



PFNDAI

# FOOD, NUTRITION & SAFETY MAGAZINE

BULLETIN JUN 2022

## **DELIVERY** OF **HEALTH BENEFITS** OF **PLANT PROTEIN** THROUGH **SNACKING**

Ms. Naaznin Husein

**THE IMPORTANCE  
OF MILK FORTIFICATION:  
THE REAL REASON  
IT IS NEEDED**

Dr. Madhav Joshi

**PERSPECTIVES OF  
RECENT REGULATIONS:  
FRONT OF PACK LABELLING,  
TARGET GROUP RDA,  
MISBRANDING AND MISLABELLING**

Dr J I Lewis

**KNOW YOUR  
CARBOHYDRATES**

Dr B Sesikeran & Ms Prerana Patil

**CHICKPEAS OR CHANA:  
MOST VERSATILE AND  
VERY POPULAR LEGUME**

Prof Jagadish Pai

**REGULATORY  
ROUND UP**

Dr N Ramasubramanian

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## INDEX



### COVER STORY 1

JRS India,  
IFF,  
Food Ingredient Specialities,  
Bee Pharmo Labs,  
Vasta Biotech,  
Marico,  
Hexagon Nutrition,  
Fine Organic Industries Ltd,  
Samyog Health Foods,  
CALPRO,  
Synergia Life Sciences,  
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Tata Chemicals  
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ADVERTISERS

### Editorial

Delivery of Health Benefits of Plant Protein through Snacking By Ms. Naaznin Husein	1
Coming Events	7
Know Your Carbohydrates By Dr B Sesikeran & Ms. Prerana Patil	8
Chickpeas or Chana: Most Versatile and Very Popular Legume By Prof Jagadish Pai	13
The Importance of Milk Fortification: The Real Reason It Is Needed By Dr. Madhav Joshi	19
Perspectives of Recent Regulations: Front of Pack Labelling, Target Group RDA, Misbranding and Mislabelling By Dr J I Lewis	22
Regulatory Round Up	28
Research in Health & Nutrition	30
Food Science and Industry News	38
Regulatory News	44

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# EDITORIAL

Packaging material is increasing day by day. Much of it is plastic which is creating problems world over because of the waste it creates. The use especially grew more rapidly during the pandemic as much of the household products especially foods were delivered which created even more intense use of packaging especially plastic.

Packaging of foods is used to prevent contamination and of course for holding the food product itself. It protects foods from environmental factors such as air or oxygen, humidity, light etc. that may cause undesirable changes in colour, flavour, texture and other attributes of foods.



One of the important protections is from mechanical damage so the delicate material is physically protected. This becomes even more important when food has to be delivered over sizeable distances.

Another very important protection is from tampering. Food packed by manufacturer needs to be offered to consumers as such without pilfering or admixing or in some way tampering.

During the pandemic the last two protections became more important than before as a large amount of food was being delivered and due to drastic conditions prevalent it was more important to protect the food especially from being pilfered or in some way tampered. This made manufacturers to overwrap or use excessive packaging so it became difficult for person handling to interfere with it without obviously destroying integrity of the package.

Manufacturers had to resort to many ways to protect their credibility and one such thing was use of packaging that would be



very difficult to open and close it without making it obvious the misuse. They even used bubble wraps which not only well protected the food but breakable container, say made of glass, from mechanical damage.

This sometimes creates another problem. When the delivery organisation finds that the package is too big for the small product and then it is filled with a lot of junk so the package fills and the product inside does not move around during transport.



Protection against pilferage has become a preoccupation of most manufacturers. This obsession creates excessive packaging and also most difficult packages to open. Sometimes it becomes a big project just to open the package. You need scissors, screwdrivers, knives and all kinds of things that would allow you to cut, pierce and tear things.

Most often there are no instructions about how to open the package so a hapless customer tries to figure ways to open and spends a lot of time trying to open and many times he or she finds out that the product inside was not worth all the effort.

Manufacturers must now pay some attention to make opening of the package simple though pilfer-proof so unauthorised person would not open it without destroying the integrity of the package. They spend so much time trying to figure out how to achieve customer satisfaction when the customer consumes the product, but very little effort for the customer to reach the product effortlessly or painlessly. Bad experience in opening the package would certainly affect the score in customer satisfaction.



Prof Jagadish Pai,  
Executive Director, PFNDI



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# DELIVERY OF HEALTH BENEFITS OF PLANT PROTEIN THROUGH SNACKING



AUTHOR

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Food is our companion on every occasion. We always turn toward food for comfort, celebrating a happy moment, or being at our lowest. With the availability of a great variety of food, especially snacks, today, people pull all their five senses into the experience of eating with its organoleptic properties.

The simple joy of hearing food being cooked, smelling its ingredients, enjoying its texture as we eat it creates an unforgettable taste, and visually tasting the food even before it hits our tongue. But with changing times, people have understood the importance of nutrition. With fondness, they even want their food to



be nutritious and healthy. People turn more towards organic, local, seasonal and wholesome foods to maintain a healthy lifestyle and overcome diseases and disorders.

Today many diseases have a common etiology, which is Obesity. Obesity is hence aptly called "Emperor of all Maladies." Obesity and co-morbidities like metabolic syndrome and cardiovascular disease are serious public health issues. Treatment approaches that target a range of short- and long-term mechanisms are required to address this issue. Controlled caloric consumption combined with moderately enhanced protein intake may represent a successful and practicable weight-loss strategy, albeit every dietary or lifestyle change must be individualized. (1)

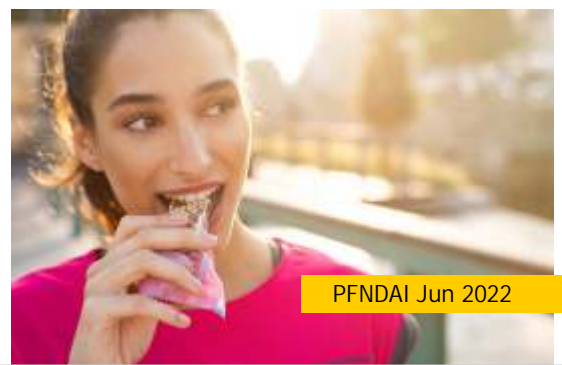
With the busy lives of people and less time to spend on eating proper meals, people prefer quick and hassle-free snack items. Snacking significantly impacts people's diet quality, specifically their BMI (BMI). Scientific evidence reflects, Obesity is more likely in those who consume huge portions and sizes of snacks regularly. Due to

the growing consumption of energy-dense, high-sugar, high-fat meals, snacking has been identified as one of the critical factors of obesity.

Conversely, people who prefer protein-rich, fibre-rich, and nutrient-dense snacks are more likely to manage their weight. (1)

"Snacking" is when you consume food or beverages between your regular meals.

"snack foods" refers to processed, high-calorie, nutrient-poor items like chips and cookies. Millennials and Gen -Z replaces main meals and suffice on eating snacks all day in today's society. Hence it is essential to differentiate and choose snacks that are healthy, nutrient-dense, and high in protein and fiber. (2)



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Snacks can be an essential part of your diet. It provides many benefits, such as satiety. A study done in 2016 shows that eating snacks between meals promote satiety and suppress overconsumption at the subsequent dinner. Studies suggest that Wholefoods snacks high in protein, fiber, and whole grains enhance satiety. (3)

Recent research suggests that several factors influence snacking, such as Age, Beliefs, Peer/ family influence, Hunger (primary motivation), Preference, Cravings, Location, Social Environment, Time of day, Food availability, and Stress. (4)

What differentiates the two scenarios is one's Snacking Behavior. What you snack, Why you snack, the Frequency of snacking, and How snacks fit into your overall eating plan play a significant role in determining how it will affect your weight and overall health.



Several studies in various journals have shown that snacking can be differentiated into Healthy snacking and Unhealthy snacking. Healthy snacking aims to maintain weight, boost energy, provide extra nutrients, and maintain adequate nutrition if one has a poor appetite and higher diet quality. Whereas unhealthy snacking leads to weight gain, reduces hunger at mealtimes, and lower diet quality. (5) (6)

Snackers are classified into seven types based on their behavior

towards foods: Meal Skipper, Nighttime eaters, Nibblers, Steady Snackers, Heavy Portioners, Convenient Diners, Swing Eaters, and Fruitless Feasters.

Over the past 20 years, higher-protein diets have been touted as a successful strategy to prevent or treat obesity through improvements in body weight management. These improvements are thought to be due, in part, to modulations in energy metabolism, appetite, and energy intake. Recent evidence also supports higher-protein diets for



improve  
ments in  
cardio-  
metaboli  
c risk  
factors.

Protein  
is one of  
the three

macronutrients, along with carbs and fat. It performs the following roles of repair and maintenance of skin tissues, hormone production, enzyme production, transportation, and storage of molecules in your body. Protein is made up of smaller units known as amino acids.

Of the 22 amino acids, nine are considered "essential," meaning they must be consumed in food because your body can't make them. Notably, some foods provide better protein based on their amino acid profile. Although protein quality is essential, the amount of protein you consume is critical. Many researchers believe that the current protein recommendations may be too low to stay truly healthy in the long term.

Several meta-analyses of shorter-term, tightly controlled feeding studies showed more significant weight loss, fat mass loss, and preservation of lean mass after higher-protein energy-restriction diets than after lower-protein energy-restriction diets. Reductions in triglycerides, blood pressure, and waist circumference were also

reported. In addition, a review of the acute feeding trials confirms a modest satiety effect, including greater perceived fullness and elevated satiety hormones after higher-protein meals. Still, it does not support an impact on energy intake at the next eating occasion.



Recent evidence shows Body composition and blood pressure are improved when consumed with 1-1.2 g/kg BW of protein. The risk of body weight return increases when the diet contains too little protein. The success of the so-called "low carb" diet, which is typically high in protein, can be due to the relatively high protein intake rather than the reduced carbohydrate content. (7)(8)

Protein has been shown to have tremendous benefits when included in a person's weight loss regime. While there are many benefits to dietary protein, four main areas directly affect weight loss, i.e., Effect on metabolism, appetite, weight, blood sugar, hunger, late-night cravings, and fat storage. (9)

Protein consumption significantly affects metabolism; in one study, active young men who ate a high-protein or high-carb snack before bed had a significant increase in metabolic rate in the morning. Snacking every few hours is often believed to increase metabolism. Night-time consumption of protein or carbohydrate results in increased morning resting energy expenditure in active college-aged men (12)

Protein intake is linked inversely with appetite. In a study, men eating a high-protein, high-fiber snack bar had lower levels of the hunger hormone ghrelin and higher levels of the fullness hormone GLP-1.



Numerous studies have shown the significant effects of a high protein diet on weight loss. Research proved that 17 people with diabetes munching on snacks high in protein and slow-digesting carbs resulted in weight loss of 1 kg within four weeks. Weight loss with snacking depends on the type of snack chosen. Chronologically scheduled snacking with high-protein products within the habitual diet in type-2 diabetes patients leads to a fat mass loss: a longitudinal study (16)

With an effect on weight loss, protein has proven beneficial in maintaining healthy blood sugar levels. Snacks with a high protein content improve blood sugar control. Lower-carb, higher-fiber snacks have a more favorable effect on blood sugar and insulin levels than high-carb snacks in people with and without diabetes. Impact of dietary fiber-enriched ready-to-eat extruded snacks on the postprandial glycemic response of non-diabetic patients.

As mentioned earlier, snacking on protein-rich sources significantly impacts the hunger levels of an individual. Eating a protein and fiber-rich snack can curb hunger and prevent poor food choices and excess calorie intake. Increasing the protein to carbohydrate ratio in yogurts consumed as a snack reduces post-consumption glycemia independent of insulin.

Protein is a great option to include in an individual's weight loss journey as the storage of protein in the form of fat is a



complex process. During periods of weight loss, there are often when more energy is consumed than expended. Minimizing how much of that excess energy (i.e., calories) is stored as fat is essential. The body processes the three different macronutrients (i.e., proteins, carbohydrates, and fats) differently. For a protein to be stored as fat, it goes through a much different biochemical process than either carbohydrates or protein. This process makes it much harder for protein to store as body fat. One study found that protein is stored as body fat with roughly 66% efficiency, while carbohydrates are stored with 80% efficiency, and fats store at 96% efficiency.

Many studies have enlightened people on the benefit of protein in cutting down craving levels and reducing the desire for late-night snacking. Cravings are the dieter's worst enemy. They are one of the biggest reasons people tend to fail in their diets. Interestingly, protein can have a powerful effect on cravings and the desire to snack at night. A recent study comparing a high-protein diet and a normal-protein diet in overweight men showed that when proteins were used at 25% of total calories, it significantly reduced cravings by 60%. It cut the desire for late-night snacking by half. It may be interesting to note that Breakfast may be the most important meal to load up on the protein. In one study on teenage girls, a high-protein breakfast significantly reduced craving. (11)

One of the most critical aspects of weight loss is the thermic effect of food. The sum of resting energy expenditure, the thermic effect of food, and activity-related energy expenditure is total energy expenditure. Protein enhances dietary-induced thermogenesis more than other macronutrients, according to the literature.

According to the Atwater factor, protein has metabolic energy of 17 kJ/g. On the other



hand, protein is highly thermogenic, with a net metabolizable power of 13 kJ/g, which is lower than carbohydrates or fat. Due to the high thermic effect and several other factors, a high protein intake boosts metabolism. It makes you burn more calories around the clock, including during sleep. A high protein intake has been shown to boost metabolism and increase the number of calories burned by about 80 to 100 per day.

In addition to its favourable effects on weight, protein may help improve health in several other ways like increase muscle mass, reducing muscle loss during aging, strengthening bones, and improving wound healing.

Today more and more people are interested in following a plant-based diet or reducing their use of animal products. A shift away from animal products is more straightforward with more fortified and nutritious plant-based foods.

Plant-based or plant-forward eating patterns focus on foods primarily from plants. This includes fruits, vegetables, nuts, seeds, oils, whole grains, legumes, and beans. It doesn't mean that you are vegetarian or vegan and never eat meat or dairy. People have started to rely more on plant sources for their protein intake than animal sources. Studies suggest that plant proteins have fewer calories than animal proteins, which helps maintain a healthy weight and lowers your cancer risk. Replacing red meat with a plant-based protein reduces the risk of cancer-related death and keeps your blood pressure in check.







Plant protein can be efficiently added to snacks to make them more nutrient-dense. Plant-Based Protein Snacks have several benefits: being rich in fiber, lower risk of cardiovascular disease and cancers, having no saturated fat and cholesterol, high antioxidants and phytonutrient levels, and help in weight management and preserving lean body mass. (10)

A healthy snack can increase its protein, antioxidant, and micronutrient content and reduce refined carbohydrates, fat, salt, and sugar.



