



# PFNDAI

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SEP 2020

# FOOD, NUTRITION & SAFETY MAGAZINE



## PROTEINS: BOTH QUANTITY AND QUALITY ARE **IMPORTANT**

Dr Shobha A. Udipi

### PLAGIARISM

Ms Seles Gupta, Dr. Shatadru Sengupta  
& Dr B Sesikaran

### TURMERIC & CURCUMIN: HEALTH BENEFITS & APPLICATIONS

Prof Jagadish Pai

### REPORT ON CERTIFICATION PROGRAM DAIRY PROCESSING

Ms Seles Gupta

PROTEIN FOODS AND  
NUTRITION DEVELOPMENT  
ASSOCIATION OF INDIA

2nd Floor, Mahalaxmi Chambers, 22 Bhulabhai Desai Rd., Mumbai - 26 (India)

Phone: 022 23538858 / 23519014

Email: [pfndai@pfndai.org](mailto:pfndai@pfndai.org) Website: [www.pfndai.org](http://www.pfndai.org)



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# EDITORIAL

I watched a TV show in which the anchor talked about food and criticised every product in the market. She said she was not a nutritionist but was talking more emphatically on nutrition and health than an expert with highest qualifications, experience and the expertise of the most renowned nutritionist. She said she was just talking out of common sense but showed total lack of it.

She said only industry wants people to believe that Indians are deficient in protein. Women according to her need only 48 g protein and men 54 g per day. She did not know that protein requirements are based on weight, fitness of the person and the physical activity during the day. She also did not know that there are different proteins with different quality.

When people become old their caloric requirement decreases but not the protein requirement. So when they reduce food intake to reduce calories they also reduce protein intake and they become deficient. When people are vegetarian and their proteins mostly comes from rice, wheat and pulses, unless they ensure to get milk or soya protein they are also going to be deficient unless they increase their protein intakes.

The TV person was also talking about gluten-free diet and thought it was just a myth created by industry wanting to sell the products at 200 to 300% higher cost. Although most people are not gluten sensitive or allergic but there is a sizeable population that is. Although one can avoid by choosing the foods and ingredients properly, it becomes very convenient when a person has to eat outside food or has little knowledge about cooking.

Some people do it as a fad but that does not make the whole industry sham and those who want to follow it deceptive. People who face the discomfort would like to follow gluten-

free diet and if there are food products available that would allow those sensitive people lead a painless comfortable life there is nothing wrong. We need not ridicule them.

Same is the case of lactose intolerance. Now there is greater awareness of it and people have realised how to avoid it and manage it. Either they stay away from it or if the intolerance is not severe they can consume fermented dairy products like curds and yogurt. Others use lactase preparations like tablets or drops that they use in their milk or take tablets along with milk products and that prevents any discomfort faced by them.

There are almond milk, soya milk and other substitutes they can enjoy. That does not mean that alternative industry is trying to deceive people by saying that milk is bad for them. The TV person is so sure that because of the veganism and such fads the alternative and substitutes will make a lot of money fooling people.

She also feels that all this talk of immunity is also false advertisement and there is no need for any green tea or antioxidants etc. We used to eat meals at home in olden days and we were healthy. There were no such supplements and immunity builders. She forgot that environment was different at that time. We did not have pollution; we were not exposed to many of the viruses that are now rampant in the environment. So we are exposed to more dangers now so there is need for protection.

I sincerely hope that we do not have to learn new science from these TV personalities as they seem to have the least knowledge and experience but more confidence than a Nobel laureate.

Prof Jagadish Pai,  
Executive Director,  
PFNDAI

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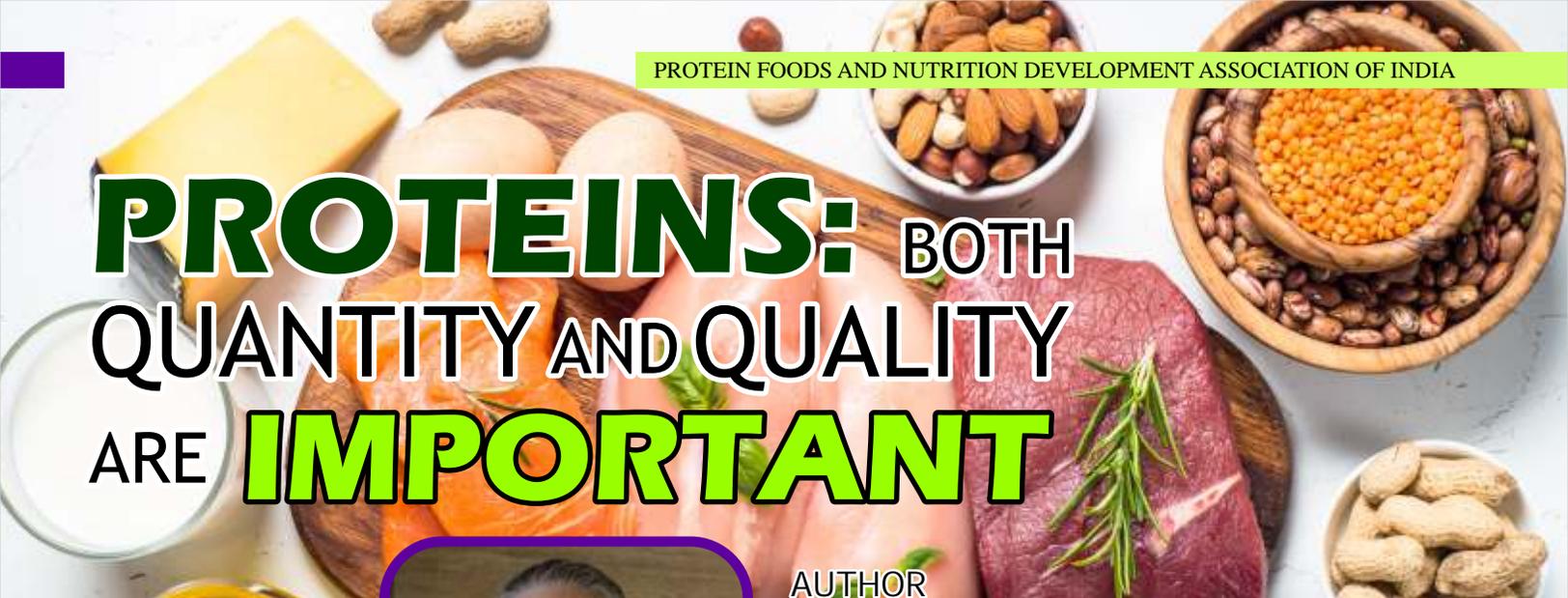
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# PROTEINS: BOTH QUANTITY AND QUALITY ARE IMPORTANT



AUTHOR

**Dr Shobha A. Udpi,**  
 Hon Director, Integrative  
 Nutrition and Ayurceuticals  
 Medical Research Centre-  
 Kasturba Health Society,  
 Vile Parle West, Mumbai - 400056

Protein is a very important life-sustaining macronutrient. Proteins constitute the major structural and functional component of human and animal tissues. Without protein even the most basic functions of the body such as respiration, digestion etc. cannot be carried out.

A healthy adult male's body contains about 14% protein. When it comes to protein intakes from food and the requirement of the body, we cannot just think about the total amount present in our diets. What is extremely critical is to think of the amino acid composition particularly the indispensable amino acids (IAA) and many a times, the conditionally essential amino acids that are present in the food (Table 1).

The amount of the indispensable amino acids present determines the protein quality which must be considered along with the amount ingested when we look at protein nutriture.

One important characteristic is that the human body does not have the ability to store protein and therefore, we need to provide good quality protein to our body throughout the life stages, to

maintain growth and other physiological functions

through infancy, childhood and adolescence, during pregnancy and lactation and to preserve muscle mass and for repair, healing, immunity etc. at all stages including old age.

