FOOD, NUTRITION & SAFETY MAGAZINE

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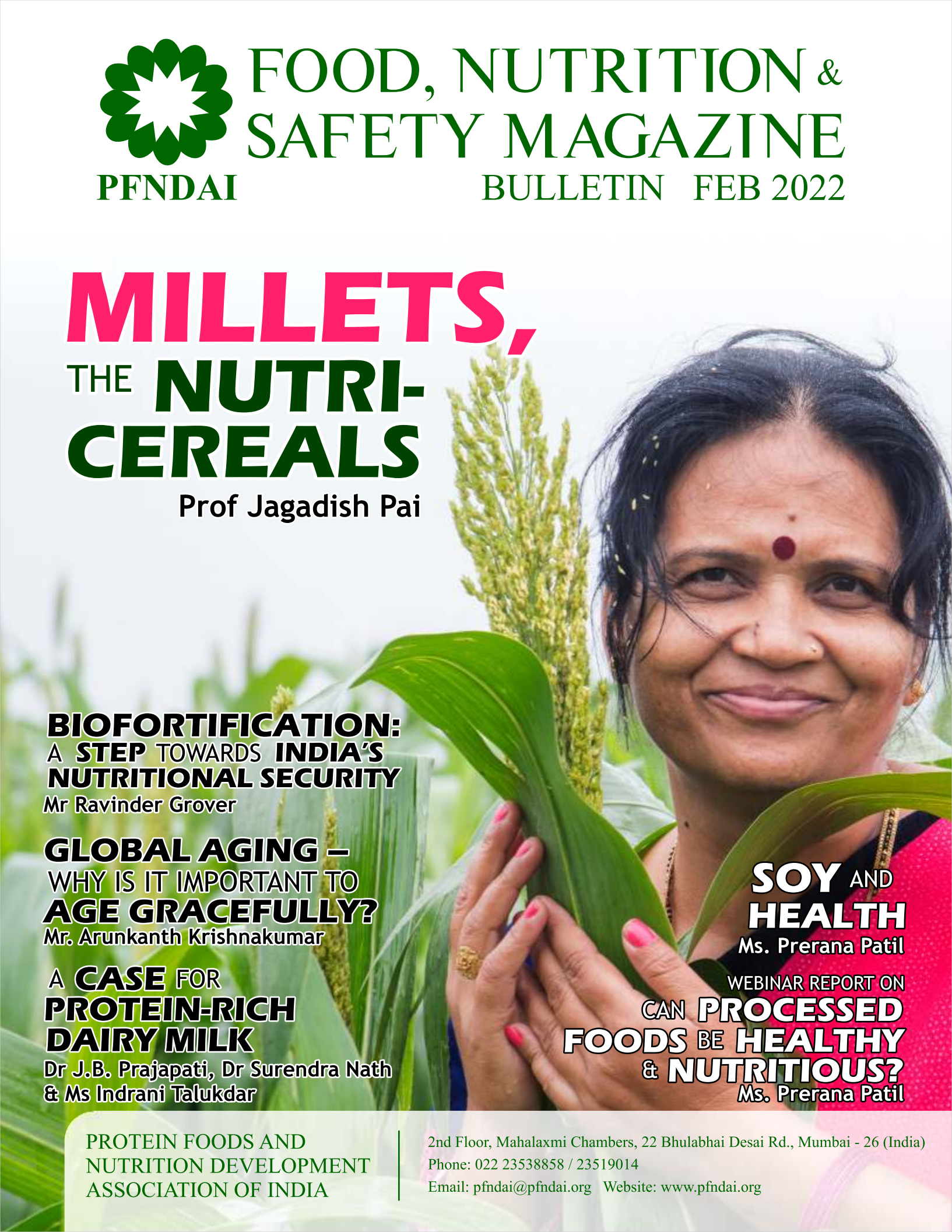

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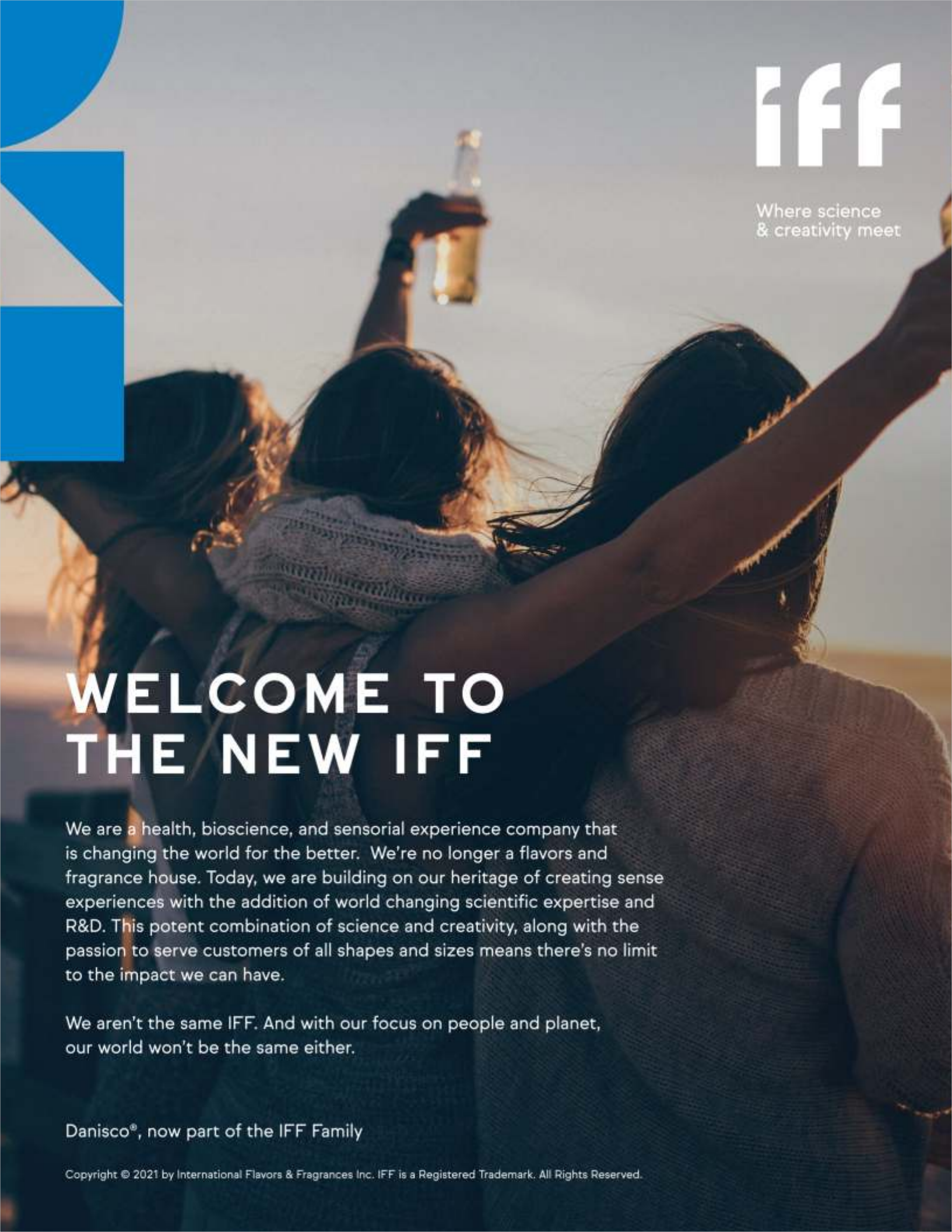

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PFNDAI Bulletin FEB 2022
PFNDAI FOOD, NUTRITION & SAFETY MAGAZINE

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EDITORIAL

Isaac Asimov, the famous science-fiction author once said, "The saddest aspect of life now is that science gathers knowledge faster than society gathers wisdom." It is so true in many ways in current situation.

We have seen this happen during the pandemic. Our scientists developed vaccines in record times trying to tackle the scourge of Corona virus. However, people were afraid of trusting these for various reasons and refusing to be vaccinated. Some thought it might cause changes including some long-term ailments. Some thought that government was trying to introduce some chips through the vaccines. Some even went to the extent of expressing their right not to get vaccinated forgetting that they were encroaching on others' right of safety. There were also some people defying the requests of wearing masks in public creating situations that prolonged the pandemic.

We have reached now the stage where science is progressing in mind-boggling speed. One of the examples is developments in IT and the various ways of it is affecting the lifestyle. Computers and smart phones are now allowing communication and computations at amazing speeds with such ease. At the same time people are accepting them because they allow them leisure of managing so many of their chores and responsibilities. They forget that there are also risks that these things generate such as theft of their funds if they are not careful. We must accept these new technological products with discipline to avoid such misfortunes.

In our context, there have been many developments especially in agricultural science and technology. In 1960s, green revolution came about as the scientists developed hybrid grain varieties that greatly increased grain production. At that time, it was criticized by many. However, as farmers started using them everywhere, the criticism disappeared.

Similar thing happened when Bt cotton introduced the GM crop in India. There were protests from activists even when it was thoroughly tested and shown to be safe. However, when farmers started using it because of the benefits it offered against the pests, it was allowed.

The next crop to be examined was Bt brinjal, which was tested for efficacy as well as safety and was cleared. However, the activists were persistently against its introduction. So government backed down. So even today it has not been allowed in India although in many other countries people and farmers are getting the benefits of this GM crop.

We probably need to sensitise people as they are carried away by emotional appeals by activists rather than cold facts offered by scientists. Let us try to create awareness among general public about science and its various technological developments in food and nutrition and related fields. Let us keep up with science as in future when we face tougher situations, it may be our way out of difficulties.

Prof Jagadish Pai,
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MILLETS, THE NUTRI-CEREALS

AUTHOR
Prof Jagadish Pai,
Executive Director, PFNDAI

Millets are cereals, which are mostly produced and consumed in Africa and Asia. They were among the early grains consumed. They are smaller than other grains, so they are a bit difficult to process e.g. to decorticate. However, they grow well even in poor soils and moisture.

Their nutritional profile is very good with high protein and fibre contents in case of most millets. They are also high in antioxidants and minerals like iron and calcium. Lately people like them because they are also gluten-free.

They have great potential in contributing substantially to food and nutritional security of the country, they are climate resilient crops and with their unique nutritional benefits, they are useful in controlling blood glucose levels among other things. Because of this the Indian government declared in April 2018 by a gazette notification, millets including sorghum (jowar), pearl millet (bajra), finger millet (ragi), and other minor millets foxtail millet (kangani), proso millet (cheena), kodo millet, barnyard millet (sawa), little millet (kutki) and pseudo-millets black wheat (kuttu) and amaranthus (chaulai) as "Nutri-Cereals".

Recently, India's Permanent Representative to the UN Ambassador T S Tirumurti introduced a resolution in the UN General Assembly sponsored by India and supported by over 70 nations. This resolution was adopted by the UNGA declaring 2023 as the International Year of Millets. This would give the much needed boost to popularise the millets world-over.

Market for Millets

As per FAO, the world production of millets was 28.4 million tonnes of which India produced over 10.3 million tonnes in 2016. Other countries producing millets are Niger, China, Mali, Nigeria and Burkina Faso. Indian production reached 13.2 million tonnes in 2020 before falling to 11.5 million tonnes in 2021. Thus India is a leader in millet production and can lead and show the world how to produce more, process the grain in many nutritious products and popularise the consumption of millets.

Health Benefits of Millets

Table: Nutritive Values of Millets (per 100g)

Cereal	Moisture g	Protein g	Fat g	Mineral g	Dietary fibre g	Carbohy-drate g	Energy kcal	Calcium mg	Iron mg
Bajra	12.4	11.6	5	2.3	14.20#	67.5	361	42	8
Foxtail millet	11.2	12.3	4.3	3.3	24.71	60.9	331	31	2.8
Jowar	11.9	10.4	1.9	1.6	12.69	72.6	349	25	4.1
Proso millet	11.9	12.5	1.1	1.9	30.48	70.4	341	14	0.8
Ragi	13.1	7.3	1.3	2.7	19.08	72.0	328	344	3.9
Sawa millet	11.9	6.2	2.2	4.4	38.93	65.5	307	20	5.0
Kodo millet	12.8	8.3	1.4	2.6	37.76	65.9	309	27	0.5

Ref: Nutritional Values of Indian Foods: Gopalan et al. & # from Millet Mela by Univ. Agri. Sci., Dharwad

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Nutrition & Health Benefits of Millets

Millets have good amounts of proteins. Bajra, jowar, foxtail and proxo millets have good amounts of proteins while ragi and others have slightly less. There is another advantage of proteins in millets. They are very low in gluten content so very useful in making gluten free or low gluten products which are quite popular in western countries and are becoming more accepted elsewhere.

Millets are also quite high in dietary fibre. Although in some millets it may be too high which will cause some problems, the fibre in most major millets is very useful in giving them low glycemic index (GI) and are ideal for diabetics and for weight reduction diets. They not only help in controlling the sugar levels of blood, they also help decreasing insulin resistance.

The soluble fibre also helps in reducing the cholesterol levels and triglyceride levels. This is very useful heart health.

Millets are also good sources of minerals such as calcium and iron. However they need some proper preparation and cooking techniques to avail of them as millets are also high in oxalates and phytates. There are traditional methods as well as some new technologies developed by researchers in institutions like CFTRI and IMRI which help get the benefits of nutrients with minimal effects of anti-nutritional factors.

Some Problems of Millets and Solutions

While millets are very healthy there are some problems too. As mentioned above, they have phytates and oxalates which bind the mineral ions such as calcium and iron making their less bioavailable when consumed. Thus, although the millets have good amounts of these minerals they become unavailable due to complexing with phytates and oxalates.

Milling to decorticate pearl millet and sorghum is difficult as they are smaller than cereals like wheat and rice. Further, although decortications had no effect on protein contents but it significantly decreased dietary fibre, minerals and antioxidant capacity as most of these components and nutrients giving the health benefits are present in the hull. This decreased millet application as functional food. So some methods prior to cooking were developed using the whole millets that reduced the antinutritional properties.

Since many antinutrients are water-soluble and are present in hull or skin or the grain, when millets are soaked these dissolve. Sprouting or germination is another method tried for reduction of antinutrients. During sprouting changes take place in the seed leading to degradation of phytates and protease inhibitor. Sour dough is prepared by fermenting grain flour by mostly bacteria in which phytates is degraded.

Combination of treatments such as dehulling, soaking and cooking of millets decreased phytates and increased protein digestibility and improved bioavailability of iron and zinc.

Germination of millets decreased tannins, improved digestibility of proteins and starch in pearl millet. It also reduced phytates, tannins, etc. Bioavailability of calcium, iron and zinc improved in pearl and finger millets by germination.

Fermentation of pearl millet improved fibre, protein, but significantly reduced some minerals but enhanced flavonoids.

Thus there are some advantages of these cooking methods that improve the nutritional quality by reducing the antinutrients and improve the availability of minerals. However, much more work is needed to refine such techniques that would improve the nutritional quality.

Processing of Millets

There has not been much technological push into developing processes and equipment for millets. There are separate facilities for various grains and sometimes because of gluten contamination, the processing of wheat is done in separate facilities so other grains could be labelled gluten-free. However, most facilities use all millets in the same machinery. Although institutes like CFTRI and IMRI and others have developed processes for different millets there has not been enough enthusiasm in developing separate machines dedicated for each millet.

We also have many different varieties developed of wheat and rice depending on the product characteristics and applications. Hard wheat is used for bread whereas soft for cookies and cakes.

Durum is preferred for pasta and noodles. However we don't have such varieties in market although these are grown. We need to develop the special varieties with processing properties and composition so these could for uniformly high quality products.

As millets lack gluten, this could be nutritionally advantageous but for processing there are difficulties as gluten is very useful for making bread and some other fermented products. Processes need to be developed using additions of certain ingredients. There are products made using mixture of wheat and millets so some of the advantages such as higher proteins, dietary fibre and minerals could be attained, but gluten-free claims cannot be made.

How can we improve millet consumption?

There needs a multi-pronged approach to do this. Right now the consumption of millets has gone down because other tastier products are appearing which are difficult to make by millets. Millets are more expensive than wheat and rice, so there is less incentive for the consumers to go for it. Farmers are finding it more and more difficult to grow and market. Small farmers find marketing it extremely difficult. Productivity is low although in some cases like in Tamil Nadu there has been some good progress.

There needs to be inputs from every stake holder including government, industry, research and consumers besides farmers. We need to increase the productivity and help farmers market the millets so they will grow more of desirable varieties with higher yields using better soils. This would not only increase the production but also may bring prices down. Industry should play a role in developing some popular and tasty products developed by researchers using the varieties which they would ask farmers to grow. There should also be consumer awareness about how to use millets to prepare different products using better cooking for safer and nutritious products. With some millets it may not be advisable to completely switch over as they may have too high fibre content, antinutrient contents. There could be some blending with other cereals to prepare most familiar products.

Already many products have appeared in the market including cookies, khakhra, vermicelli, etc. Millet flours as well as multi-grain flours with inclusion of millets have appeared for different applications as dosa, pancakes, and others.

Future

We certainly need to give a big push to this effort. India is the leader in many ways. Being the largest producer of millets (about one third of world production), as well as having the infrastructure of developments in agricultural science, research in nutrition and product development and well as the industry capable of carrying out such ambitious goals, we should be able to take up this challenge to popularise the millets.

It is not just because it is nutritious and has several health benefits, but considering population rise world over and grim forecasts about environmental changes, we need grains that not only can withstand the adverse conditions but also can feed large populations. Our government has already announced its intention of pushing this effort by naming the millets as Nutri-Cereals and also getting UN resolution of International Year of Millets for 2023. We all must do our share of helping this cause and try in whatever manner like development, popularising, marketing and certainly creating awareness to join this movement.

BIOFORTIFICATION: A STEP TOWARDS INDIA'S NUTRITIONAL SECURITY

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In India, malnutrition in children under 5 years of age continues to be among the highest in the world. Around 19.3% of children are wasted, 32.1% are underweight, and 35.5% are stunted in India, according to NFHS-5. Anaemia among children under5 has become significantly worse with the current prevalence at 67.1%, compared to 58.6% according to NFHS-4.