To get the most out of your snacks, follow these guidelines. Eat snacks that provide about 200 calories. Add at least 10 grams of protein to provide satiety. Put snacks in containers for portion control as it is easy to overeat straight from the package. The frequency of snacking is essential. The number of snacks varies based on your activity level and meal size. An active person prefers 2–3 snacks per day. A more passive person may do best with one snack per day. Keep portable snacks with you when at work or traveling to avoid eating food from outside. Put snacks in small plastic containers or bags, easy to carry in a pocket. Pairing a protein with a carbohydrate will help the snack keep you most total for the longest. Some examples are whole-grain pulse-based crackers, defatted peanut flour or pulse flour-like moong, besan, rajma, chloralkali, based crunchy snacks like crackers, chips, khakra, Extruded snacks, or traditional recipes. (14)

Introduction of intelligent plant-based snacks with anti-inflammatory properties as well as high in alpha linoleic acids (ALA) and magnesium like a bowl of nuts like almonds, walnuts, cashews, pistachios, or seeds like flaxseeds, chia seeds, pumpkin seeds, sunflower seeds, sesame seeds can be fantastic game-changers as intelligent snacks. These could be adapted into engaging plant-based alternative dairy formats, protein health bars, pralines, trail mixes, Traditional delights of ladoos, mithais, chikkis, etc. More awareness needs to be created at a consumer level on decoding and reading the Nutrition Facts label, which provides information on serving size, calories, fat, sodium, and added sugars. (13)

At individual levels, Consumers need to understand healthy grocery shopping differentiates everyday food vis-a-vis indulgent foods for occasions. Simple tips like avoiding stacking up home pantry or office pantry with foods high in salt, sugar, fats, or other unhealthy snacks in your house. Mindful buying occasional foods like cookies, chips, or ice cream. Move the healthier foods to the front, at eye level. Serve a small portion of snacks. Use small plates and bowls to make snacks look interesting. Avoid eating directly from a pack or a Box. Cut into different shapes, and make the dish look colorful. Prepare



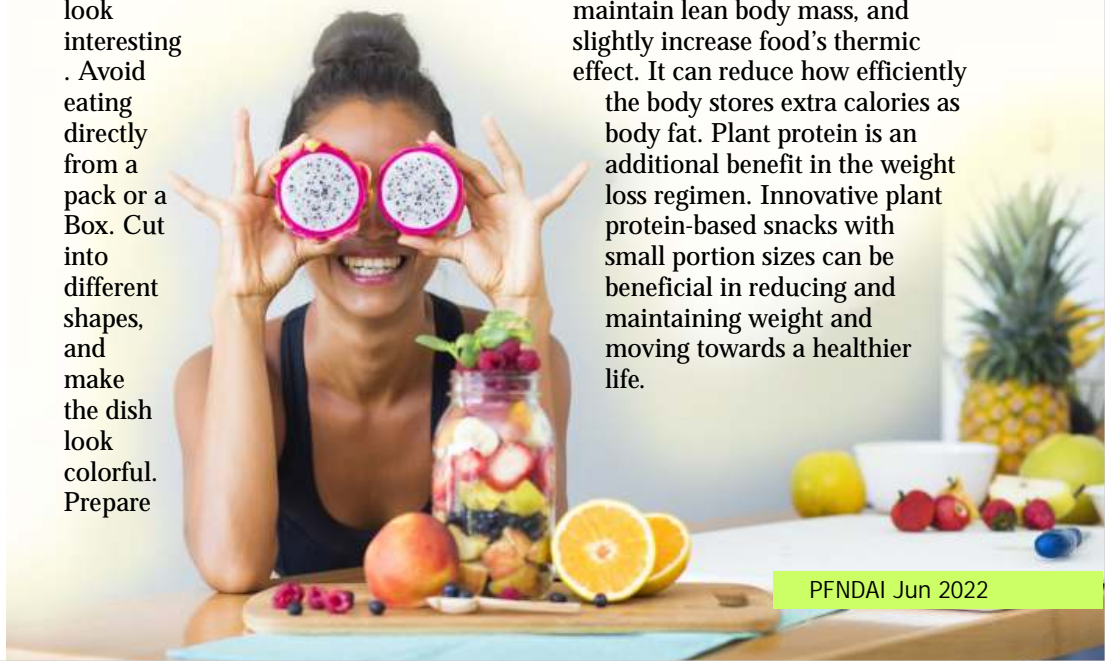
a nutrient-rich snack by combining various foods in one snack- e.g., nuts and fruits mixed. Plan and prepare well in advance. Do not allow snacking close to mealtimes. Involving teenagers while preparing snacks is an important step.

Today, with many positive innovations by the food industry, many healthy packaged snacks and bars are available. (15)

An Intelligent homemaker, when guided well by a qualified Dietitian, can also include protein-

based snacks that can be used dished out from the kitchen for children as tiffin snacks, office snacks, or simply for elders at home. Some easy-to-make homemade plant protein snacks ideas are Apple slices with peanut butter, roasted chana, buttermilk, chia seed pudding, yogurt, mixed nuts bowl, soya kebab, granola bars, hummus with vegetable sticks, sprout salad, sprout tikki, chana chaat, ragda, murmura, and makhana.

While many different diets can be successful for weight loss, the protein content of a diet is one of the essential factors to consider when planning a diet. Protein has been shown to promote satiety, help maintain lean body mass, and slightly increase food's thermic effect. It can reduce how efficiently the body stores extra calories as body fat. Plant protein is an additional benefit in the weight loss regimen. Innovative plant protein-based snacks with small portion sizes can be beneficial in reducing and maintaining weight and moving towards a healthier life.





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- Minerals & Toxic heavy metals
- Vitamins
- Antibiotics / Residues
- Food Adulteration tests
- Food additives, preservatives and artificial sweeteners
- Synthetic food colour
- Antioxidants
- Packaged Drinking analysis as per IS 14543
- Drinking water as per IS 10500
- Process water IS 4251
- Shelf life study(Ambient @ Accelerated)
- Microbiological testing (Bacterial and pathogens)
- Hygiene audit /Kitchen audit
- Allergens
- Sterol Composition



### Analytical Facility

- |                               |  |
|-------------------------------|--|
| 1) GC MS MS                   | 7) Ion Chromatography with CD            |
| 2) LC MS MS                   | 8) Protein / Fat / Fibre Analyzer        |
| 3) ICP MS                     | 9) Elisa Reader                          |
| 4) AAS/ GF/ Flame             | 10) FT-IR                                |
| 5) HPLC with UV/ FLD/ RI/ PDA | 11) U V Spectrophotometer                |
| 6) HS with GC FID/ TCD        | 12) Partical size by Malvern (Wet & Dry) |

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# COMING EVENTS

4th International Webinar on Food Science & Nutrition Health  
July 1 - 2, 2022 Webinar  
(Online Meeting)

Website:

<https://food.scientificmeditech.com/2019/02/16/food-science-conference-2022/>

IFT FIRST: Annual Event and Expo

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Virtual Conference

WEBSITE:

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Website :

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AgriTech India 2022

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W :

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26th World Congress on Nutrition & Food Sciences

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SIAL 2022

Oct 15 - 19, 2022

Paris France

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# KNOW YOUR CARBOHYDRATES



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Carbohydrates are a diverse group of macronutrients with varying properties and form an integral part of our diets. Understanding their structure function relationships will help us utilise them in our diets in a judicious manner. They are large macromolecules consisting of carbon, hydrogen and oxygen. Carbohydrates can be categorized from simple to complex carbohydrates based on the degree of

polymerization. Complex carbohydrates can be hydrolysed into monomeric units. The various types of carbohydrates based on the degree of polymerisation are

shown in the table below -

As mentioned in the chart above, the principal monosaccharides are glucose, fructose and galactose. These sugars occur naturally in many foods. Glucose and fructose occur in honey, berries and fruits. High fructose corn syrups (HFCS) are produced by the enzymatic conversion of glucose to fructose. HFCS 42 is used in processed foods and HFCS 55 is used in beverages. Fructose is the sweetest of all the food carbohydrates. Apart from sweetness, sugars confer many functional characteristics to food. Here are some of its properties (Zaitoun et. al., 2018)-

### 1. Sweetness

The most important role of sugar is to provide the sweetness. Sugars are used as sweeteners in many food products. Sucrose, fructose and glucose are the sugars with intense sweetness whereas lactose is mildly sweet.

Table 1- Classification of carbohydrates based on the degree of polymerization

Class (DP <sup>a</sup> )	Subgroup	Principal components
Sugars (1–2)	Monosaccharides	Glucose, fructose, galactose
	Disaccharides	Sucrose, lactose, maltose, trehalose
	Polyols (sugar alcohols)	Sorbitol, mannitol, lactitol, xylitol, erythritol, isomalt, maltitol
Oligosaccharides (3–9) (short-chain carbohydrates)	Malto-oligosaccharides (α-glucans)	Maltodextrins
	Non-α-glucan oligosaccharides	Raffinose, stachyose, fructo and galacto oligosaccharides, polydextrose, inulin
Polysaccharides (≥10)	Starch (α-glucans)	Amylose, amylopectin, modified starches
	Non-starch polysaccharides (NSPs)	Cellulose, hemicellulose, pectin, arabinoxylans, β-glucan, glucomannans, plant gums and mucilages, hydrocolloids

(Source- Cummings, J., Stephen, A. Carbohydrate terminology and classification. European Journal of Clinical Nutrition 61, S5-S18 (2007))





boiling temperature increases. Due to these changes, behaviour of proteins, starches also change giving increased dough yield in baked goods, and prevents drying out (Institute of Medicine, 2001).



## 2. Preservation-

Sugar absorbs the free water and increases the osmotic pressure resulting in reduced water activity of that food system. So, the microbial growth decreases resulting in increased shelf life. Jam and jelly are great example of such food system.

## 3. Flavour-

Sugar plays important role in achieving the desired flavour. It combines with the other chemical compounds. Adding a small amount of sugar can elevate the natural flavour of the food product. Sugars can be used in order to mask off the bitter and sour taste.

## 4. Colour

Sugar contributes to the colour of the food product by two reactions-

**1. Maillard reaction-** It occurs between sugar and amino acids resulting in browning and flavouring. The end product of this reaction provides coloration and aroma to the food. This can be seen in products like bread, cake, coffee etc.

**2. Caramelisation-** It occurs when carbohydrates are exposed to high temperatures. It does not involve any amino groups and often occurs during preparation of syrups, which can be further used in confectionary, soft drinks etc.

## 5. Texture

Sugar plays a very important role in providing texture to a food product due to its ability of interacting with water. When sufficient amount of sugar is added to the solution it will provide mouthfeel by increasing viscosity. With the addition of sugar as solute the water activity and freezing point decreases whereas the

Carbohydrates is a vast category so various terms are used to describe carbohydrates or sugars like-

- **Total Sugars-** This term refers to all sugars from all sources except Polyols.
- **Free sugars-** These are the unbound sugars. These include all the monosaccharides and disaccharides added to the food by manufacturer. It also includes the sugars naturally present in honey, syrup and fruit juices.
- **Added sugars** are sugars and syrups that are added to foods during processing or preparation.
- **Intrinsic sugar-** These sugars are an integral part of unprocessed foods (Whole fruits and vegetables), enclosed in plant cells .
- **Extrinsic sugars-** These Sugars are not located within the cellular structure of a food. It includes fruit juices and added sugar in processed foods.

## Glycaemic carbohydrates-

Carbohydrates act as an energy source following the process of digestion and absorption in the small intestine. Carbohydrates, which provides glucose for metabolism are referred to as 'glycaemic carbohydrate' e.g. Most mono- and disaccharides, some oligosaccharides (maltodextrins) and rapidly digested starches, Slowly digested starches

Carbohydrates that pass to the large intestine prior to being metabolized, is referred to as 'non-glycaemic carbohydrate' e.g.

oligosaccharides, non-starch polysaccharides and resistant starches.

Most carbohydrate-containing unprocessed foods have both glycaemic and non-glycaemic carbohydrate. Glycaemic response to carbohydrate depends on the intrinsic properties of the food and also extrinsic factors such as the composition of the meal, the overall diet and biological variations of the host.

## Polyols-

Polyols or sugar alcohols are the alcohols of glucose and other sugars. Aldose reductase is used to convert the aldehyde group of the glucose molecule to the alcohol. They are a group of low-digestible carbohydrates that can be used instead of sucrose. Polyols occur naturally in foods and come from plant products such as fruit and berries. Sorbitol, mannitol, lactitol, xylitol, erythritol, isomalt, maltitol are some examples of polyols.

Sorbitol is used as a replacement for sucrose in the diet of people with diabetes. They can act as bulking agent along with sweeteners. Some polyols give a cooling sensation when they dissolve in the mouth. Also, excess consumption of polyols can result in laxative effects (Lenhart & Chey, 2017.)



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**Physiological properties of dietary carbohydrates (Cummings & Stephan, 2017)-** The physiology of carbohydrate can vary among individuals and populations. The absorption of

different carbohydrates can have a wide range. For example the absorption of polyols, it varies from complete absorption of erythritol to no absorption of lactitol (Livesey, 2003). Starch can have a different range depending upon the granular size and processing conditions. So, different carbohydrates have different physiological properties. Here are some of the physiological properties of different carbohydrates-

glycolysis, which takes place in cytoplasm releasing energy. The second stage of glucose breakdown takes place in mitochondria through the citric acid cycle releasing more energy. The third stage is oxidative phosphorylation by which a large amount of energy is conserved and made available to cells in a form they can utilize.

If body already has enough energy then excess energy is stored as glycogen in liver and muscles, which can be converted into cellular energy when needed. Having adequate levels of glucose in blood prevents the breakdown of protein for making glucose and also prevents ketosis.



equivalent or 60% of glucose utilization or 20% of the energy needs of the human body in the resting state. Liver requires fatty acids while muscles can utilize fatty acids, glucose, and amino acids.

Virtually all the cells are able to take up and utilize glucose. But the rate of glucose uptake varies depending upon the glucose concentration in blood. The glucose enters a cell via specific transporters called as glucose transporters (GLUT). These transporters have different types depending upon location and affinity towards glucose. After meals glucose is the primary source of energy for adipose tissue and skeletal muscle. These muscles have



GLUT4 which is present only when the glucose concentration is high. After carbohydrate meal liver mops up glucose through GLUT2. So, including carbohydrates in our diet is very important as glucose acts as a

main fuel source in functioning of many tissues.

### Basis for Recommendation of Energy Requirements

Our body requires energy for performing various metabolic activities, physical work and growth. The energy requirements may vary from person to person depending upon various factors like age, gender, level of physical activity, physiological factors etc. The energy requirement can be defined as the level of energy intake from food that balances energy expenditure when the individual has a body size and composition and level of physical activity,

**Table 2- Physiological properties of carbohydrates**

	Provide energy	Increase satiety	Glycaemic <sup>a</sup>	Cholesterol lowering	Increase calcium absorption	Source of SCFA <sup>b</sup>	Alter balance of microflora (prebiotic)	Increase stool output	Immuno-modulatory
Monosaccharides	✓		✓						
Disaccharides	✓		✓		✓				
Polyols	✓					✓ <sup>c</sup>		✓	
Maltodextrins	✓		✓						
Oligosaccharides (non- $\alpha$ -glucan)	✓				✓	✓	✓		✓
Starch	✓		✓			✓ <sup>d</sup>		✓ <sup>d</sup>	
NSP	✓	✓		✓ <sup>e</sup>		✓		✓	

<sup>a</sup>Provides carbohydrate for metabolism (FAO, 1998).

<sup>b</sup>Short chain fatty acids.

<sup>c</sup>Except erythritol.

<sup>d</sup>Resistant starch.

<sup>e</sup>Some forms of non-starch polysaccharide(NSP) only.

(Source- Cummings, J., Stephen, A. Carbohydrate terminology and classification. Eur J Clin Nutr 61, S5-S18 (2007))

### Energy management in cell (Bacha et al., 2010)-

The primary role of carbohydrates is to supply energy to all cells in the body. About 70% of glucose entering in the body through digestion is redistributed back into the blood for use by other tissues. Cells that require energy remove glucose from blood in to the cell with the help of transport protein and obtain the energy by breaking the chemical bonds between carbon atoms. This controlled burning of glucose is called as cellular respiration. The first step of cellular respiration of glucose includes

Carbohydrates are the main source of energy and many cells require glucose as a source of energy than the other compounds like fatty acids. But it differs depending upon the tissue. Red blood cells require only glucose as they do not have mitochondria. Cells that grow and divide fast like WBC, stem cells, some epithelial cells and cancer cells require glucose as primary oxidized substrate. Eye lens and Pigment layer of retina utilize glucose only as they do not have mitochondria. Brain cells require glucose and ketones. The blood brain barrier blocks the lipid entry except in fasting. Daily consumption of nerve cells is about 120 g of glucose

Table 3.- Acceptable macronutrient distribution range  
**ACCEPTABLE MACRONUTRIENT DISTRIBUTION RANGE (AMDR) BY AGE AND PHYSIOLOGICAL GROUPS AS PERCENT OF ENERGY (%E)**

Age group Nutrients	1-2 years	3-18 years	Adults	Pregnant and lactating women
Protein (PE ratio)*	5-15	5-15	5-15	5-15
Total Fat	30-40	25-35	15-35	20-35
n-6 PUFA #	4-10	4-10	4-10	4-10
n-3-PUFA	0.5-1	0.5-1	0.5-1	0.5-1
Carbohydrate	40-60	45-65	45-65	45-65

\*Depends on protein quality and total energy intake

# n-6 to n-3 ratio should be between 5-10:1

Note: For good health, adults should consume minimum of 100 to 130g of carbohydrates and atleast 20g fats (food sources)

ICMR RDA 2020

(Source- ICMR-NIN, Nutrient requirements for Indians, A report of expert group, 2020)

consistent with long-term good health, also allowing for maintenance of economically essential and socially desirable activity. In children and pregnant and lactating women, it includes the energy needs associated with the deposition of tissues during growth, or secretion of milk at rates consistent with good health (ICMR-NIN, 2020).

When energy intake is equal to energy expenditure, a steady state is achieved which results in healthy body weight. The total energy expenditure can be determined using PAL and BMR. This can give more accurate results compared to when the energy intake is taken into consideration.

Physical activity level (PAL) is defined as the total energy required over 24 hours divided by the energy needed for basal metabolism in over 24 hours. and Basal metabolic rate (BMR) is the amount of energy used for basal metabolism in a

period of time (FAO, 2004). So, total energy expenditure (TEE) can be calculated as multiplication of PAL to BMR.

