutritional indicators and available data suggests that diets in India are heavily cereal based, with inadequate consumption of high-protein, nutritious foods.

Simultaneously, our agricultural and food systems are already suffering from significant pressure on natural resources, putting a growing percentage of the population at risk of going hungry. Over the next year, India is slated to become the world's most populous country, surpassing China, with 1.4 billion people. A growing population combined with factors such as demographic transitions will put additional pressure on agriculture and natural resources, necessitating the need for food systems that are resilient, environmentally sustainable, and safe.

Here's where protein diversification comes in

When it comes to nutrition and food security in India, our conventional sources of industrially-derived protein foods needs to be the focal point of dialogue and action. In order for us to supplement our current sources of protein and diversify the country's protein supply, focusing on plant-based sources of protein - many of which, like pulses, are indigenous to India - will be critical. It's imperative for us to de-risk our food system, safeguarding against the following:

1. Environmental impacts:

Animal agriculture is a leading driver of climate change, ecosystem loss, and environmental degradation worldwide. By 2030, it is estimated that up to 130 million people could fall back into extreme poverty, while 200 million could be displaced by increasingly frequent and severe climatic disasters. India is also the seventh most vulnerable country globally to climate change, and we've been witness to how low- and middle-income populations suffer the worst impacts, as they have the fewest resources to buffer natural disasters, climate variability and extremes.

2. Resource inefficiencies:

Animal agriculture competes for limited land and agricultural inputs, while diverting massive quantities of crops away from direct human consumption and toward animal feed, ultimately driving up the price of grains and legumes for human consumption, displacing subsistence farmers, and exacerbating food insecurity. The Economist reports that animal feed accounts for 33

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percent of the worldwide grain supply. Cycling crops through animals is inherently inefficient, to illustrate, chickens take in 9 calories of feed to produce just 1 calorie of protein in the form of meat.

3. Public health risks: Our current global food system poses significant risks for human health and is a leading contributor of pandemics, zoonotic diseases, and antimicrobial resistance. While these challenges are global in nature and transcend national borders, it is most usually people living in low-income communities who are at high risk, due to limited access to quality healthcare.

Bypassing the animal when it comes to protein production and directly processing plants to create delicious, nutritious, sustainable alternatives to meat, eggs, and dairy is our best bet at providing protein to a fast-growing and still-vulnerable population. Several studies, such as the Eat Lancet Report, advocate for a personal and planetary health focused diet that primarily relies on plant-based foods to supplement animal sourced foods.

Smart proteins present a viable and scalable solution

While all the evidence points towards reducing meat consumption and focusing instead on plant-based foods, people are unlikely to switch from chicken to chickpeas or mutton to moong. That's why, all across the world, innovators and food technologists are working on elevating plant-based ingredients to produce 'smart protein' products. Smart proteins are foods which can reliably and predictably substitute the consumption of animal-derived meat, eggs, and dairy, because they perfectly replicate the sensory and cultural experience for consumers. Put simply, these foods look, cook, smell, and sizzle like conventional meat, but are entirely made from plants, through cell culture, or microorganisms. Smart proteins exhibit substantial benefits and offer several advantages in the supply chain for producers relative to animal agriculture, especially with regard to land use, climate change, environmental pollution, and public health risk factors. Crucially, the largest conventional meat, food, and agri corporations are seeing the opportunity to diversify their product portfolio and stay abreast of innovation, with their own lines of products like plant-based meats and investments in smart protein startup companies.

In India, we have the unique opportunity to aim these technologies at catalyzing an affordable, sustainable supply of protein, targeting malnutrition, augmenting farmers' incomes, and building a major pillar of our new green economy.

Plant-based foods are a key pillar of smart protein, and use plant-derived ingredients like peas, rice, soya, millets, pulses, lupins, to mimic the taste, texture, and nutrition of conventionally-produced animal protein. These foods are created by extracting protein derivatives from crop ingredients which are then used as the raw materials for a variety of plant-based foods depending on their inherent functional properties. These "next generation" foods go far beyond the soy-based nuggets and mock meats that have existed for millennia, and are aimed at providing consumers and producers with a truly viable alternative to animal-sourced foods.

Pulses in the spotlight

The plant-based protein industry is still in its infancy, as the tools with which we have been working, right from the ingredients at the very start of the supply chain, have not been optimized for these next generation food applications. However, India has tremendous crop biodiversity, with an abundance of pulses, millets, beans, and more, that have massive potential to diversify raw materials for the global smart protein sector.These viable, 'next gen' ingredients can power a new landscape of plant-based foods - one which is tastier, more affordable, and more nutritious.

In particular, pulses are one of the most uniquely placed crops to be optimized for consumption that benefits personal and planetary health. Peas, beans, and other pulses are high in protein content, making them perfect candidates for developing new protein-rich plant-based meat, egg, or dairy products. Pulses are also associated with lower environmental impact by way of producing less greenhouse gas emissions, and utilizing less land and water. They are nitrogen-fixing plants and work to convert nitrogen from the atmosphere into compounds that create rich, healthy soils, and typically require minimal or no additional fertilizer. When used in crop rotation systems, pulses support the growth of a more biodiverse and resilient food supply. They have also been shown to help conserve water in the soil, thereby reducing irrigation requirements for future crops, making them well-suited to water-stressed regions.

When evaluating India's landscape of crops for utilization in next-gen plant-based food applications it is important to consider factors related to protein content and quality, nutrition claims, availability, and cost. Considerations for different functional properties are made depending on the unique composition of protein types within each plant species. Protein types differ by size, shape, composition, biofunction, and ultimately their behavior in food. Depending on the functionality, these ingredients can be leveraged to function similar to animal-derived meat, eggs or dairy products. This includes aspects such as binding water, forming a gel, and emulsifying—all which influence the sensory experience of eating food. These protein effects can range from the moistness of a piece of chicken to the creaminess of yogurt.

Pulses are already being used in plant-based food applications globally, in unique and specific ways:

1. Peas (mostly dry, whole, yellow peas) are quickly becoming one of the fastest growing plant protein sources globally, with broad applications across the plant-based meat, plant-based dairy, and the extruded snacks segment. Their high fiber and protein content makes for a highly functional meat extender and texturizer in the extrusion process. *US-based Beyond Meat uses pea protein as a replacement for soy protein in their plant-based meat products, and Ripple uses peas for their high-protein plant-based milk. Corporates such as Cargill Food Ingredients and others are also beginning to supply pea protein for a variety of applications.*

Protein	Protein Concentration	PDCAAS	Allergen Risk	Commercial Stage	Flavor	Functionality	Cost (/kg protein)	Global Crop Volume (MMT)
Soy	●	●	●	●	●	●	●	●
Pea	●	●	●	●	●	●	●	●
Wheat	●	●	●	●	●	●	●	●
Canola	●	●	●	●	●	●	●	●
Chickpea	●	●	●	●	●	●	●	●
Fava Bean	●	●	●	●	●	●	●	●
Lentil	●	●	●	●	●	●	●	●
Lupin	●	●	●	●	●	●	●	●
Mung Bean	●	●	●	●	●	●	●	●
Navy Bean	●	●	●	●	●	●	●	●
Peanut	●	●	●	●	●	●	●	●
Sunflower	●	●	●	●	●	●	●	●
Almond	●	●	●	●	●	●	●	●
Corn	●	●	●	●	●	●	●	●
Oat	●	●	●	●	●	●	●	●
Potato	●	●	●	●	●	●	●	●
Quinoa	●	●	●	●	●	●	●	●
Rice	●	●	●	●	●	●	●	●
Sorghum	●	●	●	●	●	●	●	●

2. Chickpeas are increasingly being used as a highly functional protein in plant-based dairy applications, owing to their high solubility, foaming, and emulsification properties. It is a major crop in India and has substantial nutritional benefits and apart from its inherent protein content, it is high in fiber, folate, iron, and phosphorus. However, chickpeas do have a distinct aroma, and flours usually need to be deodorized. *Brazil-based Fazenda Futuro uses chickpeas, in addition to soy, in their plant-based burger patty.*

3. Lentils are the oldest known pulse staple in India. They are high in fiber, magnesium, and iron, fulfilling specific nutritional requirements of a majority of the Indian populace.

Increasingly, companies are functionalizing lentil varieties for applications in plant-based meats, as well as snack food items. Lentils do have a strong beanie taste, and usually need to be neutralized for applicability in a broad range of applications. *US-based plant-based seafood company, GoodCatch, uses a blend of ingredients including lentils in their salmon offering.*

4. Mung, an ancient bean, grown abundantly in India is emerging as a key ingredient source in plant-based egg applications following the success of *US-based JUST Egg, which popularized this pulse source as a viable egg replacement* owing to its high solubility and gelling capabilities. Mung beans are also rich in fiber, potassium, and magnesium.

By diversifying ingredient sources and leveraging these underexploited, diversified, and high-protein crop varieties, plant-based meat, egg, and dairy companies around the world are finding that pulses and other crops could lend themselves to superior functionalities, inherent nutrition-completeness, and cleaner label products!

India's plant-based startup ecosystem is growing due to increasing demand for these foods

Globally, the plant-based sector saw retail sales of over USD 23 billion in 2021, recording significant growth over the last year. In India, while this category is still emerging, there has been significant growth over the last two years, and there are now 50+ companies active in the space, with 200+ plant-based meat, egg, and dairy products available across 19+ Indian cities. Additionally, there are 80+ supporting companies within the larger ecosystem, who are all a part of the broader B2B landscape for plant-based foods in India.

Estimates of the plant-based industry's size range from USD 85 billion (as per UBS) to USD 240 billion (as per Credit Suisse) globally by 2030. In order to keep pace with this demand, the plant-based supply chain will need to scale rapidly. Based on publicly available forecasts of plant-based meat demand and production needs, GFI's report, 'Plant-based meat: Forecasting ingredient, infrastructure, and investment needs in 2030' explores a hypothetical production scenario set in 2030, where plant-based meat has captured 6% of the global meat and seafood market, necessitating the production of 25 million metric tons (MMT) of plant-based meat annually. In this scenario, the supply chain will be severely constrained, requiring anywhere between a 3x-10x increase in ingredients supply.

Creating robust R&D and value chains for crops to be viable raw materials for plant-based foods, presents a lucrative opportunity for Indian ingredients manufacturers to diversify global inputs for the sector. Currently, only a small sampling of companies are working across different categories, using different indigenous crop types. Startups such as Supplant Foods have developed a versatile, chickpea-based protein flour which is nutritive and functional and can be used to formulate plant-based dairy products or extruded snacks. Pune-based startup Proeon has developed plant protein ingredients from different indigenous sources such as mung and chickpea that have been functionalized to act as raw materials for the plant-based meat, egg, and dairy products. Another startup, DevigereBiosolutions has developed black eyed pea and mung protein concentrates for plant-based meat and egg and dairy applications, respectively.

The way forward

Taste, price, and access are the most important drivers for the growth of plant-based foods, with nutrition playing an important role in driving category appeal. While companies are innovating rapidly on aspects related to taste and price, there is still a long way to go before we reach parity with conventional meat, eggs, and dairy.

Strengthening India's smart protein ecosystem, especially regarding pulse protein research and the exploration of novel food technologies, is an important opportunity to contribute to improving protein accessibility and nutrition security around the world. In turn, this ecosystem has the potential to capture a significant share of the global supply chain contributing directly to environmental, social, and economic progress.

At the Good Food Institute India (GFI India), we have been working across business, science, and policy to build the smart protein sector from the ground up through key programs like our Indigenous Agriculture Initiative focused on making available open-access scientific information and technical advisory to entrepreneurs, large corporations, and governments. However, in order to stimulate smart protein product development utilizing a diverse array of inputs, including pulses, there is a significant amount of work to be done across scientific development, value chain creation, agri-integration, and broad-based industry building to make this a reality.We are confident that if we come together to prioritize this sunrise sector at the intersection of industry, science, and policy, we can achieve a more resilient, secure, and sustainable food system!

Please reach out to GFI India at india@gfi.org for any queries.

COMING EVENTS

Joint Workshop by AFST (I) & SRM Inst Sci & Tech on
Publication Ethics & Effective Scientific Writing for Enhancing Publication Success
Sep 9, 2022
TP Ganesan Auditorium, SRM Inst Sci & Tech, Kattankulathur, Tamil Nadu 603203
W: www.afsti.org
E: afstimys@afsti.org

3rd Edition of International Nutrition Research Conference (ONLINE)
NUTRITION 2022
Sep 12 - 13, 2022
Email : nutrition@magnusconference.com

Annapoorna – ANUFOOD India
Sep 14 - 16, 2022
Venue: Bombay Exhibition Centre, Mumbai
Koelnmesse YA Tradefair Pvt. Ltd
E : a.kumbhare@koelnmesse-india.com
Collaborators: AFST (I) Mumbai Chapter

ICFNH 2022: 16. International Conference on Food, Nutrition and Health
Sep 20 - 21, 2022
in Lisbon, Portugal
W: https://waset.org/food-nutrition-and-health-conference-in-september-2022-in-lisbon

Food Safety & Nutrition Science
Sep 22 - 23, 2022
Toronto, Canada
W: https://food-nutritionconference.euroscicon.com/
E: contact@euroscicon.com

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

SIAL 2022
Oct 15 - 19, 2022
Paris France
W: https://www.sialparis.com/

A Novel approach to the Innovation and Invention in Food and Nutrition Science
5th International Conference on Food and Nutrition
Kuala Lumpur, Malaysia
Nov 16 - 17 2022
W: https://www.usfn.net/food-nutrition-conference/ &
E: foodandnutrition@bioleagues.com

World Diabetes Congress 2022
IDF: International Diabetes Foundation
Dec 5 - 8 2022
Lisbon
E: congress@idf.org
W: http://www.idf.org/

FRUCTO-OLIGOSACCHARIDES - MINERAL ABSORPTION AND BONE HEALTH

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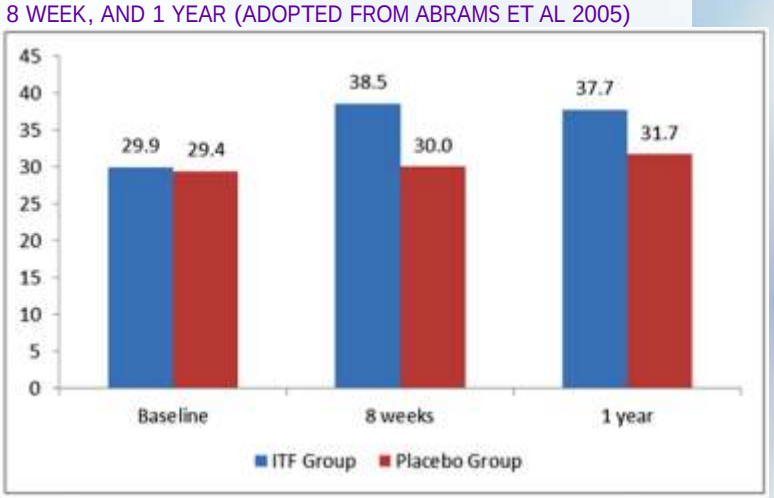
It is well known that Fructo-oligosaccharides, a prebiotic dietary fibre, is not digested in the gastro-intestinal tract and are metabolized completely by the colonic microflora, through fermentation, producing post-biotics, such as short-chain fatty acids (SCFAs), lactate, and gases (CO_2, H_2, and methane).

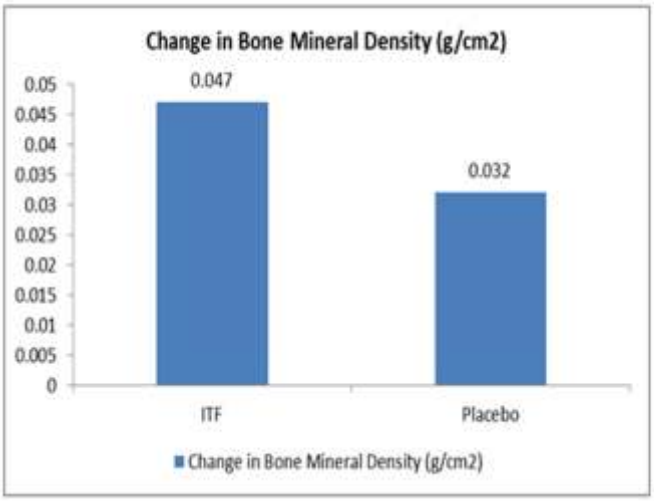
The production of lactate and the SCFAs (acetic acid, propionic acid, and butyric acid) has several health benefits, including mineral absorption, and subsequently supporting bone health. Production of SCFAs improves mineral (calcium) absorption through an exchange of intracellular H^+ for Ca^{2+} in the distal colon.

Studies have documented that in the presence of SCFAs in the large intestine, there is a rise in cecal blood flow that have trophic effects on epithelial cell proliferation, a decrease in the cecal pH, and an increase in the trans-cellular passage of minerals. Thus, there may be an increase in the mineral availability for absorption and subsequent improvement in bone health.