It is astonishing that a country where warehouses are choked up with grain reserves, is ranked 101st out of 116 countries on the Global Hunger Index report. Where is the problem? Are we chasing the wrong goal? Is it time to revisit the strategic goals of food security set in the past and redefine priorities in terms of nutritional security, which is a more relevant goal today?

The COVID-19 pandemic has further deteriorated the nutrition status of the country and highlighted the need to promote sustainable consumption patterns to combat micronutrient malnutrition. Providing necessary nutrition through diversified food sources is a safe and acceptable method of addressing a nutrition crisis. However, due to changes in consumer preference, food habits, lifestyle etc., ensuring adequate quantities of diversified food still seems to be a challenge.

While the country prepares for likely future waves of COVID- 19, it must be recognized that nutrition cannot wait and must be prioritized. Good nutrition is critical for children's cognitive development, in addition to a reduced burden of non-communicable diseases like diabetes, reduction in stunting and wasting, improved immunity and lifelong protection against several infections and illnesses. Therefore, nutrition security should be a part of our COVID response.

Like many developing countries, India is also facing the double challenge of managing the disruptions caused by COVID-19 and addressing the impacts of a changing climate. Food systems significantly contribute to GHG emissions and are also significantly impacted by climate change, which is going to further accentuate the problem of nutritional security in the country. Several studies indicate that elevated CO2 levels lead to 3-17% lower crop concentrations of protein, iron, and zinc. A study published in Nature in 2018 projected such climate-induced micronutrient and protein reductions in food crops would decrease dietary iron intake by 4% for children under 5 and women of childbearing age. By 2050, 502 million women and children, in India, will become vulnerable to anaemia and other diseases associated with iron deficiency. We will also bear the burden of having 50 million zinc deficient people. A warming climate poses a direct nutritional threat to the 1.4 billion people who rely largely on staple food crops.

There are several approaches that can be used to address nutrition related concerns and focus on ensuring nutrition security such as supplementation, food fortification, and dietary diversification.

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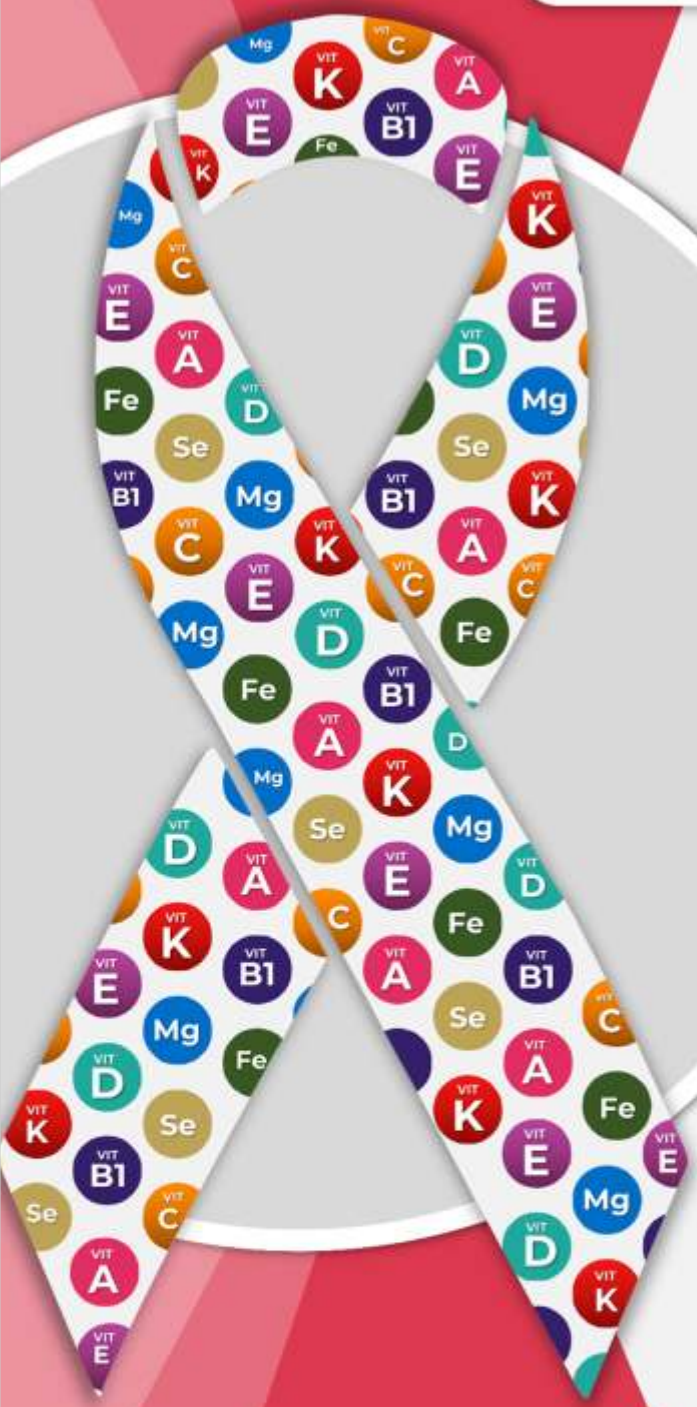

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Biofortification: A Step towards India's Nutritional Security

Apart from these, consumption of nutrient enriched crops, also known as biofortified crops, are plant breeding-based solutions developed by HarvestPlus and its CGIAR global agricultural research partners to improve the micronutrient content in the world's most-widely consumed staples.

Globally iron, vitamin A, and zinc deficiencies are the most widespread micronutrient deficiencies and are common contributors to poor growth, cognitive impairments, perinatal complications, and increased risk of morbidity and mortality. Hence these micronutrients are naturally enhanced in the staple crops, with roughly 400 varieties available worldwide. In India, ICAR (Indian Agricultural Research Institute) has released more than 25 varieties of iron & zinc enriched staples.

Biofortification will be a part of the solution for one of the biggest problems in low- and middle-income countries and also answer the needs of consumers in the developed world. Products made from high nutrient biofortified crops can tick important boxes for consumers: Not only are these products more nutritious, but their nutrition also comes from the products' core ingredients. In addition, studies conducted by HarvestPlus in different geographies such as Uganda, Tanzania, Mozambique, and South Africa show that consumers like the sensory attributes of products made with biofortified crops. Biofortification provides a practical, cost-effective solution as it does not require behaviour change, can reach the poorest sections of society, and supports local farmers. The nutrient enrichment strategy is more sustainable as once the seed is developed, its distribution and delivery do not lead to any further losses of nutrients or do not need

any additional interventions for improvement of bio-efficacy of the nutrients added. It reduces the risk of over/underdose as the nutrient addition is closely aligned to the natural growth cycle of a crop; biofortified crops are also often more resilient to pests, diseases, higher temperatures, and drought, and provide a higher yield.

Consuming biofortified varieties has significantly impacted individual nutrient status and cognitive performance as evident in numerous peer-reviewed, published scientific studies. For example, biofortified iron pearl millet (IPM) in the form of bhakri and sev improved the iron status, serum ferritin levels and cognitive skills related to memory, attention and perception in children aged between 12–16 years in Maharashtra. Another study conducted in Delhi showed

decreased levels of morbidity and pneumonia in children aged between 4–6 years who consumed zinc biofortified wheat varieties.

A randomized controlled trial with 40 iron-deficient children aged two years old in Northern Karnataka, India, assessed the amount of iron and zinc absorbed from a mixed-diet that provided <100 g of pearl millet per day. The amount of iron and zinc absorbed from the iron biofortified pearl millet met 100 percent of the estimated physiological requirements for children (1-3 years) for both minerals. Absorption of both minerals was also significantly higher in children who consumed the biofortified pearl millet variety.

According to the farmer feedback study conducted among IPM seed purchasers in rural Maharashtra in 2013, showed that 83% of pearl millet growers had replaced their traditional variety with a biofortified one; farmers liked the yield, input use and other production, processing, and consumption attributes of IPM more than the regular variety, and 84 percent of the IPM harvest was consumed by the household. A majority of the farmers were willing to plant IPM again next season, and plant in more acreage.

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It was also noted that the global market for biofortification stood at around USD 72 million in 2017 and is predicted to reach up to USD 117 million within the next few years, growing at a compound annual growth rate (CAGR) of 8.6% according to Biofortification market report published in 2018. Increasing demand for high nutritional content food along with improvement in technology in the agriculture sector are driving this growth.

The Indian government has already taken a significant step in tying agriculture and nutrition to biofortification. Prime Minister Narendra Modi has backed staple crop biofortification as a long-term and cost-effective way to combat malnutrition. The Prime Minister stated on World Food Day 2020 that common varieties of some crops lack crucial micronutrients that are necessary for optimal health, and that biofortified varieties were produced to address these deficiencies. He also dedicated 17 biofortified seed varieties of eight local and traditional crops, including wheat and paddy rice, to the nation. The addition of these biofortified types, as well as other culinary additives, is projected to turn the traditional Indian thali into a Nutri-thali.

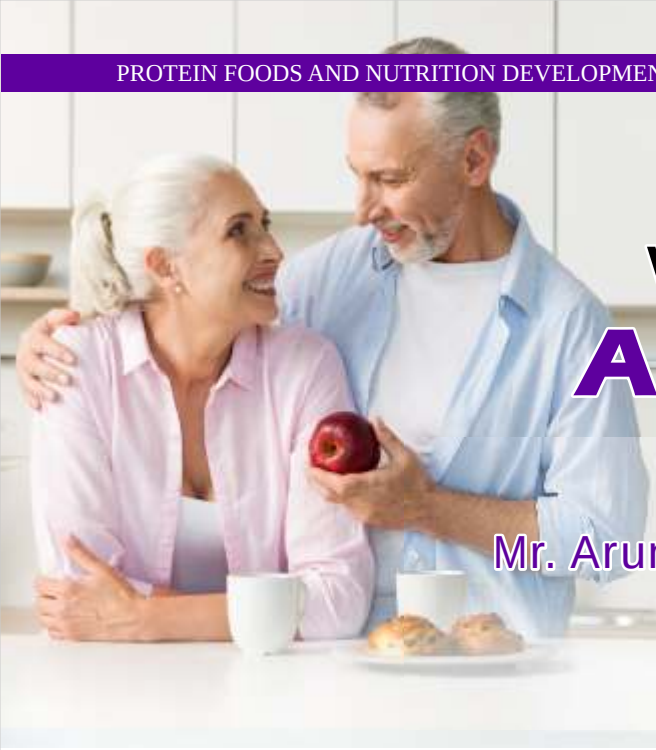
Last year, in his Independence Day speech, Prime Minister Narendra Modi indicated the shift from food security to nutritional security by announcing the fortification of rice distributed under various government schemes, including the public distribution system (PDS) and midday meals in schools, by 2024.

In order to resolve India's malnutrition crisis, it is critical that policymakers look beyond calorie intake and shift their focus to ensuring the availability of nutritious food. With a strong push to mainstream nutrition in the public food distribution system and other governmental measures, India has the potential to significantly increase the breeding, release, production, and consumption of naturally nutritious crops, and develop healthier food systems for future generations. Without urgent and significant consideration given to nutrition as part of our national covid response, the malnutrition crisis will only deepen.

The COVID-19 pandemic and subsequent lockdowns are likely to worsen the situation, not only in India, but globally, putting families at multiple risks, hindering food security, access, and production. Not only that, combating the climate crisis is extremely crucial to ensure India's food and nutritional security. The focus must be on introducing nutrient-dense, climate-smart staples, in addition to targeting higher yield.

Meanwhile, fast-tracking the research, dissemination, and commercialization of technologies, to offset the impact of climate change on the yield and nutrition of staples, should also be emphasized.

Biofortification could be one of the solutions towards climate-proofing our food systems and nutrition security. A comprehensive well integrated policy which goes beyond food security and focuses on the convergence of agriculture, nutrition and climate to achieve sustainable nutritional security could be a significant first step.



GLOBAL AGING – WHY IS IT IMPORTANT TO AGE GRACEFULLY?

AUTHOR
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According to a report by World Health organization, today most people can expect to live into their sixties and beyond. Every country in the world is experiencing growth in both the size and the proportion of older persons in the population. By 2030, One in Six people in the world will be aged 60 years or over. The number of persons aged 80 years or older is expected to triple between 2020 and 2050 to reach 426 million[1,2].

Further, aging is also characterized by the emergence of several complex health states commonly called geriatric issues. They are often the consequence of multiple underlying factors and include frailty, urinary incontinence, falls, delirium and pressure ulcers.

The realisation that you're growing old can feel pretty dreadful and lonely. Having said that, if there is one thing COVID-19 has taught us, it is that monumental events don't matter as much as health and happiness. So it's not growing old that we should be afraid of, but losing our natural body capabilities as we grow old. Keeping the strength of our bones and the mobility in our muscles intact are things we must actively work towards.

A proper exercise program will help men delay many of the changes of aging, particularly when they combine it with other preventive measures. And the same program can help ward off many of the chronic illnesses that tarnish one's golden years. Because exercise helps improve so many cardiac risk factors (cholesterol, blood pressure, diabetes, obesity, and stress), it should have a powerful protective influence on heart attacks — and it does.[3]

Exercising alone is not enough for aging gracefully- your complete lifestyle makes a difference: What you eat, when you sleep, whether or not you have any vices are important considerations. Most people spend their youth saving up for their future hospital bills, all the while making decisions that will be the cause for them landing up in that hospital. What if, instead, we focused on taking care of our bodies while we still can - making corrective changes in our day-to-day routines? Doesn't it make sense to eat clean now, so we don't have to blow up our savings on a heart surgery later and become a liability to our family?

pick? The latter, right? People over age 45 may need more of some vitamins and minerals than younger adults do. Apart from healthy eating, natural supplements may help the aged population to stay healthier and stronger.

Shouldn't we stretch our joints as a preventive measure against age-related pain? Perhaps, there are multiple natural ingredients clinically validated to support healthy aging by improving muscle health, strength, stamina and endurance.

In addition to eating healthy, following regular exercises, the inability to manage stress can mess up our hormones and as a result our metabolism and aging process. So many factors come into play, yet how little we do for ourselves. Some may argue that growing old is inevitable, that eventually, we're all going to become weak, senile and incapable of doing the things we used to when we were younger. To such people we say - If you had a choice between playing a match where you will definitely lose and one where you have a 50% chance of losing, which one would you

Healthy aging depends on people's physical and social environments also and the impact of these environments on their opportunities and health behaviour. Older people are often assumed to be frail or dependent and a burden to society. Public health professionals, and society as a whole, need to address these and other ageist attitudes, which can lead to discrimination, affect the way policies are developed and the opportunities older people have to experience healthy aging.

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COMING EVENTS

5th International Conference on Food Safety and Hygiene
Mar 9 – 10, 2022
Time: 9:00 AM – 9:00 AM GMT
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Register: https://foodsafety-hygiene.alliedacademies.com/2020/registration

Global Conference on Food Science and Technology
Apr 11 – 13, 2022
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A CASE FOR PROTEIN-RICH DAIRY MILK

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For millennia, milk has been an undisputed staple item in the Indian diet. It is the first meal that every mammal receives after birth. As a nutrient-dense food that has a high concentration of highly accessible nutrients at an affordable price, milk is regarded as a near-complete meal.

And yet, the Indian staple is changing to be replaced by plant-based alternatives. Be it soy, almond, or oats, "milk" appears to be getting increasingly disassociated with a bovine derivative. No doubt, the selection and consumption of any food as part of one's diet is a matter of personal choice. But if you are considering substituting plant-based dairy beverages (PBBs) for milk and milk products, you need to weigh up the nutritional differences and health implications. The primary obstacle to altering lives in modern times is following fads while ignoring scientific truths.

Today, the din over veganism appears to have subdued the voices of conventional milk aficionados. Or, has it really? Latest research counters, rather robustly, the vegan claim about PBBs throwing up healthier properties.

The parameters of protein

As everyone knows, proteins are vital for optimal health. Proteins comprise lengthy chains of amino acids, which are referred to as the "building blocks of life." That is why the amino acid profile forms one of the main parameters involving protein comparison in various organisms. The other parameters include total protein digestibility, which includes the protein proportion that gets absorbed in the system, protein efficiency ratio (PER) that may be defined as the gain in body weight divided by the weight of protein consumed by a growing test group of organisms, biological value (BV) or the

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proportion of absorbed protein that is retained for body maintenance and growth, and protein digestibility-corrected amino acid score (PDCAAS) that evaluates protein quality by its ability to meet the human body's amino acid requirements recommended by FAO and WHO.

A keen scrutiny of the nutrition profile of the seemingly inimical beverages reveals a scenario tilted heavily towards cow milk, chiefly cow milk proteins comprising whey and casein. Whey is the liquid that remains after milk has been processed into cheese. Casein, on the other hand, is responsible for binding calcium and phosphorus needed for skeletal development. It also supplies essential amino acids to newborn mammals.

It needs to be emphasized that both whey and casein are absent in plants.

The importance of whey

Whey proteins contain branched amino acids or all protein-building components that the body is incapable of generating on its own. It is no wonder that gym trainers advocate consumables high in whey protein subsequent to a strenuous workout. Notably, whey protein is a preferred diet supplement for individuals across all ages. It is present in baby formulae as well as nourishment smoothies for the elderly.

Needless to say, whey comes packed with a range of healthy dividends.

Whey, for instance, is high in leucine, which is responsible for maximizing muscle protein synthesis (the process of repairing and refurbishing damaged muscle). It also has a higher presence in bovines than plants. For instance, 100 grams of buffalo milk contains 0.44 grams and cow milk 0.32 grams of leucine as opposed to soya extract which contains 0.26 grams.

Aside from leucine, the other whey-based branched amino acids include isoleucine and valine. Isoleucine plays diverse physiological roles, including wound healing, detoxification of nitrogenous wastes, immunological function enhancement, and hormone production stimulation. Valine, on the other hand, is an energy fuel that aids muscle development and tissue healing. Valine deficiency causes hypotonia (low muscular tone), excessive sleepiness, hyperactivity, and developmental delays.

A minuscule statistical representation is in order here:
One hundred grams of buffalo milk and cow milk contain 0.23 grams and 0.20 grams of isoleucine, respectively, as opposed to 0.14 grams contained in soy extract. The presence of valine in all three substances is 0.26, 0.22, and 0.15, in that order.