PAL \* BMR = TEE

As per the recent research, BMR of Indians is 10% less than western data. Also, the PAL have come down considerably.

**Acceptable Macronutrient Distribution Range (AMDR):** We acquire energy from macronutrients (carbohydrates,

proteins and fats). So, to ensure the sufficient intake of all the nutrients Acceptable Macronutrient Distribution Range (AMDR) have been estimated for individuals of different age groups and physiological states. It indicates a person's daily calorie requirements that should come from protein, fat, and carbohydrates.

As mentioned in the above chart the percentage energy required from carbohydrates is 45-65%. So, the maximum amount of energy is required from carbohydrates. Hence including healthy carbohydrates in our diet is very important.

Carbohydrates have gained a reputation of being unhealthy but not all carbohydrates are unhealthy. Unprocessed or minimally processed food products like whole grains, vegetables, fruits can be some of the healthier choices. Whereas the white bread, pastries, sodas and other highly processed/refined products can be unhealthy.

So, in order to remain healthy choosing your carbohydrates wisely is essential.

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# CHICKPEAS OR CHANA: MOST **VERSATILE** AND **VERY POPULAR** **LEGUME**

AUTHOR

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There have been many Indian spicy preparations that became globally popular in recent years. Chana masala made with chickpeas has been very close to the top. Popular magazines and papers carry its recipe making it even more trendy ([Washington Post 2022](#)). Indians love it as they can get this dish not just in any part of India but in most western cities so they never miss the home cooked taste.

Chana or chickpeas are available everywhere as it has been a staple pulse in many countries. In fact chickpeas are said to be originated in Turkey ([Susan Bell 2014](#)). Today every part of the world has some indigenous and traditional preparations made out of chickpea. There are different regional names including gram, Bengal gram, chole, garbanzo, garbanzo bean or Egyptian pea and others. Chana came to India over 5000 years ago and became home to it, as most of

chickpeas are grown here.

With different forms such as whole chana, dal and flour or besan many popular foods and recipes are prepared including chana masala, Mysore pak, besan laddu, sev & bhujia, soan papdi, pakodas, boondi, dhokla, ganthiya, kadhi, zunka and many more.

Cultivated chickpeas are of 2 types, Desi and Kabuli. Desi seeds are smaller, darker in colour and smooth or wrinkled. Kabuli are larger and cream-coloured with less fibre and cook faster than Desi. The Desi type are generally consumed as dry pulse, whole, split as dal or ground as flour and used in sauces like hummus or soups. Kabuli may be used in salads, vegetable mixes and canned ([Feedipedia 2019](#)).

As mentioned above, India produces bulk of global chickpea production. India in 2020 produced 11.1 million tonnes of chickpeas out of the total world production of 15.1 million tonnes ([FAOSTAT](#)). Other major producers are Turkey, Myanmar and

Pakistan.

Indians love humble dal or split dried pulse made into thick puree-like stew or soup. Most Indian thalis have dals as indispensable part which may include vegetables and meat. Each region has favourite dal like masoor, tur, urad, moong and chana dal. Indian dal made its first appearance in Indus Valley civilization where all kinds of pulses were staple food including peas, chickpeas, green gram and black gram. Ancient Indian texts describe dal recipes served at celebratory meals including Chandragupta Maurya's wedding in 303 BC ([Sanchari Pal 2017](#)).

Thus Indian cuisine was closely revolved around chickpeas and so many different products besides chana dal were prepared in different regions some of which are now acknowledged globally.





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## Let's talk!

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### Postharvest Processing [\(Vikaspedia\)](#)

Chickpeas are generally harvested by hand or simple farming implements when pods are ripe but not yet open. They are then pre-dried in sun. The pods are then dried further by mechanical dryers and chickpeas are then removed from pods. Many products are made from whole or after dehusking. Roasted, flour, sattu, sprouts, fermented products etc. are commonly prepared at domestic or commercial level. Dal milling is done in which husk may be removed and splitting done. Some amount of broken are formed. Sometimes oil is applied to improve appearance of chickpeas.

Before milling, chickpeas are tempered for easy removal of husk. Chana dal and broken obtained here are milled in burr or hammer mill to prepare flour or besan.

### Health Benefits

Chickpeas are rich in vitamins and minerals. They provide good amounts of B vitamins, especially folate. They also provide iron, manganese and phosphorus. They are also rich in protein and dietary fibre and are low in fat and sugar. Thus, chickpeas have many health benefits including helping weight management, improving digestion and reducing risk of some diseases.

The protein and fibre keeps appetite under control. They slow digestion and promote fullness, which lowers the calorie intake [\(Hervik & Svihus 2019, Moon & Koh](#)

[2020\)](#). In a study, chickpea hummus reduced appetite and calorie intake [\(Reiser & Leidy 2020\)](#) and in another study meal consisting of chickpea and bread reduced appetite [\(Zafar & Kabir 2017\)](#).

Chickpeas are excellent source of plant protein making them great food for people who avoid meat and animal products. Besides helping promote fullness and keeping appetite under control, protein also helps in bone health and muscle strength [\(Dolan & Sale 2018\)](#).

Besides providing the nutrients, there are many health benefits of diet containing chickpeas and their products especially that are related to lifestyle.



### Sugar Level Control and Diabetes

Chickpeas may help reduce the risk of and manage diabetes as they have a sugar regulating effect. Both fibre and protein in chickpeas control the blood sugar from rising too quickly after meal, which is critical in diabetes management [\(Campbell & Rains 2015\)](#). Also due to their low GI value, they are suitable for diabetics and they will not lead to spikes of blood sugar.

While scientific literature is emerging, many studies with hummus or chickpeas consumption support their benefits in weight control, glucose and insulin response, cardiovascular disease, cancer and gastro-intestinal health [\(Wallace et al. 2016\)](#). Presence of good amounts of magnesium, zinc and B vitamins also help in managing diabetes [\(Barbagallo & Dominguez](#)

[2015, Wang et al. 2019\)](#). [Yang et al. \(2007\)](#) showed that chickpeas significantly improve insulin resistance and prevent high

blood sugar and insulin levels after meal caused by chronic high-fat diet in rats.

### Heart Disease

Chickpeas are excellent source of several minerals including magnesium and potassium [\(USDA 2018\)](#). These support heart health as they prevent hypertension, which is a major risk factor of heart disease [\(DiNicolantonio et al. 2018\)](#). Also the soluble fibre in chickpea reduces triglycerides and LDL cholesterol [\(Surampudi et al. 2016\)](#) which in turn lower the risk of heart disease. One meta-analysis of 26 research studies found that at least one serving per day of legumes including chickpeas, may help lower LDL cholesterol significantly [\(Ha et al. 2014\)](#).

### Cancer

Research has suggested that eating chickpeas regularly may reduce the risk of certain types of cancer as chickpeas may produce butyrate and other short chain fatty acids that reduce inflammation in colon cells thus decreasing the risk of colon cancer [\(Fernando et al. 2010\)](#). There are other dietary components such as lycopene, Biochanin A (an isoflavone) and saponins present in chickpeas have also shown to reduce risk of some cancers [\(Jukanti et al. 2012\)](#).

Although saponins have some health benefits like anti-cancer properties, they also have some risks. They can cause upset stomach and diarrhea. They are thought to be not toxic to humans but further studies are necessary [\(Nelson 2020\)](#). Soaking before cooking is one way to reduce the saponins from chickpeas.







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### Other Health Benefits

There are many other benefits of chickpeas in our diet. Chickpeas, with high fibre content have several digestive benefits. As fibre in chickpeas has substantial soluble portion it dissolves in water and forms gel-like substance. This helps many healthy bacterial to grow in gut and prevents overgrowth of unhealthy bacteria. This may reduce the risk of irritable bowel syndrome (IBS) and colon cancer ([Elliot & Link 2021](#)).

Chickpeas may also support brain function and mental health. Choline is important for brain function and chickpeas are a great source of choline. This nutrient is necessary for formation of neurotransmitters and other substances required for brain function. Although body can make it, the needs are greater than what body can make so dietary choline is necessary and chickpeas have lots of it ([Wiedeman et al. 2018](#)). Some nutrients related to mental health such as magnesium, zinc, and selenium are plentiful in chickpeas ([Wang et al. 2018](#)).

Saponins have both beneficial and undesirable properties. Health promoting saponins affect immune system in ways that help to protect us against cancers and also they lower cholesterol levels, blood lipids and blood glucose response. However, saponins along with trypsin inhibitor, hemagglutinins,

tannins as well as phytates and oxalates create some problems including lowering absorption of nutrients, interfere with digestion of proteins, causing irritation of bowel, bloating etc. Soaking and cooking has been shown to reduce their contents in chickpeas but there are some losses in nutrients also. Microwave cooking incurs less losses of vitamins ([el Adawy 2002](#); [Srivastava & Vasishtha 2012](#)).

### Products of Chickpeas

Chickpeas are consumed in many forms. Whole chickpeas are used in many different cuisines including Indian, where chana masala is a globally popular dish. Many other similar spicy stew-like products are made elsewhere. Examples are chakhchoukha of Algeria, Manchego stew or Cocido lebaniego with chickpeas of Spain, and Minestra di ceci soup of Italy.



Whole chickpeas may also be roasted which make them crispy and can be low

cost snack. Leblebi is a snack made from roasted chickpeas and seasoned with hot spices and sometimes candy coated. It is popular in Iran, Syria, Greece, Turkey and nearby places. Split chickpeas or dal is also very common especially in India, which is used for making soup-like curry, plain or seasoned and garnished with herbs and spices. However most common ingredient used in many delectable recipes is either besan (chickpea flour) used in many Indian recipes or ground cooked chickpeas used in hummus and



other Middle Eastern recipes.

Besan has been a very versatile ingredient in Indian cuisine. It has been used for such sweets as barfi, halwa, Mysore pak, soan papdi and laddus, but a large range of savouries like boondi, pakora, bhujia, bonda or vada, chakli, dhokla, ganthiya, kadhi, papad, sev, and zunka among other things.

Elsewhere people have realised the processing and nutritional benefits of this wonder ingredient and have been trying some bold new products. One such product is chickpea butter to replace peanuts. Many people have peanut allergy so they could use chickpea butter instead which also has lower fat. Although it may have less protein than peanut butter but it has more dietary fibre and some other nutrients which makes it compete with nut butter ([Van Hare 2018](#)).

Thus chickpea is going places because of many advantages people are rediscovering and is one of the most acceptable traditional ingredients that is now reclaiming its place of pride in food and nutrition. India being the leader in its production can guide this advantage by marketing not just traditional products and recipes but new ones that can boost its popularity with not just those who want to stay away from animal products but those who get enamoured by innovative ideas of products and tastes.



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# THE IMPORTANCE OF MILK FORTIFICATION: THE REAL REASON IT IS NEEDED



AUTHOR

**Dr. Madhav Joshi,**  
Chief Sales and Marketing Officer  
Hexagon Nutrition Limited



## Key Takeaways:

- Milk fortification is the process of adding nutrients to milk to improve its nutritional value.
- Fortifying milk with vitamin D can help to improve the bone health of those who are deficient in this nutrient.
- Milk fortification is a crucial public health measure that has been shown to improve the health of populations who consume it.

Did you know India is the largest consumer of milk in the world with 83 million metric tons of consumption in the year 2021? It is quite contradictory to state that despite maximum milk consumption a majority of the population is not receiving adequate nutrients. With the growing malnutrition and hidden hunger challenges, it has become imperative to consider increasing the nutritional value of staple foods.

The increased awareness of nutritional

deficiencies has spurred the need for milk fortification, which is the addition of a micronutrient to food.

## What is Milk Fortification?

Milk fortification is the process of adding essential micronutrients to milk to improve its nutritional value.

The most common vitamins added to milk are Vitamin D and Vitamin A, but other vitamins and minerals may also be added. Milk fortification is essential because it can help to prevent certain health problems, such as Osteoporosis, Rickets, and Vitamin D deficiency.





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### Why Is Milk Fortification Necessary?

There are a number of reasons why milk fortification is important. It helps to ensure that people receive the nutrients they need in their diet. Fortified milk provides a good source of essential vitamins and minerals, including calcium, vitamin D, Vitamin A and Phosphorus.

Another reason why milk fortification is significant is that it can help to improve the quality of milk. For example, adding vitamin D to milk can help to prevent osteoporosis. Vitamin D is also

where fortification comes in.

Fortification is the process of adding vitamins and minerals to food in order to improve its nutritional content. Therefore, milk fortification is the addition of vitamins and minerals to milk to make it a more complete and nutritious food.

Perhaps the most important reason is that it can help to close the nutrient gap for those who may not be getting enough of certain vitamins and minerals from their diet. For example, fortifying milk with vitamin D can help to improve the bone health of those who are deficient in this nutrient.

### Significance of milk fortification in the global food supply

Milk is a vital part of the global food supply, providing essential nutrients for people of all ages. However, due to the way milk is processed and distributed, it can sometimes be lacking in certain nutrients. This is why milk fortification has become such an

important practice in recent years.

Fortifying milk with vitamins and minerals helps to ensure that everyone who consumes it gets the nutrients they need. This is especially important for children and pregnant women, who have higher nutritional needs.

There are different ways to fortify milk, and new methods are being developed all the time. The most important thing is that milk fortification

is done in a way that does not compromise the quality or safety of the milk.

### Conclusion

Milk fortification is a crucial public health measure that has been shown to improve the health of populations



who consume it. Fortified milk is an excellent source of essential nutrients, including calcium, vitamin D, and vitamin A. It also provides a significant amount of protein and other essential vitamins and minerals. Milk fortification has been shown to reduce the incidence of osteoporosis, rickets, and other diseases.

This World Milk Day let's take a pledge to maximise the potential of milk and consume fortified milk.



known to have other health benefits, such as reducing the risk of some cancers.

### Benefits of Milk Fortification

Milk is a vital part of our diet and provides many essential nutrients. However, due to the processing and packaging, milk can lose certain vitamins and minerals. This is



# PERSPECTIVES OF RECENT REGULATIONS: FRONT OF PACK LABELLING, TARGET GROUP RDA, MISBRANDING AND MISLABELLING



**AUTHOR**  
**Dr J I Lewis,**  
Chairman,  
Regulatory Affairs,  
PFNDI

The webinar, 'Perspective on recent regulations' addressed front of pack nutritional labelling (FOPNL) models, target group RDA and misbranding. It did not specifically deal with the regulation itself; instead, it sought to examine its context and prospects upon which it is made. Where does it come from - namely what is the situation that triggers the need for a regulation. How is it related to a country's situation? What and when will it achieve its intended purpose? Of the three topics, two of them are concerned with public health and the third is related to consumer protection against fraudulent practice.

Food regulations address both the person and the situation in which he is present, both being connected and equally important. In the case of food, every person - the population - is a stakeholder, therefore it is necessary to inform them of the impact the regulation will have on

improving their health. Perspective building is informing all stakeholders about the risk, quantifying it and the mitigation impact expected from the regulation. The three speakers are well known for their wide knowledge and expertise in the respective areas. In the time allotted, they were asked to provide the participants primarily with a perspective explaining the situation from which a regulation becomes necessary. The Panel discussion followed the talks for an industry perspective and participant involvement.

Front of pack nutrition labelling models

Ms Mili Bhattacharya, Scientific and Regulatory Affairs, Coca Cola India Pvt Ltd., gave a

detailed explanation on the FOPNL models considered prior to the impending draft. FoPNL is a graphical representation of specific nutrients, calories, fat, saturated fat, sugar and salt, excess of which are associated with an adverse impact on health; collectively understood as non-communicable diseases (NCD). There are several models in play and countries have adopted these according to the dietary consumption of their population, contributing sources and risk presented (Fig. 1a).



Ms Mili Bhattacharya

FOPNL Models	COUNTRY	SYMBOLS/ICONS
Monochrome GDA	Many EU Countries, Thailand etc.	<p>of an adult's guideline daily amount*</p>
Traffic Light	UK	<p>Reference: 100kJ/25kcal</p>
Healthier Choice	Singapore, Malaysia, Norway	



FOPL Models	COUNTRY	SYMBOLS/ICONS
Health Star	Australia	
Nutri-Score	France , Belgium	
Warning	Chile, Ecuador, Costa Rica, Mexico, Brazil, Canada (under discussion)	

Other models (Fig. 1b) use endorsement symbols and icons on the healthfulness of a product. In the Health Star Rating (HSR) model, the math using algorithms is done and the healthfulness of a product is rated by number of stars allotted. More the stars healthier the product.