Various clinical trials have reported a relation between prebiotics and mineral absorption/status and/or markers of bone health. Adequate mineral absorption is important during adolescence years for better peak bone mass and thus becomes critical. In a study (Abrams et al. 2005), adolescent girls and boys (aged 9-13 years)

FIGURE 1: CALCIUM ABSORPTION IN THE CHILDREN AT BASELINE, 8 WEEK, AND 1 YEAR (ADOPTED FROM ABRAMS ET AL 2005)





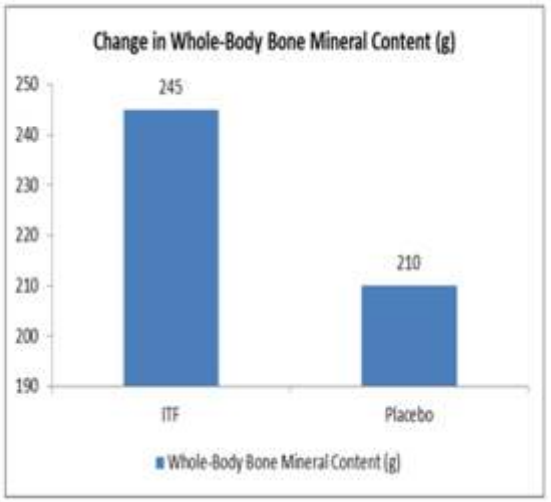


FIGURE 2: CHANGES IN BONE MINERAL DENSITY AND WHOLE BODY BONE MINERAL CONTENT (ADOPTED FROM ABRAMS ET AL 2005)

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*Sci Rep. 2019 Apr 2;9(1):5473

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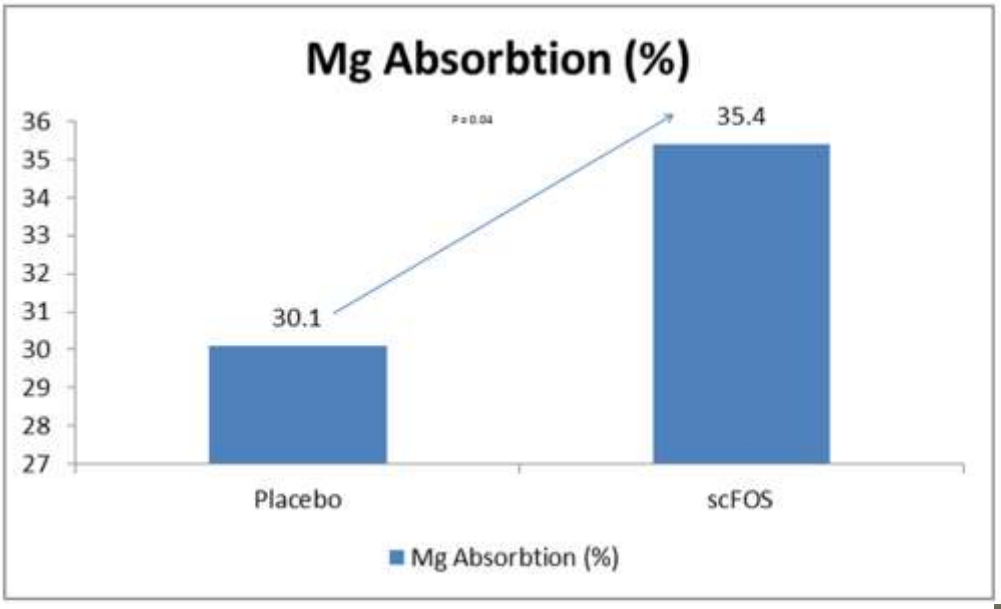
received 8g/day blend of inulin type fructans (ITF) daily for one year and compared to a placebo (maltodextrin). The consumption of ITF significantly increased the percentage rate of calcium absorption compared with the control group, after eight weeks and one year (Figure 1). Bone mineralization measurements were performed after one year by dual-energy X-ray absorptiometry (DXA) and it was found that change in whole-body bone mineral content and change in bone mineral density were significantly greater in the ITF group compared to the control group ($p < 0.05$) (Figure 2). The study showed that a daily intake of prebiotics as fructo-oligosaccharides improved mineral (calcium) status among the adolescents.

Another double-blind, randomized cross-over design study (van den Heuvel et al. 2009) evaluated the effect of short-term and long-term consumption of short-chain fructo-oligosaccharides on mineral absorption in 14 adolescent girls with calcium intake below 1,100 mg/day. The study subjects consumed 10 g of short chain fructo-oligosaccharides or maltodextrin (control) for 37 days each, separated by a 12-day washout period. The study concluded that consumption of short chain fructo-oligosaccharides for 36 days significantly stimulated magnesium absorption in girls by 18% after 36 days (Figure 3).

Another group of individuals where mineral absorption is extremely important are the post-menopausal women. Minerals such as calcium are important for peak bone mass as well as in the prevention of bone loss associated with aging. Due to menopause, postmenopausal women have a higher risk of developing osteoporosis because of declining estrogen concentrations. Also, menopause is associated with a decreased intestinal calcium absorption, increased renal calcium excretion, and overall reduced calcium retention. These changes can lead to a negative calcium balance, which is maintained at the expense of bone resorption,

and as a result, bone mineral loss may occur. Any dietary intervention that may support either of the three mentioned conditions may support wellness with improved calcium status. In a clinical study (Slevin et al. 2014), a daily intake of 3.6g short chain fructo-oligosaccharide for 24 months reported a slowdown in the total body and spinal bone loss indicating improvement in calcium status in long term among post-menopausal women. The study showed a favourable bone health profile after supplementation with calcium and fructo-oligosaccharides.

FIGURE 1: MAGNESIUM ABSORPTION IN ADOLESCENT GIRLS AFTER 36 WEEKS OF FRUCTO-OLIGOSACCHARIDES INTAKE (ADOPTED FROM VAN DEN HEUVEL ET AL 2009)



In another study (Tahiri et al. 2003) post-menopausal women randomly received 10 g/day of short chain fructo-oligosaccharide or placebo (sucrose) for five weeks each with a washout period of at least three weeks between the diet periods. The results showed that the mean of the intestinal calcium absorption with fructo-oligosaccharides treatment was similar to that of the placebo group of women (35.63 vs 36.55, respectively).

However, it was observed that women who had been going through menopause for > 6 years had a tendency for calcium absorption higher with short chain fructo-oligosaccharides treatment as

compared to their counterparts with placebo treatment. Another report documented that calcium supplements were more effective in preventing bone mineral loss in late menopause (>6 years) than in early menopause (Dawson-Hughes et al. 1990). Thus, it may be implied that the short chain fructo-oligosaccharides may positively influence calcium absorption better in the late menopausal phase.

Fructo-oligosaccharides may be beneficial to calcium absorption in populations with high calcium needs, such as adolescents or among individuals with impaired active intestinal calcium absorption, such as elderly people, in whom down-regulation of calcium absorption is less likely. Inclusion of prebiotics such as fructo-oligosaccharides support beneficial effects on important mineral (such as calcium) absorption and subsequently may support bone health. Calcium has been documented to contribute to maintenance of bones and teeth, normal muscle function and neurotransmission, normal blood clotting, normal energy yielding metabolism, and normal function of digestive enzymes. Also, mineral like magnesium is reported to contribute to a reduction in tiredness and fatigue and normal physiological functions.

It is important to evaluate if fructo-oligosaccharides need to be consumed as a supplement or if it may be incorporated in food applications without altering their organoleptic properties. Fructo-oligosaccharides provide improved organoleptic, nutritional, functional properties, which make it an important functional food ingredient. It is water-soluble and can be used in several food applications (non-acidic; pH >4) such as functional beverages, dessert and sweets, bakery products and dairy products. It has a higher viscosity compared to sucrose at the same concentration leading to an improved body and mouth feel. Fructo-oligosaccharide is stable at refrigerated temperatures and may be used to alter the freezing temperatures of frozen foods. Fructo-oligosaccharide is about 30% as sweet as sucrose. Furthermore, it is highly hygroscopic, providing high moisture retaining capacity, preventing excessive drying, and a low water activity, which in turn support controlling microbial contamination. Fructo-oligosaccharides find their place as desirable ingredients, which incorporated into foods or drinks do not compromise their taste and sensory qualities.

BUREAU OF INDIAN STANDARDS: THE NATIONAL STANDARDS BODY OF INDIA

AUTHOR
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When a choosy and well-informed customer goes to market place to buy products, he/she looks for a quality product at very reasonable price, be it food or any other product. When it comes to food product, in addition to quality, safety is also gaining equal or more importance.

There are a lot of mandatory certification marks or private labels indicating safety and quality. These may include FSSAI logo; Veg/ Non-Veg logo; compliancy with HACCP or ISO 22000 standards; NSF or even IS marking. Vegan or Organic products are also getting a lot of attention.

Indian Standards Institution (ISI) is the first quality standard institute established in India with history of over seventy-five years. It was established on 6 January 1947 as a Registered Society under the Societies Registration Act, 1860.

The organization has evolved over this long period and has changed from its initial function of just making standards to its present multifunctional approach. Being the National Standards Body of India, the organization had a clear mandate of preparing and promoting standards for adoption by Indian Industry. Subsequently, for improving the quality of products and to provide the advantages of standardization to common consumers, the Indian Standards Institution started operating the Certification Marks Scheme under the Indian Standards Institution (Certification Marks) Act, 1952. The Scheme was formally launched in 1955 and is popularly known as the 'ISI Marking Scheme'.

To empower the ISI, parliament passed the Bureau of Indian Standards Act, 1986. Thus, Bureau of Indian Standards (BIS) came into existence on 1st April 1987, taking over the functions of erstwhile ISI, with broadened scope and vested with more powers. Although the "ISI" became "BIS", the prefix "IS" remained unchanged in the nomenclature of the standard even after the transition.

Later on in 2016, with the notification of the BIS Act 2016, the Rules and the

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- Popping candies
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- Modified starches
- Vitamin and mineral premixes

Confectionery and Bakery
- Whey proteins for bakery applications
- Sodium caseinates for whip toppings
- Bakery enzymes
- Modified starches
- Dietary fibers
- Dragees, extruded products and decoratives
- Popping candies
- Maxinvert for syrups and fillings
- Pure cheese powders
- Dehydrated green chives

Processed Food and Food Service
- Cheese powders for seasoning condiments, sauces and dips
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Regulations framed thereunder, BIS has been authorized to undertake Conformity Assessment of Goods, Article, Services, Systems and Processes as per the relevant Schemes given in the BIS (Conformity Assessment Regulations, 2018). The Conformity Assessment Schemes are based on the principles laid down in IS/ISO/IEC 17067. It is a nice coincidence that when India is celebrating its Amrit Mahotsav of Independence, this pioneering standards Institute has also completed 75 years.

BIS has its Headquarters at New Delhi. It has 5 Regional Offices (ROs) located at Kolkata (Eastern), Chennai (Southern), Mumbai (Western), Chandigarh (Northern) and Delhi (Central). Under the Regional Offices are the Branch Offices (BOs). There are 33 BOs located at 28 different locations.

OBJECTIVES OF BIS:

• Harmonious development of the activities of standardization, marking and quality certification of goods.
• To provide thrust to standardization and quality control for growth and development of industry on one hand and to meet the needs of consumers on the other.

To achieve its objectives, BIS has set in processes and infrastructure for various activities. These are briefly described below.

Standards Formulation:

This is the most important activity of BIS. Any Ministry of the Central or State Government, Union Territory, consumer organizations, industries, professional bodies, members of the Bureau and members of its technical committees may submit proposals to the Bureau for establishing a standard or for revising, amending, or cancelling an established standard by making such request in writing.

The work of formulation of standards on any specific subject is undertaken when the Division Council concerned is satisfied as a result of its own deliberations or on investigation and consultation with concerned interests that the necessity for standardization has been established. The Division Council concerned then assigns the task of formulating the standard to an appropriate Technical Committee or shall appoint a new Technical Committee for the purpose.

When request for establishing a standard for any specific subject has not been accepted after its due consideration, the proposer is informed of the decision.

A draft standard prepared and duly approved by a committee is issued in draft form and widely circulated for a period of not less than one month amongst the various stakeholders for critical review and suggestions for improvement. The wide circulation may be waived if so, decided by the Sectional Committee where the matter is urgent or non-controversial.

The appropriate Technical Committee thereafter finalizes the draft standard giving due consideration to the comments that may be received. After it has been approved by the Sectional Committee, the finalizeddraft standard is submitted to the Chairman of the Division Council concerned for adoption.There are twenty-nine technical committees under FAD (Food and Agriculture Department) which deals with food related products

All established standards are reviewed periodically, at least once in five years, to determine the need for revision or withdrawal. Standards which in the opinion of the Sectional Committee need no revision or amendment are reaffirmed by the Sectional Committee.

Product certification:

This is another important activity of BIS. When the certification of a product is done the applicant Manufacturer is authorised to use IS mark with a particular number on its product.

Product certification is generally voluntary in nature. The application for Grant of Licence is to be made in any of the Branch Offices or Regional offices, depending on the location of manufacturing. ISI Mark on a product is granted to a manufacturer after assessing the manufacturing and testing Capabilities of the manufacturer as well as ensuring conformity of the product to the requirements of the relevant Indian Standard(s) through testing. During operation of licence, surveillance visits of the licensees' premises, testing of products drawn from factory and open market etc. are carried out by BIS to maintain a close vigil of the operation of the licence as well as the quality of BIS certified goods.

Compulsory certification: A number of products compliances to Indian Standards is made compulsory by the Central Government under various considerations viz. public interest, protection of human, animal or plant health, safety of environment, prevention of unfair trade practices and national security. For such products, the Central Government directs mandatory use of Standard Mark under a Licence or Certificate of Conformity (CoC) from BIS through issuance of concerned officers.

Table I below gives list of the Food Products which are under mandatory certification.

Foreign Manufacturers Certification Scheme (FMCS):

At times when an organisation with its manufacturing facilities, which are outside of India or manufacturer from outside India, wants certification of the product, FMCS scheme is to be applied.

- FMCS is a scheme under which BIS licence is granted to a foreign manufacturer in accordance with the BIS Act, 2016 and Bureau on Indian Standards (Conformity Assessment) Regulations, 2018.
- The licence is granted for the products which conform to relevant Indian Standards.
- The Standards may be under mandatory or voluntary certification.
- BIS licence to use or apply Standard Mark is granted for products manufactured in a manufacturing premises and conforming to all the requirements of the relevant Indian standard(s).

Table I: Food Products under compulsory certification

1.	IS 15757	Follow-up formula – complimentary foods
2.	IS 11536	Processed cereal based complementary foods
3.	IS 1165	Milk-powder
4.	IS 1166	Condensed milk, partly skimmed condensed milk
5.	IS 13334 Part 1	Skimmed Milk Powder, Standard Grade
6.	IS 13334 Part 2	Skimmed Milk Powder, Standard Grade
7.	IS 13428	Packaged natural mineral water
8.	IS 14543	Packaged drinking water (other than packaged natural mineral water)
9.	IS 1656	Milk cereal based complimentary food
10.	IS 14625	Plastic feeding bottles
11.	IS 5168	Glass feeding bottles

Food Safety and standards, Prohibition and restriction on sales Regulation, 2011, GSR 759 (E) & GSR 760 (E)

Laboratory Recognition

Scheme (LRS): Testing is prime important part of certification while granting the licence to the manufacturer. BIS has established a network of eight laboratories of its own in the country to cater to testing of samples generated from its Product Certification Scheme. It is neither physically possible nor economically viable for BIS laboratories to develop testing facilities for each and every product covered under BIS Product Certification Scheme. Laboratory Recognition Scheme (LRS) has been formulated with the objective of having a sufficient number of outside laboratories in India and abroad, in addition to BIS labs to cater to the needs of Product Certification Scheme. With a set of rules and procedures, BIS recognizes or de recognizes these laboratories. It maintains the list of recognized laboratories.

Other functions of BIS:

Hallmarking Jewellery:

Hallmarking of Gold Jewellery was started by BIS in April 2000. The scheme for Hallmarking of Silver Jewellery / artefacts was launched in October 2005.

Under the hallmarking scheme, the jewellers are granted certificate of registration to sell hallmarked jewellery and Assaying & Hallmarking (A&H) centres are recognized to assay the purity of the jewellery submitted by the registered jeweller along with declaration of purity and apply hallmark on such jewellery which is found conforming to relevant Indian Standard including declared fineness.

Systems certification:

Bureau of Indian Standards has been operating Management Systems certification Scheme since 1991. Initially, BIS started the scheme with Quality Management System Certification (IS/ISO 9001) and over the years it has gradually expanded its activities to various other Management Systems. The Management Systems Certification Department at Headquarters New Delhi is the policy-making department, which also coordinates the Systems Certification activities from the country in a uniform and impartial manner as per ISO/IEC 17021. BIS is the only organization in India, which operates Management Systems Certification Scheme under an Act of Parliament. Being member of ISO, BIS takes part in the deliberations of the Technical Committee such as ISO/TC 176 and ISO/TC 207 responsible for formulation of ISO 9000 series of standards and 14000 series.

National Institute of Training for Standardization (NITS):

BIS imparts training through NITS to the technical and management personnel from industry, consumer organizations, public sector undertakings, govt. bodies and developing countries. The institute also conducts International Training Programmes (ITP) for developing countries under different cooperation schemes of Government of India.