The goodness of casein

Casein, long advocated as the ideal protein for building muscle health by scholars and athletes alike, breaks down at a leisurely pace subsequent to ingestion. Available as a supplement in health and medical stores, experts advise its consumption before sleep.

Casein is deployed rather prolifically across dairy products for its texture-imparting, stabilizing, and water-binding functions. It is used in ice creams, for instance, for stabilization and texturization. Casein also comes in handy while preparing various types of cheeses owing to its fat and water-binding properties and in coffee whiteners for emulsification.

Nutritionists favour casein for its proline-rich qualities. Proline, it needs to be mentioned, contributes to the formation of collagen, cartilage regeneration, connective tissue formation, skin repair and wound healing, gut lining mending, and joint repair. This amino acid stands out for its unique structure since it is the only proteinogenic amino acid (responsible for biosynthesizing proteins) embedded with a secondary amine. Not only does it aid in the "construction" of proteins, but also acts as a catalyst across various chemical processes.

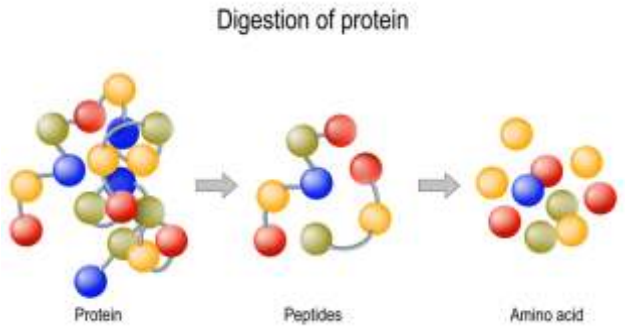
Lysine is another important amino acid belonging to the casein family. For proper development and muscle turnover, lysine is required to manufacture carnitine, which is present in most cells. It also helps transfer lipids between cells for energy production. A lysine deficit may manifest itself in fatigue, difficulty to focus, irritability, bloodshot eyes, stunted development, hair loss, anemia, and reproductive complications.

A hundred grams of buffalo milk yields 0.34 grams of lysine, while the same quantity of cow's milk yields 0.26 grams and soy extract 0.22 grams of lysine.

Needless to add, plant-based drinks, including the much-feted calcium-fortified soy milk, are bereft of many of the nutrients intrinsic to bovine milk. Research compels us to ponder certain other facts.

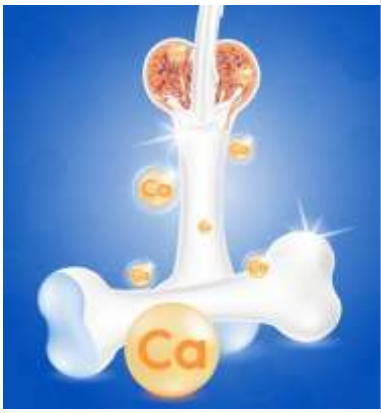
Consider the following:
Milk boasts a protein efficiency ratio (PER) of 3.1 and soy of 2.1. For wheat and rice it is 1.5 and 1.2, in that order.

Comparing mammalian milk with PBBs across all other parameters makes the picture clearer. For instance, protein digestibility (95%) in milk is slightly lower than that of eggs (97%) but higher than soy (91%), wheat (86%), and rice (88%). Milk's protein efficiency is 3.1% as opposed to soy's which stands at 2.1%.



As far as protein digestibility-corrected amino acid score (PDCAAS) is concerned, milk stands at a whopping 121%, which is higher than that of eggs (118%), soy (91%), wheat (42%), and rice (55%). The low PDCAAS of plant protein sources has been attributed to lower digestibility and the absence of certain essential amino acids.

Undoubtedly, the gamut of nutrients of dairy milk is far more impressive compared to its non-dairy counterpart. The bottom-line is quite simple: plant-based beverages or PBBs, as they are now popularly referred to, are no substitute for milk.



SOY AND HEALTH

AUTHOR
Ms Prerana Patil,
Food Technologist, PFNDAI

Soybean is getting a lot of attention these days due to its excellent nutritional profile.

Soy has been a part of Asian cuisine for centuries but, now the world is taking note of it. Soy has become an important part of the diet all over the world. We see many soy-based products in the market, which include soy sauce, soy milk, tempeh, miso, tofu, soy protein, soy flour, soybean meal, etc. Soybean (Glycine Max) is a well-known legume and a member of the Fabaceae family. It can be used in the production of plant-based meat alternatives as well as milk. The soy-based products are mainly popular amongst people who are vegan, vegetarian, or lactose intolerant, because they provide the required amount of protein. It can be a great substitute for animal proteins in order to achieve a sustainable lifestyle. Apart from being a protein alternative and providing delicious products soy has many other health benefits.

Health Benefits of Soy

(Mikstas 2021)-

Soy contains approximately 36% protein, 15% soluble carbohydrates, 15% insoluble carbohydrates, and 18% fat. Soy is one of the few plant-based high-quality protein sources, which contains all the essential amino acids as in the meat. The protein digestibility corrected amino acid scores (PDCAAS) for soy is 0.9-1. Soy carbohydrates mainly consist of oligosaccharides, which are considered prebiotic. Soy is very low in saturated fats. Out of the total fat content of soy, polyunsaturated fatty acids account for 46-62%, which contains omega 3 and omega 6 fatty acids, linoleic acid, and alpha-linolenic acid. It is also high in fibre. One cup of soybean contains 10 g of fibre. Soy is a great source of vitamins and minerals like iron, calcium, potassium, folate, thiamine, etc. Apart from these, soy is rich in bioactive compounds like isoflavones and saponins. Soy has high amounts of isoflavones than other plant sources. Isoflavone mainly contains genistein (50%), daidzein (40%) and glycitein (10%).This nutritional profile of soybean makes it a must-add food in our diet.

Here are some of the health benefits that you may get by consuming soy and soy-based products-

1. Heart Health and Soy Protein

(Erdman 2000) -

Cardiovascular disease is one of the major causes of death all over the world. However, certain factors responsible for the risk of cardiovascular disease can be reduced with a proper diet. A low cholesterol level is desired for good heart health. For every 1% reduction in LDL cholesterol there is a 1-2% reduction in cardiovascular events and for every 2-3% rise in HDL cholesterol there is a 2-4% reduction in cardiovascular events. The consumption of soybean has been associated with the reduction of blood cholesterol levels.

consume soybeans from an early age. Soybean consists of diphenolic compounds known as isoflavones. Several studies show that these compounds can inhibit the development of breast cancer.
Soybean is an important part of Asian cuisine. So, a 30% reduction in the risk of development of breast cancer was observed in Asian women. An epidemiological study including over 11000 women from the US and China shows that the consumption of soy post diagnosis improves survival and reduces the chances of reoccurrence. Soybean intake is inversely associated with breast cancer risk with better results in the case of women in the premenopausal state.

Prostate cancer is the second most diagnosed cancer in the male. Consumption of soy shows protective effects against prostate cancer. Research shows that the risk of prostate cancer is reduced by 50% in Asian men who consume soy as a part of their diet. Isoflavones can be responsible for this but further research is required.

According to FDA, 25g/day of soy protein as a part of a diet low in saturated fat and cholesterol can reduce the risk of cardiovascular diseases. A meta-analysis of 38 controlled studies conducted in 1995 indicated that replacing animal protein with soy protein resulted in the reduction of LDL cholesterol (12.9%), Total cholesterol (9.3%), and triglycerides (10.5%) without affecting the HDL cholesterol levels. Several components associated with soy protein like trypsin inhibitors, saponin, isoflavones, phytic acid, and fibre can help in lowering the LDL cholesterol levels.

However, according to recent research, soy reduces LDL cholesterol and triglycerides by 4-6% and 5% respectively and increase the HDL cholesterol by 1-3%. Though these results are much modest than the previous results they are still relevant. Hence, including soy and soy products in the diet may help in improving heart health due to its high content of polyunsaturated fat, fibre, vitamins, and minerals. Replacing animal protein sources with soy protein can definitely be beneficial for heart health as only 10-15 % of total fat in soybeans is saturated. (Messina, 2016)

2. Protects Against Breast and Prostate Cancer

Soy has been considered to help against breast cancer. It is found that the risk of developing breast cancer is very low in those women who

3. Soy and Blood Pressure-

Including soy in a regular diet may help in reducing high blood pressure or hypertension. Soybean is a package with high protein, low carb, and low fat, which may help in regulating blood pressure. The isoflavones especially daidzein and genistein present in soy can be responsible for the role of soy in regulating blood pressure.

A study conducted by He et al. 2005 and He et al. 2011, indicated that the inclusion of soy protein supplementation resulted in the reduction of systolic and diastolic blood pressure. Hence replacing the carbohydrates in our diet partially can be an important strategy for the prevention and treatment of hypertension.

4. Soy and Iron

Soybean is a major source of non-heme iron. According to WHO 66-68% of the world's population is affected by iron deficiency. It is the most prevalent micronutrient deficiency. Infants, children, and adolescents especially girls are at higher risk of developing iron deficiency due to the loss of iron during menstruation.

Also, vegetarians or vegans can be at a higher risk of developing iron deficiency because their RDA for iron is 1.8 times higher than that of people consuming meat due to the assumed lower bioavailability of iron in plant-based proteins. The presence of antinutritional factors like phytic acid can be responsible for it. Germination can be a way out here because the sprouted soybean can reduce the antinutritional factors and increase the bioavailability of iron.

A study conducted on 280 adolescent anemic girls of china indicated that consumption of sprouted soybean and soybean improved the iron status of the participated girls (Li et al. 2019). One serving of soybean (90 g) can provide 4.42 mg of iron and hence soybean can be a good source of iron and help in overcoming iron deficiencies.

5. Bone Health

Bone health is greatly affected with increasing age. Osteoporosis is a condition in which bone mass is reduced and the porosity of the bones increases making the bones fragile and more prone to fracture. Women can lose a lot of bone mass in a postmenopausal state. Including soy in the diet can help in this condition. Research shows that phytoestrogen mainly isoflavones which is a chemical compound mimicking estrogen can help in reducing bone loss (Akhlaghi et al., 2019; Bawa 2010).

6. Soy and Menopausal Symptoms-

Menopause is the condition that indicates the end of a women's menstruation cycle. Hot flashes red and loss of estrogen are the most common symptom of menopause. Hot flashes last for 6 months to 2 years and in some cases up to 20 years. Hot flashes are less prevalent in Japanese women who consume soy regularly. It is believed that soy isoflavones can alleviate hot flashes. A study conducted by Taku et al. (2012), shows that soy isoflavones can reduce the frequency and severity of hot flashes by 20.6% and 26.2% respectively. Also, soy can improve arterial health in menopausal women.

Soy Allergies-

Soy is a rich source of protein and provides many health benefits. But in some people, soy protein can act as an allergen. Soy allergies occur when the body mistakes soy protein for an allergen and creates antibodies in response. So, every time a person with the allergy is exposed to soy protein the immune system reacts resulting in soy allergy.

The symptoms of the soy allergy occur within minutes or hours after exposure to soy protein. The symptoms include tingling, itching, swelling of lips and other body parts, wheezing, belly pain, nausea, vomiting, red skin, etc. If severe symptoms like difficulty in breathing, drop in blood pressure, increased heart rate and dizziness occur then immediate attention of the doctor is required as these are the symptoms of anaphylaxis.

Soy is the part of "Big eight" Allergen along with milk, egg, peanut, tree nut, fish shellfish, and wheat. But 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).

Though the prevalence of soybean is low, skipping soy from the diet is the best option to avoid soy allergy. Also, make sure to read the label before purchasing any food product as many processed products contain soy.

In conclusion, soy can be a great addition to our diet. Its nutritional profile is different than other legumes. It is a great source of high-quality protein, unsaturated fats, fibre, iron, calcium, potassium, and most importantly isoflavones. This eminent nutritional profile of soy is responsible for its numerous health benefits and hence it is becoming popular in non-Asian countries as well. Soy protein can indeed be a sustainable alternative to animal proteins. But, before including soy in the diet to prevent or treat a health condition, it is advisable to consult with the health care professional.

WEBINAR REPORT ON CAN PROCESSED FOODS BE HEALTHY & NUTRITIOUS?

AUTHOR
Ms Prerana Patil,
Food Technologist, PFNDAI

On the occasion of 53rd Annual General Meeting, Protein Food And Nutrition Development Association of India (PFNDAI) conducted a webinar on "Can Processed Foods Be Healthy and Nutritious?" This event was sponsored by Nestle, Hindustan Unilever Limited, Mother Dairy, and IFF.

The speakers for the webinar were, Dr. B. Sesikeran, Former Director, NIN, ICMR Hyderabad., Chairman – Science Advisory Committee, PFNDAI, Ms. Richa Mattu, Nutrition Lead, Hindustan Unilever, and Ms. Shilpa Wadhwa, Head-Nutrition, Health & Wellness, Nestle, India.

On the panel were Dr. Jagmeet Madan, Principal, SVT College of Home Science, IDA, Mr. Indranil Chatterjee, Regional Product Line Manager – South East Asia & South Asia, IFF, Ms. Zamurrud Patel, HOD, Chief Dietician, Global Hospitals, Mumbai and Dr. Pulkit Mathur, Professor and Head, Department of Food & Nutrition &Food Technology, Lady Irwin College, University of Delhi.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PROTEIN FOODS AND NUTRITION DEVELOPMENT ASSOCIATION OF INDIA
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Organized by
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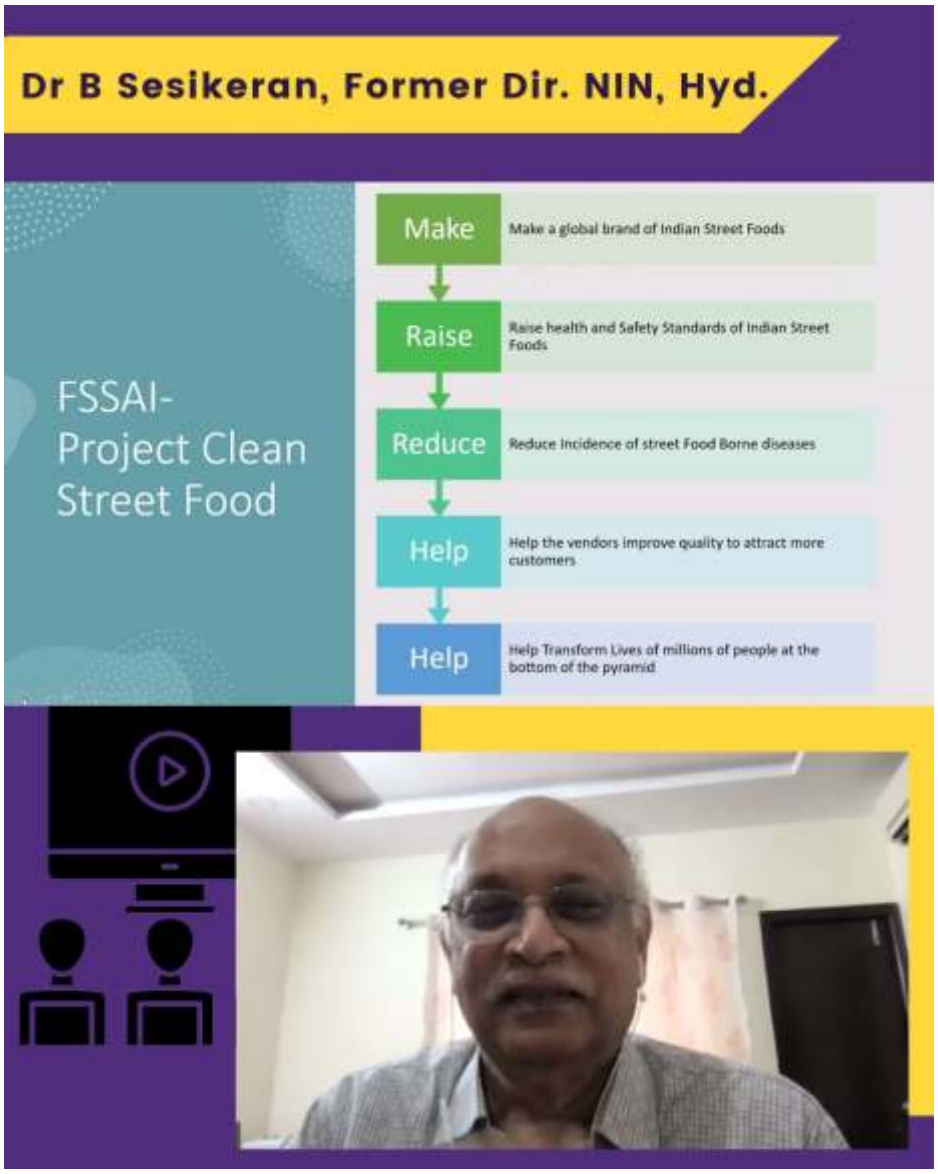
Dr Jagadish Pai
Dr B Sesikeran (Moderator)
Ms Richa Mattu
Ms Dolly Soni (Convenor)
Ms Shilpa Wadhwa
Dr Pulkit Mathur
Dr Jagmeet Madan
Mr Indranil Chatterjee
Ms Zamurrud Patel

1. Making Street Foods Healthy- By Dr. B. Sesikeran



He highlighted that processed food is as old as mankind but today the word 'Processed Food' has become synonymous with 'Unhealthy'. Some processed foods could be considered unhealthy due to the ingredients but not all. So, generalizing all processed foods to be unhealthy is wrong. One such category of processed food is street food. Here are some of the highlights from his presentation-

• Street foods are consumed by low- and middle-class consumers in significant amounts on daily basis, especially in urban areas. Street foods can be the least expensive and most accessible means of a nutritionally balanced diet for many low-income groups provided the consumer is aware of what to eat.