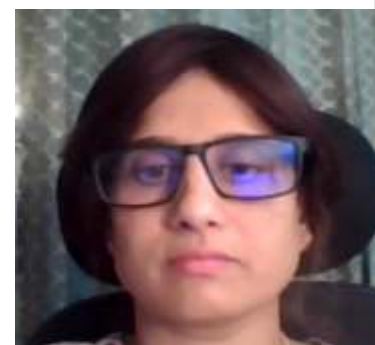


meeting recommended nutrient intake levels.

#### Target group RDA

Questions are often asked about the various terms used for nutrient intakes and information on these becomes important when planning diets or formulating products intended for different target groups.

Dr Agatha Betsy, Senior Specialist, Nutrition Strategy and Communications, Mondelez International, explained the various terms related to nutrient intakes



Dr Agatha Betsy

namely Estimated Average Requirement (EAR), Recommended dietary or daily allowance (RDA), Tolerable Upper Levels (TULs) and in case of macronutrients the Acceptable Macronutrient Distribution Range (AMDR). These terms are important in framing nutrition policy and diet planning. Recently the Indian Council of Medical Research (ICMR - NIN)

revised RDAs (2020) introducing the Estimated Average Requirements (EAR) and the Tolerable Upper Limits (TUL), published in 2018. Taken together these terms bring in clarity on the revision of the Indian RDAs as well as improving nutrient intake from all sources taking into account the TULs for each nutrient. While a balanced and varied diet is the recommended nutritional advise for a healthy intake of nutrients, however this is not happening for various reasons.

The monochrome model provides consumers with information on the amount of energy, fat, saturated fat, sugar and salt (or any other nutrient of interest) in the product as a percent of their recommended daily intake values. Daily intake values are variously described as Daily Values (US) or Reference Intake (EU) and based on daily energy 2000kcal. FSSAI has provided these values in FSS (Labelling & Display) 2020. The traffic light model is similar except that information on certain nutrient exceeding a predetermined threshold is given cautionary colour depictions.

NutriScore is a five step colour rating scheme moving from green (healthier) to red (less healthy). In some cases, regional clusters of one or more countries (South America), use a common model because of their population dietary patterns of consumption and the prevailing nutrient level of risk may be similar. Australia and New Zealand introduced the HSR system. FoPNL is an initiative primarily to change purchase behaviour of pre-packaged foods. In countries where staple-based home cooked foods occupy the centre of the plate, consumption not purchase is a significant factor to be recognised. Moving on, the next talk deals with eating right and



Ms Prerana Patil

Dr Shatadru Sengupta

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Fig. 2: Indians are not consuming enough fruit, veg and milk but too much salt and sugar



Generally, Indians are not able to sustain a balanced and diverse diet. (Fig 2).



3). Adolescents have a higher physiological demand for nutrients, e.g. calcium, iron and proteins than the general population and are unlikely to bridge this gap, without making major changes in their diets or through fortified foods. Apart from this, products are being formulated to meet specific requirements for various age groups. The current state of inadequacies indicate a need to adopt a scientific based approach to augment nutrient

intakes from all sources. These include balance and varied diets, fortified foods – both voluntary and mandatory routes, as well as supplementation. Targeting deficiencies within various age group particularly adolescents is a market segment available for suitable product offerings. Moving on, the next topic deals with communicating with consumers responsibly.

There is another set of values variously described as Dietary Reference Values (DRV) or Reference Nutrient Intake (RNI), used in a regulatory setting for nutrition labelling. The RDA's cover 97.5th percentile of healthy individuals for each age group, gender, physiological and activity status. So, when it comes to planning diets or formulating products for a specific group, relevant RDAs are available. The RDA for sedentary male is taken for labelling of products for the general population or for fortifying foods.

Notably micronutrients deficiencies often referred to as "hidden hunger" particular in iron, iodine, vitamin A and D, have major health impact on health for all age groups (Fig.

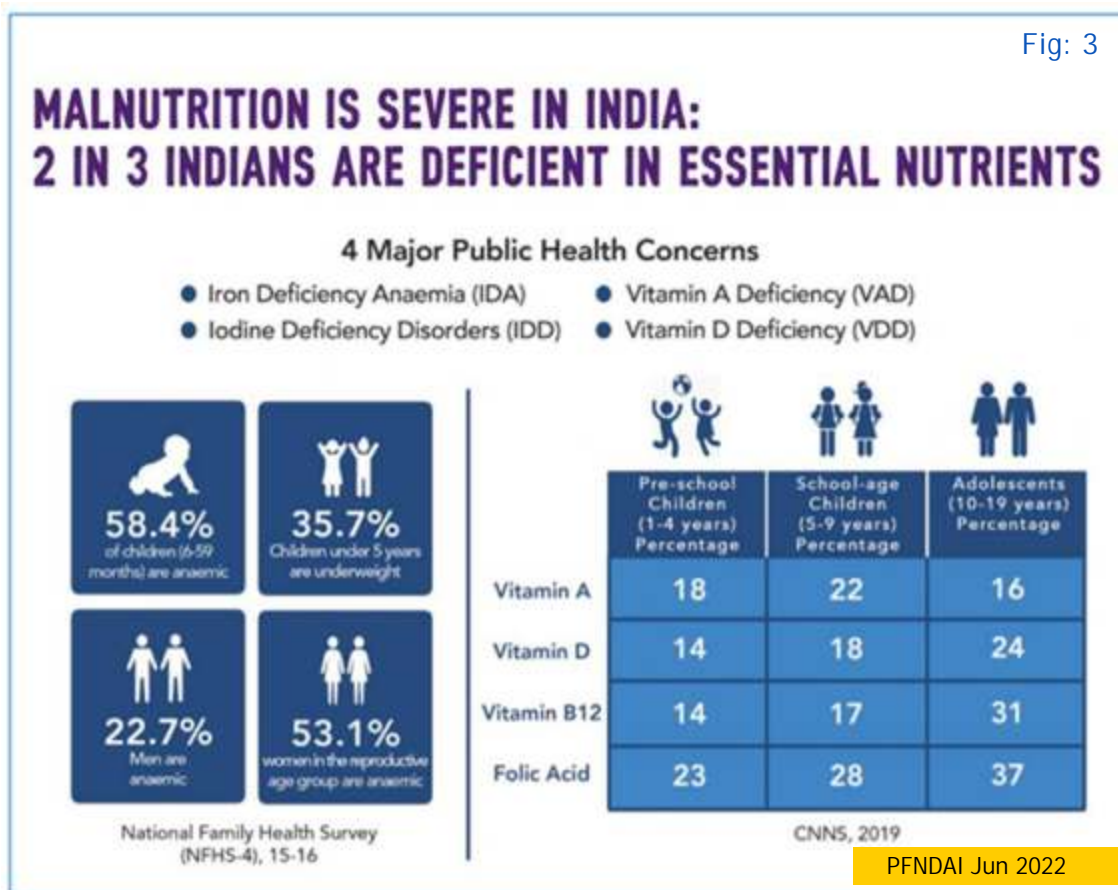


Fig: 3

**Misbranding and misleading**

Dr Shatadru Sengupta, Senior Director Legal, Hardcastle Restaurants Pvt Ltd, provided an overview of what the law envisages in protecting consumers from communications that may be considered fraudulent. He brought out several instances of product related issues as well as those made in advertisements, that raise issues on compliance requirements. The two words misbranding and misleading appear in Act and in several regulations and expectedly there is a difference. Though this does not emerge immediately what constitutes either offence must be learned from a careful reading of the texts.



Dr Shatadru Sengupta

is inside the package and what is stated. Though the language appears convoluted, food businesses working in highly regulated space must understand how labelling and advertisement requirements are to be complied with.

There are differences and similarities between the two terms misbranding and misleading. Misbranding includes misleading, the former is akin to the 'genus' while misleading is a 'specie'. All misleading communication is misbranding but not vice versa. While misbranding is defined, misleading is not; the former attracts a fine of Rs. 3 lakh, while the latter has a fine of Rs. 10 lakh.



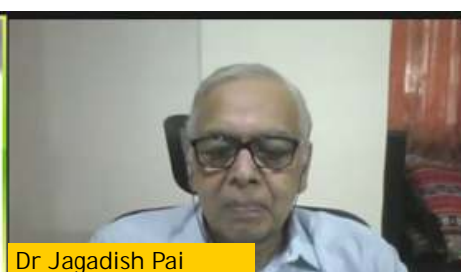
Under section 24 of FSSA – “no advertisement should be made on any food which is misleading or deceiving or contravenes the provisions of this Act, rules and regulations made thereunder. The section relates to advertisements and not about labels. To make a compelling appeal to consumers on the virtues of their product food businesses may communicate more than what the product can do. These provisions of law ensure that food businesses fall within the requirements of the law and FBOs require due diligence in labelling and claims.

Fig. 4 : Misbranding

Type	Specifics	What exactly	In a nutshell
A	Claims, names, Mfr.	1) False, misleading or deceptive claims on <u>package</u> or <u>advertising</u> 2) Other name sales 3) Fake individual or company mentioned as manufacturer	Methods of Sale and Advertising
B	Imitation, false ingredients, false place	1) Imitative, substitute, resemblance with some other product 2) Misleading mention of ingredients 3) Product of a wrong place or country	Name and address of manufacturer are correct, but little else. The food is not what it is <u>said to be</u> .
C	Deficient label, SDU, limits	1) Flavour, colour, chemical preservative not mentioned correctly on label 2) Special Dietary Use food, without information on	Labelling deficiency as to Inside v. Outside (Conflict between what <u>is inside</u>



Ms Dolly Soni



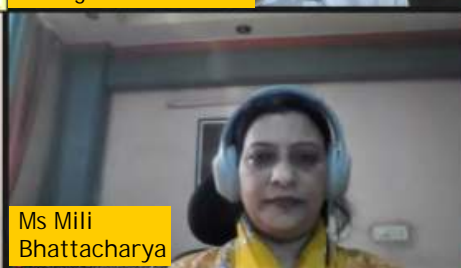
Dr Jagadish Pai



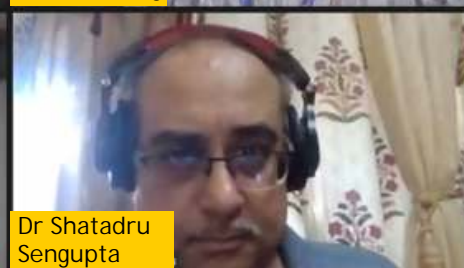
Mr Jitin Garg



Dr Joseph Lewis



Ms Mili Bhattacharya



Dr Shatadru Sengupta





Mr Jitin Garg



Ms Priyanka Virmani



Dr Bhavna Sharma



one adopted a different model?

What is EAR and RDA, are they used for labelling? When are target group RDAs required on products?

A panel of industry experts, Mr. Jitin Garg, General Mills, Ms. Priyanka Virmani, Nestle India Ltd, and Dr Bhavna Sharma, ITC discussed the several points made out in the talks and responded to questions from participants.

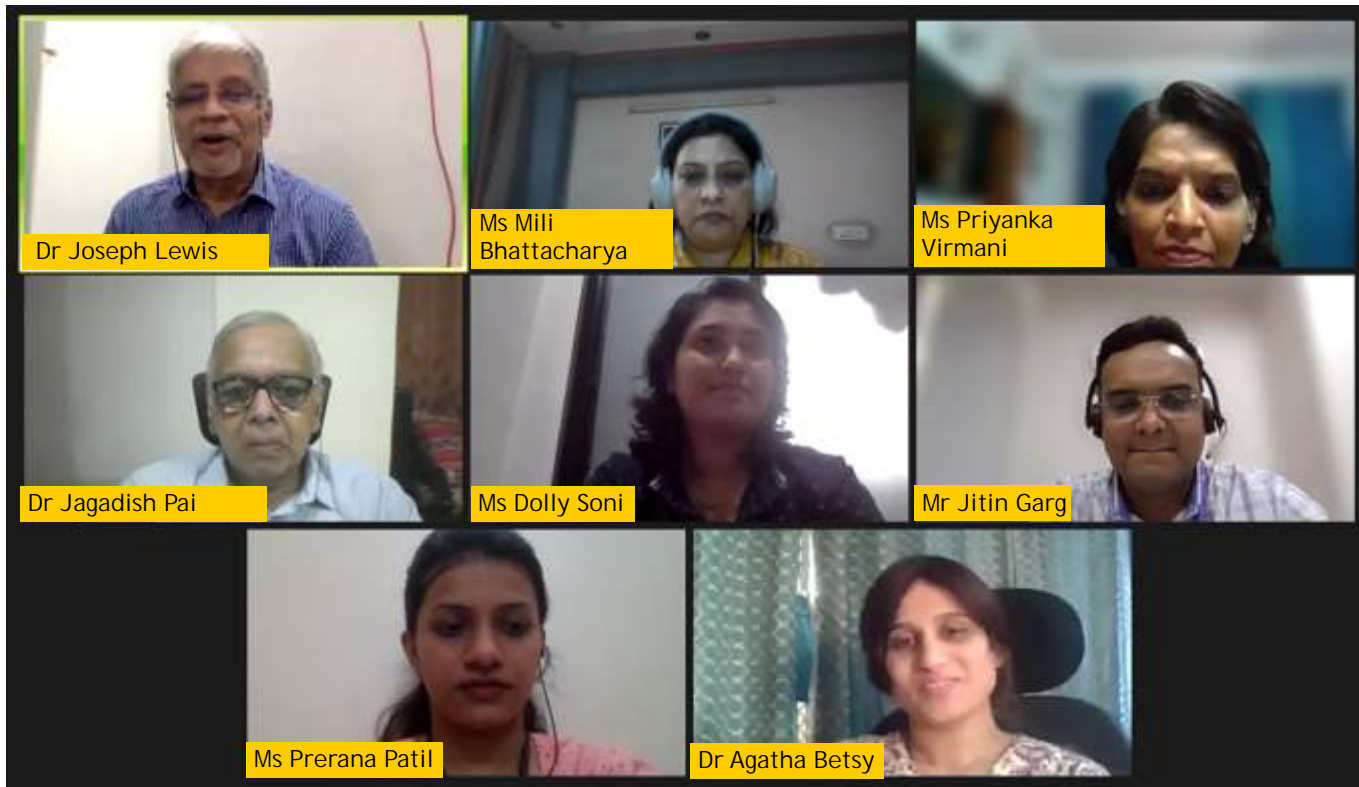
should be balanced and varied, why are we trying to make each food product balanced? Is it about balancing the diet or each product? Labels carry a lot of information, “sugar”, “sugars”, “added sugar”, “total sugar”: is this not confusing to consumers? Whether regulations made take into consideration dietary practices of the country and whether they are accordingly assessed for impact on population health. Are any of the countries proposing FOPNL have a similar dietary pattern to India where 80% of food consumed is from home cooked meals. Are the various models, country specific and why has each

Are misbranding violations attracted only due to absent/erroneous declarations made on the label?

The webinar brought together well composed and interestingly delivered talks, followed by an enthusiastic panel discussion. Perspective building helps all stakeholders to ensure that regulations are effective enough to reach their stated outcomes.



Several of them had to do with the numerous nutrition messages given to consumer. For instance, “when the advice is that the total diet



# REGULATORY ROUND UP



By  
Dr. N. Ramasubramanian,  
Director, VR FoodTech,  
[n.ram@vrfoodtech.com](mailto:n.ram@vrfoodtech.com)

Dear Readers

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

FSSAI, now on a periodic basis, is putting out the compendium of regulations which is updated with all the amendments till that date. Please have a look at it regularly.

The last date for the submission of annual return in Form D1 has been extended to 30 June 2022. In view of the representations of FBOs for extension for

submission of annual returns, the last date has been extended from 31st May to 30th June 2022.

Standard relating to naturally occurring formaldehyde in fresh water fish has been operationalized and can be adopted.



The fishes are listed under four groups namely Group I (Marine - all fin fishes), Group II (Fishes of fresh water origin, Group III (Marine - Lizard Fishes) and Group IV (Frozen Fish Products). The limits for naturally occurring formaldehyde for Group I and II has been set at 4 ppm, for Group III at 8.0 ppm and for the frozen products at 100 ppm.

FSSAI, through a directive, has operationalized the changes in Total Dissolved Solids, Calcium and Magnesium in Packaged Drinking Water

The total dissolved solids, in mg per litre, has been revised from the present limit of 500 max. to a range of 75 to 500.

Similarly, the Calcium and Magnesium content also has been revised to a range of 20 to 75 mg per litre and 10 to 30 mg per litre respectively. Previously it was a single value.