International activities:

International Organization for Standardization (ISO)- BIS is a founder member of ISO and is actively involved in development of International Standards by acting as Participating (P) member or Observer (O) member on various Technical Committees, Sub-Committees, Working Groups, etc.

International Electro-technical Commission (IEC)- India is represented in IEC through BIS.

Bureau of Indian Standards: The National Standards Body of India

Regional and Bilateral Cooperation- BIS is actively involved in the Regional and Bi-lateral Co-operation Programmes pertaining to standardization, testing, certification, training etc. So far, BIS has signed several MoUs with national standards bodies of various countries. BIS also plays an active role in formulation and implementation of regional standards and on conformity assessment scheme for the SAARC countries under the South Asian Regional Standards Organization (SARSO).

World Trade Organisation – Technical Barriers to Trade (WTO-TBT) Matters - BIS is the National Enquiry Point for WTO -TBT.

Consumer affairs and publicity: BIS endeavours to create awareness and promote quality amongst all its consumers through various awareness programmes 1) Consumer Awareness Programmes: For promoting the concept of standardization, certification and quality consciousness among consumers. 2) Industry Awareness Programmes: To propagate the concept of standardization, product certification, management systems certification and other BIS activities amongst Industries, Industry Awareness Programmes are conducted by BIS. 3) Educational Utilization of Standards Programmes: BIS organizes Educational Utilization of Standards Programmes (EUS) for students and faculties of schools, colleges etc., to inculcate the young minds with the concepts and benefits of standardization. 4) World Standards Day: BIS celebrates the World Standards Day on 14th Oct. 5) Public Grievances: Consumer complaints relating to BIS certified products are reviewed and monitored regularly for redressal. 6) Public Relations: The publicity activity of BIS is aimed at creating awareness for various BIS activities among its target audience including the industry and common Consumer, significantly relating to Standardization, Certification of goods & services and Hallmarking of Gold Jewellery.

PFNDAI and BIS:

A team of PFNDAI is closely working with technical committees of BIS coming under FOOD and Agriculture Division (FAD), which is responsible for standards related to foods. The kind of advice given by PFNDAI is on all the standards, which are due for update, revision, also forming new standards or deleting the obsolete ones. In this way, PFNDAI has an opportunity to represent and take care of industries in general and its members in particular. The standards range from products, analytical methods and ingredients.

Therefore, seventy-five years old India's first Standards Organization has grown from just making standards to multifarious activities. Although we have tried to cover all the activities, it is very difficult to describe all the functions in details in this small article. Readers who are interested to learn more are suggested to refer BIS website <https://www.bis.gov.in>

CAN WE BE ALLERGIC TO FOOD?

AUTHOR
Ms. Prerana Patil,
Food Technologist, PFNDAI

Food is very important to us for surviving. Food contains both macronutrients and micronutrients that are essential for leading a healthy life. Main macronutrients are carbohydrates, proteins, and fats. While our body processes these nutrients in different ways sometimes our body is unable to digest certain nutrients especially protein fractions which causes allergic reactions.

We often hear this word Allergy. In simple words allergy is an abnormal immune response to an antigen or foreign substances. It can be food, pollen, dirt, mites. Allergy is a hypersensitive response. Our body's immune system tries to protect us from all the possible pathogens but sometimes it overreacts. This response is called as hypersensitivity which is triggered by allergen. These hypersensitive reactions can be classified into four types (Marwa & Kondamudi, 2022).

- Type I: reaction mediated by IgE antibodies
- Type II: cytotoxic reaction mediated by IgG or IgM antibodies
- Type III: reaction mediated by immune complexes
- Type IV: delayed reaction mediated by cellular response (T cell mediated reaction)

Out of the four types, first three are immediate hypersensitivity as the symptoms occur within 24 hours and the last one is delayed hypersensitivity which shows symptoms after 12 hours with maximum period of 48 to 72 hours.

Type I hypersensitivity is the most known allergic reaction which involves anaphylaxis. Food allergies are the reactions that come under Type I. Food allergy is defined as an abnormal immune reaction to proteins in the food (Lopez et al., 2022). It can be classified as IgE mediated food allergy, Non IgE mediated food allergy (cell mediated food allergy) and mixed food allergy.

The food allergy occurs in two stages. In first stage the IgE mediated antibodies sensitize the host to antigen and in second stage, subsequent exposure to antigen causes type I anaphylactic or atopic immune response (Abbas et al., 2022). In case of non IgE mediated allergies, the response is delayed and the primary pathogenesis is not the production of IgE antibodies. It affects the gastrointestinal tract resulting in chronic reactions (Cianferoni, 2022). Mixed food allergy involves both the IgE dependant (IgE mediated) and IgE independent (non IgE mediated) reactions.

Food allergies are becoming prevalent these days. Immunoglobulin E (IgE)–mediated food allergy is a significant public health issue that affects an estimated 3% to 10% of adults and 8% of children worldwide (Messina, 2022). Mostly the allergic reactions occur due to indigested or partially digested protein fractions. These protein fractions act as allergen. But not all proteins act as allergen. Usually when the protein is ingested it is broken down into amino acids for further absorption.

8 IMMUNITY NUTRIENTS
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Bournvita has nutrients that support your child's immunity. So, when schools re-open, they're ready to get going.

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- *Vitamin B12*
- *Vitamin C*
- *Zinc*
- *Vitamin D*
- *Selenium*
- *Iron*
- *Copper*

Bournvita encourages everyone to wear masks and practice social distancing while stepping out.

A bundle with Nutrients known to support in the maintenance of strong bones (Vitamin D, Phosphorus), strong muscles (Protein, Vitamin D), active brain (Iodine, Iron, Vitamin B2, Vitamin B12) and normal function of the immune system (Vitamins (A, B12, C, D), Zinc, Iron, Copper, Selenium). Recommended as part of a balanced diet and healthy lifestyle. 14.4g in Rs. 5/- pack (recommended serve of 3 packs a day).

Table 1- Specific food induced allergic conditions

Pathology	Disorder	Key Features	Most common causal foods
IgE mediated (acute onset)	Acute Urticaria/ angioedema	Food commonly causes acute (20%) but rarely chronic urticaria.	Primarily "major allergens" (see text)
	Contact urticaria	Direct skin contact results in lesions. Rarely this is due to direct histamine release (nonimmunologic).	Multiple
	Anaphylaxis	Rapidly progressive, multiple organ system reaction can include cardiovascular collapse.	Any but more commonly peanut, tree nuts, shellfish, fish, milk and egg
	Food-associated, exercise-induced anaphylaxis	Food triggers anaphylaxis only if ingestion is followed temporally by exercise.	Wheat, shellfish and celery most often described
	Oral allergy syndrome (pollen-associated food allergy syndrome)	Pruritus and mild edema are confined to oral cavity and uncommonly progress beyond the mouth (~7%) and rarely to anaphylaxis (1% to 2%). Might increase after pollen season.	Raw fruit/vegetables; cooked forms tolerated; examples of relationships: birch (apple, peach, pear, carrot), ragweed (melons)
	Immediate gastrointestinal hypersensitivity	Immediate vomiting, pain.	Major allergens
Combined IgE and cell mediated (delayed onset/ chronic)	Atopic dermatitis	Associated with food allergy in ~35% of children with moderate-to-severe rash.	Major allergens, particularly egg, milk
	Eosinophilic esophagitis	Symptoms might include feeding disorders, reflux symptoms, vomiting, dysphagia and food impaction.	Multiple
	Eosinophilic gastroenteritis	Vary on site(s)/degree of eosinophilic inflammation; might include ascites, weight loss, edema, obstruction.	Multiple
Cell mediated (delayed onset/ chronic)	Food protein-induced allergic proctocolitis	Primarily affects infants; chronic exposure: emesis, diarrhea, poor growth, lethargy; re-exposure after restriction: emesis, diarrhea, hypotension (15%) 2 hours after ingestion	Cow's milk, soy, rice, oat, meat
	Food protein-induced allergic proctocolitis	Mucus-laden, bloody stools in infants	Milk (through breast-feeding)
	Allergic contact dermatitis	Often occupational because of chemical moieties, oleoresins. Systemic contact dermatitis is a rare variant because of ingestion.	Spices, fruits, vegetables
	Heiner syndrome	Pulmonary infiltrates, failure to thrive, iron deficiency anemia.	Cow's milk

Source- Burks et al., 2012.ICON: food allergy. J Allergy Clin Immunol; 129: 906-920

But, in case of certain proteins our body mistakes them for allergens resulting in animmune-mediated response which causes allergy resulting in symptoms like hives, flushed skin or rash, tingling or itchy sensation in the mouth face, tongue, or lip swelling, vomiting and/or diarrhoea, abdominal cramps, coughing or wheezing, dizziness and/or light headedness, swelling of the throat and vocal cords, difficulty breathing, loss of consciousness, and life-threatening symptoms like anaphylaxis (FDA,2022).

These allergic reactions can vary from person to person. It is still unknown why a food component triggers allergic reaction in some individuals while it is normally digested in others.

Various factors like can be responsible for these allergic reactions. Also, many allergies can be outgrown with the age.

Food allergies- The Big 8-

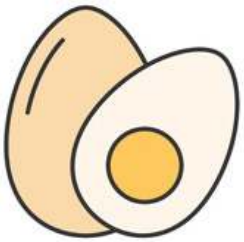
More than 160 foods have been identified to have allergic reactions after consumption. But out of all these identified food allergens only some are more prevalent than others. Food Allergen Labelling and Consumer Protection Act of 2004 (FALCPA) has identified 8 foods as major food allergens namely milk, wheat, shellfish, soybean, tree nuts, peanuts, fish and eggs. These eight foods are responsible for more than 90% of food allergies (Al-Muhsen et al., 2017).

1. Milk Allergy-

Milk is a very common cause of allergy. Milk contains various casein and whey proteins out of which many can act as allergen and triggers an immune-mediated response. This allergy is most common in children. However around 80% of them outgrow it by the age of 6 (Groetch & Sampson, 2016).

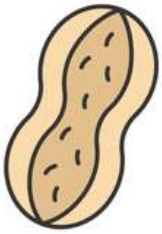
There is another term when we talk about milk-- lactose intolerance. But, milk allergy and lactose intolerance are different. Milk allergy occurs due to immune-mediated response whereas the lactose intolerance is due to lack of lactase enzyme required for metabolizing lactose. It can be considered as food intolerance.

2. Egg allergy-



After milk, egg allergy is the most common allergy. Most of the allergenic proteins are present in egg white ovomucoid, ovalbumin, ovotransferrin, and lysozyme. Also egg yolk contains alpha-livetin which acts as allergen (Caubet & Wang, 2011).

3. Peanut allergy-

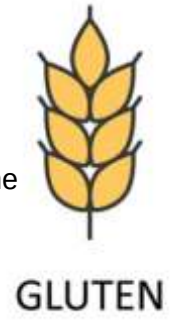


Approximately 1.8 % of children are affected bypeanut allergyin the USA (Scott & Hugh, 2014). Previously it was believed that the peanut allergy is lifelong but, around 20% of them outgrow this allergy (Groetch & Sampson, 2016). Approximately 35% of these children are also allergic to tree nuts (Sicherer, 2001). In most of the children symptoms develop on first exposure. Peanut allergy requires special attention as it is associated with sever food allergic symptoms like anaphylaxis. Ingestion of only one peanut or even trace amounts can trigger an allergic reaction.

4. Soybean allergy-

Soy is a rich source of protein and provides many health benefits. But in some people, soy protein can act as an allergen. Amongst the big eight allergen, Soy is the least prevalent from 0.1%-0.6% in adults. While in children it is 1.5% for 1-year children which decreases to 0.2% at age of 14 -17 years. Approximately 70% of children outgrow soy allergy by the age of 10 years (Messina et al. 2020, Messina et al. 2016).

5. Wheat allergy-

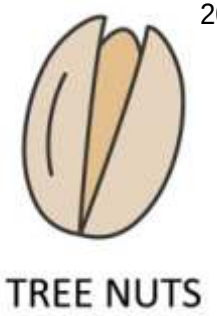


Wheat is an important part of our diet be it in the form of bread, pasta, cake, roti. But if a person is allergic to wheat proteins then avoiding wheat is the best choice. Protein fractions of wheat can cause IgE mediated reaction causing severe symptoms.

Wheat allergy is developed most commonly in childhood and is outgrown before adulthood. Wheat contains allergens like alpha-purothionin, alpha-amylase/trypsin inhibitor, peroxidase, thioredoxin, lipid-protein transfer, serine proteinase inhibitor, thaumatin-like protein (TLP), gliadin, thiol reductase, 1-cys-peroxiredoxin, and serine protease-like inhibitor (Patel &Samant, 2022).

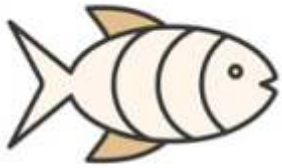
When we talk about wheat protein, Gluten is a word that we cannot avoid. Ingestion of small amount of gluten results in non IgE mediated allergic reactions causing inflammation and disruption of inner lining of small intestine. Celiac disease is caused due to gluten. Treatment for celiac disease is complete avoidance of gluten (Patel et al., 2022; Patel et al., 2015). If left untreated it can be life threatening.

6. Tree nuts allergy-
Tree nuts include cashew nuts, pistachio, almond, hazel nuts. Allergies to nuts can develop in childhood as well as adulthood.


TREE NUTS

According to a study prevalence of treenut allergy is 0.52% inchildren and 0.87% in adults (McGowan et al., 2013).

7. Fish allergy-
The prevalence of fish allergy is 0.43 and 0.46% in childhood and adulthood respectively (McGowan et al., 2013). Fish are the common triggers to allergic reactions. The most common allergen in fish is parvalbumins. A person with allergy must avoid all fish unless proven otherwise. Most patients with shellfish allergy can tolerate fish.


FISH

8. Shell fish allergy-
Shell fish allergy occurs mostly in adulthood. The prevalence of shellfish allergy in childhood is 0.87% and 2.04% in adulthood (McGowan et al., 2013). Tropomyosin is the identified allergen and has a high rate of conserving its sequence among different crustaceans including shrimp, crab, and lobster; molluscs including oyster, scallop, and squid; and insects such as cockroach, grasshopper, and dust mite. Cross reactivity for shell fish is very high so avoiding all kinds of shell fish is the best option if you have shell fish allergy (Patel et al., 2014).

Food allergy management-

Food-allergy reactions affect 6% to 8% of children and 1% to 2% of the adult population (Iweala et al., 2018). It has become a public health concern which requires attention. The best way to avoid food allergies is to avoid the foods causing allergies. So, it is important to be an aware and informed consumer.

When selecting ingredients or food products make sure to read the label. Many allergens may be present in single food product. The allergy causing component may not be always present naturally. Even added ingredients can contribute to the allergenicity (Zukiewicz et al., 2013).

Sometimes even if a product is prepared in the same premises or utensils which were used for food products containing allergen then cross contamination may occur. Even trace amounts can trigger an allergic reaction.


CRUSTACEANS


MOLLUSCS

So, to protect the people from food allergies it is mandatory to declare all the food ingredients that may act as allergen on the label of the product. FSSAI has provided guidelines for this. According to Food Safety And Standards (Labelling And Display) Regulations, 2020, allergen should be declared on the label. The foods and ingredients which are known to cause allergy shall be declared separately as Contains..... (Name of allergy causing ingredients).

FSSAI has enlisted foods causing allergies to be mentioned on the label which includes cereals containing gluten; i.e., wheat, rye, barley, oats, spelt or their hybridized strains and products, crustacean, milk & milk products, eggs and egg products, fish and fish products, peanuts, tree nuts (e.g., almonds, walnuts, pistachio, cashew nuts) and their products, soybeans and their products. Also, presence of ingredients, which can cause allergy due to cross contamination, should be declared separately on the label.

So, when buying food products next time make sure to check the label. But does this eliminate the risk of food allergies totally? There are other foods or ingredients or additives except the big eight allergens which can pose health risks. According to the FASTER Act of 2021, sesame is being added as the 9th major food allergen effective from January 1, 2023. When sesame is used as an ingredient it is mentioned on the label but when used in spice mixes, tahini or other preparations it is not mentioned. So, FDA has issued guidelines for manufacturers to mention sesame on the label in order to protect people who are allergic to sesame. So, continuous monitoring for identifying such allergens is required. The regulatory bodies can play a vital role here. Keeping the record of such events and taking samples of the concerned foods for further analysis is necessary in order to avoid future harm.

FDA has provided certain guidelines to the consumers, food producers and other concerned products regarding the ways of identifying and controlling allergens. FDA conducts inspection in order to make sure that all the control measures are being followed and the allergens which are present are mentioned on the label. If certain issues occur then FDA works with companies to recall the product and releases notification regarding it for informing the population. They also have the authority to seize the products which do not comply with the regulations. Such type of system is required for avoiding allergies (FDA, 2022).

Usually symptoms of food allergy start within two hours of consumption. If it is a severe case of allergy then it can be life threatening so immediate medical care is necessary. Although the Big 8 serves a great purpose in protecting people against the major allergen it still has its limitations as it was established based on a very limited prevalence data (Messina, 2020). So, it is necessary to update the data and guidelines based upon a broader spectrum of evidences regarding food allergies. Also, it is necessity of time to create awareness regarding the management and effects of food allergies and educate the health professionals regarding food allergies so that they can guide their patients correctly.