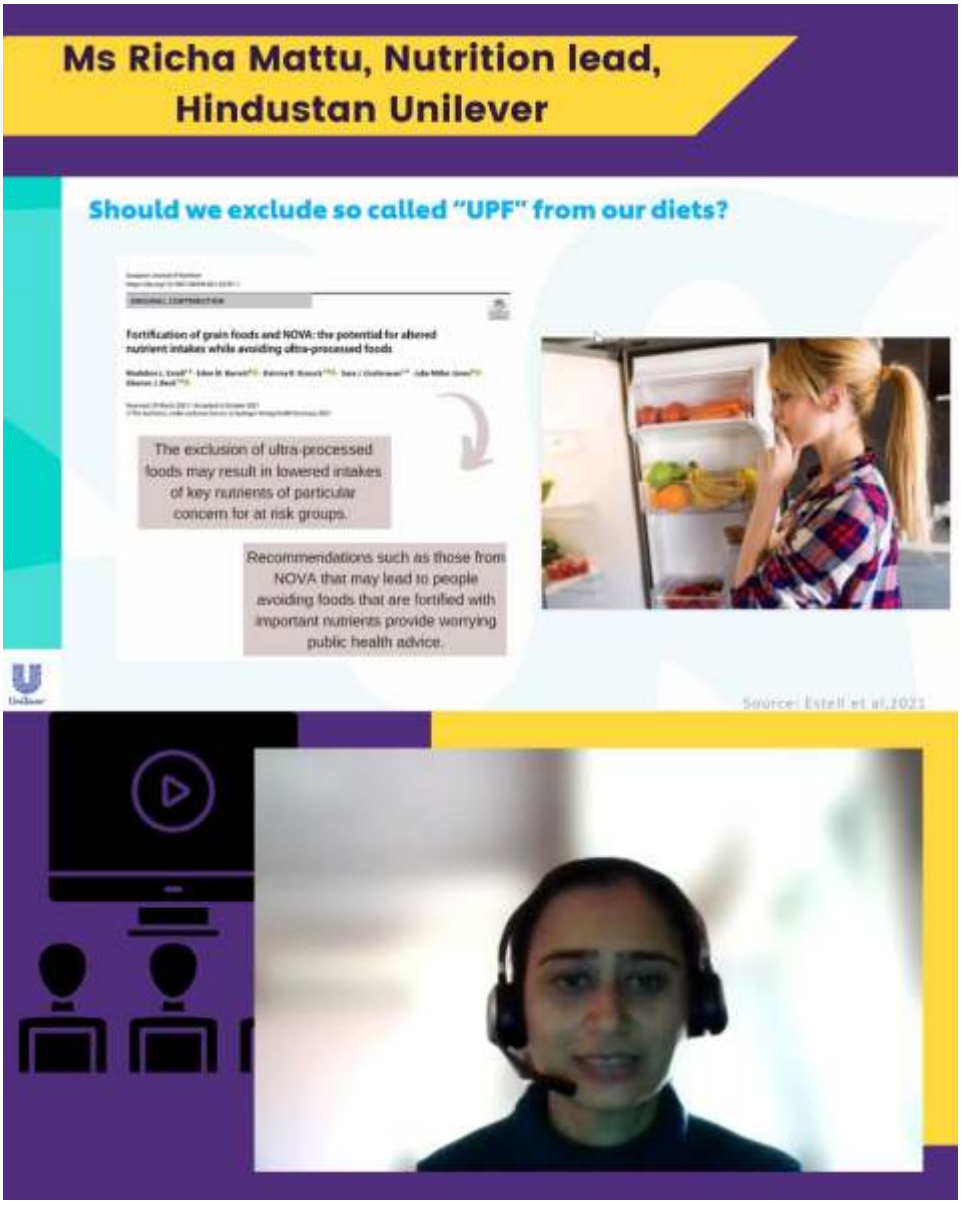
• Street foods are affordable, accessible, available instantly, prepared fresh, very palatable, achieve satiety, and give a wide range of choices.

• There are some problems when it comes to street foods like compromised hygiene, poor quality ingredients, and water, poor sanitization of surrounding and waste disposal, selling the food in public places like the sidewalk, improper cooking practices, food is high in fat, salt, sugar, and energy.

• Street food contributes significantly to the diet of children and adults in terms of energy, protein micronutrients. A wide variety of street foods includes major food groups.

• Many Indian traditional snacks can be part of healthy diet e.g. dosa, idli, pav bhaji, bhel, dhokla, chhach (buttermilk), paratha etc. These when formulated properly can be very healthy. Also others could be reformulated to reduce fat, sugar and salt while using whole grains and other healthier ingredients to make them richer in protein, dietary fibre and micronutrients.

He concluded his presentation by highlighting the initiative taken by FSSAI for healthy and safe street food [Project Clean Street Food] and stressed the importance of being aware and informed consumers when it comes to making street foods healthy.



2. Are Processed Foods Safe and Healthy? - by Ms. Richa Mattu

She enlightened the participants regarding how processed foods can be healthy and safe.

Here are some of the highlights from her presentation-

• Food preparations and processing can be defined as any change that is made to food to alter its eating quality or shelf life. Food processing includes anything that changes food's original form be it at home or industrially.

• Food is processed for increasing availability, altering antioxidant levels, for convenience, tailoring for specific needs, safety, increasing diversity, changing texture and flavour, fortification and enrichment, reducing waste, preservation, etc.

• There are various barriers when it comes to processed foods. For example, Consumers expect processed foods to have recognizable and fewer ingredients. Also, consumers avoid purchasing products with too many additives and processed foods are considered to be less healthy

• The evidence indicating the negative impact of ultra-processed foods on health is based on data and not on the level of processing. So, according to the WHO obesity data, there was no correlation between ultra-processed food availability and obesity.

• Rather than eliminating ultra-processed foods, we should acknowledge their utility and consider that their reformulation might have a more meaningful impact on improving the nutritional quality and health at the population level.

Ms. Mattu concluded her presentation by emphasizing the fact that the healthiness of a product is determined by its nutritional quality and not the level of processing. So, processed foods can be a part of a healthy and sustainable diet.

3. Processed Foods for Convenience and Health- By Ms. Shilpa Wadhwa

She highlighted how processed foods can be convenient and healthy at the same time.

Here are some of the key points from her presentation-

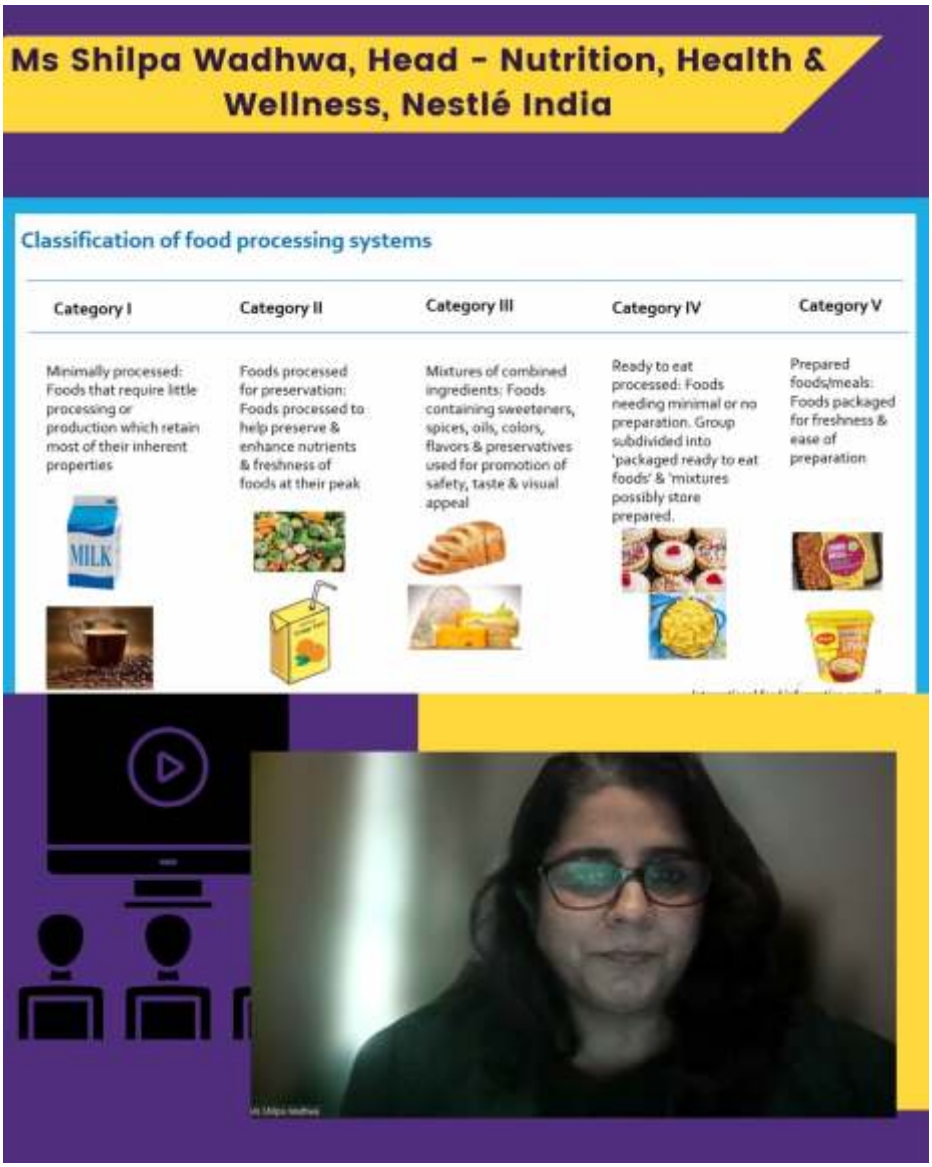
• According to the global hunger index, hunger levels are highest in Africa, south of the Sahara, and South Asia. Nutritional inadequacies in Indian diets are reflected in young children both in urban and rural areas.

• Both fresh and processed foods make up vital parts of the food supply chain. Processed foods contribute to both food and nutritional security.

• Food processing includes a wide variety of activities and makes food palatable, accessible, and safe. Most of the foods stored in our pantries are processed. Hence, processed foods can be classified into different categories from minimally processed to highly processed foods.

• Processed foods can be a convenient partner for working women as processing increases the shelf life of products, saves time and effort, provides food that is safe, hygienic, healthy, and affordable.

• Processing leads to increased food safety and nutritional value of food products. Fortification and enrichment of foods can enhance the nutritional value of a product and address specific health concerns.



• Food processing plays an important role in ensuring sustainability.

She concluded her presentation by emphasizing that food processing has increased food availability, seasonal fruits are available throughout the year through preservation, canning, and freezing.

Also, processing contributes to food safety and nutritional security.

Each presentation was followed by a question and answer session where the respective speaker answered the questions raised by the audience.

Finally, a panel discussion on the various aspects of processed foods and health was conducted. The panel discussion was moderated by Dr. Sesikeran. The panel discussion was followed by a vote of thanks. The webinar concluded with a vote of thanks by Ms. Dolly Soni.

REGULATORY ROUND UP

By
Dr. N. Ramasubramanian,
Director, VR FoodTech,
n.ram@vrfoodtech.com

Dear Readers

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

Notification

FSS (Packaging) Regulation, 2018 has been amended to include food contacts other than plastic material for packing drinking water. In such cases, the requirement of transparency has been omitted.

Compendium of many regulations have been published. Compendiums include all the final amendments till date. A very useful document to keep updated.

Advisories, Orders and Clarifications

The present FSS (Labelling and Display) Regulation 2020, requires the declaration of percentage contribution, in a single serve, towards the Recommended Dietary Allowance in case of Energy, Added Sugars, Fat, Trans fat, Saturated Fat and Sodium.

However, this document has no RDA specified for different age groups for Energy, Added Sugars, Fat, Trans fat, Saturated Fat and Sodium.

Latest list of FSSAI approved Testing Laboratories

FSSAI has issued a standard operating procedure to deal with the violations associated with the disposal of used cooking oil.

FSSAI had prohibited the manufacturers adding fresh oil to the used oil to lower the Total Polar Matter below 25%. This prohibition has been removed.

The RDA is based on the requirements of an adult. FSSAI vide its directive dated 03 February 2022 permits the manufacturers to change the basis of the RDA depending on the target age group recommended in FSSAI's published RDA document on 02 August 2021.

Recycled PET has been permitted to be used as a food packaging material. A procedure also has been laid down for the recycling of PET.

FSSAI, vide its letter 13 January 2022, has decided to temporarily permit the use of either old or new names of pro biotics for the purpose of labelling till further order.

RESEARCH IN HEALTH & NUTRITION

Is the relationship between diet, intestinal bacteria and cells, key to preventing systemic inflammation?

Science Daily November 23, 2021

Inflammation is an important process that protects the body from invading infections and toxins. But in individuals who are successfully treated for HIV to the point that their viral load is no longer detectable, the continuing low-grade inflammation in the cells of the intestine contributes to the increased risk of heart attack or stroke in such people.

These individuals have been found to have a "leaky gut" with more gut bacterial products in their blood such as the potent pro-inflammatory bacterial product known as lipopolysaccharide, or LPS, which promotes systemic inflammation that can accelerate the disease in arteries that leads to heart attack and stroke.

UCLA researchers previously used mouse models of treated HIV to study this problem. They found that adding a tomato concentrate called Tg6F to the western diet of the mice improved their "leaky gut" and significantly reduced systemic inflammation in the mice. Tg6F contains a peptide mimetic of the main protein in HDL ("good cholesterol").

To learn more about how diet is related to inflammation, researchers led by Pallavi Mukherjee fed half a group of mice a typical "western diet," high in fat, cholesterol and calories, while the rest were fed the normal mouse diet, known as a "chow diet," which is low in fat, cholesterol and calories. The researchers examined dietary phospholipids to identity causes of the associated systemic inflammation.

Normal phospholipids do not induce inflammation, but oxidized phospholipids are known to often induce a strong inflammatory response. Researchers suspected that the high-fat western diet might contain high levels of oxidized phospholipids accounting for the ability of this diet to induce systemic inflammation. Surprisingly, they found the western diet contained very low levels of oxidized phospholipids, while the low-fat chow diet contained much higher levels of oxidized phospholipids.

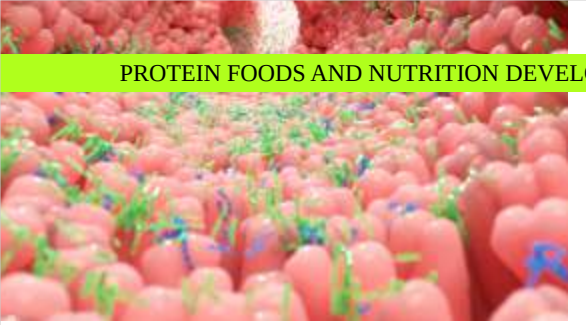
Dr. Alan M. Fogelman, chair of the department of medicine at the David Geffen School of Medicine at UCLA said, "we studied the portion of the small intestine known as the jejunum, because it is very actively involved in the uptake of dietary fats."

The investigators focused on a thin mucous layer that is the interface between the bacteria in the lumen of the jejunum and the cells on the surface of the jejunum that take up the dietary components. The jejunum relies on antimicrobial peptides and proteins in this thin mucous layer to keep the bacteria in the lumen of the intestine from interacting with its cells.

In mice fed the western diet, the jejunum contained high levels of oxidized phospholipids compared to those in mice fed the chow diet. They also had low levels of antimicrobial peptides and proteins compared to mice fed the chow diet. Consistent with the decrease in levels of antimicrobial peptides and proteins, the number of bacteria and the levels of LPS increased in jejunum mucus from mice fed the western diet. The permeability of the jejunum also increased in mice fed the western diet.

The lymph draining from the jejunum of mice fed the western diet contained increased levels of LPS as did the blood of these mice. LPS is known to induce inflammation in both mice and humans, and markers of systemic inflammation were increased in the mice fed the western diet.

Researchers hypothesized that the western diet-mediated changes were due to the formation of oxidized phospholipids in the jejunum.



To test this hypothesis, they added oxidized phospholipids to segments of jejunum taken from mice on the chow diet. This reproduced the changes in gene expression seen in the jejunum of mice fed the western diet, which would account for the decrease in antimicrobial peptides and proteins on this diet. The investigators found adding Tg6F to the western diet reduced the levels of oxidized phospholipids in jejunum mucus. Additionally, it prevented the decrease in antimicrobial peptides and proteins, prevented the increase in bacteria and LPS in jejunum mucus, prevented the increase in jejunum permeability, and reduced LPS in lymph and blood, which reduced markers of systemic inflammation. The authors say their findings suggest that targeting the mucus interface between the bacteria and the cells of the small intestine with peptide mimetics of the main protein in HDL may be a way of preventing systemic inflammation.

Vitamin D deficiency raises risk of metabolic syndrome in children, study finds

29 Nov 2021 Nutrition Insight

The prevalence of metabolic syndrome (MetS) is higher in children with a vitamin D deficiency compared to those who are not deficient in the nutrient.

This is according to researchers at the Alborz University of Medical Sciences, Iran, whose study results stress the importance of prevention of vitamin D deficiency in younger populations. MetS begins early in life and is one of the important underlying factors for non-communicable diseases (NCDs) in adulthood, the researchers flag.

MetS is a group of conditions that include increased blood pressure, high blood sugar, excess body fat around the waist, and abnormal cholesterol or triglyceride levels. When these conditions occur together, the risk of heart disease, stroke and Type 2 diabetes increases.

The study authors highlight that vitamin D supplementation in schools should be considered, particularly in countries with a high prevalence of its deficiency. This is because "knowledge on the benefits of vitamin D and the unfavorable effects of its insufficiency is growing by the day, and the beneficial outcomes are too important to ignore," they state.

Physical examination and blood sample collection

The nationwide cross-sectional study was performed as part of a surveillance program in Iran. The participants were 2,596 students, aged between seven to eighteen years old, living in 30 provinces. The study process included filling questionnaires, a physical examination and blood sample collections. The serum concentration of 25-hydroxy vitamin D (25(OH)D) was measured using the direct competitive immunoassay chemiluminescence method. The study results showed the prevalence of vitamin D deficiency and insufficiency in participants was 10.6% (n = 276) and 60.5% (n = 1570), respectively. The majority of MetS was higher in the vitamin D deficient group. Additionally, the researchers flag that the students with deficient vitamin D levels had higher odds of MetS, abdominal obesity and high fasting blood sugar in comparison to those with sufficient levels. Although vitamin D is vital for good health, the French Agency for Food, Environmental and Occupational Health & Safety have previously warned of the dangers of vitamin D overdose, especially for infants.