[SOP for applying for Fortified Logo under FOSCOS has been amended.](#)

Food Safety and Standards (Fortification) Regulation, 2018 sets standards for the fortification of certain food categories. Edible common salt is under mandatory fortification. Though not mandatory, standards for the fortification of other foods like Oil, Milk, Cereals, Bakery products, fruit juices have been stipulated. However, there was an ambiguity regarding the fortification of foods which were not listed in the regulation. In an effort to clarify, the directive lists products, under each broad category, which can be fortified and applied for the printing of the fortification logo.



[Draft regulation making amendments in FSS \( Food Products Standards and Food Additives\) Regulation, 2011.](#) Draft amendments have been suggested in standards of identity in case of Cheese, Peanut Butter, fatty acid composition of Virgin Olive oil, Refined Olive oil, and Olive Pomace oil, introduction of standards for crude solvent extracted corn oil, Vitamin and Mineral premix for the preparation of fortified Rice Kernel, fortified Rice Kernel, Fish Oil, etc. The list of foods to which Oligo Fructose can be added is extended. Microbiological standard for Bakers Yeast has been introduced.

[Draft notification permitting the use of recycled PET as food contact under FSS \(Packaging\) Regulation, 2018.](#)

The current regulation specifically prohibits the use of recycled plastics as food packing material. In line with the sustainability concept, FSSAI through this draft notification has proposed to permit the use of recycled polyethylene terephthalate (PET) as food



packaging material as and when the standard for such materials is notified by the Authority. Such packaging materials shall also comply with other applicable national standards and regulations (like BIS etc)



[A draft notification amending FSS \(Alcoholic Beverages\) Regulation 2018.](#)

Presently, Alcoholic beverages are prohibited from declaring nutritional information on the label. The draft amendment proposes to make an exception in case of Energy value. Manufacturers may declare the Energy content on the label on voluntary basis.



# RESEARCH IN HEALTH & NUTRITION

## Children eat what they like, but food intake driven more by what they dislike

February 22, 2022 Science Daily

It is often said that "children eat what they like," but the results of a new study by Penn State nutritionists and sensory scientists suggests that when it comes to meals, it is more accurate and more relevant to say, "children do not eat what they dislike."

There is an important difference, according to lead researcher Kathleen Keller, associate professor in the departments of Nutritional Sciences and Food Science, who conducted an experiment involving 61 children ages 4-6 years to assess the relationship between their liking of foods in a meal and subsequent intake. The research revealed that when presented with a meal, disliking is a stronger predictor of what youngsters eat than liking.

"In other words, rather than high-liking driving greater intake, our study data indicate that lower-liking led children to avoid some foods and leave them on the plate," she said. "Kids have a limited amount of room in their bellies, so when they are handed a tray, they gravitate toward their favourite thing and typically eat that first, and then make choices about whether to eat other foods."

Study co-author John Hayes,

professor of food science and director of the Sensory Evaluation Center in the College of Agricultural Sciences, puts it another way.

"For 50 plus years, we've known liking and intake are positively correlated, but this often leads to the mistaken assumption that if it tastes better, you will eat more," he said. "Reality is a bit more nuanced. In adults, we know that if you really like a food, you may or may not eat it. But if you don't like it, you'll rarely or never eat it. These new data show the same pattern is true in young kids."

Children participated in two identical laboratory sessions in the study conducted in Keller's Children's Eating Behavior Laboratory in the College of Health and Human Development, where seven foods --

chicken nuggets, ketchup, potato chips, grapes, broccoli, cherry tomatoes and cookies -- were included on a tray. Also included were two beverages, fruit punch and milk.

Before eating the meals, children were asked to rate their liking of each food on the following five-point scale -- Super Bad, Bad, Maybe Good-Maybe Bad, Good and Super Good. After the children had eaten as much of the meal as they wanted, the researchers weighed what they ate and compared the results with what the kids said they liked and disliked. The correlations were striking.

In findings recently published in the journal *Appetite*, the researchers reported that the relationship between liking and intake was not strong for most of the foods. For instance, only liking for potato chips, grapes, cherry tomatoes and fruit punch was positively associated with the amount consumed. But no associations were found between liking and intake of other meal items.

However, there was a strong correlation between consumption -- or non-consumption in this case -- and the foods the children said they didn't like. At a multi-component meal, rather than eating what they like, these data are more consistent with the notion that children do not eat what they dislike, the researchers concluded.

Even at a young age, children's food choices are influenced by their parents and peers, Keller pointed out. So, we need to be careful with assumptions about what truly is driving their behaviour when they sit down to eat a meal.

"They pick up on what is said around the table about what foods are good, and while that may not actually correspond to kids eating them, they are taking it all in, and that's affecting their perceptions of foods," she said. "Milk is a good example of that -- for some families, there may be a health halo effect around milk. Kids learn from an early age that drinking milk will give them a strong body, so they may drink milk even if it's not their favourite beverage."





Because children in the United States continue to consume insufficient amounts of vegetables, the findings of research projects such as this one are of great interest to parents, many of whom struggle to get their kids to eat vegetables, Keller believes. Parents want to know how they can improve their kids' nutrition.

"Some parents struggle with kids who are very picky eaters," she said. "That can cause long-term nutrition issues and creates a lot of stress for the family. I think picky eating is one of the most common complaints that I hear from parents - 'How do I get my child to accept more foods? How do I make the dinner experience better and easier for my family?'"

### Food for thought: A high-fibre diet may reduce risk of dementia

Science Daily  
February 22, 2022

We are always hearing that we should eat more fibre. It is known to be vitally important for a healthy digestive system and also has cardiovascular benefits like reduced cholesterol. Now, evidence is emerging that fibre is also important for a healthy brain. In a new study published this month in the journal *Nutritional Neuroscience*, researchers in Japan have shown that a high-fibre diet is associated with a reduced risk of developing dementia.

"Dementia is a devastating disease that usually requires long-term care," says lead author of the study Professor Kazumasa Yamagishi. "We were interested in some recent



The team also examined whether there were differences for the two main types of fibre: soluble and insoluble fibres. Soluble fibres, found in foods such as oats and legumes, are

important for the beneficial bacteria that live in the gut as well as providing other health benefits. Insoluble fibres, found in whole grains, vegetables, and some other foods, are known to be important for bowel health. The researchers found that the link between fibre intake and dementia was more pronounced for soluble fibres. The team has some ideas as to what might underlie the link between dietary fibre and the risk of dementia.

"The mechanisms are currently unknown but might involve the interactions that take place between the gut and the brain," says Professor Yamagishi. "One possibility is that soluble fibre regulates the composition of gut bacteria. This composition may affect neuro-inflammation, which plays a role in



research which suggested that dietary fibre may play a preventative role. We investigated this using data that were collected from thousands of adults in Japan for a large study that started in the 1980s."

Participants completed surveys that assessed their dietary intake between 1985 and 1999. They were generally healthy and aged between 40 and 64 years. They were then followed up from 1999 until 2020, and it was noted whether they developed dementia that required care. The researchers split the data, from a total of 3739 adults, into four groups according to the amount of fibre in their diets. They found that the groups who ate higher levels of fibre had a lower risk of developing dementia.

the onset of dementia. It's also possible that dietary fibre may reduce other risk factors for dementia, such as body weight, blood pressure, lipids, and glucose levels. The work is still at an early stage, and it's important to confirm the association in other populations."



### The immune system also helps a healthy body

February 16, 2022 Science Daily

The immune system has cells stationed all over the body, and they're actually doing their business even if you're fit as a fiddle. This is shown in a new study published in the scientific journal *Cell Metabolism*.

- Until recently, it was believed that the immune system was mostly dormant unless the body was under attack in connection with infections. However, it now turns out that the immune system most likely also plays an important role for perfectly healthy people and can affect the body's production of vital energy sources, says one of the lead authors of the study, Anne Loft, who is a postdoc at the Department of Biochemistry and Molecular Biology. Specifically, the immune system causes the liver of the healthy body to produce an energy source called ketone bodies. This takes place by letting the liver burn fat during fasting.

### Energy for the brain

"When we're fasting -- that is, we haven't eaten anything for maybe half a day or a full day -- we start drawing on our fat deposits, but not all of our body cells are capable of burning fat.





This applies, among other things, to the brain, which instead depends on the production of ketone bodies, which the liver forms by metabolising fats. The ketone bodies thereby energise the body, allowing us to function even if we don't eat anything, explains another lead author of the study," Søren Fisker Schmidt, Assistant Professor at the Department of Biochemistry and Molecular Biology.

Ketone bodies are also the focal point of many popular weight loss diets focusing on cutting carbohydrates from our food, so the body begins burning fat instead. Other research also suggests that the ketone bodies may have a positive impact on, among other things, risk factors for the development of cardiovascular disease.

"We now believe that the immune system affects the production of ketone bodies in fit and healthy individuals and given the beneficial effects of ketone bodies in various common metabolic disorders, this knowledge can hopefully also be applied to understand how the immune system is trying to keep the body in equilibrium when we're sick," Anne Loft explains.

### Undernourished infants at risk for lung restriction, weaker health as adults, study finds

Science Daily February 10, 2022



Infants and children with poor nutrition and growth are more likely to suffer from a serious respiratory condition that has been linked to co-morbidities and early mortality as adults, according to an international investigation led by researchers at the University of Arizona Health Sciences.

The study, published in The Lancet Respiratory Medicine, is the first to identify early-life risk factors for spirometric restriction in adult life. A team led by Stefano Guerra, MD, PhD, MPH, director of population sciences at the UArizona Health Sciences Asthma and Airway Disease Research Center, found three risk factors that were significantly linked to adult spirometric restriction: maternal nutritional problems during pregnancy, low birth weight for gestational age, and below normal weight in childhood.

Spirometric restriction, a restrictive lung disease that decreases total lung capacity, is an important marker of poor general health and has been linked to an increase in cardiovascular disease, diabetes and metabolic syndrome, as well as a higher risk of dying of any cause.

"Participants who were underweight in childhood had a risk of developing lung restriction that was three times higher than children with normal weight," said Dr. Guerra, a professor of medicine and the Henry E. Dahlberg Chair in Asthma Research at the UArizona College of Medicine -- Tucson.

"Similar increased risks for spirometric restriction were found for infants who were born small for gestational age. This may be an indicator that during early development, perhaps even in utero, something went wrong, and that's affecting your lungs as well as your cardiovascular system and other organs. That might explain the co-morbidity and increased mortality



risk that we see with this restrictive pattern."

Researchers examined data from participants who were tracked over two to four decades, from infancy to adulthood, in long-term respiratory studies including the Tucson Children's Respiratory Study at the Asthma and Airway Disease Research Center and two similar studies in Great Britain and Sweden.

Study participants whose mothers had nutritional problems such as anemia and excessive vomiting during pregnancy were twice as likely to have spirometric restriction at ages 22-36. Infants who were born small for their gestational age were nearly three times more likely to develop spirometric restriction as adults. And when childhood nutritional status was evaluated from ages 6 to 16, participants who were underweight -- particularly those with deficits in lean body mass -- were three times more likely than those with a normal weight to develop spirometric restriction as adults. "What was striking is how consistent the findings were. This association was pretty much identical in each of the three cohorts," said Dr. Guerra, who is a member of the BIO5 Institute.

"Our findings really highlight that growth and nutrition problems very early in life have a long-term effect or consequence on adult lung health," added co-author Nipasiri Trudeau, née Voraphani, a statistician in the Asthma and Airway Disease Research Center who earned a doctorate in medicine in Thailand before emigrating to the U.S.



Dr. Guerra and other UArizona Health Sciences investigators are now studying whether children can "catch up" and improve their long-term health through better nutrition or other interventions.



### Men with high levels of body fat may be at risk for osteoporosis

Science Daily February 10, 2022

Men with high levels of body fat have lower bone density and may be more likely to break a bone than those with normal levels of body fat, according to a new study published in the Endocrine Society's Journal of Clinical Endocrinology & Metabolism.



Most studies have shown positive or neutral effects of body fat mass -- the weight of fat in your body -- on bone health. Lean mass is the entire weight of your body, including organs, skin and bones, minus fat. Health care providers often assume people with higher body weight have high bone density and are at low risk of fracture, and these patients are less likely to be screened for osteoporosis.

"We found that higher fat mass was related to lower bone density, and these trends were stronger in men than women," said Rajesh K. Jain,



M.D., of University of Chicago Medicine in Chicago, Ill. "Our research suggests that the effect of body weight depends on a person's makeup of lean and fat mass, and that high body weight alone is not a guarantee against osteoporosis."

The researchers analyzed the bone mineral density and body composition data of 10,814 people under 60 years old from the National Health and Nutrition Examination Survey (NHANES) 2011-2018. They found a strong positive association between lean mass and bone mineral density in both men and women. Conversely, fat mass had a moderately negative association with bone mineral density, especially in men.

"Health care providers should consider osteoporosis screening for patients with high body weight,

especially if they have other risk factors like older age, previous fracture, family history, or steroid use," Jain said.

### Changing your diet could add up to a decade to life expectancy, study finds

*A new model, available as an online calculator, estimates the impact of dietary changes on life expectancy*

Science Daily February 8, 2022

A young adult in the U.S. could add more than a decade to their life expectancy by changing their diet from a



typical Western diet to an optimized diet that includes more legumes, whole grains and nuts, and less red and processed meat, according to a new study publishing Feb. 8 in PLOS Medicine by Lars Fadnes of the University of Bergen, Norway, and colleagues. For older people, the anticipated gains to life expectancy from such dietary changes would be smaller but still substantial.

Food is fundamental for health and, globally, dietary risk factors are estimated to lead to 11 million deaths and 255 million disability-adjusted life-years annually. In the new study, researchers used existing meta-analyses and data from the



Global Burden of Diseases study to build a model that enables the instant estimation of the effect on life expectancy (LE) of a range of

dietary changes. The model is also now available as a publicly available online tool called the Food4Health yLife calculator (<https://food4healthylife.org/>).

For young adults in the United States, the model estimates that a sustained change from a typical Western diet to the optimal diet beginning at age 20 would increase LE by more than a decade for women (10.7 [uncertainty interval 5.9-14.1] years) and men (13.0 [6.9-17.3] years). The largest gains in years of LE would be made by eating more legumes (females: 2.2 [1.0-3.4]; males: 2.5 [1.1-3.9]), more whole grains (females: 2.0 [0.7-3.3]; males: 2.3 [0.8-3.8]), and more nuts (females: 1.7 [0.8-2.7]; males: 2.0 [1.0-3.0]), less red meat (females: 1.6 [0.7-2.5]; males: 1.9 [0.8-3.0]) and less processed meat (females: 1.6 [0.7-2.5]; males: 1.9 [0.8-3.0]).

Changing from a typical diet to the optimized diet at age 60 years could still increase LE by 8.0 (4.8-11.2) years for women and 8.8 (5.2-12.5) years for men, and 80-year-olds could gain 3.4 years (females: 2.1-4.7 and males: 2.1-4.8) from such dietary changes.

"Understanding the relative health potential of different food groups could enable people to make feasible and significant health gains," the authors say. "The Food4HealthyLife calculator could be a useful tool for clinicians, policy makers, and lay-people to understand the health impact of dietary choices."

Fadnes adds, "Research until now have shown health benefits associated with separate food group or specific diet patterns but given limited information on the health impact of other diet changes. Our modelling methodology has bridged this gap."

## More spice could help seniors avoid salt

Science Daily February 3, 2022

Add a little spicy seasoning to a low sodium meal, and adults over the age of 60 may have a harder time noticing a lack of salt, according to a new study in the journal Food Quality and Preference.

Led by Carolyn Ross, a professor of Food Sciences at Washington State University, the study tested saltiness perception in older adults using white sauce formulations with varying amounts of salt and different spices and seasonings added.

The results of the analysis showed the addition of chipotle seasoning to the white sauce made it difficult for the study participants to differentiate between the samples with low and high levels of salt. Conversely, the addition of herbs, such as basil leaves, garlic powder and coarse ground pepper, was not as effective at masking the samples with less salt. The research points to the significant role that spice could play in reducing salt intake for people over 60.

"We were working specifically with a population of older adults to see if we could reduce the amount of salt in a product and then tailor it to their tastes," Ross said. "This is important because the ability to taste and smell is known to weaken with age, and weaker perception of salty flavours may induce people to season their food with excessive salt, which may increase their risk of cardiovascular disease."

For their study, Ross and Maria Laura Montero, a postdoctoral researcher in the



WSU School of Food Sciences, recruited 39 healthy people over the age of 60 to participate in an in-person taste testing experiment that took place over several days slightly prior to the onset of the COVID-19 pandemic.