PATENTS AND THEIR SIGNIFICANCE IN THE FOOD INDUSTRY

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What is a Patent?

Patent is the oldest form of intellectual property protection. It is an exclusive right granted to an individual for an invention. A patent safeguards an original invention for a certain period of time and is granted by either a national patent office or a regional patent office. In order to get a patent, technical information must be disclosed to the public in a patent application. The following categories are patentable:-

1. Processes
2. Machines
3. Manufacture
4. Compositions of Matter

In the Indian Patent Law patents are covered under Utility Patents. However, patents are also classified as Design patents and Utility patents under international patent laws.

Utility Patents are creation of new or improved product, process or machine. It is also known as patent for invention." Utility patents are good for up to 20 years after filing of the patent application but requires the patent holder to pay regular maintenance fees.

Plant Patents are designed for new and unique plant's key characteristics from being copied, sold or use by others. The duration of protection is different for different types of crops. For Trees and vines- 18 years, for other crops- 15 years. In order to be patentable, the plant must be invented or discovered in a cultivated state and asexually reproduced; it should not have been described in a U.S. patent or published patent application with certain exceptions.

Design Patents are obtained to provide patent protection on specific ornamental design of an article of manufacture. A design patent provides patent protection to a specific design of a product. Design patent protection lasts for a period of fifteen years from the date the design patent is granted (10 years plus 5 more years if you ask for a renewal in India).In order to be eligible to obtain a design patent protection, one must ensure that the product's design is inseparable from the object and serves only aesthetic purpose. It cannot have functionality.

Relevance of Patents in the Food Industry

The Indian Patent Act's 2005 amendment has stated guidelines for patenting food related inventions. Over the years, several patents on food have been registered in India and abroad. Similar patent process is followed in USA similar to standards set in India. An additional step is full disclosure of food based invention must be made for patenting purpose. A detailed description of the components involved in scientific food manufacturing procedure is included.

Patenting a food product offers several advantages. It offers credibility to a food product or procedure. It also offers

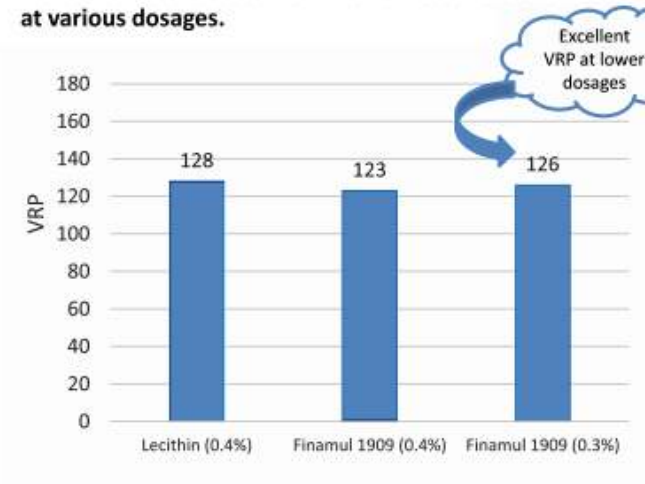
FINAMUL 1909: Safe & Sustainable alternative to Lecithin for Chocolate manufacturers

FINE ORGANICS

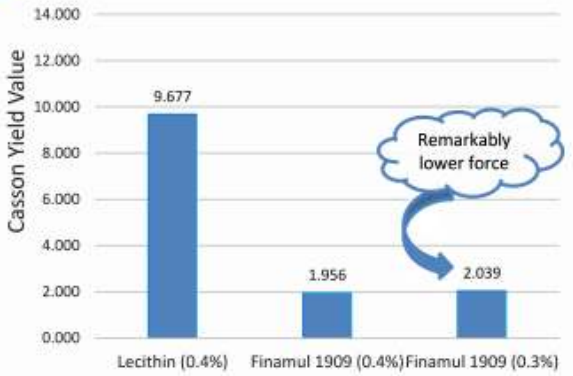
Increasing demand for an allergen-free, Non-GMO and safer consumption approach drives the confectioners to make Finamul 1909 (Ammonium Phosphatide E442) a perfect substitute for Lecithin in their chocolate recipes. Its documented functionality and assured batch-to-batch stability makes it a preferred choice of confectioners over Lecithin. Finamul 1909 has been used by the confectionery industry as an efficient alternative to Lecithin since 1960s.

Finamul 1909 is FINE's specialized grade of Ammonium Phosphatide that is specially designed to help chocolate manufacturers to effectively replace Lecithin to take control over the chocolate's rheology and optimize the flow properties and Casson yield value.

Performance evaluation of Finamul 1909 Vs Lecithin in rheological studies conducted on chocolate formulations at various dosages.



Viscosity reducing power (VRP) attained with Finamul 1909 Vs Lecithin



Force required to initiate the uniform chocolate flow with Finamul 1909 Vs Lecithin

Advantages of Finamul 1909 over Lecithin

Finamul 1909	Lecithin
No adverse effect on flavor even at higher dosage	Imparts off-flavors due to rancidity
Lower Viscosity	Higher Viscosity
Assured batch-to-batch consistency	There may be variation in Chocolate batches produced due to variability quality of lecithin
Offers great microbiological safety and hygiene due to high processing temperatures.	Carries Microbiological risk which can be transferred on to chocolates due to low processing temperature
Easy handling - Pumpable at room temperature	Difficult to handle and stick to the bottom of the container
Free from residual oil, Taste & odor	It carries residual oil & beany note
Higher oxidative stability	Lower oxidative Stability

Major applications:

- Moulded Chocolates
- Chocolate enrobing/coating
- Chocolate paste
- Chocolate spread

Finamul 1909 can be used in combination with Finamul 2402 (PGPR) and Finamul 6030 (anti-bloom agent) in order to achieve a synergistic effect to optimize the product viscosity and render excellent flow control to your chocolate mass.

Select a befitting specialty food ingredient for your food formulation with us at: food@fineorganics.com.
We look forward to connecting with you and can host technical webinars to specially address your requirements.

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competitive advantages to a product or a process over other companies from patenting similar product. Patenting can also allow the inventor to allow inventor to license the patented food product for additional revenues.

Some examples of patents in the area of food product development include producing baked potato slices with an expanded texture (Patent No.257367), process for preparing soy curd, preparing extruded nutrition products comprising of carotenoids such as lutein, beta-carotene, lycopene, zeaxanthin etc.

Other components involved in foods could be patented such as packaging. Packaging plays a major role in extending shelf life of a food product, thus many innovative packaging systems have been patented in the past.

Some great examples:

1) A method of sealing a food product package with the help of an ultrasonic sealing system (Us8028503),

2) Multitier packaging system designed to carry multiple food products in the same box (2258/CHE/2015), and

3) Packaging container subjected to temperature of 115ºC to create formable slices of fruits and vegetables, which could be preserved and used for a long time.

Food combinations that mix flavours have also been patented like storing peanut butter and jelly in the same container for its novelty.

Procedure for patent filing

Most inventors opt for engaging the services of a patent filing professional or agency. Such individuals charge a fee for providing their expertise. It is important to note that the patent filer must sign a Non-Disclosure Agreement (NDA) with the agency so that the agency does not pass off your invention as theirs. However, these criteria do not apply in India.

The patent filing procedure consists of several steps:-

Step 1:- Checking if the invention is patentable.

An in-depth patentability search is required for understanding if we have a chance of getting a patent or not.

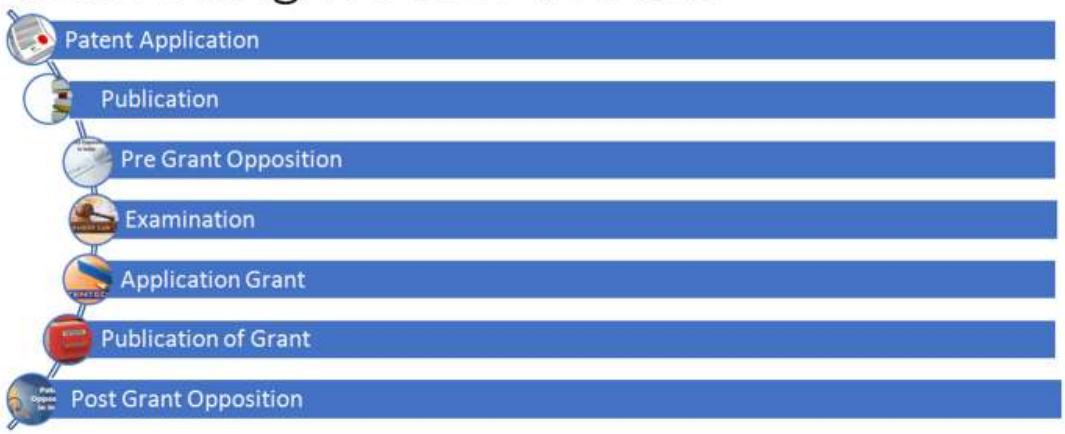
Step 2:- Drafting the patent application

Indian applicants need to fill Indian Patent Application Form 1. For every patent a person files, it is mandatory to provide a Form 2 patent specification. A choice can be made between a provisional and complete patent application, based on the stage of invention. An invention being tested for example might require a provisional patent application. In such a case, a period of 12 months is granted to work on the invention and file for a complete patent.

Step 3:- Filing the patent application

As per the patent filing procedure in India, one needs to submit all the forms mentioned below:

Form 1:- Application for patent grant



Form 2:- Patent specification form (provisional or complete)

Form 3:- Undertaking and statement about foreign applications under section 8 (mandatory only in case a corresponding application for patent is filed in a foreign country)

Form 5 – Declaration of invention to be filed with complete application

Form 26 – Form authorizing patent agent (applicable only if you opt for an agent to help file the patent)

Form 28 – Mandatory only if applicant is claiming small entity or start-up status

Priority Documents – You need to provide priority documents only if priority is being claimed from a foreign patent claim or application.

Step 4:- Publishing the patent application

Post the submission of all the documents, the patent application is safely secured by the Indian Patent Office. The patent is published in an official patent journal after a period of 18 months. Inventors who wish to have their patent application published can submit Form 9 before this 18-month period.

Step 5:- Examining the patent application

Before the patent is granted, it has to be examined. As per rules of the patent application process, the patent is thoroughly examined based on the merits of the invention as claimed. The applicant needs to make a request to get their patents examined by submitting Form 18. It is common in case of patents that an examiner raises his objections, to which the inventor can make changes by filing a request for time extension by submitting Form 4.

Step 6:- Decision to grant patent

When the examiner finds no objections in the patent application, he grants the patent. The patent is then published in the official patent gazette.

Step 7:- Renewing the patent

The patent holder needs to renew his patent by paying annual renewal fee. It is possible to renew your patent for a period of 20 years at maximum, from the date the patent was filed.

The entire process of patent filing process is long and complex and can take anywhere between 3-5 years. However, one must remember the advantages a patent brings along itself at the end of the tunnel.

Types of Intellectual Property in foods include patents, trademarks, copyright, trade secrets and design rights. Having an intellectual property asset is extremely valuable, especially when a company becomes successful.
The main categories of food patents include-
1. Food composition
2. Method for making a recipe/ creating products
3. Use of novel microorganism, plant or animal which has been genetically modified to produce a particular chemical (e.g. a food ingredient)
4. A method or apparatus for making or testing a composition
5. Bioactive compounds
6. New synthetic process or molecule produced by this process to produce a particular effect, for example flavour, aroma, texture or stability.
7. Machines for making food items
8. Packaging of food products

Trademarks are an integral part of any food company's branding strategy. A trademark includes any word, name, number, symbol, device or combination used or intended to be used to identify and distinguish food products.

Registered Designs

Registered Designs protect the physical appearance of an article such as its shape, configuration, pattern, or ornamentation. It is possible to register any design in connection with any article. A registered design may be used to cover a new type of packaging or features of an apparatus such as a toaster, oven or grinder. A registered design may protect the appearance of food for example, a specially designed Yorkshire pudding or shape of a teabag.

The basic design of an Oreo cookie has not changed since its introduction and In 1913, Oreo became the official trademark.

Trademark

A trademark or a service mark can include any word, name, number, symbol, device or any combination used or intended to be used to identify and distinguish goods or services. Colours and smell can also act as trademarks provided they can be graphically represented.

Trade Secrets

Trade secrets are industrial and commercial secrets, which companies opt for when corporations/companies do not seek to patent their food product because they want a longer lasting product compared to what is afforded by granting a patent. A patent offers limited time protection for up to 20 years from the date of filing (Section 31 Patents Ordinance 2000), and will be open to the public to see how the food invention was made, as well as the process involved in its creation. Entities like Coca-Cola have chosen not to patent their flagship products and instead keep it as confidential information or a 'trade secret' as it commonly known in the US.

CopyRights

Copyright law protects original works of authorship fixed in a tangible medium of expression. To obtain protection, the author must show a certain threshold of originality. Companies have attempted to use copyright law to protect food products with varying success based on a particularly high creativity threshold. Copyright protection faces its own challenges in the food industry but it can still provide valuable protection options for innovative businesses.

Challenges with IP protection in food industry

Copyrights, trademark, design, and patent protection generally do not apply to shapes, features or characteristics, which are purely functional or necessary to obtain a technical result.

This results in significant challenges for the food industry as more often the taste, appearance, colour and/or shape of the food and/or its packaging are dictated by functional result. Henceforth, courts around the globe regularly reject copyright, patent, design, or trademark protection for a variety of food products. In Oregon State of U.S.A., the U.S. Patent and Trademark Office rejected a trademark protection claimed on the "orange flavour" for a pill, based on the fact "orange flavour" was functional as much as it provided consumers with a pleasant taste. One company lost its battle to register its wafer chocolate bar. The court's point was that the company had not been able to show a level of acquired distinctiveness beyond mere recognition, especially considering the fact that consumers could not see the shape of the product when buying it, just a square package that is not distinctive.

IP is playing an ever-expanding role for businesses looking to acquire an edge over their competitors. Food businesses are racing to differentiate themselves by applying innovations to shape, material, colour, taste, texture or manufacturing process of their food or packaging.

Further Reading:

1. Patents And Trade Secrets In The Food Industry (courtingthelaw.com)

2. Intellectual Property Protection in the Food Industry | Food Safety (food-safety.com)

3. Intellectual Property Protection in the Food Industry | Food Safety (food-safety.com)

4. Patent Office Procedures (ipindia.gov.in)

5. Patent Filing - A Detailed Procedure Explained - Patent Drafting Catalyst

6. https://www.wipo.int/patents/en/faq_patents.html

FUNCTIONAL STARCHES FOR IMPROVING FOOD PRODUCTS:

WEBINAR ORGANIZED BY PROTEIN FOODS AND NUTRITION DEVELOPMENT ASSOCIATION OF INDIA (PFNDAI) IN COLLABORATION WITH ROQUETTE: A REPORT

AUTHOR
Ms Nidhi Gupta,
Scientific Assistant,
PFNDAI

PFNDAI in collaboration with Roquette organized a webinar on the topic "Functional Starches for improving Food Products" on 7thJuly 2022.

The speakers for the webinar were Dr. Jagdish Pai, Executive Director PFNDAI, Ms. Charmie Patel, Application Scientist, Roquette, Mr. Rohit Salgaonkar, Application Development Team Leader, Roquette. The Panellists were Mr. Clifford Pinto, Head of marketing department (Food GBU) South Asia, Roquette, Mr. Mayank Kumar, Deputy General Manager- R&D Innovation centre, Mother Dairy Fruit & Vegetable Private Limited, Mr. Manoj Pareek Global Head of R&D, Hindustan Unilever Limited, Mr. Amol Waghmare, Senior Manager R&D, General Mills and Ms. Nidhi Gupta, Scientific Assistant, PFNDAI. There were more than 100 attendees in the event. Ms. Dolly Soni, Executive-Marketing and Digital introduced the speakers.

1. The first presentation was given by Dr. Jagadish Pai on "Introduction to Starches and their Functional Properties."

Prof Pai spoke about various sources of starches in food products, including grains, pulses and root vegetables. He presented on the structure of starch, types of starches based on digestibility (Rapidly Digestible Starch, Slowly Digestible Starch and Resistant Starch). He mentioned about the slow digestibility of Amylose and the low Glycemic Index associated with it. Amylopectin (70-80%) on the other hand digests rapidly

which could be utilised by athletes requiring instant energy. Resistant Starch is undigestible by our enzymes and they act more like dietary fibre. Whole grains, potatoes and green bananas have good amounts of Resistant Starch in them. Slow Digesting Starch (SDS) is better for sustained energy and for long distance runners. Both RS and SDS are good for diabetics and give low GI to foods. RS also works as prebiotics and helps probiotics grow, it improves insulin sensitivity, lowers LDL and helps HDL cholesterol levels.

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Starch sources containing highAmylose content were discussed including High Amylose Corn, Corn, Cassava, Wheat, Sweet Potato, Arrowroot, Sago and Potato. Different types of RS (RS1, RS2, RS3 and RS4) were discussed with their sources of occurrence. Dr. Pai gave an introduction to the various functional properties of modified starches in foods like specific viscosity, thin boiling, viscosity resistance acid, freeze thaw stability, gel texture, clarity, flow properties, mouthfeel, adhesiveness, crystallinity, long shelf life stability, cold water swelling, film forming properties.