Vitamin D's potential underscored

Industry players have been interested in the role of vitamin D to prevent and treat ailments. In this space, DSM recently highlighted the need for regulatory and educational changes when dealing with nutrient deficiencies in children. Earlier this month, the Council for Responsible Nutrition found a correlation between higher levels of vitamin D and lower severity of COVID-19.

Meanwhile, Kappa Bioscience research revealed that vitamin D and vitamin K2 alleviate inflammation when combined. A German Cancer Research Center study also showed that vitamin D supplementation could prevent 30,000 cancer deaths annually.

By Nicole Kerr

Zinc supplements could fight respiratory tract infection symptoms, suggests review

02 Nov 2021 Nutrition Insight

A new study review suggests zinc supplementation may reduce the risk, duration and severity of respiratory illness, including coughing, congestion, colds, flu, pneumonia, SARS-CoV-2 infections and recovery from stroke. Indirect evidence has demonstrated a link between zinc supplementation and reduced virus risk, particularly in populations at risk of zinc deficiency, including people with chronic disease co-morbidities and older adults.

Crucially, the study warns over 17% of the global population is estimated to be zinc-deficient and 20% of national diets contain insufficient zinc to meet minimum health requirements. This review paper arrives amid scientific debate on zinc's ability to reduce coronavirus symptoms. Some researchers have argued zinc, along with vitamins B3, C and D hold promise in reducing the risk or severity of COVID-19, while others flag zinc "fails to live up to its hype."

Beyond immunity boosting

Published in Advances in Integrative Medicine, the review included 118 publications of 1,627 records. Four randomized clinical trials specific to SARS-CoV-2 are ongoing, with two investigating zinc for prevention and two for treatment. "The potential role of zinc as an adjuvant therapy for SARS-CoV-2 may be broader than just antiviral or immunological support," the study authors write. "Zinc also plays a complex role in hemostatic modulation, acting as an effector of coagulation, anticoagulation and fibrinolysis. Zinc is also essential for neurological function."

Unclear on dosage

While these study findings are "promising," the effectiveness of zinc in preventing or treating SARS-CoV-2 infections is "yet to be systematically evaluated." Most consumers are familiar with zinc supplements in the form of a lozenge, tablet, capsule, liquid or syrup. However, the study flags safety concerns associated with high doses or prolonged intake of zinc includes anosmia (loss of smell) and copper deficiency.

Zinc gaining ground

Critically, zinc deficiency results in the impaired formation, activation and maturation of lymphocytes, disturbs the intercellular communication via cytokines and weakens the innate host defence. Consequently, zinc rose to the top of consumers' immune health strategies, as evidenced by increased Google searches for the keywords. A survey from this March revealed 41% of US consumers believe the ingredient supports immunity. Zinc was also among the fastest-growing ingredients for immune health between 2019 to 2020, which grew at a CAGR of 78%. Examples of industry innovation in this space include new research to improve crops' zinc uptake and zinc-biofortified ingredient launches.

On the flip side

Although these findings appear promising, other research highlights zinc supplementation may not be as effective as consumers assess it to be. In an analysis of 300,000 UK users of the ZOE COVID Symptom Study App, study researchers were "surprised" they did not observe an effect for zinc, vitamin C or garlic supplements. These findings were reproduced in another ZOE study four months later.

The researchers behind a controversial US study, which found zinc and vitamin C did not help patients with COVID-19, stood behind their findings despite backlash from The Council for Responsible Nutrition (CRN). At the time, NutritionInsight spoke with experts from both sides of the debate.

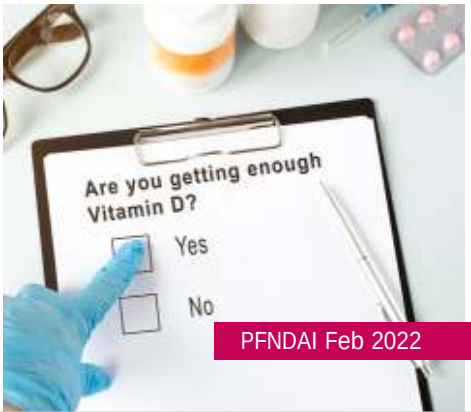
By Anni Schleicher

Higher vitamin D status linked with better COVID-19 outcomes, reveals CRN

04 Nov 2021 Nutrition Insight

Mounting research correlates higher vitamin D blood levels to lower incidences or severity of COVID-19, according to the Council for Responsible Nutrition (CRN). The US-based non-profit applauds the "significant link" found in most – but not all – of 13 meta-analyses from over 100 clinical trials specifically studying the vitamin and COVID-19.

"This growing body of research does not indicate that vitamin D is a substitute for vaccines, mask wearing, social distancing or other behaviours to mitigate the spread of the coronavirus," says Luke Huber, vice president of scientific and regulatory affairs at CRN.



"But the data does suggest that vitamin D levels may play a role, in combination with other therapies, in strengthening the immune system to resist the virus."

Digging into the data

Of the 13 meta-analyses CRN cites, most examined blood levels of vitamin D and COVID-19 while two exclusively examined vitamin D consumption in relationship to the illness. "We have known for years that vitamin D plays an important role in immune health, and now there are multiple meta-analyses that appear to demonstrate the benefits of this nutrient in COVID-19," affirms Huber.

Most of the reviews found higher blood levels of vitamin D appear to be correlated with a lower incidence of COVID-19. Several – but not all meta-analyses – found greater severity of and mortality from COVID-19 were associated with lower vitamin D levels.
One meta-analysis found reduced mortality with vitamin D intervention following COVID-19 diagnosis, while a smaller meta-analysis did not see a statistically significant relationship. Timing and dosage of the interventions may have played a role in the differing results.

Varying perspectives

Throughout the COVID-19 pandemic, experts have expressed mixed opinions on advising vitamin D supplementation. This is in light of some studies showing no correlation between the "sunshine vitamin" and the disease, as well as fears of too high doses.

Nevertheless, England offered free vitamin D supplements last winter to more than 2.5 million people deemed vulnerable to COVID-19. In addition, a US-based campaign called #VitaminDforAll called for immediate widespread increased vitamin D intake. In February, a US representative introduced a House resolution recognizing the potential role vitamin D may play in decreasing the severity of COVID-19.

Mechanism for action?

While it is unknown how vitamin D may reduce severe COVID-19 outcomes, scientists have proposed certain theories. CRN notes that adequate vitamin D levels as well as a healthy balanced diet, particularly the Mediterranean Diet, have been identified as beneficial to offset this inflammatory response.

Reduced inflammation could, in turn, ease the "cytokine storm," which is when an infection triggers the immune system to flood the bloodstream with inflammatory proteins called cytokines. This cascade of inflammatory reactions can kill tissue and damage organs. It plays a critical role in COVID-19 patient outcomes, supports the non-profit.

Additionally, vitamin D may exhibit antiviral effects by interfering with viral replication and, through its ability to stimulate the immune system and reduce inflammation. Vitamin D has also been explored in combination with other supplements, such as probiotics, for an enhanced ability to fight COVID-19.

A portal for uncovering facts

CRN presented these latest findings via its Vitamin D & Me! initiative, a space for consumers to explore the collective research on this topic and to hear directly from the researchers involved. The initiative has tracked and reported research on the link between vitamin D and COVID-19 since May 2021. Brian Wommack, executive director of the CRN Foundation, adds: "Consumers need science-based evidence to make informed health decisions."

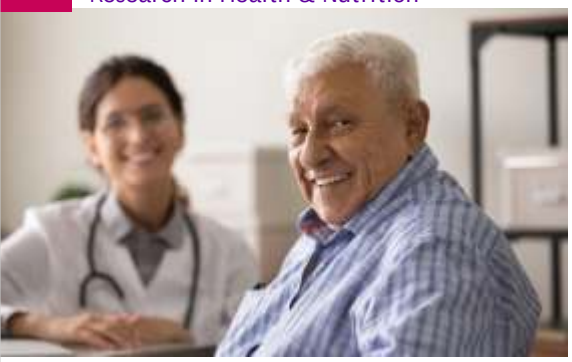
By Missy Green

Amino acid blend inhibits development of dementia, study finds

08 Nov 2021 Nutrition Insight

An amino acid combination called Amino LP7 can hinder the development of dementia, including Alzheimer's disease. This is according to a study conducted by the National Institutes for Quantum Science and Technology in Japan.

Researchers using a mouse model have found that the intake of Amino LP7 – a supplement containing seven amino acids – can inhibit the death of brain cells, protect the connections between them and reduce inflammation, preserving brain function in people with Alzheimer's disease.



"Our data highlight the significance of specific amino acids for the protection of the brain against dementia due to accumulations of toxic molecules with aging," Makoto Higuchi, head of department of Functional Brain Imaging at National Institutes for Quantum Science and Technology, tells NutritionInsight.

Amino LP7 potential

The present findings will support the usefulness of Amino LP7 as a safe, cost-effective and handy means to prevent the onset of dementia, details Higuchi. "These results suggest that essential amino acids can help maintain balance in the brain and prevent brain deterioration. Our study is the first to report that specific amino acids can hinder the development of dementia," says Dr. Hideaki Sato, Department of Functional Brain Imaging, National Institutes for Quantum and Radiological Sciences and Technology.

Although the study was performed in mice, it brings hope that amino acid intake could also modify the development of dementia in humans, including Alzheimer's disease, notes Dr. Yuhei Takado, National Institutes for Quantum and Radiological Sciences and Technology.nThe study opens avenues to understand how dementias occur and how they can be prevented. As Amino LP7 improves brain function in older people without cognitive impairment, the findings suggest it could also be effective in people with cognitive dysfunction. The researchers' work expands on previous studies, which have demonstrated the effectiveness of Amino LP7 in improving cognitive function.

Dementia in depth

Dementia is a condition involving the loss of cognitive function, and it is caused by a variety of disorders, including Alzheimer's disease. According to World Health Organization estimates, approximately 10 million individuals worldwide develop dementia every year, indicating this condition's high psychological and social impact.nDementia mainly affects older people, and so far, simple and effective strategies for preventing this condition have remained elusive. "In older individuals, low protein diets are linked to poor maintenance of brain function. Amino acids are the building blocks of proteins," says lead study author Dr. Makoto Higuchi. "We wanted to understand whether supplementation with essential amino acids can protect the brains of older people from dementia and, if yes, what mechanisms would contribute to this protective effect."

Examining mouse brain function

During the study, the researchers first investigated how a low-protein diet affects the brain in mouse models of Alzheimer's disease, which generally demonstrate neurodegeneration and abnormal protein aggregates called "Tau" aggregates in the brain. They found that mice consuming a low-protein diet showed accelerated brain degeneration and had signs of poor neuronal connectivity. These effects were reversed after supplementation with Amino LP7, indicating that combining seven specific amino acids could inhibit brain damage.

The research team then examined how Amino LP7 affects different signs of brain degeneration in the Alzheimer's model. Untreated mice showed high levels of progressive brain degeneration, but Amino LP7 treatment suppressed neuronal death and thereby reduced brain degeneration, even though the Tau aggregates remained."Tau plaques in the brain are characteristic of Alzheimer's, and most treatments target them. However, we have shown that it is possible to overcome this Tau deposition and prevent brain atrophy via supplement ation with Amino LP7," explains researcher Dr. Akihiko Kitamura.

The next step was to understand how Amino LP7 protects the brain, and the researchers analyzed the gene-level changes induced by Amino LP7. They observed that Amino LP7 reduces brain inflammation and prevents kynurenine, an inflammation inducer, from entering the brain, thereby preventing inflammatory immune cells from attacking neurons. Additionally, Amino LP7 reduces neuronal death and improves neuronal connectivity, improving brain function.

Diets improving brain function

Industry players have shown interest in the role of diet and its potential in alleviating ailments. In September, a Swedish study found that omega 3 intake improved memory in participants with Alzheimer's. Arjuna Natural's BCM-95 turmeric extract was shown to decrease damage from Alzheimer's disease on organs such as the spleen, liver and lungs. Meanwhile, vitamin K2 is a potential solution for Alzheimer's disease "protection" according to a NattoPharma study.

By Nicole Kerr

Curcumin and green coffee extract "immensely valued" for muscle injury repair

16 Nov 2021 Nutrition Insight

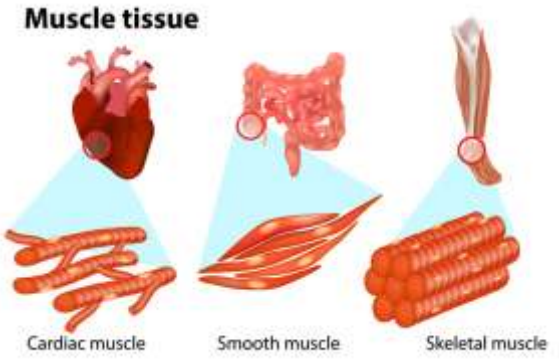
Green coffee extract and curcumin antioxidant formulation Gremin has been found to accelerate muscle injury repair. The blend is positioned as a performance ingredient in the sports nutrition segment across all age groups.

"Gremin is better in the resolution of skeletal muscle injury as compared to the simple physical mixture of curcumin extract and green coffee bean extract," state the authors of the mouse study. The researchers believe that the cytoprotective effects they observed in this study are exerted by the synergistic effects of both curcumin and chlorogenic acid (the major active of green coffee bean extract). According to the study authors, while curcumin and green coffee have been shown to have beneficial effects individually, there were no previous studies to examine the synergistic effects of these compounds at an optimized ratio.

Synergistic properties

Gremin was developed by embedding herbal extracts in a hydrophilic matrix system to ensure optimal efficacy and therapeutic benefits. It aims to deliver synergistic anti-inflammatory and antioxidant properties to support improving stamina and endurance through accelerating recovery and healing. "Muscle repair and regeneration is a priority for athletes and active individuals who rely on being physically fit," says Shankaranarayanan Jeyakodi, Zeus Hygia co-founder and one of the study authors.

The sports nutrition industry can play a major role here, with Innova Market Insights spotlighting the market potential. Notably, about 10% of US consumers purchase sports nutrition on a grocery shopping trip, with about 40% saying they have increased purchases of the category in the past year.



Limited options?

However, Jeyakodi continues that there are limited natural remedies for most common muscle soreness due to overuse and minor injuries during regular exercises or workouts. "Apart from vigorous exercise, even regular walking, jogging and other physical activities may also cause muscle soreness or injuries. Chronic inflammation may lead to the destruction of muscles."

The study authors also write that there are few treatment options for muscle injury aside from symptomatic treatment. "In this study, we have demonstrated that a supplement of Gremin is highly beneficial for muscle injury treatment and could be of immense value for post-injury rehabilitation."

Testing four groups

The study, which is now published in the Journal of Nutraceuticals and Food Science, used a mouse model of BaCl2-induced muscle injury to the right tibialis anterior (TA) muscles while the left TA muscle served as a contralateral control. The subjects were divided into four groups of six mice – vehicle control, BaCl2 control, Gremin and reference compound.

All except the vehicle were administered with BaCl2 injection to induce muscle injury. The BaCl2-induced muscle injury model is the commonly accepted locally specific method for the study of muscle regeneration. Gremin and the reference compound were administered at a dose of 200 mg per kg body weight daily for up to 17 days. The researchers assessed biochemical markers TNF- , creatine kinase (CK), and lactate dehydrogenase (LDH).

Indicating muscle recovery

Results showed that those in the Gremin group exhibited reduced levels of LDH and CK enzyme biomarkers, indicating muscle recovery. Gremin has also undergone a clinical study in healthy individuals, exhibiting "very promising" results. The study data is currently in the publication process with a peer-reviewed journal. In May, Zeus Hygia also unveiled its patent-pending BioSolve Technology, which offers higher bioavailability for active ingredients by using food-grade encapsulating excipients.

Edited by Katherine Durrell

Review tips vitamin K2 as beneficial for heart health

23 Nov 2021
Nutrition Insight

Vitamin K2 is overlooked in cardiovascular health, according to a review paper published amid calls to roll out a recommended daily intake. Published in Open Heart, the paper presents an overview of data on vitamin K2 and specifically identifies the US, where vitamin K deficiency is significant.

"There is an alarmingly high prevalence of vitamin K deficiency and suboptimal recommended intake among the general population in the US. Despite this, there is a growing body of evidence that supports the potential role of vitamin K2 in cardiovascular health," says paper author and professor of biochemistry of Vascular Calcification, Leon Schurgers.

Vying for K2 supplements

The review presents an organization of data surrounding vitamin K2, which is "desperately needed in the effort to petition for a K2-specific recommended daily intake" according to Schurgers. The paper was published by the Cleveland Clinic and Maastricht University, which is NattoPharma's long-time research partner. NattoPharma is part of Gnosis by Lesaffre.

"This review covers the rapidly expanding evidence supporting the cardioprotective effects of vitamin K2 intake," notes Dr. Hogne Vik, chief medical officer with NattoPharma – Gnosis by Lesaffre. "Vitamin K2 supplementation appears safe and practical, and randomized clinical trials can investigate its use. With evidence mounting, the definitive role of vitamin K2 supplementation in delaying progression of vascular and valvular calcifications remains the subject of multiple clinical trials," highlight the authors.

Exploring the interplay between K2 and Matrix Gla

The review aims to summarize literature for scientists and clinicians, highlighting the patho-physiological interplay between K2 and Matrix Gla protein. It also seeks to provide information on cardiovascular benefits of vitamin K2 and supplementation.

"There is expanding preclinical and clinical data on vitamin K's cardiovascular benefits, with multiple ongoing clinical trials. To that end, there is a pressing need to organize our understanding of the pathophysiology, and efficacy of K2 intake as it relates to markers and outcomes of cardiovascular health," notes Schurgers.

There is a growing body of scientific evidence and consumer understanding supporting the benefits of vitamin K2, providing suppliers with increased options for NPD. Research by Kappa Bioscience, manufacturer of K2 MK-7, revealed vitamins D3 and K2 each function more effectively when combined. A previous NattoPharma-backed study, flagged that vitamin K2 may improve cardiovascular risks in nicotine users.

Edited by Andria Kades

Higher coffee consumption could lower Alzheimer's risk, study finds

24 Nov 2021 Nutrition Insight

Two daily cups of coffee may lower the risk of Alzheimer's disease, according to an Australian study, which observed more than 200 individuals for a decade.