Previous research examining saltiness perception in older adults has tended to use water as a matrix for tasting experiments rather than actual food products. To generate more realistic data in terms of what people actually enjoy eating, Ross and Montero used a white sauce

formulation that is commonly found in ready-to-eat Cajun chicken pasta meals.

The study participants were asked to compare

three different formulations of the sauce at five different salt concentrations. One of the formulations had no added herbs, the second had just herbs, and the third had both herbs and chipotle seasoning. Their results showed the formulation with both herbs and chipotle seasoning made it difficult for the seniors to determine the amount of salt being used while the formulation with exclusively herbs did not.





In addition to administering the taste test, the researchers surveyed their participants about their oral and olfactory health, the number and type of medications they were taking and any other pre-existing conditions that might affect their saltiness perception.

Their analysis showed there was a positive correlation between poor oral health and the number of medications each participant was taking, which could be a result of less saliva production; however, their data on whether or not this was the main cause of lowered saltiness perception wasn't conclusive.

Moving forward, when it is once again feasible to recruit participants for in-person studies, the researchers plan to follow-up with a larger study evaluating lower salt concentrations as well as different herb and spice concentrations. "To date, a clear relationship between taste loss, and thus higher taste thresholds, and eating behaviour remains to be established," Ross said. "So, we are investigating a bunch of different possible factors."



### Greater body fat a risk factor for reduced thinking and memory ability

Science Daily February 1, 2022

A new study has found that greater body fat is a risk factor for reduced cognitive function, such as processing speed, in adults.

Even when the researchers took cardiovascular risk factors (such as diabetes or high blood pressure) or vascular brain injury into account, the association between body fat

and lower cognitive scores remained. This suggests other not yet confirmed pathways that linked excess body fat to reduced cognitive function.

In the study, 9,166 participants were measured by bioelectrical impedance analysis to assess their total body fat. As well, 6,733 of the participants underwent magnetic resonance imaging (MRI) to measure abdominal fat packed around the organs known as visceral fat, and the MRI also assessed vascular brain injury -- areas in the brain affected by reduced blood flow to the brain.

The results were published today in JAMA Network Open. "Our results suggest that strategies to prevent or reduce having too much body fat may preserve cognitive function," said lead author Sonia Anand, a professor of medicine of McMaster University's Michael G. DeGroote School of Medicine and a vascular medicine specialist at Hamilton Health Sciences (HHS). She is also a senior scientist of the Population Health Research Institute of McMaster and HHS.

She added that "the effect of increased body fat persisted even after adjusting for its effect on increasing cardiovascular risk factors like diabetes and high blood pressure, as well as vascular brain injury, which should prompt researchers to investigate which other pathways may link excess fat to reduced cognitive function."

Co-author Eric Smith, a neurologist, scientist and an associate professor of clinical neurosciences at the University of Calgary, said that "preserving cognitive function is one of the best ways to prevent dementia in old age. This study suggests that one of the ways that good nutrition



and physical activity prevent dementia may be by maintaining healthy weight and body fat percentage." Smith is head of the brain core lab for the two population cohorts used for this new analysis- the Canadian Alliance for

Healthy Hearts and Minds (CAHHM) and PURE Mind- a sub-study of the large, international Prospective Urban Rural Epidemiological (PURE) study.

The participants were in the age range of 30 to 75 with an average age of about 58. Just over 56% were women; they all lived in either Canada or Poland. The majority were White European origin, with about 16% other ethnic backgrounds. Individuals with known cardiovascular disease were excluded.

### Vitamin D2 may "harm health" by interfering with D3's role, warns study

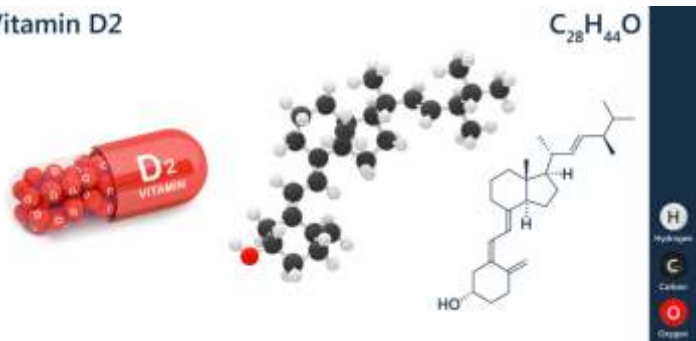
25 Feb 2022  
Nutrition Insight

Vitamin D2 has a questionable role on human health, while vitamin D3 may help with fighting viral infections, a collaborative UK study by the Universities of Surrey and Brighton has revealed.

FORMS OF VITAMIN D	
Ergocalciferol (vitamin D2)	
Cholecalciferol (vitamin D3)	

"The main implication of this study is that dietary intake of vitamin D2 should not substitute for vitamin D3. Although this may sound controversial, it is possible that vitamin D2 could harm health by interfering with the physiological roles of vitamin D3," Colin Smith, lead author of the study and professor at the University of Surrey, tells NutritionInsight. "The food industry should only add vitamin D3 to its products, avoiding vitamin D2. Health policy should be specific about the type of vitamin D that should be taken, vitamin D3."

## Vitamin D2



### Harming health?

The impact of vitamin D2 was found to have a “questionable” impact on human health, while D3 appears to balance people’s immune systems. It could also help strengthen defences against viral infections such as COVID-19, the researchers note. “Consumers should use vitamin D3 supplements and vitamin D3-fortified foods and, where possible, get into the sun for 30 minutes a day,” Smith says.

According to Smith, individuals on vegan or vegetarian diets tend to use vitamin D2 because vitamin D3 is often sourced from animal products. “They should switch to a vegan-friendly source of vitamin D3.



These do exist,” he highlights. Tapping into the demand, Lycored last year unveiled a vegetarian multivitamin D3, delivering 1 million IU per gram of

vitamin D3. Industry groups have been calling on the European Commission to classify vitamin D3 as a chemical entity, as opposed to a Product of Animal Origin and therefore not be subject to import tests.

### Link to immunity

Researchers found evidence that vitamin D3 had a modifying effect on the immune system that could fortify the body against viral and bacterial diseases. The study investigated the impact of vitamin D supplements – D2 and D3 – taken daily over a 12-week period on the activity of genes in people’s blood.

“We have shown that vitamin D3 appears to stimulate the type I interferon signalling system in the body – a key part of the immune system that provides a first line of defence against bacteria and viruses. Thus, a healthy

vitamin D3 status may help prevent viruses and bacteria from gaining a foothold in the body,” Smith adds. “Our study suggests that it is important that people take a vitamin D3 supplement, or suitably fortified foods, especially in the winter months. While we found that vitamin D2 and vitamin D3 do not have the same effect on gene activity within humans, the lack of impact we found when looking at vitamin D2 means that a larger study is urgently required to clarify the differences in the effects,” adds Susan Lanham-New, co-author of the study and head of the department of nutritional sciences at the University of Surrey.

Although some foods are fortified with vitamin D, like some breakfast cereals, yogurts, and bread, few naturally contain the vitamin. Vitamin D3 is produced naturally in the skin from exposure to sunlight or artificial ultraviolet UVB light, while some plants and fungi produce vitamin D2.

By Andria Kades

### Combination of two beta-glucans reduced inflammatory biomarkers in COVID-19 patients - India clinical trial

By Guan Yu Lim 02-Feb-2022 – NutraIngredients Asia

The combination of two beta-glucans produced by *Aureobasidium Pullulans* (AFO-202 and N-163) strains along with standard treatment was shown to reduce

inflammatory biomarkers in COVID-19 patients, compared to just the standard treatment alone.

In this clinical trial conducted in India, patients who received the beta-glucans in addition to standard treatment saw a greater reduction in C-reactive protein (CRP), ferritin, and Interleukin 6 (IL-6), which are important biomarkers to predict the course of COVID-19 and risk of developing severe disease and respiratory failure. Currently, treatment for COVID-19 involves standard care comprising of medications such as dexamethasone, azithromycin, remdesivir, as well as use of antiviral agents and



immunomodulators to control inflammation by preventing a cytokine storm and further tissue damage. “With some vaccines approved and a variety of vaccine candidates under investigation and in clinical trials, adjuvants have been advocated to overcome challenges of low immunogenicity and inefficient protective immunity,” said researchers from India and Japan who conducted the current study.







Examples of current adjuvant treatments for COVID-19 include quercetin, vitamin D, zinc and beta glucans. The beta-glucans (AFO-202 and N-163 strains) assessed in this study was manufactured by Japan-based GN Corporation.

One of the authors, Dr Samuel Abraham, who is head of R&D at GN Corporation, told NutraIngredients-Asia : “AFO-202 is an immune enhancer with some immune modulation, while N-163 is a better immune modulator, which were earlier proven in both pre-clinical studies and studies in healthy volunteers in Japan. In this study, compared to the control group, the cytokine storm and coagulopathy markers continued to be under significant control on day 15 in those who consumed the two variants of AFO-202 and N-163 strains together .”

The study is being peer-reviewed now and available on medRxiv. This study was conducted at Madras Medical College Hospital, in collaboration with the TN Dr MGR Medical University in Chennai, India. In total, 40 adult patients with mild to moderate COVID-19 were recruited. They required hospitalisation, but those requiring intensive care were excluded.

AFO-202 beta glucan is in the form of granules, while N-163 beta glucan is administered as a gel sachet. The primary outcomes were the time taken for improvement, complete recovery, recurrence in typical symptoms from baseline. The secondary outcomes were mortality, progression to critical care admission, oxygen/life-support and tests for biochemical parameters such as ferritin, IL6, and CRP.

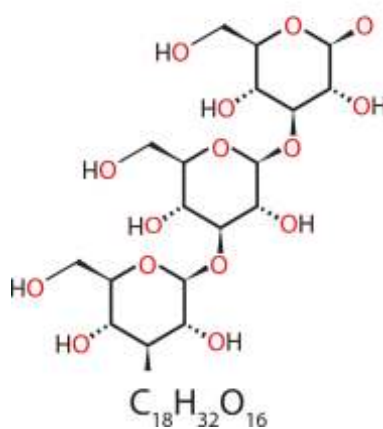
#### Biomarker findings

The findings revealed that CRP reduced from 33.95 mg/l at baseline to 5.64 mg/l on day 7 for the treatment group, and continued to be under control on day 15 (5.68 mg/l). For the control group, CRP levels declined from 33.95 mg/l at baseline to 5.07 mg/l on day 7, however, it further increased to 14.6 mg/l on day 15.

The same trend was observed in ferritin, the treatment group's levels dropped from 560.58 ng/ml at baseline to 261.44 ng/ml (day 7) and 182.40 ng/ml (day-15). For the control group, ferritin levels fluctuated from 535.24 ng/ml at baseline, to 116.66 ng/ml on day 7

and 291.95 ng/ml on day 15. Similarly for IL-6, the treatment group also showed a significantly larger decline between day 7 and day 15 compared to the control group. Researchers said: “These findings add to the advantages of these nutraceutical agents as continuous oral supplemented adjuncts for treatment and prevention of COVID-19 after necessary validation in larger multicentric studies.”

#### beta-Glucan



This study was conducted in late 2021, before the Omicron variant emerged. Researchers said the current and past evidence “make them (beta-glucans) worth considering as the optimal supplemental treatment and prophylaxis adjuvants ,” and pointed out that future studies will need to be conducted for variants of concern.

For GN Corporation, Abraham told us: “Having understood the multiple potentials of Nichi Glucan range of products, we are now studying the association between gut microbiome and metabolome in healthy and disease status, immune modulation in neurological diseases like multiple sclerosis and muscular dystrophies and gut microbiome in neuro-developmental diseases and their potentials in acting as prophylaxis to Parkinsons disease and Alzheimer's disease.”





# FOOD SCIENCE & INDUSTRY NEWS

## Industry rife with opportunities in probiotic space

28 Feb 2022 Nutrition Insight

Consumers across the globe are keen to learn more about probiotics, a study reveals.

The interest is driven by demands for gut health, feeling better and immunity support, according to the findings. “This is a call to action for probiotic food brand owners to become even better to live up to their consumers’ needs. Probiotics are well-known as a concept, and it is time to ensure that those key ingredients are explained properly to the educated consumer,” Lars Bredmose, senior director of commercial development in food cultures & enzymes, tells NutritionInsight.



Surveying 16,000 individuals across 16 countries, the results revealed 71% of consumers would like to learn more about probiotics, preferring packaging and online resources as avenues for deepening their understanding. The strong interest in learning signals “a new

chapter for market trends and a valuable opportunity for players in the global food industry,” the company highlights.

### Knowledge driving industry future

The findings show a continued high understanding of probiotics among consumers and a familiarity with the concept of a natural microbiome, Bredmose adds. Specifically, 50% of consumers are familiar or very familiar with the term ‘gut microbiome’. “This is a new development that allows probiotic brand owners to address their customers’ health needs in more accurate language. It is clear that consumers both understand and demand science behind the probiotics they purchase.”

According to the findings, consumers are keen to learn more about probiotics in a bid to cater to their health, sparking a motivation to learn more about which probiotics may offer the best outcomes for individual needs. The study notes 48% of respondents consume probiotics daily or almost daily in supplements or other foods. “Survey results suggest that

probiotic consumption is driven by an interest in their functional benefits, such as promoting gut and immune health and supporting the microbiome,” the company notes. The space for functional F&B for probiotics has been spotlighted as a “still unexploited segment for probiotics” with ample opportunity in the space as consumers seek to improve their holistic health and well-being.



### Strains for innovation

Consumers are most interested in information regarding health

benefits and information that helps them identify which probiotic strains to select, the data reveals. “We think that strain branding is one of the key trends we will see going forward, to inform consumers of which exact probiotic strain they are getting with a particular product,” Bredmose underscores. In practical terms, this could mean more information as to which probiotics may offer the best outcomes for individual needs, he adds. “Moreover, we believe the findings can serve as a source of inspiration in terms of innovation for the relevant producers.”





### Tackling misconceptions

Though 75% reported being very or somewhat familiar with probiotics, there are a range of misconceptions surrounding the space, the findings highlight. "For example, 47% of consumers agree or somewhat agree to the incorrect statement that all dairy yogurts contain probiotics, when in fact most contain live cultures but not all contain probiotic cultures," the research notes. A separate survey last year revealed that demand for probiotics is being driven by an increasing interest in digestive and immune health. While internet research is the most popular way to learn more about probiotics, more than half of consumers have received a recommendation to consume probiotics from someone they trust, the study notes. "The flavour of the product and trust are top drivers for choosing and staying with a particular brand of probiotic food."

By Andria Kades

### Leave gas in the past: Intoleran targets global food intolerances with enzyme supplements

09 Feb 2022 Nutrition Insight

Intoleran's director of finance and operation, Bouke Smeets, says the company's clean label enzyme supplements help consumers "functionally avoid" the adverse effects of certain food intolerances. NutritionInsight speaks with Smeets about Intoleran's enzyme supplements and its plans to increase its presence in Europe and the US.



Intoleran supplements contain enzymes found within the body that help break down nutrients that may be hard to digest. The company has supplements alleviating intolerance to lactose, fructose, starch and fibre. Intoleran also offers a supplement containing diamine oxidase, an enzyme to treat histamine intolerance. "We started as a company in the Netherlands, so most of our products are sold there. However, due to our unique range of products for different intolerances and most FODMAPs like fructose, starch, sucrose, fructans and galactans, we help customers all around the world," she says.

### Food intolerance is rising

FODMAPs – fermentable oligosaccharides, disaccharides, monosaccharides and polyols – are a group of sugars that are not completely digested or absorbed by the intestines. They can ferment when they pass into the large intestine, leading to gas, bloating and discomfort. Smeets says

Intoleran is currently developing web content to help those suffering from digestive issues figure out the root cause of the problem and identify potential solutions. "For example, we have

recently launched an Intolerance Check. This helps explain what food contains which nutrients and FODMAPS to help clients understand their issues."

Increasingly, industry members are being pushed to address food sensitivities and



intolerances to better serve customers. Rising global allergy rates have fuelled this.

### The current market for enzyme supplements

"When people suffer from, for example, gas and bloating nowadays, there are more dieticians and doctors with the knowledge to identify the root cause of their symptoms, which is often food intolerance. Due to the growing awareness, the demand for enzyme supplements that can help to support a healthy diet has been growing." Smeets informs that the products are clean label and produced in Intoleran's own facility with as few ingredients as possible to avoid unnecessary additives. Limiting added ingredients increases Intoleran's consumer base by making the products appeal to the broadest pool of customers. "For example, our Lactase capsule only contains three ingredients: lactase enzyme, small amounts of calcium carbonate as a filler and the HPMC capsule itself. In most of our competitors, we see a wide variety of long lists of ingredients."