The need for modified starch in place of native starch arises due to the limited functionality and application of native starches. Starches can be modified by esterification, etherification, hydrolysis and oxidation to achieve desired properties. These modifications make starch suitable for various baked products, confectioneries etc. Modified starches including physical, enzymatic and chemical modifications have properties suitable for gelling, emulsification etc. Physically modified starches are not very stable and hence chemical modifications like esterification, etherification, oxidation and cross linking play an important role in achieving the desired properties of modified starch which can then be used in various applications like canned foods, baked goods, frozen foods, salad dressings, baby foods etc.

2. The second presentation was given by Ms. Charmie Patel, Application Scientist, Roquette. Ms. Charmie's presentation was focussed on the role of starches in improving product characteristics in Dairy, Beverages and Confectioneries.

Native Starches are modified to improve functional characteristics as once native starch is heated they tend to degrade. She mentioned about stabilized starches, which are used as thickeners in foods and undergo thermal treatment e.g. in soups, sauces, instant noodles etc. Stabilized starches are used where cooking temperatures are low, in freeze/thaw applications and for improving the shelf life.

Among the dairy category,the role of starches was discussed. Milk undergoes multiple high temperature, high shear processes, where there is extreme pressure and latent heat formation to the product. Multiple critical aspects need to be considered while formulating the product. For preparing yoghurt of improved flavour release, it has to maintain the right viscosity to expect the right set product which the consumer is expecting. To identify right ingredient mix is important, hence many yogurts containing fruit fillings in a sandwich format or with lots of layering are containing starches.

Acid-resistance of the product needs to be rightly estimated and based on this the correct ingredient needs to be identified. In other products like beverages, the low acidity, mouthfeeland dispersibility of the product, type of starch needs to be identified. In savoury products, mayonnaise, ketchups and sauces shear mixing plays a role. Different groups of modified starches (thin boiling), have different applications. Converted starches or thin boiling starches are designed in a way that do not build viscosities at higher temperatures and pressures. Their application remains in gummies and confectionery. They are also having retrogradation over a period of time.

Thin boiling starches are specially designed do not set and remain liquified so that it can be deposited into moulds. It enables to obtain a specific texture and finds a huge application in vegan cheese and serves as an important substitute for milk proteins. OSS (Sodium Octenyl Succinyl Starches; Emulsifying starches) are cold soluble (mayonnaise) and in a lot of flavour encapsulation applications. Different grades of OSS starches are available based on their solubility index and their ability to hold oil portion and hence could be used easily for all the spray drying applications.

Pregelatinized Starches (Instantized starches) are used for instant dairy desserts, instant creams, instant soup and are designed in a manner when there are no lumps while being used in small packet applications in the industry. An overview of drum drying of pregelatinized starches was represented where pregelatinized starches could either be native starches where they are instantized for cooking or they are modified for different applications. Modified starches E numbers would change upon different modifications of the starch. Application of starches (Cold Soluble/Instant viscosifier), important to develop processing parameter and identifying the matrix of that formulation. Instant ready to use fondant, instant shakes and premixes. Modified starches when used in kulfis, ice creams helps in controlling melting rate, clean shiny gloss in the fruit preparations. Clean label starches are used at specific applications and is a versatile cook up starch, it is best used for drinking yogurt formats.

3. Mr. Rohit Salgaonkar

presented on some new segments in bakery segment.

Overmixing of batter leading to overdevelopment of gluten and loss of CO2 leading to tunnel formation. Other problem is sedimentation of the inclusions. Inclusions are added in cake batters which stay in suspension, upon baking sedimentation occurs leading to non uniformity in the final product. When temperature rises during baking it leads to melting of the fat crystals along with sugars which decreases the viscosity of the solution and hence the sedimentation. It is important to maintain viscosity until starch gelatinization and protein coagulation happens.

Crust staling and crumb staling are the two main categories in physical retrogradation. Crust goes stale because moisture from the crumb has transferred, when crumb goes stale it is because the starch has crystallised because of the retrogradation of the amylose molecule, hence for better shelf life addition of amylopectin with starch is recommended. Pregelatinized starches can replace part of the flour decreases the tunnel formation, also pregel starch will help maintain the viscosity and keep inclusions in suspension throughout the process. Pregel starches are a god choice for gluten formation, moisture retention of cakes and serves as a texturing and stabilizing agent. After 30 days, cakes with waxy starches were 30% softer than control.

Modified starches serve effective in controlling the moisture within the product. In breakfast cereals and bars, there are 4 major challenges which could be categorized as low bowl life, sogginess, binding and breakages (during transportation). Due to quick moisture uptake by these cereals when mixed with warm milk, it results in low bowl life of these products. Also these cereals are loaded with high sugar to increase its bowl life. Pregelatinized native maize starch can be added to coating to increase its functionality ,

will improve its storage stability and will help improve the bowl life of the product. Amylose forms a coating on top of the cereals which results in delayed sogginess/ improved bowl life of the product. This starch can be used as a bonder in baked bars as well giving it a crunchier texture.

In sandwich creams, certain amounts of sugars and fat in the solution were replaced using a certain amount of pregelatinized potato based starch. It adds stability to the product, maintains thick and creamy sensory qualities, offers excellent dispersibility and helps in sugar and fat reduction. In the snacking category, extruded snacks are tricky to formulate, starches helps in maintaining good lubrication capacity, controls expansion in products like puffed cheeseballs with the correct amount of use. High amylose starches control expansion and reduce breakages, increases porosity, improves binding and machinability, improves crispiness. When we extrude with the right combination of the starches, we will have crunchier and harder texture.

In the Savoury segment, challenges, which need to be addressed in product formulation include viscosity management, high water activity, skin formation, lump formation and phase separation. Sauces aremade with different processes (hot and cold). Cold processes are usually used to manufacture salad dressings and mayonnaise. All of these concepts would need a thickening agent to provide viscosity but it is important to identify the process before identifying the thickener. Shelf stability and stability of the finished product need to be looked upon to identify the right modification and thickener. Modified pregelatinized and cookup waxy maize starch are used due to their high amylopectin content and good shine to the product. In batter and coating, starches play an important role to control batter pickup. Slow digestible starches have become popular in people focussing on weight management and looking for sustained energy release.

Finally, a panel discussion was held on the various applications of modified starches. The panel discussion was moderated by Ms. Dolly Soni.

Mr. Mayank Kumar addressed the question on "Type of starches used in dairy products and their functional role in dairy products." He mentioned about the use of starch as fat replacer, texture improver, high nutritional claim, stability for better heat and shear resistance.

Mr. Clifford Pinto addressed the panel question on "what are modified starches" , by defining them as modification of starches from grains like maize, wheat, potato, peas have been treated by heat, acid or enzyme to improve their stability and keep the structure and texture of food as desired by the consumer. There are different types of modified starches depending upon physical, chemical or enzymatic modification. He mentioned that almost 50% of products in the market with a texture claim have had an incorporation of modified starches in them like readymade pizza, sauces, soups.

Mr. Amol Waghmare addressed the panel question on "Which modified starches are preferred in baked products and their functional roles in the same." He highlighted the role of modified starches in cakes, pastry, doughnuts, puffs etc. Choice of starch in these bakery products depends on the end product desired like moist cake, dense, cream cakes etc. In general native, pregelatinized starches are usually used in bakery. In desserts, where chocolate sauce and whipped cream are used starches having emulsifying capacity are used. Crosslinked Starches have a critical role to play in the frozen dough and retain moisture as frozen dough tend to lose moisture during storage.

Ms. Nidhi Gupta addressed the panel question on "Soup premixes commonly utilising starches, and their functional role". She highlighted on the use of potato starches commonly used in soup premix which are in cross linked form, in particular distarch phosphates provide better granule swelling without disruption in the soup premix.

Ms. Charmie Patel addressed the panel question "Can starch dissolve in water if heat is applied. If yes, why?" She first made it clear that there is a possibility for starch to be dissolved in cold water if the starch has been modified. Pregelatinized, instantized starches are created for this type of application. She mentioned that heat application would result in dispersion of starch in water as the granules swell due to water uptake, hence it cannot be termed as dissolution.

Mr. Rohit Salgaonkar addressed the panel question on "how to choose right starch and which parameters need to be considered." Process conditions, storage conditions and target shelf life determine the choice of starch. A vigorous process of say 1000C, holding time of say 30 mins and pH 3.8 and storage is at frozen condition, a highly cross-linked starch and stabilized controls freeze thaw stability of the product and will not result in loss of viscosity of the product at the same time.

The webinar concluded with a vote of thanks by Ms. Dolly Soni.

REGULATORY ROUND UP

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

Hearty Greetings on the occasion of 75th year of Independence. Please find below FSSAI notifications, advisories, orders, etc since the last round up.

As we are all aware, FSS (Vegan Foods) Regulation 2022 is published and is effective from 10 June 2022. As per the regulation, food products claiming "Vegan" must get prior approval from FSSAI. FBOs claiming vegan had approached seeking more time for compliance. In deference to their wishes, FSSAI has postponed the enforcement of the Vegan regulation to 23 January 2023. In other words, FBOs can continue to claim "Vegan" and simultaneously apply for approval.

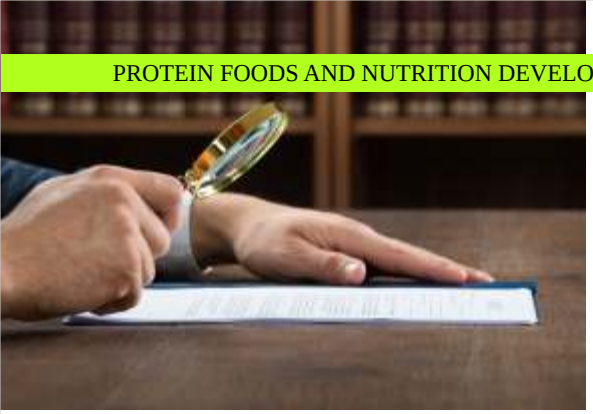
Guidelines have been issued for the submission of application for endorsement of Vegan Logo.

FSSAI has published a FAQ on the regulatory provisions of milk analogues and dairy terms, definition of analogues in the dairy context, use of dairy terms in food product, labelling of analogues and use of milk logo. A very useful document interpreting the regulation.

Many FBOs might have faced the problem of review of already licensed Health Supplement/Nutraceutical products by the licensing authority while applying for new products. Many might have been questioned on the category, etc. To address this challenge, FSSAI vide its advisory dated 08 August 2022 has requested the central licensing officers not to review the products which are already endorsed in the license. They are requested to focus only on the new application.

Latest list of FSSAI recognized laboratories is published. The document includes analytical areas for which the laboratories are NABL accredited and also their validity. For easy reading colour highlights are used like yellow for near expiry, etc. FBOs to check the validity of the laboratories before sending the sample for analysis.

FSSAI has issued an order regarding the product sampling for microbial analysis (if required) at the time of import. The order directs Authorized officer to draw samples under sterile conditions as per the sampling guidelines of microbial analysis. Aseptic sampling involves sterile spoons, spatulas, alcohol swabs, etc for proper sampling. One wonders whether such conditions can be maintained at ports. This will assume greater importance in case of high-risk products like meat, milk and their products. Inappropriate sampling will lead to erroneous results and avoidable litigations.



As per the FSSAI order dated 03 August 2022, consignments of milk and milk products, pork and pork products, fish and fish products, imported on or after 01 November 2022, must be accompanied by the Health Certificate issued by the competent authority of the exporting country in the prescribed format. The prescribed format has conditions like that the manufacturing process complies with Schedule 4 of FSS (Licensing and Registration) Regulation 2011 and with the microbial requirements of Schedule B of FSS (Food Products Standards and Food Additives) Regulation, 2011. It is strange for a manufacturing company situated outside to comply with Schedule 4. It also appears that the "milk products" mentioned here refers to standard foods under Section 1 of FSS (Food Products Standards and Food Additives) Regulation, 2011.

In March and November 2021, Standards of Identity for Sorghum, Bajra and Multigrain flour, etc were notified. Presently, FBOs are unable to comply with parameters like alcohol acidity, fibre, moisture content, etc. FSSAI vide its order dated 27 July 2022 has deferred the enforcement of alcohol acidity in bhajra flour, sorghum flour, multigrain flour and mixed millet flour and total dietary fiber in mixed millet flour till 31 Jan 2022. In addition, the order also revises the upper limit for moisture from 11% to 13% in case of mixed millet flour with immediate effect.

Such emergency amendments might not have been required if the stakeholders had sent their comments and suggestions and FSSAI had considered it seriously, if received. All of us have to spend more time in reviewing the draft notification to avoid future challenges.

FSSAI vide its order informs FSSAI notified laboratories to strictly adhere to the timelines for the analysis of samples which is 14 days for 1st stage and referral laboratories and 5 days for import samples.

List of products approved and rejected under FSS (Non Specified Foods) Regulation, 2017.

FSSAI has published revised manual of methods of analysis of Cereal and Cereal products, Tea, Coffee, Chicory, Vitamin A, D2 and D3 in edible oils and vitamins in fortified rice. It is important that the stakeholders go through these methods critically and send in their comments in prescribed format. It must be noted that the Public Analysists in Government Laboratories would be following these methods to analyse the foods sampled by the Food Safety Officers. Methods employed by the Food Business Operators (FBOs) to be preferably aligned with the official methods.

FSSAI in continuation of its interactions with FBOs, has published the meeting calendar with different sectors of Food Industry.

New Central Advisory Committee members, for the next three years, are appointed with effect from 29 July 2020.

RESEARCH IN HEALTH & NUTRITION

Vitamin D, omega 3 and exercise combo may reduce cancer risk by 61%

28 Apr 2022 Nutrition Insight

A "first of its kind" study carried out across five EU countries has revealed the combination of vitamin D3, omega 3 and exercising can have cancer preventative effects in the elderly. The findings may pave the way in shaping public health efforts, according to the researchers.

"This is the first randomized controlled trial to show that the combination daily vitamin D3, supplemental marine omega 3s, and a simple home exercise program may be effective in the prevention of invasive cancer among generally healthy and active adults aged 70 and older," Dr. Heike Bischoff-Ferrari, at the University Hospital Zurich, says.

The three-year DO-HEALTH trial included 2,157 participants across Switzerland, France, Germany, Austria, and Portugal. Apart from preventative recommendations such as not smoking and sun protection, public health efforts that focus on cancer prevention are limited, Bischoff-Ferrari adds. "Our aim was to test promising combined interventions for cancer prevention taking advantage of potentially small additive benefits from several public health strategies."

Filling knowledge gaps

According to the researchers, mechanistic studies showed that vitamin D inhibits the growth of cancer cells. Similarly, omega 3 may inhibit the transformation of normal cells into cancer cells, and exercise has been shown to improve immune function and decrease inflammation, which may help in the prevention of cancer. However, there was a lack of robust clinical studies proving the effectiveness of these three simple interventions, alone or combined.

High doses of vitamin D3 and omega 3, and simple home exercising were tested individually and then combined. The daily dosage of vitamin D3 was 2000 IU, which is larger than a double recommended dose for adults, equivalent to 800 IU. Previous studies have shown that too much vitamin D can have negative effects on the body. However, the amount of 2000 IU is still lower than amounts that have been proven dangerous as 4000 IU per day is considered the safe upper-limit.

Omega 3 was daily dosed as 1 g, and the home workout program contained a schedule of three days per week. The participants were divided into eight groups, and the treatments were mixed, individual and not present.

Risk reduction reaches 61%

All three treatments showed a cumulative benefit on the risk of invasive cancers. Individually, the treatments showed small benefits. However, when combined, the benefits were statistically significant in reducing overall cancer risk by 61%.

Even though the results proved significant, the research still needs to be replicated to verify that the combination of treatments is beneficial for reducing the burden of cancer. "The results may impact the future of invasive cancer prevention in older adults," the scientists concluded.

Delving into detailed impact

Previous studies have shown that vitamin D prevents the growth of cancer cells. It does so by regulating the genes responsible for cell differentiation and proliferation. On the contrary, it has also been shown that vitamin D does not benefit cancer prevention, but it may reduce the risk of advanced cancer.

Omega 3 has been shown to inhibit carcinogenesis, which is the transformation of normal cells into cancer cells. It does so by suppressing cell proliferation, angiogenesis and inflammation. Omega 3 has also shown to be linked to immune function. However, the overall results on omega 3 for cancer prevention are inconclusive.

Physical exercise decreases inflammation and improves immune function, according to the study. It has been proven to be consistent in reducing the risk of several cancers. Additionally, physical exercise increases the chances of survival if diagnosed. The previous studies were mechanistic studies rather than clinical. Therefore, the scientists from the University of Zurich identified the need to fill this knowledge gap.

Edited by Beatrice Wihlander

Low vitamin K levels linked to cognitive dysfunction

27 Apr 2022 Nutrition Insight

A large-scale, cross-sectional study has linked vitamin K deficiency to lower cognitive well-being and brain health for elderly people. The Gnosis by Lesaffre research is described as a positive development providing further evidence that Vitamin K2 is an essential nutrient.