Therefore, protein quality is a very important consideration. Quality is basically determined by the ability of the food protein to fulfil or meet the body's need for amino acids

which in turn depends on the amino acid composition of the food. However, another important factor is the digestibility of the protein and the bioavailability of amino acids from the food. When we look at proteins from this perspective, we find that no two food sources are the same. We all know that proteins from animal sources such as meat, poultry, eggs, fish, and milk are of good quality. This is because they are able to provide the indispensable amino acids as per the body's requirement. Table 2 shows the FAO recommendations for the amount of the indispensable amino acids that an ideal protein should contain.

Milk contains adequate levels and ratios of all nine essential amino acids. Thus, its protein digestibility is high and its PDCAAS value is 1.0. Similar is the case with eggs. Beef has a PDCAAS of 0.92.

In contrast, proteins from plant/vegetarian sources mostly do not contain these indispensable amino acids in the amounts required. Cereals are generally limiting in lysine.

Table 1: Indispensable, Dispensable and Conditionally Dispensable Amino Acids

Indispensable	Dispensable	Conditionally Dispensable
Histidine	Alanine	Arginine
Isoleucine	Aspartic acid	Cysteine
Leucine	Asparagine	Glutamine
Lysine	Glutamic acid	Glycine
Methionine	Serine	Proline
Phenylalanine		Tyrosine
Threonine		
Tryptophan		
Valine		

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ESSENTIAL AMINO ACIDS for Human Nutrition	FAO Recommended Values (2011) – mg/g protein
Histidine	20
Isoleucine	32
Leucine	66
Lysine	57
Methionine + Cysteine	27
Phenylalanine + Tyrosine	52
Threonine	31
Tryptophan	8.5
Valine	43

Thus, wheat protein has a much lower PDCAAS of 0.42. Also, some foods like cereals contain less amount of protein as compared to pulses/legumes as well as the animal sources of protein. Pulse proteins/leguminous proteins are limiting in methionine, cysteine, and tryptophan, the only exception being soy protein. The limiting indispensable amino acid differs in different pulses. Methionine and cysteine are limiting in several pulses like red kidney beans, whole green lentils, split red lentils and split green peas as well as black beans; whereas cooked navy beans, split yellow peas, chickpeas, pinto beans are limiting in tryptophan.

The amino acid content of several pulses and the protein digestibility corrected amino acid scores (PDCAAS) and digestible indispensable amino acid scores (DIAS) values are shown in Table 3.

Protein digestibility and availability are influenced by a number of factors such as the food matrix, the amount of fat and carbohydrates present, whether there are anti-nutritional factors such as protease inhibitors, whether these are reduced by commonly used food processing/cooking methods. Sorghum, a millet has a better

amino acid profile compared to many cereals/millets but its PDAAS is quite low (0.20) because the proteins in sorghum have poor digestibility. DIAAS which is now used to indicate protein quality compares the digestible amino acids in a protein, based on the true ideal digestibility of proteins. Table 4 gives the DIAAS for some cooked cereals.

As can be seen in Table 4, most cereals except buckwheat a pseudocereal, are not good sources of protein. In contrast, whole milk has a DIAAS of 114, and the DIAAS of hardboiled eggs is 113 and that of chicken breast 118.

In general, it is seen

that protein sources of plant origin, particularly pulses contain such inhibitors. Processing methods applied to pulses and cereals in our country generally improve the digestibility and reduce the amount of anti-nutritional factors like protease inhibitors. Germination which is applied to some pulses increases the protein content and improves digestibility. Cooking of beans, chickpeas, peas and lentils reduced trypsin inhibitor activity and decreased tannin concentration. Also, protein content of cooked kidney beans, faba beans and chickpeas was more. This was attributed to the possible removal



Table 3: Amino acid scores, True protein digestibility, PDCAAS and DIAS of selected cooked pulses

Food	PDCAAS	DIAS
Cooked Pulses		
Red kidney beans	0.549	0.51
Navy beans	0.667	0.65
Whole green lentils	0.628	0.58
Split red lentils	0.538	0.50
Split yellow peas	0.643	0.73
Split green peas	0.500	0.46
Black beans	0.534	0.49
Chick peas	0.519	0.67
Pinto beans	0.590	0.60
Soybean	100	99.6
Soybean cake	99.4	97.0
Tofu	56.0	52.0
Almonds	39.0	40.0
Cereals		
Wheat	46.3	40.2
Barley	59.1	47.2
Corn grain	47.3	42.4
Cooked rice	62.0	59.0
Whole milk powder	116.1	115.9
Beef	70.0	61.1
Egg (hard boiled)	100	113
Chicken breast	100	108
Whey protein isolate	100	109
Soy protein isolate	98	90
Pea protein concentrate	89	82
Rice protein concentrate	42	37
Soy flour (50% protein)	77.0	

**Table 4: DIAAS and Limiting Amino Acid in some cooked cereals**

Cereals	DIAAS	Limiting Amino Acid
Brown rice	42	Lysine
Polished rice	37	Lysine
Buckwheat	68	Sulfur containing amino acids
Oats	43	Lysine
Proso millet	7	Lysine
Foxtail millet	10	Lysine
Whole wheat	20	Lysine

of carbohydrates. Cooked kidney beans, faba beans and chickpeas had higher concentrations of essential amino acids than the raw beans.

In black beans germination was found to improve the PDCAAS and when the germinated beans were combined with rice, the PDCAAS improved. Better digestibility has been observed with *Dolichos lablab*, var. *lignosus*, cowpeas, green gram, lentils. However, despite these improvements, the increase varies from less than 10% to about 15 to 20% improvement in digestibility. Soaking, boiling, microwave cooking and autoclaving increased total IAA content determined in the seeds of cowpea, pea and kidney bean. Sometimes large differences have been observed between the raw seeds and the cooked ones. Other factors that have been found to influence digestibility include pH, temperature, ionic strength conditions, protein

folding/denaturation, cross linking, presence of emulsifiers.

However, human diets in most populations that relied on cereals as staples have evolved to combine foods so that the indispensable amino acids are complemented. In Mexico, corn tortillas are combined with beans, in South Asia rice or wheat are combined with a variety of pulses and in other Asian countries soy is the major pulses combined with rice. Figure 1 shows the digestibility of tortillas made with corn, or wheat and that of yeast-leavened bread with and without soybean.