"In the absence of effective disease-modifying treatments for Alzheimer's disease, our research is looking at modifiable risk factors that could delay the onset of the disease," lead author and post-doctoral research fellow at Edith Cowan University, Dr. Samantha Gardener tells NutritionInsight. "Even a five-year delay would have a massive social and economic benefit. These dietary modifications are generally accessible to all as well as being less expensive than medications and with fewer side effects.

Potential in combating Alzheimer's

The results showed an association between coffee and several important markers related to Alzheimer's disease, Gardener adds. "We found participants with no memory impairments and with higher coffee consumption at the start of the study had a lower risk of transitioning to mild cognitive impairment – which often precedes Alzheimer's disease – or developing Alzheimer's disease over the course of the study."

"If the average cup of coffee made at home is 240 g, increasing to two cups a day could potentially lower cognitive decline by 8% after 18 months," notes Gardener. "It's a simple thing that people can change and could be particularly useful for people who are at risk of cognitive decline but haven't developed any symptoms." Changing to two cups a day could also lead to a 5% decrease in amyloid accumulation in the brain over the same time period. In patients with Alzheimer's disease, the amyloid clumps together, forming plaques which are toxic to the brain.

Personalization may lead future

Published in Frontiers, the study observed 227 participants, who were aged 60 and above, for over a decade. A key limitation, however, is that the study did not differentiate between caffeinated and decaffeinated coffee or the presence of added ingredients such as milk and sugar. Scientists could not identify any benefits or consequences on how the coffee was brewed.

Studies have suggested a difference in health benefits between the temperature in coffee and the way it is brewed. Hot-brewed coffee made from dark roasts produces a "potentially healthier drink", containing higher levels of antioxidants and more kinds of acid.

According to Gardener, the study was unable to conclusively suggest a maximum number of cups that could provide a beneficial effect. Though this flags the need for further research, she notes that "unfortunately, there will be a limit whereby more cups will not produce any further positive effects."

"Any future recommendations would also have to be personalized to the individual, taking into consideration any other medical conditions they have that may be contraindicative to coffee consumption."

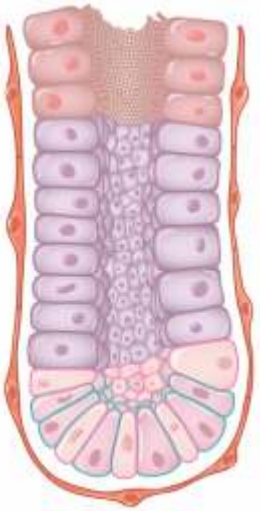
A previous study pointed toward certain compounds found in coffee called phenylindanes that may hinder two protein fragments responsible for Alzheimer's and Parkinson's from clumping, therefore potentially aiding in the prevention of these diseases. Coffee has also been linked to lowering the risk of stroke by 32% for individuals who drank two to three cups a day, according to a Chinese study.

By Andria Kades

New link between diet, intestinal stem cells and disease discovered

Science Daily November 19, 2021

The molecular mechanisms behind this maladaptation are part of the research field of Heiko Lickert and his group at Helmholtz Munich and the Technical University of Munich. The scientists assume that intestinal stem cells play a special role in maladaptation. Using a mouse model, the researchers investigated the effects of a high-sugar and high-fat diet and compared it with a control group.



Intestinal stem-cell niche

From high-calorie diet to increased risk of gastrointestinal cancer

"The first thing we noticed was that the small intestine increases greatly in size on the high-calorie diet," says study leader Anika Böttcher. "Together with Fabian Theis' team of computational biologists at Helmholtz Munich, we then profiled 27,000 intestinal cells from control diet and high fat/high sugar diet-fed mice. Using new machine learning techniques, we thus found that intestinal stem cells divide and differentiate significantly faster in the mice on an unhealthy diet." The researchers hypothesize that this is due to an upregulation of the relevant signaling pathways, which is associated with an acceleration of tumor growth in many cancers. "This could be an important link: Diet influences metabolic signaling, which leads to excessive growth of intestinal stem cells and ultimately to an increased risk of gastrointestinal cancer," says Böttcher.

With the help of this high-resolution technique, the researchers have also been able to study rare cell types in the intestine, for example, hormone-secreting cells. Among their findings, they were able to show that an unhealthy diet leads to a reduction in serotonin-producing cells in the intestine. This can result in intestinal inertia (typical of diabetes mellitus) or increased appetite. Furthermore, the study showed that the absorbing cells adapt to the high-fat diet, and their functionality increases, thus directly promoting weight gain.

Important basic research for non-invasive therapies

These and other findings from the study lead to a new understanding of disease mechanisms associated with a high-calorie diet. "What we have found out is of crucial importance for developing alternative non-invasive therapies," says study leader Heiko Lickert, in summarizing the results. To date, there is no pharmacological approach to prevent, stop or reverse obesity and diabetes. Only bariatric surgery causes permanent weight loss and can even lead to remission of diabetes. However, these surgeries are invasive, non-reversible and costly to the healthcare system. Novel non-invasive therapies could happen, for example, at the hormonal level through targeted regulation of serotonin levels. The research group will examine this and other approaches in subsequent studies.

Diet trumps drugs for anti-aging and good metabolic health

Science Daily
November 16, 2021

The pre-clinical study by the University of Sydney's Charles Perkins Centre suggests the makeup of our diet could be more powerful than drugs in keeping conditions like diabetes, stroke and heart disease at bay.

Conducted in mice, the research showed nutrition (including overall calories and macronutrient balance) had a greater impact on ageing and metabolic health than three drugs commonly used to treat diabetes and slow down ageing. The findings are published in Cell Metabolism. The research builds on the team's pioneering work in mice and humans demonstrating the protective role of diet and specific combinations of proteins, fats and carbohydrates against ageing, obesity, heart disease, immune dysfunction and risk of metabolic diseases, such as type 2 diabetes.

Senior author and Academic Director of the Charles Perkins Centre, Professor Stephen Simpson said drugs can also target the same biochemical pathways as nutrients.

There has been a huge effort to discover drugs aimed at improving metabolic health and ageing without requiring a change in diet, he said. "Diet is a powerful medicine. However, presently drugs are administered without consideration of whether and how they might interact with our diet composition -- even when these drugs are designed to act in the same way, and on the same nutrient-signalling pathways as diet," said Professor Simpson.

The researchers set out to discover whether drugs or diet were more powerful in remodelling nutrient-sensing and other metabolic pathways, as well as whether drugs and diet interacted in ways that made them more or less effective.

"We discovered dietary composition had a far more powerful effect than drugs, which largely dampened responses to diet rather than reshaped them," said Professor Simpson. "Given humans share essentially the same nutrient-signalling pathways as mice, the research suggests people would get better value from changing their diet to improve metabolic health rather than taking the drugs we studied."

The study explained

The research team designed a complex mouse study, involving 40 different treatments, each with varying levels of protein, fat and carbohydrate balance, calories and drug content. The study was designed to examine the impact of three anti-ageing drugs on the liver, which is a key organ in the regulation of metabolism.

A key strength of the study was the use of the geometric framework for nutrition developed by Professors Stephen Simpson and David Raubenheimer. The framework made it possible for the team to consider how mixtures and interactions of different nutrients influence health and disease, rather than focusing on any one nutrient in isolation, which is a limitation in other nutrition studies.

What did they find?

The results add another piece to the puzzle in our understanding of the mechanisms that link 'what we eat' with 'how we age'. The researchers found calorie intake and the balance of macronutrients (protein, fats and carbohydrates) in the diet had a strong impact on the liver.

Protein and total calorie intake had a particularly powerful effect not just on metabolic pathways, but also on fundamental processes that control the way our cells function. For example, the amount of protein eaten influenced activity in the mitochondria, which are the part of cells that produce energy. This creates a downstream effect, as the amount of protein and dietary energy eaten influences how accurately cells translate their genes into the different proteins needed to help cells function properly and to make new cells. These two fundamental processes are linked to ageing.

In comparison, the drugs mainly acted to dampen the cell's metabolic response to diet, rather than fundamentally re-shaping them. However, the researchers also found some more specific interactions between the biochemical effects of the drugs and diet composition.

One anti-ageing drug had a bigger effect on changes in the cells caused by dietary fat and carbohydrates, while a cancer and another diabetes drug both blocked the effects of dietary protein on the energy-producing mitochondria.

Lead author Professor David Le Couteur of the Charles Perkins Centre and Faculty of Medicine and Health said although the study was very complex, it shows how important it is to study many different diets at the same time, rather than just comparing a few different diets. "This approach is the only way we can get an overview of the interaction between diet, our health and physiology," said Professor Le Couteur. "We all know what we eat influences our health, but this study showed how food can dramatically influence many of the processes operating in our cells. This gives us insights into how diet impacts on health and ageing."

Obesity raises the risk of gum disease by inflating growth of bone-destroying cells

Findings may improve understanding of chronic inflammatory, bone-related diseases that develop alongside obesity, such as gum disease, arthritis and osteoporosis

Science Daily November 12, 2021

The study, completed in an animal model and published in October in the Journal of Dental Research, found that excessive inflammation resulting from obesity raises the number of myeloid-derived suppressor cells (MDSC), a group of immune cells that increase during illness to regulate immune function. MDSCs, which originate in the bone marrow, develop into a range of different cell types, including osteoclasts (a cell that breaks down bone tissue).

Bone loss is a major symptom of gum disease and may ultimately lead to tooth loss. Also known as periodontal disease, gum disease affects more than 47% of adults 30 years and older, according to the Centers for Disease Control and Prevention. "Although there is a clear relationship between the degree of obesity and periodontal disease, the mechanisms that underpin the links between these conditions were not completely understood," says Keith Kirkwood, DDS, PhD, professor of oral biology in the UB School of Dental Medicine.

"This research promotes the concept that MDSC expansion during obesity to become osteoclasts during periodontitis is tied to increased alveolar bone destruction. Taken together, this data supports the view that obesity raises the risk of periodontal bone loss," says Kyuhwan Kwack, PhD, postdoctoral associate in the UB Department of Oral Biology. The study examined two groups of mice fed vastly different diets over the course of 16 weeks: one group a low-fat diet that derived 10% of energy from fat, the other group a high-fat diet that drew 45% of energy from fat.

The investigation found that the high-fat diet group experienced obesity, more inflammation and a greater increase of MDSCs in the bone marrow and spleen compared to the low-fat diet group. The high-fat diet group also developed a significantly larger number of osteoclasts and lost more alveolar bone (the bone that holds teeth in place).

Also, the expression of 27 genes tied to osteoclast formation were significantly elevated in the group fed a high-fat diet. The findings may shed more light on the mechanisms behind other chronic inflammatory, bone-related diseases that develop concurrently with obesity, such as arthritis and osteoporosis, says Kirkwood.

Additional investigators include Lixia Zhang, PhD, research scientist in the UB Department of Oral Biology; Jiho Sohn, doctoral candidate in the Jacobs School of Medicine and Biomedical Sciences at UB; Victoria Maglaras, student in the UB School of Dental Medicine; and Ramkumar Thiyagarajan, research scientist in the Jacobs School.

Early egg and peanut consumption slashes allergy risk but many parents unaware

05 Nov 2021 Nutrition Insight

A new US study highlights that introducing eggs to children can prevent them from developing an allergy. Similar findings for peanuts four years ago were adopted into national guidelines, however recent US research reveals only 40% of parents received the necessary recommendation to feed peanuts to their children by a certain age.

The research on eggs carried out by the American College of Allergy, Asthma, and Immunology (ACAAI) found that children who were not introduced to eggs by 12 months were more likely to have an egg allergy at the age of six. "Egg allergy is the second most common food allergy throughout the world. Current evidence suggests that early introduction of eggs during infancy, followed by consistent and frequent feedings, seems protective against development of egg allergy," says Dr. Xiaozhong Wen, senior author and principal investigator of the study.

Ongoing research to reduce egg allergy

Researchers collected data from 2,237 parent surveys, of which 1,379 participants had complete food allergy data until the age of 6. A total of 0.6% reported an egg allergy at one year and 0.8% at six years. Children with an allergy at those ages had less frequent egg consumption while they were five, six, seven and ten months old. Though Wen notes research is still ongoing in attempting to find the optimal timing of introducing egg to infants and the frequency of the feeding, the findings reflect similar guidelines presented four years ago on peanuts.

In 2017, the National Institute of Allergy and Infectious Diseases (NIAID) released guidelines to help parents introduce peanut products to their infants to prevent peanut allergy. Similar guidelines were also observed in Australia, which encouraged infant peanut consumption to slash allergy risk.

Guidelines not translating into practice

According to a study set to be presented at this year's ACAAI annual scientific meeting, 58% of US parents reported their primary care physician (PCP) discussed early peanut introduction. However, only 40% of the parents said they received a recommendation to introduce peanuts by 11 months. "We now know that the earlier peanut is introduced, as early as when a child begins solid foods, the better the chance that peanut allergy can be prevented," Dr. Christopher Warren, and primary author of the study, notes.

The findings of the survey highlighted that PCP's discuss the idea of introducing peanuts early with parents of infants but are not recommending they do so by 11 months of age. A total of 44% of the parents/caregivers reported they introduced peanut by the age of 11 months. "Only 13% of all those who responded were aware of the NIAID guidelines. Early peanut introduction should be discussed with parents/caregivers of all infants, including those at higher risk of developing peanut allergy," notes Dr. Ruchi Gupta, ACAAI member and co-author of the study.

Parents/caregivers of children with eczema had a greater awareness of the guidelines, reaching 18%. Within that group, 69% of parents said their child's PCP had discussed peanut introduction, according to the study. Most infants are either moderate or low-risk for developing peanut allergies, according to Gupta, who cautioned against giving whole peanuts to infants as they can be a choking hazard. The findings of both studies are reflected by previous research undertaken by King's College London and St George's, which shows peanut and egg allergies can be prevented with an early introduction to infants' diets.

Edited by Andria Kades

FOOD SCIENCE & INDUSTRY NEWS

Keeping chocolate milk smooth, stable without carrageenan

Science Daily November 15, 2021

That's the conclusion of a team of Penn State researchers, whose study suggests that the new technology can preclude the use of carrageenan in chocolate milk. The widely used food additive -- which helps keep the liquid smooth and well-mixed even after days sitting on a store shelf -- is not desired by many consumers, especially in organic chocolate milk.

Although the U.S. Food and Drug Administration has approved the use of carrageenan, concerns about its safety remain, according to team leader Federico Harte, professor of food science. He noted that some scientists believe that the additive -- a compound extracted from red seaweed -- can cause inflammation and digestive problems such as bloating and irritable bowel disease. As a result, the additive is banned in infant formula in the European Union.

"This research is not about being against carrageenan -- it's about consumers wanting clean food labels with only ingredients they recognize," he said. "And carrageenan definitely is not something they want in chocolate milk. We know that USDA has considered banning it for organic chocolate milks. Our results indicate that would be possible."

In the study, researchers thermally treated fat-free chocolate milk formulations containing skim milk, cocoa powder and sugar and then processed them using high-pressure jet technology from 125 to 500 megapascals. The viscosity, flow properties and stability of chocolate milks treated with high-pressure jets were compared with chocolate milks that did not undergo high-pressure jet processing, prepared both with and without adding carrageenan.

As expected, carrageenan-free chocolate milk exhibited immediate phase separation of the cocoa powder, whereas formulations containing carrageenan were stable for 14 days, with cocoa particles not dropping out of suspension. However, the researchers observed increased stability with increasing jet processing pressure, with maximum stability achieved when chocolate milk was processed at 500 megapascals.

"We believe that structural changes in casein micelles -- a kind of milk protein -- and new casein-cocoa interactions induced by high-pressure jet processing increased cocoa stability in the chocolate milk," Harte said. "Because milk protein seemed to be the major component enhancing cocoa stability in samples treated with this method, we conducted a second study to determine the effect of additional milk protein and high-pressure jet processing on the stability of fat-free chocolate milk."

In findings recently published in the Journal of Dairy Science, the researchers reported that formulations with 4% "micellar casein" processed at 500 megapascals showed no phase separation over a 14-day storage period, stored at 39 degrees Fahrenheit. The addition of milk protein together with high-pressure jet processing at 500 megapascals resulted in a higher apparent viscosity that keeps cocoa particles suspended.

Because the use of high-pressure jet technology to improve the dispersion stability of cocoa provides the industry with a processing alternative to produce clean label, yet stable, low-fat chocolate milk, Penn State has applied for a provisional patent on the process and is working with a dairy food manufacturer to develop and scale it up.

High-pressure jet processing of food is a completely new concept, Harte pointed out, and he has been experimenting with the idea for about six years at Penn State. His work on the technology in a pilot plant in the Rodney A. Erickson Food Science Building is unique because it uses an intensifier pump the size of a subcompact car to spray milk through a diamond or sapphire nozzle. The liquid exits the nozzle as a jet of fine droplets that collide with the air, forming an aerosol. “The equipment that we use for making these chocolate milks is not equipment that you find in the food industry -- you would normally find it in an engineering services shop," Harte said.

"This equipment is used for cutting metals. It's a water jet instrument that is used for cutting tough materials such as marble or stainless steel. We are using it in a completely different application."

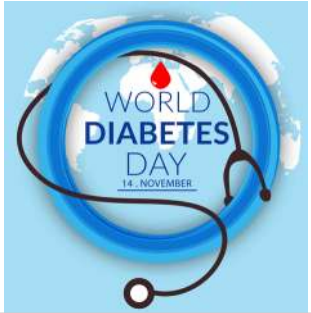
Harte bought the equipment with funds from a National Institutes of Health grant a decade ago when he was a faculty member at the University of Tennessee and had it shipped to the University Park campus when he came to Penn State. "You won't find this type of instrument in any university food science department in the U.S.," he said. "And I don't know of any in other parts of the world, either." To appreciate the pressure developed by the pump that processes the chocolate milk, Harte offers this comparison: At the bottom of the Mariana Trench -- the deepest point in any ocean -- the pressure is 100 megapascals. "We are applying five times that pressure, 500 megapascals," he said. "The liquid, as it leaves the orifice, is moving at Mach 3 -- three times the speed of sound."

"Healthy food, nutrition education and care" underscored on World Diabetes Day

Industry players explore how diet plays a crucial role in prevention and treatment

15 Nov 2021 Nutrition Insight

"Access to Diabetes Care" is the theme for this year's World Diabetes Day (WDD), which took place yesterday on November 14. Despite an estimated 537 million or one in ten adults currently living with diabetes, care for this condition is still not widely available on a global scale.