"Based on our research and the critical work that continues, we can hypothesize that K2 supplementation could prove beneficial in the brain development of children and support healthy brain function in adults," explains Dr. Hogne Vik. In the study, Japan-based researchers looked at the nutrition of 800 "community-dwelling" older adults with an average age of 75,9 after completing a senior health examination which included a Mini-Mental State Examination (MMSE) and blood test.

Paving the way

The researchers flag the study is one of the first of its kind: "As far as we know, this is the first report on the significant association of single ucOC measurement and cognitive impairment. Our analysis also suggests that vitamin K insufficiency could be associated with selected categories of cognitive function." Based on binary logistic regression analysis, the risk of cognitive impairment was significantly lower with higher vitamin K levels, interpreted via biomarkers.

"We have worked with world-renowned researchers – as NattoPharma and that work continues at Gnosis by Lesaffre – to confirm the safe and effective health benefits of MenaQ7 Vitamin K2 as MK-7," Vik underscores. "It is important to mention that in-vivo research supports that supplementation with K2 as MK-7 increases MK-4 content in the brain tissue."

Tackling deficiencies

Researchers specifically looked at participants' concentrations of undercarboxylated osteocalcin (ucOC) – a biomarker for vitamin K deficiency – in blood serum. The study was able to demonstrate an association between ucOC and cognitive function. "Since the single measurement of ucOC in serum is a simple and widely available method for vitamin K evaluation, it could be useful as a biomarker of neurodegenerative diseases affecting the cognitive functions," the researchers highlight. According to findings, when ucOC was analyzed along with MMSE scores, the highest tertile of ucOC was linked to impaired orientation, language and calculation.

A recent study into phytoceuticals and nutraceuticals found natural ingredients and nutritional supplements showed potential within mental healthcare, with certain vitamin deficiencies having associations with neurological and cognitive disorders like ADHD.

Exploring broader links

Gnosis by Lessafre underscores the results are supported by another recently published paper from Spain that assessed two years of changes in dietary K intake with cognitive function measured through neuropsychological performance tests.

The researchers concluded that: “An increase of the intake of dietary vitamin K was associated with better cognitive function scores, independently of recognized risk factors for cognitive decline, in an older adult Mediterranean population with high cardiovascular risk.”

Vitamin K and D3 were flagged as synergistic health and wellness effects, described as the perfect pair. Researchers also flagged vitamin K as a “missing link” for COVID-19 pathogenesis.

Edited by Olivia Nelson

Hold the salt: Study reveals how reducing sodium intake can help patients with heart failure

April 2, 2022 Science Daily

For the past century, people with weak hearts have been told to lower their salt intake, but until now, there has been little scientific evidence behind the recommendation. The largest randomized clinical trial to look at sodium reduction and heart failure reported results simultaneously in The Lancet and at the American College of Cardiology's 71st Annual Scientific Session over the weekend, and the findings were mixed.

Though reducing salt intake did not lead to fewer emergency visits, hospitalizations or deaths for patients with heart failure, the researchers did find an improvement in symptoms such as swelling, fatigue and coughing, as well as better overall quality of life. "We can no longer put a blanket recommendation across all patients and say that limiting sodium intake is going to reduce your chances of either dying or being in hospital, but I can say comfortably that it could improve people's quality of life overall," said lead author Justin Ezekowitz, professor in the University of Alberta's Faculty of Medicine & Dentistry and co-director of the Canadian VIGOUR Centre.

The researchers followed 806 patients at 26 medical centres in Canada, the United States, Columbia, Chile, Mexico and New Zealand. All were suffering from heart failure, a condition in which the heart becomes too weak to pump blood effectively. Half of the study participants were randomly assigned to receive usual care, while the rest received nutritional counselling on how to reduce their dietary salt intake.

Patients in the nutritional counselling arm of the trial were given dietitian-designed menu suggestions using foods from their own region and were encouraged to cook at home without adding salt and to avoid high-salt ingredients. Most dietary sodium is hidden in processed foods or restaurant meals rather than being shaken at the table, Ezekowitz noted. "The broad rule that I've learned from dietitians is that anything in a bag, a box or a can generally has more salt in it than you would think," said Ezekowitz, who is also a cardiologist at the Mazankowski Alberta Heart Institute and director of the U of A's Cardiovascular Research Institute.

The target sodium intake was 1,500 milligrams per day -- or the equivalent of about two-thirds of a teaspoon of salt -- which is the Health Canada recommended limit for most Canadians whether they have heart failure or not. Before the study, patients consumed an average of 2,217 mg per day, or just under one teaspoon. After one year of study, the usual care group consumed an average of 2,072 mg of sodium daily, while those who received nutritional guidance consumed 1,658 mg per day, a reduction of a bit less than a quarter teaspoon equivalent.

The researchers compared rates of death from any cause, cardiovascular hospitalization and cardiovascular emergency department visits in the two study groups but found no statistically significant difference. They did find consistent improvements for the low-sodium group using three different quality of life assessment tools, as well as the New York Heart Association heart failure classification, a measure of heart failure severity.

Ezekowitz said that he will continue to advise heart failure patients to cut back on salt, but now he will be clearer about the expected benefits. He urges clinicians to recognize that dietary changes can be a useful intervention for some of their patients. The team will do further research to isolate a marker in the blood of patients who benefited most from the low-sodium diet, with the aim of being able to give more targeted individual diet prescriptions in the future. The researchers will also follow up the trial patients at 24 months and five years to determine whether further benefits are achieved over the long term.

Not all dietary fibre is created equal: cereal fibre but not fruit or vegetable fibres are linked with lower inflammation

April 6, 2022
Science Daily

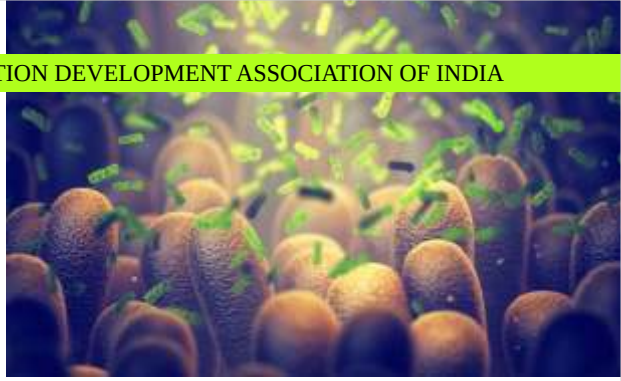
Researchers at Columbia University Mailman School of Public Health and colleagues evaluated whether dietary fibre intake was associated with a decrease in inflammation in older adults and if fibre was inversely related to cardiovascular disease.

The results showed that total fibre, and more specifically cereal fibre but not fruit or vegetable fibre, was consistently associated with lower inflammation and lower CVD incidence. Until now there had been limited data on the link between fibre and inflammation among older adults, who have higher levels of inflammation compared with younger adults. The study findings are published in JAMA Network Open.

The research includes data from a large and well-characterized prospective cohort of elderly individuals, with detailed data on dietary intake, inflammation, and incidence of CVD. The research confirmed previously observed associations between dietary fibre and CVD and extended those investigations to include the source of the fibre, the relationship of fibre with multiple inflammatory markers, and to test whether inflammation mediated the relationship between dietary fibre and CVD.

Of the 4125 adults enrolled in the Cardiovascular Health Study from 1989 to 1990, participants received a food frequency questionnaire that was administered to those without prevalent CVD at enrolment and then were followed up visits for developmen t CVD (stroke, myocardial infarction, and atherosclero tic cardiovascul ar death) through June 2015. Blood samples were assessed for markers of inflammation.

"Higher intakes of dietary fibre are associated with lower CVD risk. A common hypothesis has been that higher fibre intakes reduce inflammation, subsequently leading to lower CVD risk" said Rupak Shivakoti, PhD, assistant professor of epidemiology at Columbia Mailman School.



'With findings from this study, we are now learning that one particular type of dietary fibre -- cereal fibre -- but not fruit or vegetable fibre was associated with lower inflammation. With findings from this study we now are learning that cereal fibre has the potential to reduce inflammation and will need to be tested in future interventional studies."

Although there are data to suggest that fibre in general might have anti-inflammatory effects by improving gut function, modifying diet and satiety (e.g., reduced fat and total energy intake), and improving lipid and glucose profile metabolism, why cereal fibre but not vegetable or fruit fibre is associated with lower inflammation is not clear and warrants further investigation, noted Shivakoti. Further, he notes that it is not clear whether cereal fibre per se or other nutrients in foods rich in cereal fibre are driving the observed relationships.

"Additionally, we learned that inflammation had only a modest role in mediating the observed inverse association between cereal fibre and CVD," observed Shivakoti. "This suggests that factors other than inflammation may play a larger role in the cereal fibre-associated reduction in CVD and will need to be tested in future interventions of specific populations.

Study helps explain how xanthan gum, a common food additive, is processed in the gut

April 14, 2022 Science Daily

If you're a reader of food labels, you've likely encountered an ingredient called xanthan gum in everything from yogurt to baked goods to salad dressing. Xanthan gum is commonly added to processed foods, foods that have been altered from their natural state and which make up almost 70 percent of the typical U.S. diet. It is often used as a thickener due to its unique ability to make liquids more viscous.

A new study led by Matthew Ostrowski, Ph.D. and Eric Martens, Ph.D. of the University of Michigan Medical School Department of Microbiology and Immunology, and Sabina Leanti La Rosa, Ph.D. and Phillip Pope, Ph.D. of the Norwegian University of Life Sciences, examines the ability of the human gut microbiome to digest this relatively recently introduced food ingredient.

Xanthan gum processing appears to be driven by one microbe, a bacterium from the family Ruminococcaceae, which breaks down the carbohydrates in xanthan gum. A different gut bacterium, Bacteroides intestinalis, feeds on the smaller carbohydrates released by the Ruminococcaceae bacterium. Bacterial consumption of xanthan gum likely leads to the production of short-chain fatty acids that play roles in intestinal health and can contribute to total caloric intake.

Furthermore, the genetic signatures of these gut bacteria are relatively absent in samples from microbiomes of people from non-industrialized countries, hinting that widespread consumption of the food additive may actively alter the gut microbiome. The team also found that mice microbiomes are able to process xanthan gum, which may imply that the ability to process the substance may have already been present in the mammalian gut to some degree.

Ostrowski states, "While xanthan gum is generally considered safe, our results suggest that its widespread consumption may be enriching our microbiomes for bacteria that consume it. Our study is the first step in understanding how new food ingredients could be changing our microbiomes and whether these changes are good or bad. This may be especially important for people who consume above-average amounts of xanthan gum, such as people with celiac disease and those following gluten-free diets."

Humans possess surprising nutritional intelligence

April 24, 2022 Science Daily

Pioneering research has shed new light on what drives people's basic food preferences, indicating our choices may be smarter than previously thought and influenced by the specific nutrients, as opposed to just calories, we need.

The international study, led by the University of Bristol (UK), set out to re-examine and test the widely-held view that humans evolved to favour energy dense foods and our diets are balanced simply by eating a variety of different foods. Contrary to this belief, its findings revealed people seem to have "nutritional wisdom," whereby foods are selected in part to meet our need for vitamins and minerals and avoid nutritional deficiencies. Lead author Jeff Brunstrom, Professor of Experimental Psychology, said: "The results of our studies are hugely significant and rather surprising. For the first time in almost a century, we've shown humans are more sophisticated in their food choices, and appear to select based on specific micronutrients rather than simply eating everything

and getting what they need by default."

The paper, published in the journal Appetite, gives renewed weight to bold research carried out in the 1930s by an American paediatrician, Dr Clara Davis, who put a group of 15 babies on a diet which allowed them to "self-select," in other words eat whatever they wanted, from 33 different food items. While no child ate the same combination of foods, they all achieved and maintained a good state of health, which was taken as evidence of "nutritional wisdom."

Its findings were later scrutinised and criticised, but replicating Davis' research was not possible because this form of experimentation on babies would today be considered unethical. As a result, it has been nearly a century since any scientist has attempted to find evidence for nutritional wisdom in humans -- a faculty which has also been found in other animals, such as sheep and rodents.

To overcome these barriers, Professor Brunstrom's team developed a novel technique, which involved measuring preference by showing people images of different fruit and vegetable pairings so their choices could be analysed without putting their health or wellbeing at risk. In total 128 adults participated in two experiments. The first study showed people prefer certain food combinations more than others. For example, apple and banana might be chosen slightly more often than apple and blackberries. Remarkably, these preferences appear to be predicted by the amounts of micronutrients in a pair and whether their combination provides a balance of different micronutrients. To confirm this, they ran a second experiment with different foods and ruled out other explanations.

To complement and crosscheck these findings, real-world meal combinations as reported in the UK's National Diet and Nutrition Survey were studied. Similarly, these data demonstrated people combine meals in a way that increases exposure to micronutrients in their diet. Specifically, components of popular UK meals, for example 'fish and chips' or 'curry and rice', seem to offer a wider range of micronutrients than meal combinations generated randomly, such as 'chips and curry'.

FOOD SCIENCE & INDUSTRY NEWS

Why demystifying genetic engineering can feed Kenya

By Abraham Mulwo Friday, April 22, 2022

What you need to know:
• Over the years, societies have developed mechanisms to improve their crops and livestock to increase the quality and quantity of production.
• In recent years, scientists have developed genetic engineering technologies to make targeted changes in the genetic make-up of plants and animals.

The rapidly changing weather patterns occasioned by climate change, coupled with the increase in catastrophic crop diseases and pests, pose an increasing risk to food security in emerging economies. A study by the Integrated Food Security Phase Classification (IPC) last year shows 14 per cent of Kenyans in arid and semi-arid areas face acute food insecurity due to failed rains, low agricultural production and resulting high food prices.

As global efforts to address climate change pick up pace, the desired impact of these initiatives will take years, if at all, to be realised. That calls for interventions to ensure food crops and livestock adapt to the changing climate conditions, guaranteeing adequate food supply to the growing population.

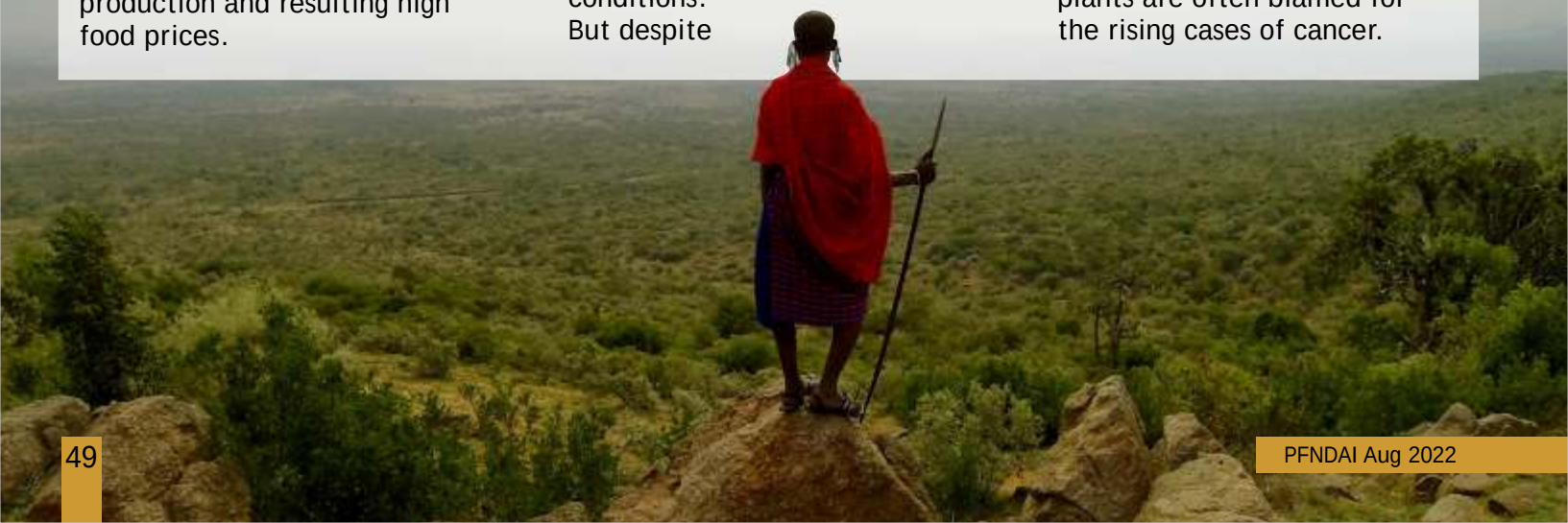
Over the years, societies have developed mechanisms to improve their crops and livestock to increase the quality and quantity of production. These include a range of breeding technologies for animals and crops and the grafting of plants to benefit from the target desirable traits of the species.

In recent years, scientists have developed genetic engineering technologies to make targeted changes in the genetic make-up of plants and animals to eliminate the genes that make them susceptible to disease, pests or harsh climatic conditions.
But despite their immense benefits, societies, especially in the developing world, are slow to adopt the technologies.

In Kenya, the debate rages on the benefits and risks of GMOs and gene-edited products, even though the government has established regulatory agencies like the National Biosafety Authority (NBA) and Kenya Plant Health Inspectorate Service (Kephis) mandated with guaranteeing the safety of food products using local scientific research.