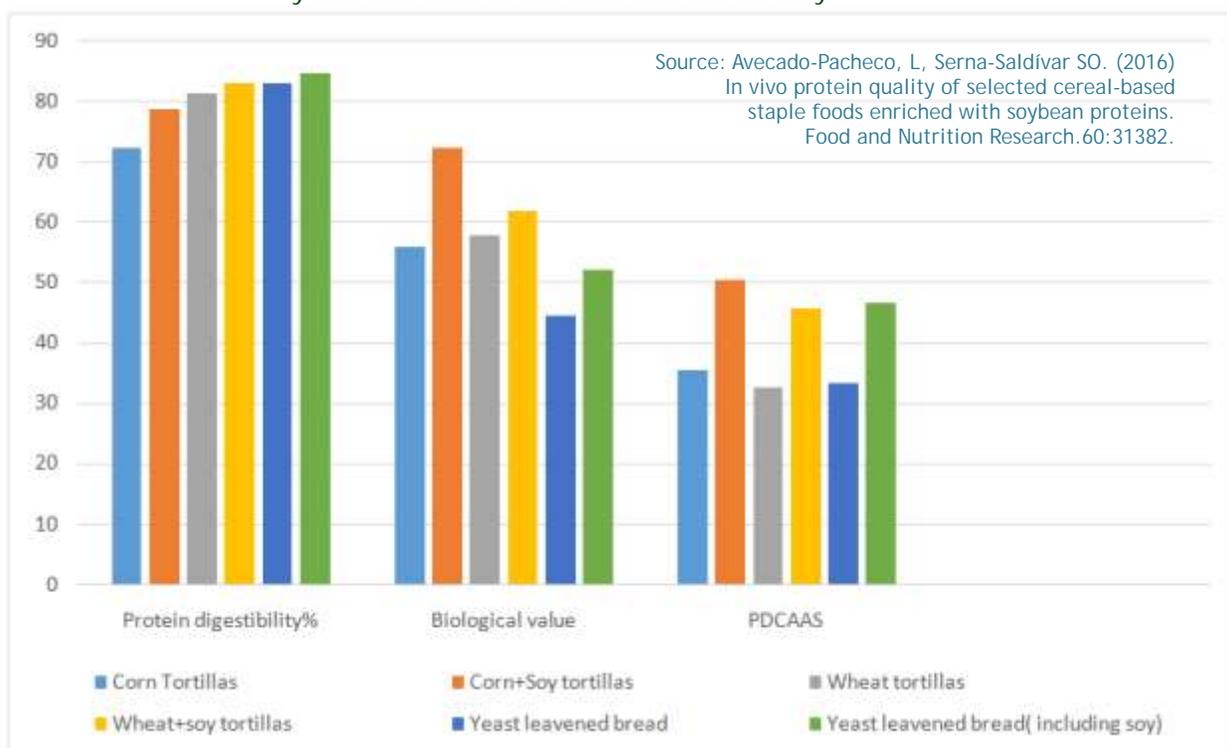
The complementation of cereals with pulses/legumes is especially seen in poorer countries. One advantage of combining pulses with cereals is that pulses typically contain about two times more protein than does wheat and almost thrice the amount present in rice.

This can help to increase the quantity of protein ingested.

Early studies have shown that a mixture of rice and black bean protein in a ratio of 60:40 resulted in the greatest improvement in rat growth, suggesting that the biological value of the mixture was good. Similar observations were reported for a mixture of black beans and corn. Such complementation and working out the best possible ratios of cereal and pulse protein is essential because in many regions of the world, particularly in South Asia and some parts of Africa cereals make a high contribution to the total protein intake of the communities.

In another study combination of pearl millet with lentils improved the metabolic availability of lysine but it was still a limiting amino acid. A minimum ratio of 2 parts of millet with one part of lentils is probably required to meet the lysine requirement of healthy adults. Such ratios need to be worked out for the different varieties of millets that are

**Figure 1: Protein digestibility, biological value and PDCAAS of tortillas (corn or wheat) and yeast-leavened bread with and without soy.**



becoming increasingly popular in India.

Adding pulse to selected food products with pea flour has been shown to improve the PDCAAS (Table 5).

quality and digestibility. They developed several blends of soybean +maize/millet/sorghum, maize+peanut, sorghum+peanut, cowpea+maize/millet/sorghum in three stages using linear

highest PDCAAS being observed for the soybean and maize blend. Lysine was the limiting amino acid in all blends except for the soybean +maize blend. At the third stage, these blends contained a minimum of about 60 to 76 gms of one of the millets/cereals along with 16 to 25 gm of one of the legumes. They found that none of these blends contained any limiting amino acid and the PDCAAS of these blends ranged from 0.78 to 0.87.

Table 5: Improvement in PDCAAS in cereal based foods after addition of pulses

Food	Weight (g)	Control (cereal alone) PDCAAS	Cereal+Pulse Amt of pulse added	PDCAAS
Cracker	20	0.34	45% pea flour	0.70
Cookie	20	0.34	60% pea flour	0.68
Breakfast cereal	28	0.40	80% pea flour	0.64
Extruded snack	50	0.40	60% pea flour	0.63
Corn-based chips	50	0.40	25% pea flour	0.60
Bagel	55	0.34	25% pea flour	0.68
Tortilla	55	0.34	25% pea flour	0.64
Bread	50	0.34	15% pea flour	0.59
Pasta/noodle	85	0.40	32% pea flour	0.70
Wheat based pasta	-	0.43	25% lentil flour	0.71
Wheat and lentil			75:25*	0.71
Wheat and peas			70:30*	0.75
Rice and lentil			80:20*	0.74
Rice and black bean			75:25*	0.75
Wheat and pea protein isolate			90:10*	0.60
Wheat and pea protein concentrate			90:10*	0.55
Wheat and soy protein concentrate			90:10*	0.50

\*Ratio of cereal to pulse

Suri, Debrah and Ghosh (2014) used linear programming to improve the nutrient content and protein quality of 'koko' which contains only cereal and cereal - legume blends used as complementary foods in Ghana. They observed that total protein content of the complementary foods, including those containing cereals and legumes overestimated the utilizable protein greatly ( as much as 133%) if adjustments were not made for

programming . The blends containing either peanut or cowpeas were of low protein quality. Addition of lysine improved the protein utilizability by 1-10% in the soybean blends, 35 to 40% in the peanut blends and 14-24% in the cowpea blends. In the first stage, they used a combination of 80 gms of the millet along with 20g of the legume source. The PDCAAS were 0.46 for the koko and for the rest the scores ranged from 0.56 to 0.87, the

Shivakumar and coworkers (2019) recently stated that protein quality can be improved and DIAAS of > 100 can be achieved if either milk or eggs or legumes are added. The amounts of these three foods that need to be added were 200g of milk, 50g of whole egg or 45 g of legumes to the daily diet. With this the DIAAS of the diet protein increased to 101 and 100%, with milk and egg, respectively; but with legumes the DIAAS was lower i.e. 81% with legumes. Such studies provide insights into the possible ways in which protein quality of Indian diets can be improved, and indicate that it is important for some animal protein source such as milk in case of vegetarians or some other animal source to be included. More work is probably required to give practical guidelines to the Indian population for combinations of different pulses and cereals/millets and to take into consideration the effect of the processing methods that may influence protein and amino acid contents.

It is equally important to remember that all foods in one group are not similar, that is all pulses do not have the same amino acid composition.





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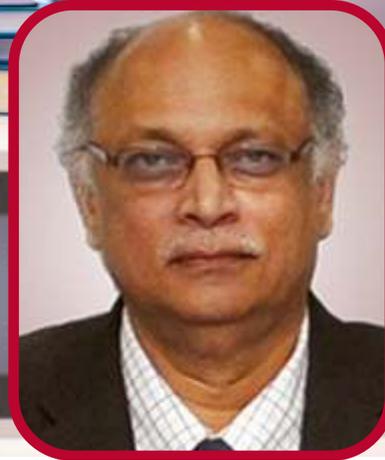
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info@beepharmo.com | food@beepharmo.com | www.beepharmo.com

# PLAGIARISM



## AUTHORS

**Ms Seles Gupta,**  
Food Technologist,  
PFNDAI

**Dr Shatadru Sengupta,**  
Sr Director - Legal,  
Hardcastle  
Restaurants Pvt Ltd.;  
Vice Chairman - PFNDAI

**& Dr B Sesikaran,**  
former Director -  
National Institute of  
Nutrition (ICMR) Hyderabad;  
Chairman - Scientific Affairs  
Committee, PFNDAI

### What is the fastest way to write a report?

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terms and conditions carefully before you subscribe to this easy solution'.

And now if you are wondering 'what if I just use one or two of the paragraphs from someone else's work, instead of copying off the complete report, and then use that information to build my own work?', It is, definitely, another good way to speed up your work process. But does it come under plagiarism? Well, it depends on how you include that information.

Even though this concept may seem very complex at first, it is actually very easy to understand.