However, industry experts tell NutritionInsight how nutritional ingredients like sweeteners and probiotics may help reduce the impact of the disease. According to the Diabetes Atlas, it is predicted that by 2030, the number of adults living with diabetes will rise to 643 million and 784 million by 2045. "ISA is running a digital campaign to support WDD for another year and to share WDD 2021 campaign messages, which aim to ensure that everyone living with diabetes can access the care they need," Caroline Hance, communications manager at ISA tells NutritionInsight.

Knowledge on suitable foods

The ISA digital campaign focuses on the nutrition aspect of diabetes care, she notes. "The campaign aims to provide an overview of what healthy food includes for people with diabetes, as well as why it is key for them to have access to healthy food, nutrition education and care, which are fundamental components of diabetes care and prevention."

Also emphasizing the role that diet plays in preventing diabetes is Anke Sentko, vice president, regulatory affairs and nutrition communication at Beneo. "The potential of developing non-communicable diseases (NCDs) such as diabetes increases with age, as the body's ability to correct dietary mistakes decreases." "The metabolic and physiological risk factors of contracting a NCD, or delaying its onset, are influenced by having high blood glucose and blood fat levels or raised blood pressure, being overweight or obese. However, the development of such diseases can be influenced by diet and lifestyle-related changes," explains Sentko.

Diabetes care: Diet and sugar

Outlining the need for greater access to accurate information about food and diet, the ISA campaign further highlights the crucial role dietitians and nutritionists can play,

Hance continues. "The fundamental components of diabetes care include access to insulin, oral medicines, self-monitoring, education, psychological support, healthy food and a safe place to exercise." Access to healthy food, which this year's ISA campaign is focusing on, includes daily intake of vegetables and fruit, whole grains in meals, preferring low-fat protein foods and healthy fats, as well as low-sugar foods and beverages, including those with low or no-calorie sweeteners, she notes. "When used to replace sugar in foods and drinks, low or no-calorie sweeteners offer people with diabetes broader food choices by providing a sweet taste without affecting blood glucose control."

Echoing the fact that low or no-calorie sweeteners can be beneficial for diabetes patients is Dr. Paul McArdle, a registered dietician and member of the British Soft Drinks Association's (BDSA) Sweeteners and Sweetness Advisory Panel. "Having diabetes, whether Type 1 or Type 2, does not have to mean a life void of sweetness in foods or drinks. Sweet tastes can give us a lot of pleasure, and there's no reason people living with diabetes can't enjoy this too, without impacting on blood glucose," he affirms.

Low glycemic ingredients and diabetes

The goal for any food producer interested in promoting the long-term health of consumers should be the development of food choices that deliver a lower glycemic profile. "This is only possible by selecting the right ingredients," explains Sentko.

"With a low or non-glycemic profile, ingredients such as isomaltulose, chicory root fiber (inulin, oligofructose) and isomalt can help in the creation of foods and beverages that support blood sugar management." The gut microbiota's role in diabetes prevention Winclove, a Netherlands-based probiotic company, highlights the potential of the gut microbiota in preventing blood sugar level spikes. According to the company, evidence "supports the gut's integral role in insulin resistance." Fecal microbiota transplantation from lean donors to human male recipients with metabolic syndrome was linked with significant improvement of insulin sensitivity and glucose metabolism.

Therefore, Winclove states that targeted probiotic formulations – such as the company's Ecologic Barriermay – be clinically relevant for optimizing metabolic health and influencing insulin resistance and low-grade inflammation associated with early- and late-stage low-grade metabolic disorders, specifically Type 2 diabetes mellitus.

Solutions for diabetes symptoms

Industry players have been highlighting different solutions that can tackle diabetes. In this space, a study found that Mankai (a leafy aquatic green) consumption can lower the risk of developing diabetes. A separate Finnish study found that whole grain foods could reduce Type 2 diabetes cases. Meanwhile, Nestlé Health Science developed a whey protein microgel that can help improve blood sugar control in individuals with Type 2 diabetes.

By Nicole Kerr

Nestlé unveils platform providing diet-related health data for 190 countries

24 Nov 2021
Nutrition Insight

Nestlé and the Friedman School of Nutrition Science and Policy at US-based Tufts University have launched the Global Nutrition and Health Atlas (GNHA), a new online platform that provides free access to global nutrition and health data for over 190 countries.

The GNHA supports groups that need easily accessible nutrition and health information, such as stakeholders, researchers, health practitioners, policymakers and advocates for healthy nutrition.

"The platform is a place to drive innovation and for people to collaborate. Many data platforms are restrictive, isolated or stagnant," says Elena Naumova, chair of the division of nutrition data science at Friedman School.

"However, with the Atlas, one can merge information from multiple sources to pull data from different locations and years. Also, one can get tips on how to use it, and this usability supports the wide array of health and nutrition needs around the world."

Collecting and visualizing data

The GNHA includes data from established sources, including international agencies, NGOs, academic institutes and peer-reviewed studies.

"At Nestlé, in addition to our research partnerships, we draw on public health data to develop science-based nutritional concepts for people across life stages around the world," says Eline Van Der Beek, head of Nestlé Institute of Health Sciences.

"This platform makes it easy for Nestlé scientists, as well as academic researchers and other external stakeholders, to access reliable data in a quick, interactive and user-friendly way."

The platform collects and visualizes data on six nutrition and health dashboards, including demographics, dietary intake, nutritional status, health status, health economics and food sustainability.

Each dashboard features data shown in maps and charts to reflect characteristics in geography, frequency and time trends. All dashboards can be downloaded in various formats for further circulation.

Accurate labeling and nutrition profiling

Key industry players have made efforts to ensure accurate F&B labeling and consumer understanding of nutrient profiles.

Last month, the Friedman School of Nutrition Science and Policy at Tufts University developed the Food Compass.

A new nutrition profiling system aims to encourage consumers and food companies to choose and produce healthier foods.

In the same month, Action on Salt and Sugar called for the UK government to make front-of-pack nutrition labels mandatory without delay following a systematic review and meta-analysis.

Meanwhile, the European Consumer Organization recently raised the need for accurate food labelling for the children's food sector as it found that children's packaging praised unhealthy food consumption.

By Nicole Kerr

Nigeria needs biotechnology to weather climate change impacts on farming, say West African scientists

By Joan Conrow

Agricultural biotechnology will help Nigeria respond to climate change issues and support food security, asserts a new study by West African researchers.

"Evidence of climate change on agriculture in Nigeria has since been established and increased atmospheric warmness, irregular rainfall, emergent pests, [crop] diseases…and their resultant adverse effect on agricultural productivity are glaring," the authors write in the November 2021 Handbook of Climate Change Management. "This scenario poses a serious threat to food security in Nigeria and calls for the adoption of innovative biotechnologies to create resilient crops with improved adaptation to the environmental stresses occasioned by the increasing climate change."

While agricultural production is extremely vulnerable to the impacts of climate change, the higher mean temperatures and longer growing seasons resulting from global warming could favor farming in regions where temperatures are already low, like North America, Europe and Asia, the authors write. But production in already hot regions, like Africa, will possibly suffer greater productivity declines as higher temperatures bring longer periods of excessive heat, which in turn shorten the growing season and eventually reduce crop yields.

Additionally, research and a 2010 global weather forecast assert that climate change will reduce global agricultural production by 6 percent by the year 2080 — a figure that could reach 30 percent or more in warm regions like regions like Africa and India, write the authors, who are affiliated with Ebonyi State University in Nigeria and the Boyce Thompson Institute (BTI) at Cornell University. (Disclaimer: The Alliance for Science is housed at BTI.)

African farmers who have little or no access to irrigation facilities will be hardest hit, they write. "Therefore, farmers in these regions very much need innovative practices and technologies that improve agricultural production under the prevailing climate change scenarios. Current biotechnologies have provided limitless opportunities to expand crop improvement through [their] capacity to source genes for desired traits from distantly related species."

Agricultural biotechnology has helped to reduce the greenhouse gas emissions (GHG) that contribute to climate change and develop crop cultivars that can tolerate heat, cold, drought, submergence and salinity stress, as well as pests and diseases, the authors write.

However, an assessment of the effects of climate change on agriculture, the anthropogenic causes of climate change and the current biotechnologies employed for climate change mitigation and adaptation in Nigeria "exposed the country's very low capacity to deal with climate change issues using biotechnology approaches," the authors conclude. "In Nigeria, only IITA [International Institute of Tropical Agriculture] has the technical capacity for crop genetic engineering approach," they note.

Nigerian researchers have developed two biotech crops to help farmers weather these challenges: insect-resistant (Bt) cotton and cowpea. Both have been approved for commercial use. Two other genetically modified crops —Africa bio-fortified sorghum and Nitrogen-Use Efficient, Water-Use Efficient and Salt-Tolerant (NEWEST) rice — are at different stages of field and confined field trials.

"Despite the numerous organizations that should be involved in the development, adoption, promotion and regulation of agricultural biotechnology in Nigeria, a recent comprehensive review of the current status of agricultural biotechnology in Nigeria showed that the rate of development, adoption and implementation of agricultural biotechnology in Nigeria is still at a low ebb," the authors assert.

"In particular, research and deployment of transgenic technology is still in its embryonic stage in Africa's most populous country…The slow rate of development and deployment of biotechnology in agriculture in the nation is unequivocally due to ethical, socioeconomic, and political issues, as well as poor knowledge of the technologies." The authors warn that "total reliance on conventional breeding methods in developing climate-friendly and resilient crop varieties, without incorporating the more efficient, modern, advanced, precise and reliable biotechnology techniques, will in the long-run deprive the rapidly expanding population access to adequate food provision and threaten food security and economic development."
Land use change and forestry (LUCF) and the energy sector accounted for up to 70 percent of Nigeria's GHG emissions in 2014. Agriculture contributes about 13 percent, largely from livestock production and rice cultivation. In Nigeria, farmers use huge quantities of synthetic (nitrogen) fertilizers annually to boost crop yields, especially rice, which leads to high emission of N2O from this sector, the authors write.

Nigeria's agricultural sector produces far more GHG emissions than in developed nations due to its use of traditional agricultural practices and overdependence on farming, the authors note. Climate change has already been triggering drought and flooding scenarios that adversely affected crop production in various parts of Nigeria, the authors write. Reduced rainfall occurred in some northern states in 2010 and reduced millet, sorghum and cowpea production by about 10 percent. Other northern states that do not normally have heavy rainfall have experienced flooding that reduced rice production by as much as 50 percent.

Temperature and rainfall

fluctuations are also associated with increases in plant diseases and insect pest pressure that further suppress production and make farming increasingly difficult. "Climate change-induced crop yield losses are forcing existing and potential farmers in Nigeria to abandon farming for nonfarming ventures," the authors warn.

"As the effects of climate change on agricultural productivity in any region do not depend only on the changing climatic conditions, but even more on the region's adaptive response capacity, Nigeria is at a high risk of the damaging effects of climate change if effective adaptive and mitigation technologies and strategies remain acutely lacking," the authors caution.

"However, with the emerging biotechnology landscape in Nigeria, harnessing innovative biotech approaches for effective response to climate change is pivotal, but would require concerted efforts and engagement of all stakeholders including policy makers, scientists, and farmers."
From: Alliance for Science
November 24, 2021

Food trade in a post-COVID-19 world: More digitalisation and fewer trade barriers demanded by experts

By Pearly Neo 24-Nov-2021
NutraIngredients Asia

An expert panel convened at the Asia Pacific Economic Council (APEC) has highlighted the need to help all firms, both large and small, to embrace digitalisation to ensure survival, and also called upon nations to 'unwind' on trade restrictions as soon as possible.

The expert panel convened at the recent APEC CEO Summit 2021 to discuss trade recovery in the region, including food trade and supply chain recovery, and comprised of New Zealand dairy giant Fonterra's COO Fraser Whineray, China e-commerce heavyweight D Hgate's Chair and CEO Diane Wang, and Jacobs Engineering Group's President and COO Bob Pragada. APEC is a regional economic forum made up of 21 countries surrounding the Pacific Ocean, both from with the Asia Pacific region and otherwise (United States, Peru, etc.)

According to the panel, given the enormous shift that has been seen towards online shopping during the pandemic, it is essential that all food firms are able to be included in this shift to ensure a healthy commercial environment - not just the bigger firms with the budget to do so. "The COVID-19 pandemic impacted all sectors seriously, with an especially massive impact on international trading of all items [including] food and beverage products," said Wang. "Overall, we saw a steep downturn in global trade, which dropped by some 9% in 2020, as well as the collapse of traditional supply chains all over the world which further deteriorated trade." The food and beverage sector was one of the most heavily affected by the collapse of global supply chains, as many countries were either unable to harvest crops, or unable to ship/fly their perishable products from seafood to fruits to the usual importing destinations, leading to great deals of food waste and losses.

Although today more supply chains and shipping routes have resumed as compared to the peak of the pandemic, the fact remains that many changes to trade as a whole have taken place and are likely to be integrated into the future of the industry, such as digitalisation. "Today, smart technology like ABC (AI, Big data and Cloud) has helped e-commerce and many global supply chains to evolve since the pandemic hit by allowing consumers access to large variety of products conveniently and safely and enabled offline merchants with online channels to maintain operations despite COVID-19restrictions – but [unfortunately], not all firms have the access or knowledge needed to do this," Wang added.

"The MSME sector in particular has been heavily affected - we have found that access to these tools is a big obstacle for many MSMEs and individuals, [and] many of them fear the change to digitalisation due to a lack of knowledge and confidence, [which is troubling because] those businesses without digitalisation have been the ones hit the hardest."

Wang called for private-public partnerships to be set up to address the issue of helping these firms gain digital skills, including the building of an MSME global value chain network and an e-learning alliance in APEC to provide the required training for free. "This will all require strong partnerships and collaborations between governments and businesses but the rewards are worth it] to rebuild economies," said Wang. "Sellers can sell products directly via online communities with no need to understand trade policies, operations, logistics etc, apart from their own area of specialty and how to manage a network. All kinds of tools are available now to enable equal access to international trade and boost global trade to the next level, [which is] what is needed in these times."

Pragada concurred on the importance of technology for all types of international trade, and also stated that this change is likely here to stay. "Even in our own company, we have some four million square feet of office space that is currently not all being used as we have rescaled our footprint to operate in a hybrid model as we know we need to be business-ready for any type of disaster or unexpected event moving forward," he said. "Whichever industry any company is in, [from engineering to accounting to food], this really does seem like it is going to be the next generation and future of what work will look like in the coming years."

Reducing restrictions

Whineray agreed that digitalisation

is important, but added that a lot more time is likely to be needed before food supply chains such as dairy can return to a semblance of normalcy. "Supply chains are currently a very dynamic environment to being, as the shipping highways of the world all have slightly too much traffic on them which, or course, is causing traffic jams, and there are dynamic consequences to that," he said. "These supply chain challenges are ongoing, and we don't expect the traffic jams to unwind any time soon, so all companies need to plan for that.

"In addition, it should be noted that these supply chains saw a lot of very important restrictions which were necessary in many markets to keep people well - but it is also important to remember to take things out which are no longer required, not just leave all of the restrictions there. "It is very important moving forward to move to unwind these restrictions, as soon as vaccination rates and science allows for it."

Here, governments will have to look closely at ensuring that economies are able to get back on their feet by providing consumers, industry and investors at ease to engage in economic activities. "People will look very closely at arrangements between the governments of member economies to see if they are getting along well and whether activity will be able to happen between both economies [before engaging in economic activity] as they need that protective 'cloak' to come together," Whineray added.

"For economies to revive and recover we need that appetite for investment and training and productivity and digitisation and so on, but everyone will be looking closely at what the government leaders put in place to enable us to do that – that's the importance of governance and state leadership here."

Whineray also highlighted that the pandemic has led to a change in consumer and employee dynamics, which has led firms such as Fonterra to need to think beyond conventional products and services.
"It is important to keep confidence going around the region with investment into new products and services as consumer dynamics and employee dynamics are changing worldwide," he said. "[But in addition to this], we have also seen that the function and requirements of what needs to be provided in terms of nutrition is changing, e.g. less focus on foodservice functions out of home but more on foodservice functions in-home,[perhaps enabling restaurant quality and experiences to be recreated at home.

Prebiotics in focus, from GOS to resistant starch: 'After we get through this protein craze, there will be a push to get more fibre'

By Elaine Watson 18-Nov-2021- Food Navigator USA

Prebiotics, defined by ISAPP as "a substrate that is selectively utilized by host microorganisms conferring a health benefit," are finally starting to gain traction in food & beverage as more brands from Chobani and Lunato Olipop and Rebbl explicitly reference the term 'prebiotic' on labels, says Kara Landau, who has built a brand dedicated to microbiome health (Uplift: Good Mood Food). But brands that want to tap into this opportunity should do their homework, she cautions.

"With all this marketing going on, it is helping raise awareness, but I am seeing some misleading marketing or the use of ingredients [aggressively marked as 'prebiotic'] that let's say the Global Prebiotic Association would not classify as a prebiotic, where someone has used Dr. Google for their research," she told FoodNavigator-USA.
In basic terms, prebiotics - which promote the growth of beneficial bacteria in the gut – are fermented in the large intestine, serving as 'food' for beneficial microbes that already live your colon or elsewhere in your body, and producing beneficial compounds such as short chain fatty acids, which are associated with a series of gut, immune and other health benefits.

Examples of prebiotics include fructo-oligosaccharides (FOS) and oligofructose (OF) from things like chicory roots; galacto-oligosaccharides (GOS) from milk sugar or plant materials; xylo-oligosaccharides(XOS) from things like sugar beet; human milk oligosaccharides (HMOs) found in breast milk; and resistant starches found in things like potatoes, unripe bananas, tiger nuts, and Jerusalem artichokes(they 'resist' digestion in the small intestine and reach the large intestine, where they are fermented).

But not every fibre is prebiotic, and not all resistant starches, once

processed and heated, remain as prebiotics, says Landau, a nutrition advisor at the Global Prebiotic Association. And not everything marketed as a prebiotic has a ton of science behind it...
"An example that the Global Prebiotic Association has talked about is apple cider vinegar," she says.