Environmental sustainability

A fundamental hindrance to the adoption of genetic engineering is scarcity of accurate information on the subject. Public discourse on these technologies often draws from propaganda and deliberate misinformation spread by pseudo-scientists. It is common to hear GMO food crops described as from plants that have been injected with chemicals to make them big and healthy looking. These plants are often blamed for the rising cases of cancer.



But nothing is farther from the truth. GMO involves identification and replacement of the problematic genes with those from other species that enable the plants to resist disease, pests or adapt to harsh environmental conditions.

Gene editing involves deletion of the gene with problematic traits without any introduction of foreign genes. The NBA has ensured that these modifications are undertaken in a manner that guarantees safety for human consumption and environmental sustainability.

Inevitably, Kenya will have to embrace scientific technologies such as genetic engineering for food security amid climate change and such challenges. However, the citizens must be sensitised first.

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Beyond pea and soy: Asia's foodtech space awash with novel plant-based proteins – experts

By Nurul Ain Razali
12-Apr-2022- Food Navigator Asia

Asia's foodtech start-ups are increasingly innovating beyond soy and pea in the plant-based space, with several firms catching the eye of regional experts. The first generation of plant-based alternative proteins (before2020) usually utilises protein blends of pea and soy.

However, the next-gen start-ups of today are open to using novel ingredients and formulations, say industry experts Isabelle Decitre and Vandana Dhaul of ID Capital. ID Capital, an investment and advisory firm, is the organiser of the annual Future Food Asia Awards, which has acted as a springboard for agrifoodtech innovators.

Decitre said: "The failure rate is high for start-ups. That's why we are focusing on novel ingredients. We are excited by players with B2C products." Dhaul shared that the next-gen start-ups are faring better in producing and using novel ingredients, such as pulses, lentils, mung beans, seaweed and fungi.

The ingredients and formulations also improve the nutritional value of future food.
However, the extraction processes and competitive advantages required by such start-ups will need that catalyst from VCs who can provide strategic funding and exposure.

Decitre highlighted that the biggest hurdle when dealing with novel ingredients and formulations was the complex supply chain.

"The demand is there. But how do we scale up manufacturing to enter the mainstream market? To achieve a lower price point, we need a low-cost base. To get a low-cost base, we need the volume. To get volume, we need the capital expense. Equipment needed to manufacture plant-based meat replacements inexpensive. Furthermore, consumers do not want a compromise on taste and price," said Decitre.

Another opportunity in the agrifoodtech space is bettering agricultural practices using AI and novel technologies. AI is considered an enabling technology emerging in the agrifoodtech space, which can assist with processing various novel ingredients and re-purposing waste further downstream. They have also noticed emerging technology models that can help formulate products and optimise waste to create business value.

"There are opportunities to enter the field of energy re-generation, in which you convert or re-purpose the waste. We need to farm healthily and close the loop of sustainability," explained Decitre.

Besides novel ingredients, Decitre mentioned the "novel births" of COVID-19 "babies". She referred to agrifoodtech start-ups that were registered or incorporated at the height of the pandemic. Leading these start-ups were "novel" entrepreneurs from all walks of life – executives who left their day jobs to enter agtech, serial entrepreneurs from other industries and "second-attempters" whose first companies were shuttered. "This trend (novel entrepreneurs) is simple – it means that agrifoodtech has become an attractive and desirable sector," she said.

They usually came from four major countries: Singapore, Australia and the two mammoth markets of India and China. According to Dhaul, Singapore was at an advantage due to its geographical location and market positioning as a foodtech hub; hence, it was a great "landing destination". As for China and India, Decitre added that they had a sufficiently huge market, and their start-ups are more ambitious. On India, Dhaul said the Asian sub-continent had many agtech and foodtech start-ups.

Additionally, Decitre identified the Middle East as an emerging player in the sector, with excited founders and new kinds of agtech innovations for novel ingredient and its processing. "Asia is very different from the rest of the world. For example, in Asia itself, smallholder farmers from India are very different from smallholders in Cambodia. Hence, we want to understand the hurdles and trigger points. Today, we see younger Asian start-ups inspired by industries in the US and Europe. However, these start-ups provide the Asian edge and value addition," said Decitre.

Plant-based 3D printing: China and Australia identified as key markets for new Wagyu launch

By Pearly Neo 08-Mar-2022-Food Navigator Asia

Hong Kong 3D food printing firm Alt Farm is eyeing China and Australia as its first key target markets, revealing it hopes to launch a prototype plant-based A5Wagyu Beef product in the next 12 to 18 months.

Alt Farm is a spin-off from the Hong Kong University of Science and Technology (HKUST), and has developed a patented 3D food printing technology with a nozzle that enables it to print foods with specified textures, a considerable difference from conventional 3Dprinted foods that are usually gelatinous before any additional processing.

"Most of the 3D food printing technology currently available is focused on applications for the elderly to produce soft foods that can be swallowed easily, or to be used with chocolate to personalize shapes – our technology is nothing like that, the target for us is to make regular food using 3D printing," Alt Farm Managing Director Kenny Fung told FoodNavigator-Asia . "We have developed a patented nozzle in which biochemical enzymatic reactions can be carried out to solidify the printed product and generate different textures such as a fibrous texture for plant-based meat products.

"There are two chambers to this nozzle where the initial product is gel-like but then undergoes the squeezing, mixing, temperature and pressure control, and the enzymatic reactions to get the desired texture. Our first target is to make plant-based products, but the technology allows us to adjust the 3D printed food to be most textures from chewy to crunchy and so on. The plant-based market is our first target as it is growing really fast, and can have the scale and innovation to support our simultaneous growth as well."

The first product the firm is looking at is to 3D print is plant-based A5 Wagyu Beef. To do this, the plan is to use soy, pea and algae as the protein source in a 'meat tube'

and have a meaty flavouring with calcium in a 'blood tube' to stimulate fibre formulation in the nozzle, in addition to another 'fat tube 'using coconut, shea and cocoa butter with methylcellulose which will combine together to 3D print a wagyu steak. "We aim to have our first 3D printed steak prototype in 12 to 18 months, so some time in 2023," Alt Farm Operations Director Joanna Hui added. "Most 3D printing firms today are focused on selling the printers, but there's less pioneering value in that – our focus will be to sell products, and to do this we will be partnering with food manufacturers and distributors.

Heightened performance via nutraceuticals: Shifting trends in sports nutrition

21 Apr 2022
Nutrition Insight

Formulators are shifting their strategy for personalized performance nutraceuticals, addressing a wider consumer base and increasingly mental health. Where gender is concerned, women now increasingly seek out products tested on women rather than men. With more research on how this impacts efficacy, this is ringing the death knell on the "pink it and shrink it" strategy.

"In sports nutrition, we saw the trend, expecting female athletes to accept it. But studies show that the physiology and metabolism, and thus nutritional needs, of women, are different from men," Dr. Julia Wiebe tells NutritionInsight. "Therefore, formulators are looking for ingredients studied in men and women, not only for physical performance but also for stress and anxiety. Companies investing in clinical trials should keep this in mind when designing their studies."

Diverging on formats

According to Niki Kennedy, there is a divide between the generations in the type of products they seek. "For example, Millennial and Gen Z are more likely to choose sports drinks to improve performance. Within this age group, females are more likely to choose ready-to-drink (RTD) beverages compared to male counterparts who are more likely to opt for drink mixes," she tells NutritionInsight.

Similarly, Vaughn DuBow, explains that active nutrition consumers are also looking for new formats within the dietary supplement arena, including performance supplements, that are enjoyable and better fit into their individual lifestyles. "Beverages are having a moment as dietary supplement formats expand, both for their convenient portability and the growing active nutrition consumer's desire for hydration-plus attributes. Many people are adding drinks with isotonic properties – containing purposeful concentrations of sugars and electrolytes – to their daily routines that may support their performance in different endeavours, from work to athletic activities."

Changing demographics

While performance has long been associated with the sports nutrition space, office workers and students are increasingly seeking them to aid in concentration and focus. "Gone are the days of performance nutraceuticals only addressing the needs of professional athletes. Today, active nutrition is becoming more popular amongst athletes and non-athletes alike," Rajwant Gill, tells NutritionInsight. "As the number of health-conscious consumers increased exponentially over the last few years, the performance nutrition space has expanded to meet the demands of the broader demographics."

According to Gill, interest in the category is dominated by three main groups: bodybuilders, athletes and weekend warriors. Bodybuilders are more focused on enhancing lean muscle mass and strength for body sculpting, while athletes look for supplements that provide strength for higher outputs, energy and endurance during training and muscle recovery post workouts. Weekend warriors are generally looking to stay fit by maintaining a healthy lifestyle with regular sports. They are typically drawn to practical, quick and easy, on-the-go product formats, he adds.

Supplements for stress

In the past two years, stress and sleep disorders have grown, impacting consumers' overall daily energy levels and ability to perform, Séverine Lemoine, points out to NutritionInsight. "Stress has always been known to impact cognitive functions, the ability to concentrate, memorize and perform with clarity. But when stress settles in, it can also impact sleep and the ability to recover properly. It can also impact immunity and our metabolism's efficacy." As a result, various interest groups are eyeing stress relief options for different reasons. Athletes, for instance, will be motivated by relaxation before competition or recovery post-effort, Lemoine explains.

Office workers or students studying for exams will seek out items targeting brain performance or sleep improvement to optimize the day function-night function loop in the long run, she adds. Currently, the market has a clear division between offerings that support the mind and body, DuBow notes. "While certain supplements are more centred around focus, mental acuity and memory, others are targeting strength and muscle mass support. However, we recognize the growing consumer desire for products that may support more than one area at a time."

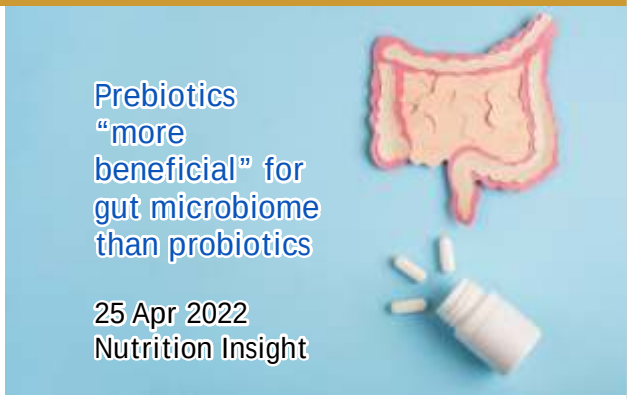
Eyeing functional ingredients

Consumers who have a higher awareness of performance nutrition are more likely to choose products with functional ingredients to help with specific needs, such as products containing amino acids, including branched-chain amino acids and essential amino acids, to optimize muscle protein synthesis, Kennedy outlines. Other popular ingredients include amino acids like L-citrulline and beta-alanine to support muscular endurance and creatine for pre-and-post-workout, she adds. "The most appealing benefit is to help boost energy levels, leading to a rise in consumption of functional snacks, such as protein-, fibre- and micronutrient-fortified bars that improve focus and provide energy. Products promoting calming benefits are also proving popular, following the increase in consumers feeling unsettled and anxious during the pandemic."

According to Gill, ingredients that target the athlete and office worker are, in fact, the same when it comes to the end-benefit targeted. This could mean caffeine in a pre-workout powder vs. in an energy drink or magnesium in a post-workout blend vs. in a nootropic capsule before bed.

"Ultimately, it is about how brands position their products and resonate with the target consumer. One difference between the two consumer groups would possibly be the formats that these ingredients are formulated in – with a heavy focus on powders, caps and bars for athletes and caps, gummies and RTD for office workers."

By Andria Kades



Prebiotics "more beneficial" for gut microbiome than probiotics

25 Apr 2022
Nutrition Insight

As gut health continues to remain at the centre of overall health, emerging insights into the benefits and effectiveness of prebiotics and probiotics have surfaced. NutritionInsight speaks with Daina Trout, who says: "Probiotics are particular, and what one lacks – and therefore needs – differs from person to person. Taking a probiotic pill will only support the gut if it's the one you're lacking, and you'd need to take a stool test to know. Prebiotics, in contrast, are non-specific. They create a very healthy environment for all good bacteria to grow."

Therefore, science demonstrates that having a diet rich in prebiotics drives microbiome abundance on the whole more than anything else. Prebiotics are more beneficial for a healthy microbiome than probiotics as the latter are specific and prebiotics are non-specific and can be personalized for the consumer, Trout explains.

Onus in mass production

Prebiotics are suitable candidates for scale and mass production, as they are safe, easy to isolate and produce and do not degrade easily. This is different from probiotics, which are very hard to keep alive and don't easily make it into the digestive tract, she notes. "Prebiotics are hard to compromise. Even the digestive system can't break them down. Conversely, probiotics are sensitive and die easily. When thinking about mass production and adding gut health attributes to F&B and supplements – prebiotics make more sense than probiotics to me," says Trout.

"Prebiotics are not finicky – they are strong and withstand all kinds of environments and temperatures, so it holds a lot of promise from a manufacturing standpoint," adds Trout.

Fermented foods "superior" for gut health

Kombucha is fermented and fermented foods have prebiotics, probiotics and post-biotics, Trout explains. "This 'trifecta' is unique to fermented foods, and it's a reason studies show such an impact on the gut and health when one regularly includes fermented foods like kombucha in a diet."

"The prebiotic soda does not contain any sucralose, aspartame or stevia. In many trials, these sugar substitutes have been directly linked to a compromised microbiome. This is a critical attribute since these products claim to support the gut," says Trout. "As a nutritionist, I would suggest these products cannot be good for the gut if they contain these sugars, period, and they should change their claims on the can as soon as possible. The easiest way to gut health is to eat fermented foods most days of the week."

"Fermented foods, like kombucha, are far superior to other products marketed for gut health support," Trout explains. "I am glad when consumers realize how superior fermented foods are compared to any pill or other F&B that one can take, eat or drink," adds Trout.

Are prebiotics better than probiotics for microbiome?

Probiotics can make a real impactful benefit to a microbiome. However, Trout explains it is a lot more complex than just taking a pill. "Probiotics are bacteria you ingest and two things have to be true for them to have a beneficial impact on your gut: firstly, they have to make it to the gut, and secondly, the gut has to need it."

"On the first point, probiotics are live organisms – they're finicky. It is estimated that as much as 80% of probiotics die on the shelf and even if they're alive by the time of ingestion, they may die in the digestive tract on their way to the gut, "says Trout. "Lastly, they need specific foods to eat when they get there, or they die."

"On the second point, a healthy gut is estimated to have 3,000+ different strains. When one strain is low or off-balance, it can wreak havoc on health. To get 'better,' one would need to take the specific strain that is lacking and knowledge of the strain is needed."

Therefore, taking a "general" pill is not likely to be very impactful. Gut health experts tell consumers to think about probiotics as something that should only be taken if they know the particular one they need – something a stool test or gut health HCP could provide, Trout explains.

"Prebiotics, on the other hand, are food for gut bacteria. When consumers eat a variety of prebiotics, the chances are high that they are eating the 'food' a struggling-out-of-balance bacteria would need to get back to normal levels." Health-Ade previously released its Kombucha-based beverage line to offer a "healthier" alternative to sodas. The Kombucha drink is a blend of gut-friendly ingredients – cranberry husk prebiotics and minerals from seaweed.

By Nicole Kerr

REGULATORY NEWS

Indian regulator FSSAI revises nutrient values for infant foods from October

By Tingmin Koe 26-Apr-2022-Food Navigator Asia

The Food Safety and Standards Authority of India (FSSAI) has revised the nutrient values for infant nutrition products, with the new requirements enforced from October.

The nutrients with revised values are manganese, selenium, biotin, and iron. The FSSAI had previously revamped its requirements for infant nutrition, known as the Food Safety and Standards (Foods for Infant Nutrition) Regulations, 2020 – which manufacturers were required to comply with by July 1 last year but later pushed to April 1 this year. However, due to requests from the industry stakeholders, the regulator had decided to revise certain parts of the regulations – namely the nutrient values of the aforementioned ingredients, with the standards enforced from October 1.

"Representations were received from industry associations regarding difficulty in reformulating and manufacturing infant food products adhering to the levels of manganese, selenium, biotin, and iron as prescribed in various standards for infant nutrition. After due consideration and concurrence of the concerned scientific panel, it has been decided to revise the limits of above said nutrients for products mentioned in Annexure 1. FSS (Food for Infant Nutrition) Regulations, 2020 with the revised limits of nutrients as mentioned in Annexure 1shall be effective from 1 April 2022. Keeping in view the fact that products need to be reformulated with the revised limits, the regulations shall be enforced from 1 October 2022," the FSSAI said.

Food for infant nutrition includes infant formula, follow-up formula, milk cereal based complementary food, and processed cereal based complementary food. Under the revision, the upper limit of manganese, selenium, and biotin has been increased, while the lower limit of iron has been decreased. For example, the upper limit of manganese in follow-up formula is up 10 times – from 50 to 500mcg per100g and from 10.60 to 106.40mcg per 100kcal. The upper limit of selenium in all categories infant nutrition products is up from 17 to 40mcg per 100g and from 3.60 to 8.50mcg per 100kcal. Biotin's upper limit has been increased from 19 to 50mcg per 100g and from 4 to 10.60mcg per 100kcal. Lastly, the lower limit of iron has been decreased from 3 to 2mg per 100g and from 0.60 to 0.42mg per100kcal.