What is Plagiarism?  
The University of Oxford defines plagiarism as "presenting someone else's work or ideas as your own, with or without their consent, by

incorporating it into your work without full acknowledgement. All published and unpublished material, whether in manuscript, printed or electronic form, is covered under this definition".

There exist a number of definitions for plagiarism by different bodies. It is observed that the common thread across all the definitions is 'lack of acknowledgement, citation, credit, or proper attribution to the original work'. Plagiarism includes text or idea from books, articles, research papers, songs, email messages, or any other medium.

Plagiarism may be intentional or reckless, or unintentional. One examples of plagiarism that was unintentional, is that a few weeks back, on 19 June 2020, a media report had implicated a premier research organisation of plagiarism

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**Types of Plagiarism**  
 • **Global Plagiarism:**  
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plagiarism when people lift entire text, images or idea from previously published work. In simpler terms, it is like when people, on Diwali, take out the gifts they received previously from someone else and replace the original gift card with their own name. This saves them the effort of going shopping and spending money and they can still get the credit for being a generous guest.

• **Verbatim Plagiarism:** Verbatim plagiarism is when people tend to copy a paragraph or a large segment from the original work and include it in their work without any proper acknowledgement to the original source. Remember when you copied and pasted the birthday wish from the Google search results into your chatbox and before sending the message, just replaced/ added the names after 'to' and 'from' sections? So, that's a simpler example to understand the concept of verbatim plagiarism. Now people may not get into trouble for sending unoriginal birthday wishes, but if someone tries to pull off this stunt in their research papers and thesis, it's highly probable that they'll easily get caught by the internet, and ultimately by the owner of the original work.

• **Mosaic Plagiarism:** It is called mosaic plagiarism when you lift words or phrases from someone else's work and mix it with your own words in an attempt to showcase it as original work. For e.g.,  
*Original text:* Hecpidin was found to be a significant predictor of iron absorption (beta= - 0.63 P=0.001,

R<sup>2</sup>=40%) from the reference dose. There was no significant effect of gender on iron and zinc absorption. We conclude that simultaneous ingestion of guava fruit with a habitual rice-based meal enhances iron bioavailability.

*Plagiarised text:* Hecpidin significantly predicts iron absorption (beta= - 0.63 P=0.001, R<sup>2</sup>=40%) from the reference dose. Gender has no effect on iron and zinc absorption. It appears that simultaneous ingestion of guava fruit along with a habitual rice-based meal enhances iron absorption. Here, the words in black have been changed and there is no citation to the original work in the running text.

• **Paraphrasing:** A lot of writers often tend to hit writer's block. Now there are a lot of writing prompts available online, but sometimes even those can't get creative juices to flow. In these times, writers need to practice perseverance and patience. But at times, when some writers are dealing with deadlines and they know that they have to send the work by hook or crook, they succumb to the temptation of plagiarising. With the urgent need to submit an original piece of work and the hope (more like delusion) that they won't get caught, they find already existing work and re-phrase and re-structure the text to showcase it as their own work. Taking reference from the above example,  
*Original text:* We conclude that simultaneous ingestion of guava fruit with a habitual rice-based meal enhances iron bioavailability.

*Paraphrased text:* Taking guava along with a predominantly rice containing food will improve the absorption of iron. If the proper references had been given in the running text and in the bibliography, it would have been acceptable. Since there is no mention of the original source, it will be considered plagiarised.

because they published a policy document with 37% of its content lifted from previously published work. The problem here wasn't that they used other without permission. The problem was that they didn't cite those sources properly. If they had given proper credit and citation to the original work in their document, they could have avoided embarrassment.

**Why do people plagiarise?**

A lot of people have this perception that it is usually the school and college students that are plagiarizing their assignments, thesis and internship reports. While plagiarism has prevalently plagued the education system and research organizations, it has not stayed contained within these systems. The bug of plagiarism is more like coronavirus in a sense that it can infect anyone, anywhere. Just look at the news from last few years, and you'll find that even celebrities and famous people can't resist the temptation of copying off someone else's work. There are a lot of celebrities who have been accused of plagiarising.

Again, just like people know the risk of stepping out of the home when the world is dealing with COVID-19, most of these people are aware of the consequences of plagiarism. So when they do know about the risks involved with plagiarising, why do they still do it? It has been found that among all the different reasons for why people plagiarize, one of the main reasons is people, sometimes, are just too lazy to put in the efforts for their work and they see copying

- **Improper Citation:** In this case, people do put the references but for the wrong text. Here, when someone tries to cross-check with the source cited, they won't be able to find the text that it was cited for.

- **Incorrect Citation:** This is when the reference that is given is not accurate and the original text cannot be traced to the cited paper. This may happen when someone uses secondary sources for information but gives attribution to only one of the two- primary or the secondary source- in her/his work.

- **Self Plagiarism:** This includes duplicate publication where the same paper gets published twice in different journals. It also involves situation where same paper with some additional information is published as another paper without referring to earlier publication (augmented publication). Using same study data and making two or more papers out of it is also a type of plagiarism which is difficult to detect (segmented publication).

Some others forms of plagiarism like image plagiarism, video clip plagiarism & cyber plagiarism also exist. The great thing about internet is that it is a home to lot of brilliant ideas. So people, with access to it, are not limited to copying reports or research papers; if needed they can plagiarise images and video-clips as well. The possibilities are endless. It is called 'cyber plagiarism' when you use internet to steal someone else's work. And it is image or video clip plagiarism when you use an image belonging to someone else or create a video concept or a storyboard that imitates someone else's work, respectively, by either claiming it's yours or using the original work without any credit to the creator.

[What are the consequences of plagiarism?](#)

Surrendering to my laziness, I stole the report. Now suspended, laziness is not an option anymore.

This is not fiction or a quote to be shared on the social media walls; it is the reality of many students, researchers and professionals who copied someone else's work and then had to face struggle and work hard to convince someone else to give them a chance.

Plagiarism may not be a part of the Indian Penal Code but it is disapproved on the grounds of moral offence. When the owner/creator comes forward with the allegations of plagiarism, usually the concerned organisation sets up an inquiry committee. The members of the committee are asked to investigate, make the comparisons and present their findings in a report. As a professional, your work is not just a reflection of who you are but it also reflects on what the organisation stands for. The plagiarism allegations can not only taint your reputation but the organisation's too. So, if the plagiarism claims are true and proved, the guilty party may face serious disciplinary actions.

For the guilty person, the consequences can range from losing credibility to expulsion from the organisation and revocation of degree. To understand this more clearly, you can refer to the case of Bharat Aggarwal. He- a former employee at the M D Anderson Cancer Centre of the University of Texas- had to resign from his position and 28 of his publications had been retracted once he was found guilty of fraud. In another example, Ranjit Chandra, a former nutrition researcher at the Memorial University of Newfoundland, in 2015, was stripped of his Order of Canada membership following accusations of scientific wrongdoing in his research. In addition to this, as per Wikipedia, he lost a \$132 million case against the CBC, was ordered to pay \$1.6 million to cover the defendant's legal fees and at

least 4 of his publications have been retracted.

[How to acknowledge original work and avoid plagiarising?](#)

Increasing easy-access to the internet has made it possible for people to find any kind of information they want. While it is understood that everyone needs help sometimes to spark their creativity, it is suggested that whenever you are using the information or an idea from other sources, make efforts to give the owner/ creator their due credit and acknowledge that your work is inspired from them. As an author/ creator, to give proper attribution, you can cite the right sources in the running text, list all of the sources in the bibliography/ reference list and put the verbatim statements within quotation marks.