### Food intolerance is often caused by enzyme deficiency

Diet-related intolerance is a common issue faced by many people who sometimes go their whole lives without understanding the source of their diet-related symptoms. "With food intolerance, there is often a problem in the breakdown of food and with digestion. This may be due to the fact that there is a deficiency of a certain enzyme or an enzyme is completely missing." Smeets

explains that carbohydrates, proteins and fats are typically broken down and digested in the small intestine.





However, if a person's digestive processes are not functioning correctly, food and nutrients can wind up in the large intestine instead, where bacteria break down what one has ingested. Depending on the nutrient being digested, this can lead to "fermentation. The problem is that this so-called 'fermentation' process often releases gas and moisture that cause unpleasant intestinal symptoms."

By Olivia Nelson

### Cost and lack of ingredients holds back 3D printing's potential for at-home customized food and nutrition

11 Feb 2022 Nutrition Insight

3D printing could unlock custom textures, flavours and nutritional content in foods, but cost, capacity and lack of printable ingredients is currently holding the technology back from taking over the market, according to a food expert.

Dr. Robert McGorin, professor at Oregon State University, tells NutritionInsight that "3D printing of foods at present is prohibitively expensive and not cost-effective for food manufacturing on a large scale. Capital costs and slow production speeds are the major hurdles at present to overcome."

In order for the technology to be available for home use within the next 15 years, McGorin says a few things are necessary. Namely, designing the print heads for easy

cleaning by the layperson, flexibility of printers to make a more extensive range of products and, importantly, source of food ingredients that are designed to be used for the 3D printers. The need for these printable food ingredients represents a gap in the market for 3D-printed personalized nutrition. Last October, Colorcon Ventures flagged the potential for 3D printing to create personalized nutrition for consumers.

### On the cusp of a food tech revolution

3D printers build pre-designed shapes in a layer-by-layer process via a nozzle that deposits materials onto a surface. When 3D printing was in its infancy, the primary material of choice was plastics. However, researchers have been looking into printing foods for a while.



Apparently, thick pastes such as frosting or peanut butter have been the easiest to 3D print. But experts are now exploring other foodstuffs, like powders, solids, gels and liquids. If experts can successfully

harness 3D printing tech to make food, the possibilities and economic opportunities for the alimentation industry are myriad.

So far, the R&D process has been challenging, as unlike plastics and similar materials, the properties of foods are not always "linear," and minute temperature fluctuations, for example, can completely alter how food materials flow.

Currently, the US Department of Defense's Combat Feeding Directorate is looking into making 3D-printed nutrition bars to serve as rations catering to the needs of soldiers under different conditions. Columbia University researchers say they have made a slice of cheesecake that has an "elaborate internal structure" and releases flavours in waves.



Also, the company Redefine Meat is attempting to reproduce the structure, flavour and texture of beef steaks with plant-based fibres via 3D printing. In 2020, researchers at the Singapore University of Technology and Design developed 3D printed dairy ingredients.

### Logistical constraints abound

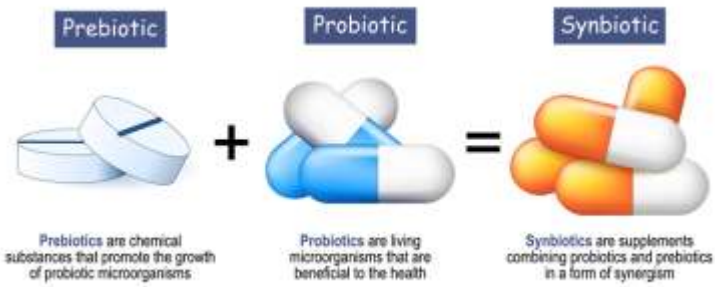
However, many barriers remain as food manufacturing plants typically need to run on a high-volume scale to maintain affordable costs. At present, 3D printers for food applications would need "considerable" technological advances to overcome the costs and manufacturing speed constraints, according to McGorin.

He elaborates the major issues with 3D printing are production speed, volume and cost of manufacturing and equipment compared to traditional food manufacturing processes. He also highlights that the 3D printers would need to undergo routine cleaning and sanitation to ensure no residual build-ups of unprocessed food ingredients. He says this could spoil the equipment and production line, causing microbiological growth and food safety risks. "I expect that the routine equipment maintenance costs for 3D printers used for high-volume food processing could be high."

McGorin explains that "food products such as snack goods need to be retailed at a low or affordable cost to be competitive. The opportunities for 3D printing are for expensive food products that retail at very high cost. For example, I am aware that 3D printing has been applied to low-volume specialty products like custom 3D-printed chocolates with a reproduced image of the sender or the recipient printed in 3D."

By Olivia Nelson





## Prebiotic experts spotlight synbiotics, convenience and functionality for 2022

24 Feb 2022 Nutrition Insight

The year ahead is expected to see the prebiotics sector move beyond gut health and emerge into areas such as skin, mood and sleep.

NutritionInsight speaks to industry experts who give insight into how the prebiotic space is also experiencing new delivery formats such as prebiotic blends and “snackification”. Commenting on the shifting gut health trend, Dr. Isabelle Jaouen, R&D director at Alland & Robert, says: “Although gut health remains a major trend within the prebiotic space, other areas impacted by prebiotics are weight and anxiety management, alleviation of sleep problems, skin health and general quality of life.”

### Eying emerging and shifting trends

The push toward a more holistic approach to health is a huge trend for 2022. Prebiotics have a vital role in putting this into practice, says Vicky Davies, global marketing director for performance, active and medical nutrition at FrieslandCampina Ingredients.

“Today, consumers treat health as a proactive, whole body-and-mind issue, exercising more and taking proactive steps to maintain their mental health, including improving their gut health.

Two in three consumers already recognize that gut health is key to achieving overall well-being,” adds Davies. “We’re already

collaborating with other experts to explore possibilities in this area, including partnering with Lallemand Health Solutions to bring together prebiotic and probiotic ingredients launches and two new gut health product concepts.”

### Spotlight on synbiotics and convenience

ADM highlights that there is also a growing trend for tailored convenience. “Consumers want options that fit into their different daily routines and lifestyles, and they want solutions specifically designed for them. Globally, 63% of



consumers say they are interested in F&B that are customized to meet individualized needs,” says Deanne Dick, director of fibre at ADM.

### “Snackification,” on-the-go formats and functionality

FrieslandCampina Ingredients discusses the current formats that are in demand in the prebiotic space. “Pre-pandemic, we were witnessing huge growth in convenience and on-the-go formats. The pandemic changed this somewhat, given we have spent two years under restrictions that limited our need to eat on the go,” Davies explains. “In 2022, consumers still want the option to eat on the go, seeking formats that are easy to incorporate in their daily routines and diets,” says Davies. “Think indulgent snack bars and low-sugar soft drinks that have additional health positionings, like supporting digestive function, sleep or immunity. In 2022, snackification is here to stay – we’re focusing our efforts on high-growth areas like health bars and shots. These products are well placed to carry gut health positionings.”

Meanwhile, ADM observes that most of today’s consumers are interested in receiving their functional ingredients in the form of F&B. “This may be due to consumers increasingly connecting what they eat to how they feel, prioritizing both the sensory experience and nutritional benefits. Many consumers turn to beverages for convenience and delicious sensory elements, like a creamy shake or smoothie or bubbly ready-to-drink (RTD) tea, says Dick.

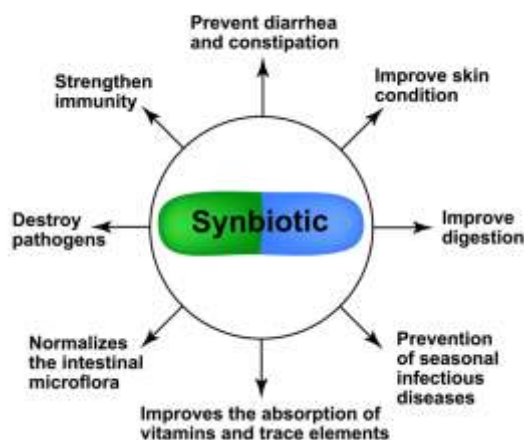
### Targeting the brain, skin and mood

Prebiotic use in skincare is becoming increasingly popular, according to Alland & Robert. “Prebiotics are very good for skin as they help to keep the skin’s microbiome robust and healthy. They also keep the skin pH levels healthy and create a barrier against inflammation. As consumers are more and more aware that what they put on their skin enters their body, prebiotics is an ideal option for natural beauty products,” says Jaouen.

Nexira adds that a new field of investigations for prebiotic activity is related to non-colonic microbiota modulation. “Notably, skin microbiota modulation by either oral or local prebiotic applications is one of the new interests. Comparatively, vaginal health is also a target,” says Damien Guillemet, scientific director at Nexira. According to FrieslandCampina Ingredients, although prebiotics operate via the gut, they have benefits that extend well beyond. “Brain health and mood are one of the most advantageous areas where prebiotics can support health – especially with consumers prioritizing mental well-being,” says Davies.



## FUNCTIONS OF THE SYNBIOTIC



“Growing research into the gut-brain axis shows us the association between gut microbiota and mental well-being, sleep and more, as well as modulation with prebiotics.” To add to this, Davies explains: “Research indicates that dysbiosis – disruption to the gut microbiota stability caused by an imbalance in the microflora – is associated with sleep disturbances, which in itself can be linked to a hampered immune system.”

### Prebiotics for infants

Human milk oligosaccharides (HMOs) have been shown to selectively encourage the growth of beneficial species and sub-species of bifidobacteria in the human gut, Davies says. “Additionally, our HMO 2’-FL offering, Aequival 2’-FL, has been shown to have a similar structure to carbohydrates found on the walls of cells of the human gut. Many viruses enter our cells via carbohydrate molecules known as glycans to which they bind during the first stages of infection.” “Due to this structural similarity, 2’-FL also can bind pathogens, including those linked with childhood diarrhea, preventing their adhesion to the intestinal wall. Currently, 2’-FL makes up part of our early life nutrition offering,” adds Davies.

### Targeting non-alcoholic fatty liver disease

“Taiyo’s fibres support biodiversity, mucosal formation and the production of IgA antibodies, and promote the production of tight

junction proteins, which increase the tightness of the intestinal wall and facilitate wound healing,” says Dr. Stefan Siebrecht, managing director at Taiyo.

He continues to add that the efficacy of PHGG against non-alcoholic fatty liver disease (NAFLD) was demonstrated in a study conducted by the Kyoto Prefectural University of Medical Science and Taiyo Kagaku Group. “The study found fat accumulation in the liver and liver inflammation was suppressed, the expression of genetic minors related to liver inflammation and fibrosis decreased and liver function markers improved.”

By Nicole Kerr

## ‘Beyond the usual suspects’: Report scrapes social media to identify emerging trends

By Oliver Morrison  
31-Jan-2022- Food Navigator Asia

Used by Nestlé, PepsiCo, Givaudan, Campbell’s, Coca-Cola, General Mills, Dole, and more, Tastewise, the AI-powered real-time food intelligence solution, is sharing the top consumer food and beverage trends for 2022.

Founded by former Google executive, Alon Chen, and former tech leader at Similar Web, Eyan Gaon, the solution predicts changing consumer needs based on over 78,000 restaurants and delivery menus, 20 billion social interactions, and 115,000 home recipes online. “The way we order, cook, and eat is transforming in the face of a global pandemic, climate change, new technologies, and increased interest in health,” said Tastewise CEO Alon Chen. Ten years ago, affordability and taste were the sole top motivators behind the UK’s food and beverage choices, he said. “If it was tasty and good for the wallet, it



was on the plate. Health - while always a consideration for some - has become a much more mainstream consideration in the interim, joining other demands like authenticity, aesthetic, and sustainability on the table.” Tastewise’s latest report identifies the trends expected to make a big impact this year, beyond the ‘usual suspects’ that have been gaining major steam and attention in reporting over the past two years.

## Sustainability is pivoting from packaging to ingredient sourcing

Consumer interest in sustainable food and beverage rose 12% last year, reckons Tastewise, based on its comprehensive social media scouring. But the focus is evolving away from the end of the product journey and refocusing on its beginning. While conversation around product packaging is on the decline, claims around sustainable ingredient sourcing are growing fast with carbon footprint (+17% YoY), habitat conservation (+32% YoY) and regenerative farming (+46% YoY) all showing rapid growth. This aligns with recent and continuing discussion around manufacturers’ responsibility to produce sustainably, and away from the consumer’s behavioural responsibility at the end of a product’s journey, such as recycling.







#### Around Asia: Regional cuisines

It's no surprise that Brits like Asian food. But there's growth in regional Asian cuisines, according to the report. There are therefore opportunities for food manufacturers to explore the tastes of Korean, Taiwanese, Malaysian and Filipino food.

#### Non-alcoholic buzz and bubbles

We know alcohol-free beers, gins, and cocktails are making waves in the market. However, non-alcoholic prosecco and champagne will be the next port of call for consumers, reckons Tastewise. Interest in alcohol-free sparkling wine rose 10% last year, it said.



#### Foraging for local flavour

While low-to-no alcoholic beverages are a growth space exciting the drinks sector, traditional alcoholic beverages are not sitting on their laurels. Here, foraged ingredients are capturing consumer imagination.

Consumer interest in botanical ingredients in alcoholic beverages is growing at 17% on-year, said Tastewise. Foraged ingredients, notably elderflower, algae, seaweed and berries tick health and sustainability boxes and add distinct local flavour that premiumizes alcoholic beverages.

#### Adaptogens for functional health

Similarly, the perceived benefits on stress relief and brain function provided by adaptogens mean consumers are increasingly looking to incorporate them into home cooking, mainly hot drinks. Adaptogens in home cooking have risen 8% this year, said Tastewise. The inclusion of adaptogens such as reishi, cordyceps and ashwagandha on restaurant menus rose 17%.

#### Florals and sensory intrigue

Floral flavour profiles from the likes of Cherry blossoms: Elderflower, Orange blossom, can help add unique sensory intrigue to diverse dishes and drinks. Floral flavour profiles are growing +41% YoY in consumer interest, revealed Tastewise.

#### Gourmet tackles sustainability

The world of gourmet cooking is no longer exclusively about indulgence. This exclusive world, too, is under scrutiny for its environmental impact, claimed Tastewise. Interest



in sustainable food and beverage is rising 28% year-on-year for gourmet applications as ingredients typically associated with gourmet - like meat and seafood, alcohol, and desserts - undergo a sustainable revolution in their production practices, observed the trends report. The intertwining of gourmet and sustainability makes sense, said Tastewise, when you consider chocolate and coffee are key ingredients in this landscape due to their links with fair trade; traditional production is in direct competition with rainforest preservation.



Similarly, the beer industry, though it is arguable if this belongs in the gourmet category, has been criticized for its impact on water sources, since water is both its primary ingredient and its largest waste by-product. Innovative beer brands are finding ways to limit their impact.





# REGULATORY NEWS

## Front-of-pack claims convince parents sugar-sweetened drinks are healthy, research finds

25 Feb 2022 Nutrition Insight

Front-of-package claims and marketing messages used to promote fruit-flavoured drinks and toddler milk with added sugars contribute to parents' misperceptions about product nutrition and benefits for their young children. This is according to new research by the UConn Rudd Center for Food Policy and Health in the US. The most recent Dietary Guidelines for Americans recommends that children younger than age 2 consume no added sugars.

The study's findings, published in *Maternal & Child Nutrition*, also revealed that many parents are confused about different product categories, such as sweetened fruit-flavoured drinks, 100% juice, toddler milk, and infant formulas. "Industry can and should do more," says Fleming-Milici. "Increasing transparency about product ingredients and eliminating misleading marketing of toddler milk and fruit-flavoured drinks can go a long way in supporting parents' best

efforts to provide healthy drinks to their children."

Companies often cross-brand their less healthy products with healthier products and place these similar-looking drinks side-by-side on shelves at retailers, contributing to this confusion. "Marketing tactics commonly used to promote fruit-flavoured drinks and toddler milk appear to mislead, mask and misrepresent true ingredients," says Frances Fleming-Milici, director of marketing initiatives at the Rudd Center and lead author of the study.

"Parents were surprised, and many were angry when they learned of the ingredients in these

drinks and that health-related claims on the packages are not supported by scientific research," he adds.



## No added sugar for toddlers

Health experts do not recommend serving fruit-flavoured drinks or toddler milk. Sugar-sweetened fruit-flavoured drinks have very little juice, and many products marketed for young children also have non-nutritive sweeteners.