On the other hand, the FSSAI has announced the list of permitted foods for the corresponding Inborn Errors of Metabolism (IEM) conditions. The foods for infants with IEM are intended for the specific dietary management of disease or a condition of infants with specific inborn error(s) of metabolism and are intended to be given under medical supervision.

According to the list published, there are a total of 15 medical conditions and the foods targeted at these conditions. For example, for infants with amino acid metabolic disorders, the food permitted include protein and amino acid free diet powder. For defects in the intraluminal hydrolysis of fat, defective mucosal fat absorption, defective lymphatic transport of fat, milk protein-based powder with medium-chain triglycerides (MCT) is permitted.

For a cleaner India: Food safety authority tightens proposals for recycled plastic packaging after pushback

By Pearly Neo 14-Mar-2022- Food Navigator Asia

The Food Safety and Standards Authority India (FSSAI)has issued new, stricter standards to govern the use of recycled plastic for food packaging after facing pushback from a group of concerned scientific experts.

Previously all use of recycled plastics to package, store, carry or dispense any food items was prohibited in India under its Plastic Waste Management Rules. But in September last year, FSSAI released draft plastic waste management guidelines proposing to allow the use of recycled plastic for ready-to-eat or drink products.

According to FSSAI CEO Arun Singhal, this revision was designed as a positive move towards more efficient management of the country's massive plastic waste, reported by a 2021 Minderoo Foundation report to stand at some 5.58 million tonnes annually. "We are in the process of setting standards for recycled plastics, [and] as soon as that is done I think all of us can move towards reducing the plastic load of food industry in the country," he said.

However, it wasn't long before scientific experts burst FSSAI's bubble of optimism, with a group of multi-industry experts from the Centre for Science and Environment, the Recycle India Foundation, the Institute of Chemical Technology (ICT) and even the Delhi High Court participating in a high-level forum voicing concerns regarding the new changes held by legal platform LawWiser.

"Amongst our main concerns include the possibility that the majority of the recycling industry in India uses recycling machines of inferior quality which could possible make plastic more toxic, as this would be dangerous to human health if brought into contact with food or drink," said the experts. Specific standards for plastic recycling have also not yet been set in India, so it will be difficult to understand the recycled plastic's composition, and continuous recycling could backfire if quality degrades too far or more toxins are produced."

The experts also highlighted that in countries where this is allowed such as the United States, manufacturers hold the responsibility to ensure that the recycled plastic is safe for usage – but in India, it is also not clear where the responsibility for this lies as of yet. In response to these concerns, as of January 2022 FSSAI has issued a new update to the draft amendment, mandating that all recycled plastics used need to adhere to national standards, and included a new five-page Annexure with details on these standards.

"The relevant sub-regulation shall be substituted to show that products made of recycled plastics including carry bags may be used for packaging, storing, carrying or dispensing of food products as and when standards and guidelines are framed by FSSAI," said FSSAI Advisor (Science and Standards Division) Bhaskar Narayan who signed off on the new directive.

"Such packaging materials shall also comply with any other national standards or regulations as applicable. Accordingly, the approved guidelines for recycling of post-consumer PET for food contact applications and acceptance criteria for recycled PET resin for food contact applications as listed in Annexure 1 is also made effective for implementation."

The standards in Annexure 1 as laid out by FSSAI specify the specific materials and recycling processes by which recycled plastic materials can be designated as 'Food-Grade Recycled PET (FG rPET)', resin that has undergone a validated decontamination process and has reached suitable purity to directly hold foods and beverages. "A conventional recycling process, i.e. a mechanical operation where PET flakes are [processed but contaminants are not removed], should not be used to make food contact materials," said FSSAI.

"Only processes that can decontaminate such as the Super-Clean Recycling Process (that uses high heat or vacuum), Melt-in Recycling Process (combination of high heat and vacuum), (Paste-in Recycling Process (chemical distillation, vacuum degassing, etc.) or Enhanced Chemical Recycling Process (chemical reaction or purification) can be used to make FG rPET.

"Testing of the recycled plastic will also be necessary, such as the Challenge Test, the Extraction Test and the Migration Test to ensure that the recycled plastic content is safe and any potential substances migrating into food or beverages are within migration limits."

It also specified that all recycling process operators and FG rPET manufacturers will need to apply and register with FSSAI moving forward, and will be required to submit supply chain communication and other supporting documents for review.

Warning labels for packaged food? Indian regulator urged to go further with health star-rating plan

By Pearly Neo
07-Mar-2022- Food Navigator Asia

The Indian food regulator is being urged to include on-pack 'warning labels' for sugar, salt and fats as part of its upcoming health star rating system for packaged foods. The Food Safety and Standards Authority of India (FSSAI) recently announced that it would be implementing new front-of-pack labelling (FoPL) rules for packaged foods based on a new health star rating (HSR) system.

This is in response to a government-commissioned study conducted by the Indian Institute of Management Ahmedabad (IIM-A). "The study was conducted on over 20,000 consumers and has found the HSR system to be most preferred by Indian consumers," FSSAI CEO Arun Singhal said. "We will be providing ratings for packaged foods based on the nutritional information per 100mg of the products, and our licensing application portal will include a new module where licensees can generate HSR certificates based on evaluation. Discussions about a FoPL system have been in the works in India for quite some time, and are expected to help reduce the burden of non-communicable diseases in the country."

At present, the FoPL system is expected to be implemented on a voluntary basis starting in 2023, with a four-year grace period for food and beverage manufacturers to make the transition before it becomes mandatory. However, local experts have urged FSSAI to highlight 'warning labels' within this system, citing research data stating that a large proportion of Indian consumers believe this would be the most effective.

This study was led by government public medical universities group All India Institute of Medical Science (AIIMS) together with several other institutions, and it was also focused on finding the most effective FoPL for the Indian population. Instead of a regular HSR system, which would give ratings based on all nutrients in a product, they argue most Indian consumers would prefer simple, direct warning labels about the 'bad' components in a food product.

"This survey revealed that an overwhelming 93% of Indian consumers believe that a simple FoPL label on food and beverage products is a necessity, as these would be the easiest to read and help guide their purchase decisions," study researcher AIIMS Rishikesh Dr Pradeep Agarwal said in a formal statement launching the findings.

This was echoed by Epidemiological Foundation of India President Dr Umesh Kapil who joined Dr Agarwal in launching the study, highlighting that prior research had already ascertained that labels which 'only highlight nutrients of concern, i.e. warning labels work best' to guide Indian consumers when making their purchases. "Indians have almost unanimously voted for 'high-in warning labels for salt, sugar, fats' as the easiest form of label to understand," Dr Kapil stressed. "India accounts for 25% of the global burden of heart disease right now, and Front-of-Pack Warning Labels (FoPWL) – beyond just FOPL – can result in immediate public health benefits, which is all the more reason why we cannot afford to not get it right the first time."

This FoPL system will be a first for the country, which currently only has mandatory nutrient labelling for back-of-package. The HSR system has previously come under much criticism from academics in Australia and New Zealand over its voluntary nature, with most believing that this should be made mandatory.

FSSAI seems to have taken this into consideration and avoided this particular landmine with its plan to implement this voluntarily first then make the system mandatory after a four-year transition period –but local experts remain sceptical about whether the food and beverage industry will be willing to take their 'FoPL warning labels' data into account.

"The corporate play book uses multiple strategies like 'corporate washing' to dilute the basis for a strong FoPL, as Big Food strives to divert attention from health harm to consumer behaviour," Indian Association of Preventive and Social Medicine (IAPSM) National President Dr Suneela Garg also told the floor during the study's launch.

"Using labels like HSR [as-is] makes false or exaggerated claims possible, e.g. sugar-sweetened beverage firms ironically committing to protect consumers from NCDs – so the hope is that the findings of this study reaffirm the global gold standard that warning labels are the most beneficial for people [including Indian consumers] as FSSAI debates the final labelling system."

It was also stressed that current HSR systems which highlight positive nutrients along with harmful ingredients end up sending a mixed and confusing message to consumers, with Australia and New Zealand data showing that no public health gains have been seen from the system as-is.

"Such systems are preferred by the industry due to having minimal impact on the market, but no large-scale reformulation of high fat, salt or sugar (HFSS) products, has been seen. Whereas research has shown that countries such as Chile that have implemented FoPWL warning label systems have seen significant reductions in salt and sugar consumption [due to reformulation] with no economic or job losses for the industry," stated the report.

India's new nutra regulations expand scope for NPD and imports – FSSAI's ex-director

By Tingmin Koe 20-Apr-2022-Food Navigator Asia

A set of new nutraceutical regulations operationalised by the Food Safety and Standards Authority of India(FSSAI) this month will make it easier for companies to innovate and import a broader range of supplements, although there are still some 'bottlenecks' to overcome, according to a former director at the statutory board.

The new set of regulations is known as FSS (Health Supplements, Nutraceuticals, Food for Special Dietary Use, Food for Special Medical Purpose and Prebiotic and Probiotic Food) Regulations, 2022. The framework is in fact, still in the process of draft publication and is open for comments from the industry stakeholders. Despite so, the FSSAI has operationalised the new regulations from April 1, without any transition period given.

Also known as FSS (Nutra) Regulations, 2022, the new framework will replace the Food Safety and Standards (Health Supplements, Nutraceuticals, Food for Special Dietary Use, Food for Special Medical Purpose, Functional Food and Novel Food) Regulations, 2016.

The new regulations aim to "remove ambiguity and bring more clarity", said the FSSAI. Speaking to NutraIngredients-Asia, Pradip Chakraborty, a former director at the FSSAI, who is currently a consultant and advisor to Reckitt Benckiser (RB) and Modicare, said that the new regulations would benefit the industry by expanding the scope for new product innovation and imports.

This is due to a number of key reasons, such as a greater range of permitted dosage formats and a higher permissible limit to certain ingredients. Also, the regulations now cover supplement guidelines for kids above two years old. Previously, the regulations only stated the supplement guidelines for individuals above the age of five. The additional formats covered under the new regulations are drops, gummies, chewable and mouth dissolving strips, bars, biscuits, and candies. This is an expansion from tablets, capsules, liquids, semi solids, pills, jelly or gel, and sachets allowed in the 2016 regulations.

"This set of new regulations will help. The manufacturers earlier were not able to manufacture and import some supplement products because there were no relevant guidelines. And so, they had to obtain permission from the FSSAI for every single product that was not covered under the regulations. Now, they just have to comply with the regulations," said Chakraborty, who was involved in the drafting of the 2016 regulations. According to Chakraborty, it takes between six and 12 months for a product not covered by the regulations to undergo assessment and approval. "It is a long-term process because the applications will be scrutinised by an expert committee. It takes at least six to 12 months to get a product approved. Sometimes, the process is longer than a year and that is really troublesome for new entrance," he said.

Another industry expert, Sandeep Gupta, chief founder and director at Expert Nutraceutical Advocacy Council (ENAC), also agreed that the new regulations will provide ease of compliance. "The new amendments are more or less on the same line as the earlier regulations and hence complying to the same will be faster," he said.

On the other hand, the permitted range for ingredients such as astaxanthin has increased, which Chakraborty said would be beneficial since this would allow a product to be more potent and in turn, more effective. For astaxanthin, the permitted range is now two to 12mg per day, while previously, it was four mg per day for use in nutraceutical.

However, others such as co-enzyme Q10 from non-GM source have been reduced from 100-1,000mg per day to between 60 and 300mg per day.

There was also greater clarity for ingredients such as tocotrienols and glutathione, Gupta pointed out. For instance, tocotrienols have been added to a component of vitamin E under Schedule I's List of Vitamins and Minerals. As for glutathione or S-acetyl glutathione, its permitted range for daily consumption has been added to the new regulations as between 50mg to 600mg.

There is also an expansion in the list of permitted pre/probiotics strains. Three more probiotic strains have been added into the List of Probiotic (Live) Micro-organisms under Schedule VII, which are Bacillus clausii, Bacillus indicus, and the established probiotic strains of Bacillus subtilis. Three more prebiotics compounds have also been added. They are partially hydrolysed guar gum, pectin, and resistant dextrin. On the other hand, soybean oligosaccharides, which was in the previous list of permitted prebiotics, have been changed to soya poly-saccharides and soya oligosaccharides.

While the new regulations would benefit the industry, the two industry experts acknowledged that there are still limitations to overcome. According to Chakraborty, one of the regulatory bottlenecks lies in the recommended dietary allowance (RDA) for vitamins and minerals. "Suppose in the case of vitamin C, the maximum permissible limit as per the 2010 guidelines of NIN-ICMR was only 40mg, now it has been revised to 80mg and both these guidelines are operated until June 30, 2023. Actually, we did not get proper efficacy for vitamin C during COVID-19 pandemic. Most of the dieticians suggested that we should consume at least 500mg of vitamin C and zinc. But in our regulation, vitamin C of more than 80mg is not permitted, so how can we consume 500mg?" he said. However, he also pointed out that "no regulation in the world is fool proof."

Gupta also pointed out the limitations of the RDA framework and advocated for the adoption of RDA by tolerable upper limits (TUL). The RDA by TUL concept refers to the maximum amounts of vitamins and minerals that one can safely consume without the risk of an overdose or serious side effects per day. "Industry representations like 50 per cent tolerable upper limits (TUL), the inclusion of certain ingredients such as adenosyl cobalamin (co-enzyme B12), benfotiamine / benfothiamine (vitamin B1) are still not covered in the regulations," he said.

UK enforces calorie-count labelling law for restaurant and takeaway menus

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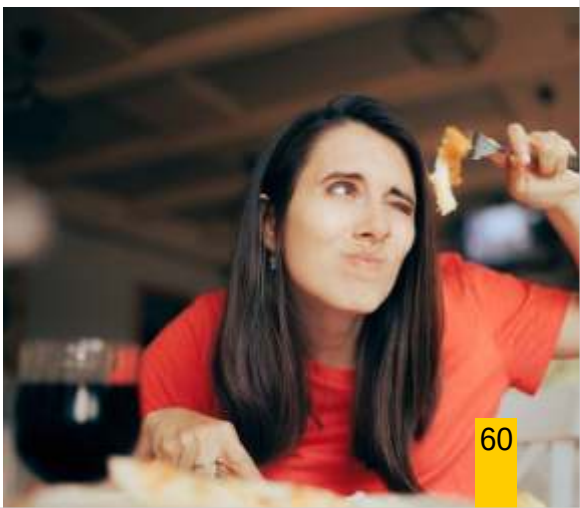
UK rules requiring takeaways, restaurants and cafés to display calorie information for non-prepackaged food and soft drinks are now in force. Calorie counts will now be displayed on menus, online menus, third-party apps, food delivery platforms and food labels at the point a customer is making their food and drink choices. Menus and labels will also need to include daily recommended calorie needs with the phrase: "Adults need around 2000 kcal a day."

"We hope this new law will make it easy for people who want to find healthier choices on these huge menus for themselves and their families, both in restaurants and at home," Holly Gabriel, nutrition manager and registered nutritionist at nutrition advocacy group Action on Sugar, tells NutritionInsight.



"An additional benefit to this law is that it will likely incentivize restaurants to develop healthier menus, which will have a positive impact on our health."
"It is crucial that we all have access to the information we need to maintain a healthier weight, and this starts with knowing how calorific our food is," says Public Health Minister Maggie Throup. "These measures are an important building block to making it as easy as possible for people to make healthier food choices."

Tackling takeout

A survey by the Office for Health Improvement and Disparities on calorie reduction revealed that 79% of respondents think that menus should include the number of calories in food and drinks. Research suggests that food people eat outside the home makes up 20-25% of adult calorie intake, flags the UK's Department of Health and Social Care.

On average, the portions of food or drink that people eat out or eat as takeaway meals contain twice as many calories as their equivalent bought in a shop, where labelling is much more common. Gabriel adds that the measures are "a great first step" to helping consumers understand what is in the food they are eating. However, menus displaying the high fat, salt and sugar content of food would be "even more beneficial in providing transparency."

Extending labelling schemes

In UK supermarkets, consumers are already familiar with front-of-pack labelling schemes to help consumers make healthier choices. A traffic light labelling system enables consumers to easily assess the content of calories, fat, saturates, sugars and salt in products. While this type of labelling is still voluntary, UK nutrition advocacy groups Action on Salt and Sugar have urged the government to make it mandatory following a recent meta-analysis.

"Full nutrition labelling is common practice for supermarket foods and drinks, and evidence shows this helps direct consumers to healthier options – if they wish," underscores Gabriel. Public Health Minister Maggie Throup highlights: "We are used to knowing [how caloric our food is] when we are shopping in the supermarket, but this isn't the case when we eat out or get takeaway."

Mom and pops exempt

The recent calorie-count count labelling law will only apply to large businesses – those that have more than 250 employees. "Only large chains are affected," continues Gabriel, "many of whom already have nutrition information online, making this an easy law to implement." However, the government is encouraging smaller shops to adopt the labelling scheme to "tackle disparities and level up the nation's health."

Certain institutions where food is served in-house are also exempt, such as workplace canteens, military establishments and hospitals. Many restaurants also offer menus without calorie labels upon request for those who are concerned with the law, notes Gabriel.

By Missy Green