The author or the creator is responsible to make sure that they properly acknowledge the rightful person, but it is not just their responsibility. The publishing companies, the journals and the concerned organisations too need to take steps to ensure that they rightly communicate and guide their employees, students, researchers to produce content/ piece of work in an ethical way. To take precautions, if you are a publisher, editor or in any way related to publishing, you can use online tools like Ithenticate, Copyleaks, etc to make sure that the work you are publishing is original and not plagiarised. With these apps/ websites, you'll just need to put in the draft manuscript and these apps/ websites will cross-check the input work with all the existing work and share the results with you. This can help you to avoid publishing plagiarised work.



# TURMERIC & CURCUMIN: HEALTH BENEFITS & APPLICATIONS



## AUTHOR

Prof Jagadish Pai,  
Executive Director,  
PFNDAI

Spice is a seed, fruit, root, bark or other part of plant commonly used for flavouring, colouring or preserving food. Many spices have antimicrobial properties which

may be one of the reasons of their prominent use in cuisines in warmer climates where spoilage of food is more likely. Spice trade was developed in Indian subcontinent and Middle East over 4000 years ago. Medical systems used spices in China, India and Korea.

Spice market had grown to over USD 15 billion in 2017 and is growing rapidly at about 5% and is expected to be over USD 21 billion by 2024. Spices are used in a variety of food products including bakery, confectionery, frozen products, sauces & dressings, convenience foods, snacks, meat & poultry products and others. Some of the important spices include pepper, turmeric, cinnamon, cumin, cloves, ginger, oregano, parsley, basil and coriander.

India is the largest producer of spices with almost three fourths of global production taking place as per UN Food & Agricultural Organisation (FAO) in 2011, however, more recent figures are around 68% as other countries have

been growing larger quantities of spices as these become valuable. Much of the production is consumed domestically whereas only about USD 3.32

billion worth spices have been exported in 2018-19 as per Spices Board of India.

**Turmeric**  
Turmeric is the third largest produced spice crop after garlic and ginger with over 9 lakh tonnes produced in 2018-19 which is approximately 10% of the total spice production in India. Turmeric, also known as haldi, is a rhizome or underground stem of the plant with botanical name *Curcuma longa* L. The rhizomes are boiled, dried and cleaned before use. Turmeric is used to flavour and colour foodstuffs. It is a major ingredient in curry powder.

World market for turmeric was estimated in 2016 as USD 3.16 billion and is expected to reach 5.65 billion by 2027. One of the main reasons for this spectacular rise of turmeric is due to its component curcumin which has many health benefits because of its anti-cancer, anti-oxidant and anti-inflammatory properties, and is one of the most researched substances for its benefits. Global curcumin market was estimated at USD 56 million in

2017 and is expected to grow at almost 10% to reach over 114 million by 2025.

**Traditional Use of Turmeric**  
Turmeric is a key ingredient in many Asian dishes including Indian curry imparting earthy aroma and pungent, slightly bitter flavour to foods. Most turmeric is used in the form of rhizome powder to impart golden yellow colour. It is also used in industry in products like canned beverages, baked products, dairy products, ice cream, yogurt, cakes, orange juice, biscuits, popcorn, cereals, sauces, and others.

**Health Benefits**  
Turmeric has been used for thousands of years in India and China. Its usage has been embedded in the ancient Ayurvedic practice and has been cited to promote holistic health of the body. It has resulted in its increased usage in the Western world too. Some of its benefits are as follows.

Turmeric's anti-inflammatory properties are used in treating osteoarthritis and rheumatoid arthritis. Consumed daily it relieves mind joint pains and inflammation. Turmeric can help manage digestive problems. It stimulates gallbladder to produce bile, making digestion more efficient. It reduces symptoms of bloating and gas.



Turmeric has been used traditionally to treat cuts, burns and infections. Its natural antiseptic and anti-bacterial properties make it an effective disinfectant. When powder is sprinkled on affected area

helps heal faster. Anti-inflammatory and antioxidant properties are also helpful in delaying type 2 diabetes in people with pre-diabetes. Turmeric also helps the human immune system. Taken with milk it reduces chances of catching flu. Turmeric is also known to promote good liver health.

#### Curcumin

Thus turmeric has long been recognised for its medicinal properties. It has received interest from both medical & scientific world as well as from culinary experts. Much of its benefits are due to the presence of curcumin due to its antioxidant and anti-inflammatory effects. Curcumin content of turmeric is not very high, just about 3%. Research studies use much higher level of curcumin to evaluate its health benefits so turmeric extracts are prepared and purified so dosages of curcumin as high as 1 g per day could be used.

Turmeric has been used in India for thousands of years as a spice and medicinal herb. It contains compounds with medicinal properties and are called curcuminoids. The most important of which is curcumin. It has powerful anti-inflammatory effect and is a strong antioxidant. However, curcumin content of turmeric is only about 3%, it has to be isolated in purer form as some of the applications need it in quantities exceeding one gram per day. Other curcuminoids are demethoxycurcumin and

bisdemethoxycurcumin which are minor fractions.

Curcumin is a natural anti-inflammatory substance. Chronic inflammation contributes to many chronic diseases. Curcumin may help treat conditions like inflammatory bowel disease, pancreatitis and arthritis. As inflammation is also linked to tumour growth, curcumin may play a role in treating and preventing some types of cancer such as colorectal, pancreatic, prostate, breast and gastric cancers.

Curcumin may improve endothelial function and thus may help protect against age-related loss of function and reduce risk of developing heart disease. Curcumin may also help prevent diabetes and improve factors contributing to the disease such as insulin resistance, high blood sugar and hyperlipidemia.

Curcumin also is being tested for its positive effects on Alzheimer's disease, depression, rheumatoid arthritis, skin health, eye health especially glaucoma.

As stated earlier many health benefits are being tested with several grams of curcumin per day which is difficult by consumption of turmeric which contains very low levels of curcumin. So preparations are being prepared of higher concentrations of curcumin.

#### Preparation of curcumin from turmeric

Curcumin extraction is carried out on turmeric which is dried and milled into powder. This is extracted using a solvent such as isopropanol, ethyl acetate, acetone or ethanol. Curcumin is soluble in these solvents and also in oils but insoluble in water at acidic and neutral pH but soluble in alkaline conditions. Its colour is also pH dependent, being intense yellow in acidic and neutral pH whereas it is red in alkaline pH.

Purification may also be done by distillation process to prepare an oleoresin. This is then extracted using solvents to prepare high concentration of curcumin. There is a problem with the bioavailability of curcumin. Ingesting it by itself does not lead to health benefits as it has poor bioavailability due to poor absorption, rapid metabolism and elimination. However, its bioavailability could be improved. Piperine is the major component of black pepper and when combined in a complex with curcumin, it elevates the bioavailability of curcumin tremendously. Thus in formulations it may be necessary to use some enhancing agent that improves bioavailability of curcumin.

#### Scope for curcumin applications in foods

Curcumin may be added to nutraceuticals products as per the Nutraceuticals regulation of FSSAI. Even turmeric may be added for its benefits in nutraceuticals products. US FDA has declared curcuminoids as GRAS (generally recognised as safe). Thus curcumin and other curcuminoids have started making appearance in market for their health benefits. They have been marketed in the form of capsules, tablets, ointment and also as ingredients in energy drinks and some food products. Many cosmetic products are also available with these ingredients.

Although a lot of information on health benefits of turmeric is available in ancient literature the newer benefits use much higher levels of curcumin. The benefits have been tested on animals but human studies are in progress. Their potential benefits have been shown. Although these are safe their benefits need to be proven scientifically so these must be tested on humans in order to make health claims. Some human studies have been conducted.