While apple skin and pulp contain pectin, which is a prebiotic fibre, apple cider vinegar (ACV) generally does not, she claims, noting that there is no published research on PubMed showing ACV is a prebiotic, and that there's little chance of any pectin from the apple ending up in the juice. In other cases, says Landau - who utilizes a broad range of prebiotic ingredients in her cookies, puffs, bites and powders, from XOS from sugar beet, chicory root fibre, Jerusalem artichoke, resistant potato starch, and green banana flour – the issue is not with the ingredient per se, but the way it's used. For example, green banana flour from unripe bananas is high in RS2 resistant starch, which is not digested in the small intestine and has beneficial effects on blood glucose among other things, making it an intriguing prebiotic. But the way it is processed and subsequently used in food applications is key, she added, noting that if you disrupt the granule by heat or shear you can lose the resistant starch.

REGULATORY NEWS

Bioavailability: Increased consumer demand and labelling accuracy dominate industry

10 Nov 2021 Nutrition Insight

As the demand for ingredients with high bioavailability continues to grow, there is an increased demand for natural and food-grade technologies that can provide significantly high bioactive "free" nutrients upon oral intake. NutritionInsight speaks to a roundtable of experts who discuss ingredient sourcing, the challenges faced during formulation and labelling issues.

Dr. IM Krishnakumar, chief research officer at Akay, states that it is "important to distinguish between 'absorption' and 'bioavailability' since these terms are often used interchangeably in nutraceuticals." This often leads to confusion among consumers and manufacturers. Absorption is the process of the movement of a substance or drug from the site of administration to the systemic circulation, he underscores. "In the case of oral delivery, it is the movement from the gastrointestinal tract, mostly from the intestine. Therefore, although the absorption of a molecule is good, its bioavailability may not be good," highlights Krishnakumar.

He points to resveratrol as an example of a nutrient that has been shown to offer better absorption, but poor oral bioavailability (<1%), since it is rapidly metabolized to glucuronides and sulfates.

Sourcing ingredients with good bioavailability

Vaneeghen is one player that develops its research on the most effective forms of vitamins based on published European Food Safety Authority opinions, clinical studies and stability data. "This helps Vaneeghen's partners in choosing the 'best' ingredient for their formulations depending on their business needs," explains Snezhana Kirina, marketing executive at Vaneeghen. "We have developed, patented and successfully applied a 100% natural, food-grade and clean label platform delivery technology called Fenumat to a variety of phytonutrients and micronutrients of both lipophilic and hydrophilic nature," adds Krishnakumar.

He notes that the technology is based on fenugreek galactomannan biopolymer – soluble dietary fiber – without synthetic emulsifiers. "The first formulation using this technology was on curcumin (CurQfen), which is a lipophilic molecule with poor solubility, in vivo stability and poor absorption," continues Krishnakumar. "CurQfen has established its free curcumin bioavailability, 45-fold, as per the strict definition of bioavailability." He states that the technology has also been applied to various molecules like boswellic acids, resveratrol, quercetin, fisetin and vitamin C. "Fenumat technology is also applicable to co-delivery formulations, where one or more phytonutrients can be put together to formulate as single powder or granules suitable for various delivery formats, including sachets and gummies," notes Krishnakumar.

Kirina also details the types of products with good bioavailability, "products which have a scientifically proven better bioavailability are Bisglycinate chelated minerals from Albion." "This range of minerals has been clinically proven to have higher bioavailability than many alternative minerals that are often used. The combination of a more natural absorption (mimicking the process of nature), better tolerably and the market highly appreciates good bioavailability," explains Kirina.

Better bioavailability means smaller effective doses

More bioavailable ingredients in a formulation mean that fewer materials are required to be effective, making it possible for formulators to have small effective doses or leave room for other ingredients to be incorporated, says Kirina. "A second benefit can be that more bioavailable can be more stable in formulations," she adds. "For example, the Albion Bisglycinate chelated minerals are protected by two glycine molecules, which results in a more neutral and stable molecule that is less likely to react with other ingredients in the formulation." For this reason, Iron Bisglycinate chelate (ferrochel) is becoming the preferred choice of iron in infant nutrition, Kirina continues.

"Especially iron, which is essential, has a small range between the lower limit and upper limit as it's also very reactive. With ferronickel in formulations, there are fewer reactions with other ingredients, but also it is safer to use in the final product for infants."

The formulation for bioavailability is always a challenge. Bioenhancers are a popular way to achieve bioavailability and are widely used, explains Dr. Benny Antony, joint managing director at Arjuna. "This approach is not without pitfalls as it introduces new compounds and processes to the equation," continues Antony. "The bioenhancers have to be specific, which is not always the case. Non-specific bioenhancers can interfere with drug delivery, complicating the health of the individual in unpredictable ways." The issues faced with using piperine or synthetic additives to curcumin to enhance bioavailability and the consequent problems faced by those on medication are well documented, he adds.

Maintaining labeling accuracy and authorization

Labelling inaccuracy occurs when the claim "more bioavailable'" or similar is not explicitly regulated and falls under the so-called A-B comparison. This comparison is when claims are made based on comparisons with other ingredients, explains Kirina. "When a local authority checks this, companies should be able to hand over the proof – scientific evidence – that the ingredient used also has a better bioavailability," he continues.

Labelling accuracy has been a grey area that has plagued the industry, states Antony.
"In an industry where a large part of the regulation is expected to be 'self-regulation,' good ethics, transparency and truthfulness are critical."

The majority of the bioavailable forms in the marketplace claim bioavailability by measuring the metabolites in plasma, which is against the definition of "bioavailability" and hence may cause regulatory issues and wrong claim substantiation, Krishnakumar further explains. "At present, labelling claims on bioavailability is mainly based on published pharmacokinetic studies."
"However, it would be more quality-oriented and regulation friendly if pharmacokinetic studies were conducted as per the definition of "bioavailability" by quantifying the free (unchanged) molecules in plasma, and published in good academic journals with minimum IF of 2.0 – as per Thomas Reuters system," adds Krishnakumar.

More consumers seek bioavailability

Looking to the future, more consumers will demand products with a high bioavailability as they are becoming more informed about their nutritional needs. Evidently, there will be more opportunities to elevate on-pack branding with this positioning. "Brands may continue educating the consumers on the importance of bioavailability via package labelling as we see many great examples described as 'immediately available' or 'better absorbed'," adds Kirina. Echoing this, Innova Market Insights reveals that industry has responded to consumer demand for convenient supplement consumption that offers all benefits in one dose. Globally, the top subcategories for bioavailability claims within supplements are vitamins/minerals and botanical/herbal supplements (January to August 2021).
"Consumers are continuing to demand better bioavailable ingredients. Overall, consumers are getting more educated on ingredients and which forms are better for them," states Kirina. "This consumer need is translated into new formulations from brands that try to differentiate with more effective ingredients." "This would give the formulators more space in the capsule, caplet, tablet, food and beverage segments to add other complementary ingredients. The high potency also translates into higher efficiency and many times into lower cost per effect," concludes Antony.
By Nicole Kerr

Unified, clear health claim frameworks could bolster consumer understanding, flags roundtable

24 Nov 2021 Nutrition Insight

Health claims play a crucial role in communicating with consumers but different regional approaches reveal a fractured scene.

Experts from Gencor, Lonza, Monteloeder and Lallemand Health Solutions tell NutritionInsight how they are navigating this complex space, especially around key ingredients like probiotics and botanicals. “The COVID-19 pandemic has awakened a breed of miracle-cure charlatans. The internet allows scammers to bombard the public through social media and email with false or misleading health claims,” says Mariko Hill, global innovations manager at Gencor. While regulators cannot stop consumers from believing in and buying “miracle cures,” they can provide increased enforcement and consumer education.

“The messages or ‘claims’ shown on the labelling of functional food products are highly important. They help consumers identify the specific health benefits provided by the consumption of these products, as well as encourage consumers to make adequate food choices,” adds Maggie McNamara, marketing director at Gencor. Notably, consumers around the world are becoming more aware of the scientific backing of ingredients. For example, a 2020 survey by Innova Market Insights found that 54% of global consumers say they have spent time educating themselves on ingredients that support immune health.

“Dietary supplement trends come and go, so creating products with claims that align with consumer health priorities and preferences is an ever-moving target,” adds Lindsey Toth, associate director of global marketing at Lonza Capsules & Health Ingredients.

Differing study requirements

In the example of probiotics, consumers often struggle to appropriately define and differentiate the various associated benefits – despite a greater overall understanding of probiotics. Solange Henoud, global regulatory affairs director at Lallemand Health Solutions, says that this is unsurprising. “How could this differentiating be feasible if claims about the specific benefits of the probiotics cannot be made appropriately? This highlights the importance of claims on probiotics.”

Beyond probiotics, the road to approval for many ingredients can be rocky. “Any potential claim must be backed by solid science,” emphasizes Jonathan Jones, Monteloeder’s chief scientific officer. Notably, the requirements for soliciting a health claim seem better defined in certain categories than others. In some cases, it is not well established which studies should be performed.

There can also be ambiguity around the required duration and number of subjects or biomarkers and the level of clinical outcome efficiency, notes Jones. “The industry would greatly benefit from clear guidelines as to what studies are necessary to have a chance at getting a health claim.”

Relaxing recruitment measures

Another further challenge resides in the need to demonstrate efficiency in “healthy” populations. This makes recruitment very difficult, requiring individuals that surpass a certain threshold of well-being while not being serious enough to be considered a disease, Jones details.

Not only is recruiting difficult but obtaining statistically significant results in such borderline populations is extremely challenging, he continues. “If the regulatory bodies would relax measures on the recruitment criteria, it would be significantly easier to demonstrate statistically significant improvements in the population study.”

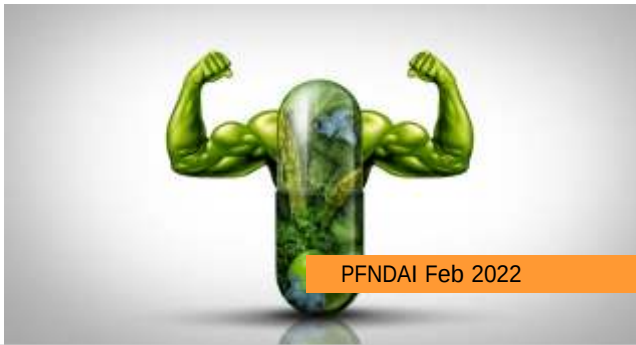
Spotlight on probiotics

Health claim regulation around probiotics is especially complex, with the European Food Safety Authority (EFSA) currently not allowing the use of the term “probiotic” or any related health claims. “Europe has faced an important negative impact this past decade from the ban. Only recently, the growth started to resume due to the increased knowledge of consumers that those Latin names refer to probiotic ingredients that are generally beneficial for health,” explains Henoud.

However, she flags that this situation is slowly changing. “Happily, we are now seeing the situation unfolding with more and more member states tolerating or authorizing the use of the term ‘probiotics’ in the EU with applicable criteria and conditions.” “Nonetheless, probiotic health claims will not be possible until the authorities take the decision to do so.” In March, the International Probiotics Association also argued that creating an EU-wide framework around allowing the term “probiotic” has numerous industry benefits.

Same product, different choices

In contrast to the EU, the US Food and Drug Administration (FDA) allows structural or functional claims such as “supports healthy digestion,” accompanied by an FDA-mandated disclaimer. “Growth in the US was amazing during the past decade when the EU was struggling. This provides evidence on the measurable impact of the regional variation between health claims regulations,” argues Henoud.



She continues that even among countries allowing claims, differences can be huge. For example, in one country, a company may claim the results of the clinical trials, while in others, they would have to use more general claims. "To illustrate this, a product reducing abdominal pain due to occasional constipation in Canada will be represented in the US as being for gastrointestinal comfort. Same product, same consumer, different choices just across the borders."

EU challenges for botanicals

Botanicals pose another challenge, with Jones pointing out that in the EU, few of these ingredients have approved health claims. According to McNamara, only glucomannan and olive leaf extract are permitted. "There are fewer still where a combination of them is used. In the case of the latter, the need to demonstrate that only the combination of those ingredients – at a specific ratio and extract concentration – is required to obtain the expected result makes it extremely difficult to get a claim," she explains. "Due to EFSA preventing any health claims on botanical ingredients, suppliers must be innovative on brand names in order for consumers to understand what the ingredient is and does," adds Hill. She anticipates that as more clinical research becomes published and a greater understanding of ingredients becomes known on a global basis, more branded botanical ingredients and other nutraceuticals will be widely accepted globally.

Equally difficult across regions?

In Jones' view, while each geographical region has its own regulations, they are all more or less equally difficult to obtain a health claim. However, there are certain advantages in the European market, for example. Here, an approved health claim can be used throughout the EU, as opposed to other regions where claims must be submitted and approved country by country. "On the other hand, there are very few approved health claims in Europe, limiting their use to very few ingredients. Furthermore, the number of health claims on hold is extremely high, with no clue as to when they may be resolved."

In contrast, the US has a higher level of margin in terms of accepted claims, as long as they are backed by sound science. "While this may seem at first as an advantage for the industry, it can also backfire. Sometimes a product can seep through the cracks and come out with misleading claims that are later removed by the FDA, which can have a negative impact on other companies that use the same ingredient."

Asia-Pacific claims become more stringent

In the APAC region, each country has its own claims' regulations. Toth notes that what is consistent across the region is that each country's rules are becoming more stringent. Some countries like China and Korea have approved lists of claim wordings, including scientific requirements, and claims may only be made for indications on these lists. "Adding new claims language is very challenging – it is only the addition of new ingredients for the existing claims that is usually possible. Regulatory authorities are continuing to announce new legislation designed to closely monitor the dietary supplements industry and health claims made on products," she explains. Hill elaborates that in Japan, there are only four categories approved for the nutrition claims: "rich in" "source," "low" and "does not contain," with minimal and maximal limits of the nutrients in question. Finally, Australia also has permitted health claims – even analgesic claims – so long as the claims are approved by the Therapeutic Goods Administration (TGA). This is unique as ingredients that typically do not have permitted health claims in the US or EU, such as palmitoyl-ethanolamide (PEA) for pain, can have analgesic claims in Australia.

By Katherine Durrell

'Systematic switch': Japan urges food manufacturers to finalise raw material origins labelling transition

By Pearly Neo 23-Nov-2021-NutraIngredients Asia

Japan has urged all local food and beverage brands to ensure that processes are in place to transition to new origin of raw material rules, in order to keep operations running smoothly and avoid 'disturbances'.

Japan first announced a revision to its Food Labelling Law in September 2017 to include the geographical origins of the main ingredient used to make a food or beverage item on the product's labels. Due to the massive nationwide undertaking for the implementation of these new labelling standards, the government allowed food firms a considerably long grace period to transition, until March 31 2022. As the due date for compulsory enforcement is fast approaching, both the local Ministry of Agriculture, Forestry and Fisheries (MAFF) and Consumer Affairs Agency (CAA) are urging local food firms who have set to complete the transition, or at least have the processes in place to complete the transition by March 31 next year, to pick up the pace or face severe penalties if they prevent the switch from going smoothly.

"All food and beverage companies need to remember that although the transition period is until March 31 2022,there are logistical components to this switch such as the ordering [and printing] of packaging materials and labels in accordance with the new labelling standards," MAFF stated via a formal statement. "MAFF and CAA have created many types of guidance documents, illustrations and videos to guide food and beverage firms through this process [so it is essential to adhere to these] and make the switch to all product labels systematically, so as not to cause any disturbances to the transition." The new origin labelling regulations will apply not only to processed foods manufactured in Japan after April 1 2021, but also fresh foods used for commercial and industrial purposes.

"Businesses or individuals that do not comply with the new regulations and continue to sell foods which are falsely labelled or do not contain the origin of the major raw materials used to make their products will face severe penalties," warned CAA. "For individuals, this could mean imprisonment for not more than two years or a monetary fine of up to JPY2mn (US$15,555) whereas for corporations [the individual penalties will apply to those responsible] and fines for the business will be up to JPY100mn (US$877,728)."

It was also stressed that these new regulations will not apply to imported food and beverage products, although these will in turn be subject to a mandatory 'country of origin' overall label, which will indicate where the product was imported from though will not detail the origins of an individual ingredient unless this is practised in the exporting country.

In the original announcement of the new labelling regulations, food firms were made aware that they will need to follow a 'by weight, by country' method, which is compulsory for the ingredient that makes up the highest weight ratio in the product. Labelling will also differ slightly according to the actual ingredient. Fresh ingredients such as meat or vegetables will state the country of origin, whereas processed ingredients such as juice or chocolate will state the place of manufacture.

For example, a pack of sausages might read: 'Pork (American), pork fat, protein hydrolysate…' whereas a bottled soft drink might read: 'Apple juice (manufactured in Australia), sugar, water…'.

"If the origins of any ingredients are mixed, this needs to be indicated as well – so if a sausage uses two types of pork, it should say 'Pork (American, domestic, Australian)' stating the countries in descending order of the weight used," said the ministry. "However, as packaging and manufacturing locations might change or switch due to business operations and it can be difficult to display the country by weight for a single ingredient, some exceptions can apply. If the ingredient comes from two countries, the label can say 'Pork (American or domestic', and if it comes from three or more countries, it can also say 'Pork (imported)' or 'Pork (domestic or imported)'".

Although the origin labelling currently only applies to the ingredient making up the highest weight in a product, the government has also stated that it is 'desirable' for food firms to also start labelling the origins of its other ingredients voluntarily – which in Japan could be a likely indication that this may also move into the regulatory phase in the future.

CAA also had to deal with some dissension from consumers in terms of allowing the use of the term 'imported' when it comes to ingredients from three or more countries - which has been protested as 'meaningless' since this would apply to the whole world apart from Japan, offering no concrete information about the origins - and has since issued a separate document in response.

"There are very few cases or products where this label display will be used so there is no need to worry," said the agency. "The specific situation where this is allowed is only when raw materials or ingredients from three or more foreign production areas are used or when the usage ratios of domestic and imported products are interchanged in the usage record for a certain period of time, and these situations continue even at the time of manufacturing so are difficult to tell apart. We have proceeded with this decision as we believe that this is information that contributes to the voluntary and rational selection of products by consumers."