Toddler milk is typically produced by infant formula companies and marketed for children (12-36 months) as the next step after infant formula, but they consist primarily of powdered milk, added sugar (corn syrup solids or other sweeteners), and vegetable oil. Despite expert recommendations, 27% of children aged 12 to 18 months and nearly 50% of 2 to 4-year-olds consume sugar-sweetened drinks on a given day.







The research used focus groups in low-to-moderate income neighbourhoods in Hartford, CT and Washington, DC to evaluate parents' understanding of common marketing tactics used to promote these drinks and whether they mislead parents to believe the drinks are healthy or necessary for children.

Participants shared their knowledge, attitudes, and behaviours regarding serving different drinks to their children and were asked to reflect on new information they learned through the focus groups:

- Few parents realized that many fruit-flavoured drinks contain non-nutritive sweeteners in addition to added sugar.
- Parents expressed shock that toddler milk package claims are not supported by scientific research and described them as “deliberately misleading.”
- Participants discussed the higher price of 100% juice relative to sweetened fruit-flavoured drinks as a reason why parents may choose sweetened fruit-flavoured drinks for their child.
- Participants described their grocery shopping as “rushed,” giving them little time to differentiate among children's products at the time of purchase and making them rely on front-of-package information to make purchase decisions.



- Parents perceived that companies monitored the age of their child after signing up for infant formula coupons because they began receiving toddler milk coupons and samples when their child was “closer to a year.”

#### Policy and industry take-away

The researchers highlight that the findings support the need for policies to address potentially misleading marketing of these drinks and demonstrate opportunities to use counter-marketing to reduce parents' provision of sweetened fruit-flavoured drinks and toddler milk. Current sugary drink reduction campaigns should inform consumers that sweetened fruit-flavoured drinks and toddler milk are also sugary drinks, and they should also help them identify added sugar and non-nutritive sweeteners.

“Industry can and should do more,” says Fleming-Milici. “Increasing transparency about product ingredients and eliminating misleading marketing of toddler milk and fruit-flavoured drinks can go a long way in supporting parents' best efforts to provide healthy drinks to their children.” Misleading or incomplete labelling can also be found in other food sectors. For example, regarding sesame ingredients, researchers are calling for faster action on allergen labelling on food packaging, citing serious health risks for consumers who are unknowingly ingesting products that often cause severe allergic reactions.

By Natalie Schwertheim

#### Elderly should take vitamin D supplement every day, says Swiss government

03 Feb 2022 Nutrition Insight

Switzerland's Federal Food & Safety Veterinary Office (FSVO) has

advised that consumers over the age of 65 should up their vitamin D intake with an 800 IU supplement every day.

The guidance says the vitamin can reduce the risk of falls and hip fractures by up to 30%. Members of the supplements industry welcome the news. The advice was put forward by the International Alliance of Dietary/Food Supplement Associations (IADSA), a UK-based group that comprises members of the global supplements industry.

The regulatory group's vitamin D resources were made as a part of its Mind the Gap initiative to spread information about vitamin deficiency. Mind the Gap's resources highlight Finland's hugely successful mandatory vitamin D fortification program.

“IADSA will continue to engage with policymakers and other stakeholders worldwide to raise awareness of the role of supplementation in increasing levels of health and well-being,” says IADSA's technical and regulatory affairs director, Cynthia Rousselot.





**Finland: A vitamin D “pioneer”**  
IADSA's Mind the Gap initiative included an in-depth look at Finland's national health policy, which has given strong advice to maintain healthy vitamin levels through supplementation since the 1950s. Seventy years ago, Finland's residents were plagued by vitamin D deficiencies caused by long, dark winters. This resulted in many children developing conditions like rickets and brittle bones.

The Helsinki government responded by implementing a program to ensure children and babies get enough nutrients through vitamin supplements. This was a massive success, decimating the rate of rickets in Finland. Inspired by the success of this program, the government went a step further and, in 2003, legally mandated that milk and margarine spreads be fortified with the ingredient. In 2010, the Finnish government upped the required quantity of vitamin D in dairy products. This resulted in the average vitamin D intake doubling in Finland between 2007 and 2012 for those aged 25 to 74.

Prior to the mandate, only a third of Finland's residents had proper vitamin levels. By 2011 however, 90% of residents had sufficient levels.

The program was such a success that other countries are reportedly interested in implementing similar fortification rules. In 2020, England's government started supplying vitamin supplements to people vulnerable to COVID-19.

**Half the population suffers from vitamin D deficiency**

The FSVO highlights that vitamin D is beneficial to bone and muscle health and supports the immune

system, dental health, the heart and the brain. As humans rarely receive enough vitamin D from diet and sunlight exposure, they must take supplements to achieve high enough vitamin D levels. According to the FSVO, about half the population lacks adequate vitamin D levels. To compound this, as people age, their ability to produce vitamin D through the skin falls by as much as 25%.

When vitamin D levels are too low, people can experience hair loss, low mood, poor bone and joint health. Symptoms of conditions like multiple sclerosis can be exacerbated by low vitamin levels. People with low vitamin D may also develop rickets and be more susceptible to viral infections.

**Edited by Olivia Nelson**

**Seaweed surge: EU accelerates algae nutrition and packaging with new market platform**

14 Feb 2022  
Nutrition Insight

The European Commission (EC) is launching a stakeholder platform to promote algae use for nutrition and packaging. Called EU4Algae, the project aims to accelerate business development and consumer awareness in the EU. The EC will be working with the European Climate, Infrastructure and Environment Executive Agency (CINEA) and a consortium of sustainability consultants composed of EurA, The European Algae Biomass Association, Systemiq, Technopolis and s.Pro for three years, beginning this summer.

The EC says that despite the evidence of algae's nutritional value,



along with its long history of use in Asian cuisine and recent scientific developments proving its uses for industrial feedstock and bioplastics, “the uptake in Europe of algae production and consumption is too slow.”

“The platform will be a unique space for collaboration among European algae stakeholders, including algae farmers, producers, sellers, consumers, technology developers as well as business-support organizations, investors, public authorities, academia, researchers and NGOs,” states the EC. “It will also act as a single information hub on algae funding calls, projects, business-related information, intelligence and best practices.”

**Seaweed nutrition boom**

Since the start of the COVID-19 pandemic, various algae products have been launched globally for their immune-supporting properties. Last summer, for example, global ingredient manufacturer Kemin Industries was granted a US patent on the use of its *Euglena gracilis* algae-derived BetaVia's beta 1,3 glucans, which have been shown to modulate human immune function and treat intestinal inflammation.



In Europe, Portuguese companies Allmicroalgae and Algaplus began promoting jointly developed microalgae, and a macroalgae powder blend branded Algaessence, which they say is the first such product launched in Europe. The product is touted for its immune-supporting power, containing protein, dietary fibre, vitamin B12 and ALA (omega 3), iodine, iron and magnesium.







### Production race

These product launches are matched by larger supply chain investments, with the Australian government last year investing AU\$59 million (US\$44 million) in the country's new Marine Bioproducts Cooperative Research Centre, which is working to meet global demand for plant-based proteins like algae. This initiative is supported by 68 industry, academic and government partners, who are co-investing AU\$70 million (US\$52 million) in cash and AU\$140 million (US\$105 million) of in-kind contributions, for a total investment of AU\$269 million (US\$190 million) in the centre.

Similarly, the Bio-Based Industries Joint Undertaking – a public-private partnership involving the EC and the Bio-industries Consortium – last year invested €15 million (US\$17.7 million) into creating the “world's largest” fully integrated microalgae biorefinery in France. The four-year project is being led by Microalgae-based ingredients producer Microphyt and includes 11 international partners.

### Seaweed packaging

The EC's EU4Algae platform will also be focusing on promoting research into algae's use for environmentally sustainable industrial applications like bioplastics. A number of business developers and academic researchers are touting algae's potential as an essential ingredient in biodegradable materials that could replace traditional plastics as legislation tightens worldwide. Recently, UK-based Notpla raised £10 million (US\$13.3 million) in series A round funding for its seaweed-based packaging materials, which include food packs, films,

coatings, sachets, pipettes and paper products. The company is already working with takeaway delivery service Just Eat to trial seaweed-based boxes for the foodservice industry.

Last year, Russian and Indian scientists also created an algae-based, water-soluble, edible film for food packaging. The researchers say the film, which is primarily composed of sodium alginate, dissolves by 90% within 24 hours. They also say the material is edible and could extend the shelf life of fruits, vegetables, poultry and seafood.

By Louis Gore-Langton



### 'Suboptimal protocols': Clinical trials used for Japan's Foods with Function Claims under fire

By Tingmin Koe 01-Feb-2022- Food Navigator Asia

The quality of clinical trials behind products under Japan's Foods with Function Claims (FFCs) is undermined by a lack of proper protocols, such as the absence of trial registration and transparent study designs, says a new study.

The study, published in *Nutrients*, was conducted by researchers from three Japanese universities, including Tokyo University of Agriculture, University of Toyama, and Tokyo Aike Medical and Health Sciences University.

A total of 136 clinical trials were sieved out from the website of Japan Consumer Affairs Agency (CAA) –the

body overseeing FFCs. These trials were published from July 2018 to June 2021.

Japan began the FFCs system in April 2015. Before launching a FFC, companies are supposed to notify the CAA with documents supporting the science and efficacy of the products. The scientific evidence could come from published systematic reviews or clinical trials conducted by the company itself. About 90 per cent of the evidence comes from systematic reviews, with only 10 per cent coming from clinical trials, according to data from CAA.

In this study, the researchers assessed the quality of the clinical trials of FFCs based on whether a clinical trial registration was performed and seven compliance items, including if the title, participant, intervention product, comparison product, outcome, and study design were stated. Out of the 136 clinical trial papers, 76 per cent performed clinical trial registration, while the remaining 24 per cent did not or failed to specify if a registration was performed.

“Despite the widespread endorsement of CTR (clinical trial registration) globally, CTR in FFC remains suboptimal, with no registration or, in many cases, unknown existence of the protocol itself,” the researchers said.

The researchers explained that clinical trial registration was important because unregistered trials were more likely to report favourable findings than registered trials.





“No registration or absence of the protocol immediately creates doubt about the internal validity of results in a CT (clinical trial). Therefore, the validity of target articles in this study is unknown, especially if there were protocol violations, which could lead to flawed conclusions based on systematic errors and/or protocol deviations.”

On the other hand, the researchers pointed out that the FFC guideline did not enforce the need to follow international guidelines for trial protocols. “The FFC guideline stated that ‘research started within one year after the enforcement of the FFC system may be reported in a format that does not comply with international guidelines’. This special measure may have led to a disregard for the importance of the protocol.”



**Intervention material not stated**  
Another problem is that some of the clinical trial papers did not specify the intervention used.

In this case, the researchers explained that the concealment could have been to prevent other competitors from stealing the intended food development content. “When researchers employed by the company conduct a CT, they may conceal the registration of contents because they recognise that the functional component of the product is confidential.

“In such cases, it is meaningless that CTR exists because it is unclear what kind of research was conducted. To remedy this situation, researchers need to re-familiarize themselves with the four dimensions of the purpose of the ICMJE (International Committee of

Medical Journal Editors) registration policy,” the researchers said.

#### Industry funding

On the other hand, clinical trials which are funded by the industry might cherry pick favourable results and downplay on unfavourable results. In addition, the researchers highlighted that 80 per cent of the authors of the published papers were affiliated with the industries, and that this was a “worrisome” problem.

#### CAA tightening checks

Over the years, the CAA has tightened its watch on the quality of scientific data used to support FFC documentation. It has put in place a checklist system that is backed by five industry associations, which would be able to assist companies in checking whether their scientific document meets the requirements.

Under this system, companies submitting scientific data must meet requirements of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement and ensure that the data is accurately used. “If CAAs or the associations found that there is a lack of information, or false statement, or some mistakes, they will send back the documents to the applicants or in the worst case, the CAA will inform them that their notification cannot be accepted. Not many cases are accepted at once, sometimes companies will need to submit them twice or thrice,” Hisaaki Kato, CEO and president of Japan-based health foods and cosmetics consultancy Smooth Link told NutraIngredients-Asia.

In addition, CAA regularly conducts checks on the scientific evidence of FFCs that are already successfully notified. This is to ensure that the evidence is up to date. However, Kato pointed out that most companies failed to check that their data was up to date regularly. “After a FFC notification is accepted by the CAA, the

notifiers/companies stopped checking the scientific data regularly and make relevant updates,” he said, and this could cause a product to be rejected if new evidence challenging the science of the product has surfaced.

#### Safety checks lacking?

Kato added that companies were overtly concerned with the efficacy of the products and have taken for granted the safety aspect of the products. “They are always focusing on the efficacy and functionality of the ingredient and have forgotten about safety. But I think they should be more careful and conduct safety check through clinical trials,” he said.

He pointed out that there has been instances where African Mango and beta-Hydroxy beta-methylbutyric acid (HMB) had come under fire due to alleged safety problems. “In the case of the African mango extract, the study used to back up the ingredient was conducted among African population and not on the Japanese. The notifiers had gotten the scientific information from raw material suppliers and most of the companies using African mango extract are relying on the same paper,” he said.

He stressed that it would be prudent for firms to conduct their trials to ensure product safety, since “everything is under the company’s responsibility” under the FFC framework.







## Philippines trans-fat ban: Policy chiefs issue new guidelines and ban on-pack claims ahead of 2023 changes

By Gary Scattergood 09-Feb-2022- Food Navigator Asia

Policy chiefs in the Philippines have circulated guidelines for food firms to eliminate the use of Trans-Fatty Acids (TFA) in pre-packaged processed foods by next year, including prohibiting the use of on-pack claims such as 'TFA-free'.

It comes after the country launched a bill in 2020 and the Department of Health issued an administrative order last June under its "National Policy on the Elimination of Industrially-Produced Trans-Fatty Acids for the Prevention and Control of Non-Communicable Diseases".

This banned industrially produced TFA from pre-packaged processed food products, with health officials citing the 'alarming global and local magnitude of the problem involving Non-Communicable Diseases (NCD)'.

It highlighted data from the World Health Organisation (WHO) detailing that 3,000 people in the Philippines die prematurely each year due to high consumption of TFA. It also stated that studies have consistently suggested that there is no safe level of TFA consumption, and that intake has no known health benefit. They further argued that

new regulations were critical to avoid the country becoming a dumping ground for TFA-rich products.

Many neighbouring South East Asian nations, including Thailand and Singapore, have similar regulations in place. In a recent circular, the Philippines Food and Drug Administration said it was seeking to provide more details for manufacturers, traders, importers, and distributors of raw materials, ingredients and pre-packaged processed food products containing TFA.



It clarified that it would be illegal to import, locally manufacture, distribute or use and sell of partially hydrogenated oils (PHO), and oils and fats blended with PHO. In addition, any oils and fats with a TFA content more than 2g per 100g/ml of total fat; and pre-packaged processed food products with PHO and high TFA content exceeding 2g per 100g/ml of total fat will be banned.

The circular states: "Pre-packaged processed food products for human consumption, commercial sale or use shall not contain PHO whether as a single ingredient or raw material, or as an ingredient to any pre-packaged processed food product. Similarly, the manufacture, trading, importation and distribution in the Philippine market of these products are prohibited."

It adds that pre-packaged processed food products for export shall follow the rules and regulations for PHO and TFA of the country of destination.

No claims  
Manufacturers have also been told that they cannot make any on-pack claims in relation to the absence of TFA. "The label claim TFA-Free, 0 g Trans Fat or No trans fat or any similar claim shall be prohibited on the label and in the marketing/advertising of any processed food," the document states.

Amount Per Serving		% Daily Value
Calories	310	
Total Fat	7 g	14%
Saturated Fat	4 g	8%
Trans Fat	1 g	2%
Polyunsaturated Fat	1 g	2%
Monounsaturated Fat	0 g	0%
Cholesterol	15 mg	30%
	430 mg	86%
	90 mg	18%

Meanwhile, any product containing TFA or PHO, whether local or imported, will have to be registered. Firms will be required to detail the technical specifications of raw materials indicating specific oil(s) and/or fat(s) used and the processing it underwent.

They will also have to secure a certificate of analysis of the finished product from an accredited laboratory of the FDA and/or Philippine Accreditation Board/Office, reflecting the TFA content per 100g or 100ml of total fat, reference methods of analysis, and the limit of detection for the method used in the analysis of TFA. The licensing process must be completed by June 2023.

"After the transition period, pre-packaged processed food products formulation shall not

contain PHO, oils and fats blended with PHO, and TFA beyond the specified limits, and shall be compliant to these guidelines," the circular stated, adding that companies which fail to adhere to the new rules will have their products banned from the shelves and be at risk of further penalties.