One study (Nutrition Research October 2012) investigated effects of curcumin ingestion and aerobic exercise training on flow-mediated dilation as indicator endothelial function in postmenopausal women over 8 weeks. Flow-mediated dilation increased significantly in curcumin group whereas no changes were observed in control group. Results indicated that curcumin ingestion can increase flow mediated dilation in postmenopausal women that can improve age-related decline in endothelial function.

In another study (Drugs in R&D, 2008) with type 2 diabetics, 300 mg daily for 8 weeks had favourable effect on endothelial dysfunction with reduction in inflammatory cytokines and markers of oxidative stress.

Curcumin-phosphatidylcholine phytosome complex was found to decrease joint pain and improve its function in osteoarthritis

patients. A study (Alternative Medicine Review, 2010) found that this combination with 200 mg curcumin per day for 8 months improved the treadmill function of patients, along with improvement of inflammatory markers.

Another study (Phytotherapy Research April 2014) with patients with depressive disorder compared effectiveness and safety of curcumin (1g) with fluoxetine (20mg). Curcumin was comparable in antidepressant-like activity with fluoxetine and when given in combination it was much more effective and found to be safe.

The future looks extremely promising for both turmeric and curcumin and other curcuminoids. We may see many food products with these substances making health claims of many sorts. For such claims more studies are necessary especially on humans to show the effectiveness as well as safety of curcumin at the recommended levels.



## COMING EVENTS

World Congress on  
Food and Nutrition Science

October 14-15, 2020

Webinar

Accelerating Research & Innovation  
in Food, Nutrition and Health to  
Feed the Future Generation

Contact:

<https://foodcongress.conferenceseries.com/registration.php>

6th International Conference  
on

Food Science and Food Safety  
October 29-30, 2020

Webinar

Contact:

<https://foodsafetycongress.foodtechconferences.com/registration.php>

10th International Conference  
on Nutrition and Food Sciences  
(ICNFS 2021)

April 20-22, 2021

Univ of Barcelona, Barcelona,  
Spain

E-mail: [icnfs@cbees.org](mailto:icnfs@cbees.org)

Contact: +852-3500-0137



# SUGAR REDUCTION IN AN AGE OF CLEAN LABELLING

It is difficult to remove sugar from a sweet product formulation, have a clean label and still prepare a sweet tasting product. Using neuroscience, plant-based ingredients and cross-modal correspondence it is possible.

Flavour is partly based on primary tastes namely salty, sour, sweet, bitter and umami but experts claim that it is more dependent on smell or aroma. There are other senses that play a role in flavour such as touch, pressure, pain and temperature etc. Some claim that there are 30 human senses that affect flavour while others talk about visual and audio senses being important too. Thus the human perception of food flavours is the integration of all five senses namely taste, smell, sight, sound and touch, each being called a modality.

In the perception of sweetness in the taste modality, different sweet tasting substances bind to different locations on sweet taste protein receptors. This binding leads changes in protein conformation triggering sweetness detection and perception. Different sweet substances such as sucrose, glucose, thaumatin and stevia etc. with different sizes bind different sites.

## Stacking High-Potency Sweeteners

Stacking is a strategy for reducing sugar by building up to required sweetness intensity and profile while staying below the thresholds of off-flavour for each of the ingredient used. One could start with the most effective high-intensity sweetener such as stevia. This can be then stacked by non- or low-calorie bulk sweetener like erythritol or allulose. This way one can build sweetness close to 9% sugar equivalence (SE) in reduced sugar beverages. For the remaining 3% SE one can employ crossmodal correspondence principle.

## Crossmodal Correspondence

This is the way the brain processes information from different senses to form multisensory experience in a combined way. This is an important field in experimental psychology which could be applied to food and beverage product design. The most relevant is application in sugar reduction by smell-taste integration using sweet aroma in nose to increase sweet taste in mouth.

When we drink and eat, there is integration of taste perceived in mouth and smell perceived at the back of nose when we swallow. Thus swallowing creates a vacuum at the back of mouth drawing food

aroma from mouth to back of nose (retronasal). This is the real smell we perceive while eating and drinking as opposed to sniffing by nose alone. Retronasal sweet aroma increases sweet taste perception that starts with mouth.

Sweet taste modulation is to make high intensity sweetener taste more like sugar in reduced-sugar foods and beverages. Stacking sweet taste modulators on top of high intensity and the low-calorie bulk sweeteners adds another 1-3% SE to the 9% SE already delivered.

There are 400 smell receptors in nose capable of detecting 1 trillion different odours. There are several mechanisms for sweet taste modulators and more specifically sweet taste enhancers. Firstly dual use flavour compound is a sweetener at high level but a tasteless sweetness enhancer below its sweetness detection limit. Glucosylsteviol glycoside is an example.

Secondly phantom flavour is a compound that is a sweetness enhancer used below its own detection threshold. Humans can sense smell or taste of it but it makes things sweeter. Vanilla extract is an example.

Thirdly congruent flavour is a sweetness enhancer that is used above its detection threshold and delivers aroma in nose that is consistent with sweet taste in mouth. This category includes sugar, honey and molasses distillates. All these sweet taste enhancers are labelled as natural flavour. Stacking a few hundred ppm of these on top of high intensity and low-calorie bulk sweeteners achieves 10%+ SE in reduced-sugar beverages.

**Ultra Clean Label Sugar Reduction**  
To replace the remaining 2% sugar to get to 12% SE, one can use concept of crossmodal correspondence beyond smell-taste and go into taste – sight/sound/touch, that is use other sensory modalities to increase sweetness perception not in mouth but in brain.

When one thinks of “smooth” to making foods and beverages sweeter. What we call “texture” in foods is really “touch” or oral somatosensation in neuroscience. So one should design reduced-sugar products with smooth surface whenever possible. Touching velvety or silk surface while drinking makes beverage taste sweeter. Carbonation,

a pain agent, reduces sweetness perception differences and makes the artificial high intensity sweet taste more like sugar.

When it comes to sight and visual cues, round shape has been shown to increase perception of sweetness. Coffee in wider round mug was rated sweeter. Also red colour helps sweetness perception so in red light wine appears sweeter and fruitier.

Sound can also influence taste. High pitched and twinkling music or sound made toffee and chocolate sweeter while lower tones emphasised bitterness.

Ultra clean label sugar reduction starts with understanding and applying sweet taste neuroscience. Build the sweetness foundation with plant-based, high intensity sweeteners such as stevia and monk fruit, and with plant-based non/low caloric bulk sweeteners like erythritol. Apply the principles of cross modal correspondence to further enhance sweetness perception in reduced-sugar foods and beverages with smell, sight, sound and touch. Think sweet aroma. Think also red colours, round shapes, high-pitched music and finally smooth surface.

References

- Adams, S and AJ Taylor. 2012. “Oral Processing and Flavour Sensing Mechanisms.” Chapter in Food Oral Processing Fundamentals of Eating and Sensory Perception, edited by J Chen and L Engelen. Wiley-Blackwell
- Presscott, J and R Stevenson. 2015. “Chemisensory Integration and the Perception of Flavour.” Chapter 45 in Handbook of Olfaction and Gustation, edited by RL Doty. John Wiley & Sons
- Sternini, C. 2013. “In Search of a Role for Carbonation: Is this a Good or Bad Taste?” Gastroenterology. 145(3): 500-503.

(Condensed from article by Alex Woo from Food Technology February 2018)



# REPORT ON CERTIFICATION PROGRAM **DAIRY PROCESSING**



**AUTHOR**  
Seles Gupta,  
Food Technologist,  
PFNDAI

Protein Foods & Nutrition Development Association of India (PFNDAI) recently organized a Certification Program on “Dairy Processing”. The program was designed for students planning to have a career in the food/ dairy industry and food industry professionals. It aimed to cover the concepts behind different types of milk & dairy products, scientific principles in dairy processing and preservation, and the FSSAI regulations for dairy products. The course was conducted online on 14 August 2020 and held in two sessions, one in the morning and another in the afternoon.

For the course, we had instructors- Dr Prabhakar Kanade (Principal Consultant, M/s Supraks Consultant) and Dr Jagadish Pai (Executive Director, PFNDAI), along with Ms Swechha Soni (Manager- Food Science &

Nutrition, PFNDAI) as the moderator. The course was attended by around 250 people. The attendees included scientists, food entrepreneurs, professionals working in food industries and regulatory bodies, professors, research scholars, students, and dieticians.

The programme started with a

welcome by Ms Swechha Soni; a brief introduction by Dr Pai about PFNDAI and the work done by the organisation. Following were the presentations.

Science & Principles behind Milk & Milk Products: By Dr Jagadish Pai;

Dr Pai started the course with the introduction of basic concepts in the milk processing industry. He further explained important concepts like - the composition of milk, FSSAI

standards for different types of milk products, the role of milk analysis in detecting adulteration, how milk affects human health, and principles of preservation.





skimmed milk powder, and what steps can be taken to ensure product quality and safety.

He then explained the various steps involved in the processing of milk, different types of heat treatment that can be used and how they help to extend the shelf life of the

products.

The audience had few questions and concerns that were addressed by Dr Kanade in a Q & A session.

Dairy Products Processing:  
By Dr Prabhakar Kanade;

The first half of the afternoon session focused on the processing of various dairy products such as ghee, yoghurt, cheese and frozen desserts. Dr Kanade talked about the FSSAI definitions of these products, the basic processes involved in their processing and the factors that are taken into consideration when deciding fermentation cultures for different products. To help the audience understand these concepts

clearly, he also talked about the difference in various dairy products like- curd and yoghurt, cheese and paneer, coffee whitener and dairy whitener, frozen desserts and ice cream.

This was followed by a brief Q & A round, where Dr Kanade and Dr Pai jointly answered the questions raised by the participants.

Food Safety in Milk Products:  
By Dr Prabhakar Kanade;

Dr Kanade in his presentation talked about how if milk is not properly processed, it can result in a product that is unsafe for consumption and make people sick. He explained all the causes of poor hygienic conditions with the main focus on CIP (Cleaning in Place) and the measures that can be taken to produce safer food. He also talked about the current status of dairy products standards, and food safety and labelling regulations set by FSSAI in India.

The day ended with a brief Q & A session moderated by Swechha Soni, where Dr Pai and Dr Kanade cleared all the doubts raised by the attendees.

At the end of the presentation, there was a short Q & A session held where he answered the questions and doubts raised by the participant.

Raw Milk and Processing:  
By Dr Prabhakar Kanade;

Dr Kanade in his presentation talked in detail about various quality parameters- physical, chemical and microbiological- that are studied during the analysis of milk to ensure that milk is safe and not adulterated. He covered advanced concepts like- various raw milk procurement methods adopted by dairy industries, the effect of different storage temperatures on bacterial growth in milk, the impact of bacterial load on quality of milk and



# REGULATORY ROUND UP



By  
**Dr. N. Ramasubramanian,**  
 VR Food Tech Private Limited  
 n.ram@vrfoodtech.com

Dear Readers

Hope you and your family are safe. Please find below FSSAI notifications since the last round up.

**Final Gazette Notifications**  
[Final notification amending FSS \(Food Products Standards and Food Additives\) Regulation, 2011.](#) Under Appendix A, a few new additives have been permitted in bakery shortening. Potassium Iodate has been removed from the permitted list of additives in a few categories. The regulation is effective from 01 July 2021.

**Draft Gazette Notifications**  
[Draft notification with regard to](#)

[Contaminants, Toxins and Residues.](#)

It is proposed to include more food categories under the limits for Ochratoxin A and Deoxynivalenol. Many changes are suggested in maximum residue limits in case of pesticides. A prohibited list of antibiotics that cannot be used at any stage of production of milk and milk products, poultry and eggs, sea foods is published. The draft regulation makes changes in antibiotic limits in different foods and food categories.

[Draft notification proposing amendments in FSS \(Packaging and Labelling\) Regulation, 2011.](#) The proposal includes amendment in the label declaration of products containing high intense sweeteners. The draft dispenses with the description “Artificial” and replaces it with “non-caloric sweetener”. Additional warnings like “not

recommended for pregnant and lactating mothers” are required in case of certain sweeteners. This is over and above the present warning “not recommended for children”. Impacted stakeholders are requested to send in their comments within 30 days in prescribed format.

[Draft notification amending FSS Rules, 2011 with regard to qualification of Food Safety Officers, Food Analysts. It also proposes number of samples to be collected by the Food Safety Officer for different purposes.](#)

[Food Safety and Standards \(Organic Foods\) Regulation, 2017 is being amended](#) to exempt intermediaries who collect organic foods from small original producer or producer organization and sell it to the end consumer directly from organic certification. However, such

products cannot carry FSSAI Organic Food Logo.

[Draft notification to amend and introduce standards for wide ranging foods](#) like soy sauce, walnut kernel, grape seed oil, black pepper, dried sage, fermented soy products, oat products, etc. It also proposes to set a limit for residual solvent in solvent extracted vegetable oil.

[FSSAI through this draft notification has made it mandatory to add 10 ppm of Brilliant Blue colour in ice that is not meant for edible purposes.](#)

Advisories and Orders, Guidance Notes and Others

[An informative guidance note on Health Supplement and Nutraceutical regulation has been published.](#) The note explains the salient features of all the products covered under the regulation in terms of ingredients and additives that can be added, permitted levels of vitamins and minerals, special labelling requirements, target group, etc. The note will be of great value

to those who wish to categorize the product under this regulation.

[FSSAI vide its order dated 21 August has mandated that all import consignments of certain agricultural commodities like rice, soybean, maize and certain vegetables and vegetables are to be accompanied by Non GM and GM Free certificate in the prescribed format.](#) For complete list, see the order.

[A clarification has been issued with regard to “class Name” in the case of flavouring substances.](#)

[FSSAI approves RAMAN 1.0 method for the detection of economic adulteration in edible oils and ghee.](#)

[FSSAI in a series of directives has urged State Food Safety Commissioners and Food Safety Officers to strictly implement the provisions of Infant Milk Substitute Act and FSS Act and regulations made there under with regard to infant milk substitutes and infant food.](#)

FSS (Packaging) Regulation, 2018 requires all packaging material and accessories like printing inks to comply with the standards set by Bureau of Indian Standards (BIS). BIS periodically amends the standards and is expected to be complied with immediate effect. This poses challenges to the food business operators. [FSSAI realizing this challenge, has permitted food business operators to take minimum 180 for compliance after the final publication of BIS standards.](#)

[FSSAI puts up an alert on the contaminated Brazil nuts byproducts.](#)

[FSSAI Central Authority has requested the licensing officers to strictly follow the “required document” list published on the website.](#)

[On account of COVID 19 pandemic, FSSAI waives off the fine on late submission of half yearly and yearly annual returns for the financial year 2019-20.](#)





# RESEARCH IN HEALTH & NUTRITION

## A low-carb diet may lower the risk of blinding eye disease

DAILY NEWS July 23, 2020

Following a long-term diet that's low in carbohydrates and high in fat and protein from vegetables may reduce the risk of the most common subtype of glaucoma, according to a study published in Eye-Nature.

The study is important because glaucoma is the leading cause of blindness in the United States and primary open-angle glaucoma (POAG) is the most common type. POAG is the leading cause of optic nerve degeneration that is related to the pressure level inside the eye, but other factors also contribute to this condition.

Since glaucoma is a condition that may be associated with mitochondrial dysfunction, researchers wanted to find out if substituting protein and fat for carbohydrates in the diet would enhance mitochondrial activity, maintain optic nerve function, and prevent optic nerve degeneration in this blinding eye disease. They performed a large-scale meta-analysis to get this answer.

They followed 185,000 adult participants from three large studies

in the United States, conducted between 1976 and 2017. Participants were female nurses and male health professionals aged 40–75. Every two to four years, they filled out food frequency questionnaires that assessed what they ate and drank. They also answered questions about their health and what diseases, if any, they might be developing. If they said they had glaucoma, the researchers asked their treating eye care providers to send medical records to determine if they had POAG.

The research team created statistical models based on the patients' questionnaire responses, dividing them into groups based on carbohydrate intake, so they could look across the spectrum from high to low carbohydrate intake and see any possible relationship with POAG. They specifically looked at three different ways of achieving a low-carbohydrate diet: substituting animal-based fats and proteins for carbohydrates, substituting plant-based based fats and proteins for carbohydrates, and replacing carbohydrates with high fats and proteins regardless of the source. Researchers then calculated the relative risk of POAG after adjusting for multiple factors for each of the dietary patterns, including age, race, and body mass index.

The researchers found that the patients in the low-carbohydrate intake group who followed a diet of increased plant-based fat and protein were associated with a 20% lower risk of developing POAG subtype with paracentral visual field loss compared with those in the high-carbohydrate intake group. However, the researchers did not find any association between POAG and a low-carbohydrate diet without accounting for the source protein or fat, and they did not find any association between glaucoma and an animal-based low-carbohydrate diet. Their findings suggest vegetable sources may be more beneficial than animal sources for a low-carbohydrate diet with respect to reducing the risk of the specific glaucoma subtype with early paracentral visual loss.

“This was an observational study and not a clinical trial, so more work is needed as this is the first study looking at this dietary pattern in relation to POAG,” said study author Louis Pasquale, deputy chair for ophthalmology research for the Mount Sinai Health System, in a press release. “The next step is to use artificial intelligence to objectively quantify paracentral visual loss in our glaucoma cases and repeat the analysis.”

tend to die earlier. But to date, scientists haven't completely understood why.

Drawing on animal and human experiments, Brunt and her team set out to answer three questions: Does TMAO somehow damage our vascular system? If so, how?

And could it be one reason why cardiovascular health gets worse -- even among people who exercise and don't smoke -- as we get older? The researchers measured the blood and arterial health of 101 older adults and 22 young adults and found that TMAO levels significantly rise with age. (This falls in line with a previous study in mice, showing the gut microbiome -- or your collection of intestinal bacteria -- changes with age, breeding more bacteria that help produce TMAO).

Adults with higher blood levels of TMAO had significantly worse artery function, the new study found, and showed greater signs of oxidative stress, or tissue damage, in the lining of their blood vessels. When the researchers fed TMAO directly to young mice, their blood vessels swiftly aged.

"Just putting it in their diet made them look like old mice," said Brunt. She noted that 12-month-old mice (the equivalent of humans about 35 years old) looked more like 27-month-old mice (age 80 in people) after eating TMAO for several months. Preliminary data also show that mice with higher levels of TMAO exhibit decreases in learning and memory, suggesting the compound could also play a role in age-related cognitive decline.

On the flip side, old mice that ate a compound called dimethyl butanol, (found in trace amounts in olive oil, vinegar and red wine) saw their vascular dysfunction reverse. Scientists believe that this compound

prevents the production of TMAO. Brunt notes that everyone -- even a young vegan -- produces some TMAO. But over time, eating a lot of animal products may take a toll. "The more red meat you eat, the more you are feeding those bacteria that produce it," she said.

Senior author Doug Seals, director of the Integrative Physiology of Aging Laboratory, said the study is an important breakthrough because it sheds light on why our arteries erode with age, even in the healthiest people. "Aging is the single greatest risk factor for cardiovascular disease, primarily as a result of oxidative stress to our arteries," said Seals. "But what causes oxidative stress to develop in our arteries as we age? That has been the big unknown. This study identifies what could be a very important driver."

The research team is now further exploring compounds that might block production of TMAO to prevent age-related vascular decline. For now, they said, a plant-based diet may also keep levels in check.

### Nutrients in microalgae: An environmentally friendly alternative to fish

Science Daily July 7, 2020

Microalgae could provide an alternative source of healthy omega-3 fatty acids for humans while also being more environmentally friendly to produce than popular fish species.

### Why do arteries age? Study explores link to gut bacteria, diet

Science Daily July 1, 2020

A compound produced in the gut when we eat red meat damages our arteries and may play a key role in boosting risk of heart disease as we get older, according to new University of Colorado Boulder research.

The study, published this month in the American Heart Association journal *Hypertension*, also suggests that people may be able to prevent or even reverse such age-related decline via dietary changes and targeted therapies, like novel nutritional supplements.

"Our work shows for the first time that not only is this compound directly impairing artery function, it may also help explain the damage to the cardiovascular system that naturally occurs with age," said first author Vienna Brunt, a postdoctoral researcher in the Department of Integrative Physiology.

Eat a slab of steak or a plate of scrambled eggs, and your resident gut bacteria get to work immediately to break it down. As they metabolize the amino acids L-carnitine and choline, they churn out a metabolic byproduct called trimethylamine, which the liver converts to trimethylamine-N-Oxide (TMAO) and sends coursing through your bloodstream.

Previous studies have shown that people with higher blood levels of TMAO are more than twice as likely to have a heart attack or stroke and



This is the result of a new study by scientists from Martin Luther University Halle-Wittenberg (MLU). The study was recently published in the Journal of Applied Phycology and offers an initial indication of the environmental effects of producing microalgae in Germany. Microalgae have been the focus of several decades of research -- initially as a raw material for alternative fuels, but more recently as a source of nutrients in the human diet. They are mainly produced in open ponds in Asia; however, these ponds are at risk of potential contamination. Also, some species of algae are easier to cultivate in closed systems, so-called photo-bioreactors. "We wanted to figure out whether microalgae produced in photo-bioreactors in Germany could provide a more environmentally friendly source of essential nutrients than fish," says Susann Schade from the Institute of Agricultural and Nutritional Sciences at MLU. Up to now, photo-bioreactors had usually only been compared to pond cultivation and they often scored worse due to their higher environmental impacts. "However, little research has been done on the precise extent of the environmental impacts of algae produced for human consumption, especially under climatic conditions such as those found in Germany," adds Schade.

For their study, the researchers developed a model to determine location-specific environmental impacts. "One of the things we did was to compare the carbon footprint of nutrients from microalgae and fish. We also analysed how much both food sources increase the acidification and eutrophication in water bodies," explains Dr Toni Meier, head of the Innovation Office nutriCARD at MLU. The researchers were able to show that microalgae farming has a similar impact on the environment as fish production. "However, if we compare the environmental effects in relation to the amount of omega-

3 fatty acids produced, fish from aquaculture comes off far worse," says Schade. One advantage of algae cultivation is its low land consumption; even infertile soils can be used. In contrast, both open ponds and the cultivation of feed for aquaculture require very large areas of land. In particular, fish species that are popular in Germany, such as salmon and pangasius, are primarily produced through aquaculture and therefore put the environment under a considerable amount of pressure. However, even fishing wild Alaska pollack had poorer values than microalgae for all environmental indicators.

"Microalgae should not and cannot completely replace fish as a food source. But if microalgae could be established as a common food, it would be another excellent environmentally friendly source of long-chain omega-3 fatty acids," explains Meier. Several algae are already used as a food supplement in powder or tablet form and as an additive to foods such as pasta or cereals. It would be a way to reduce the current gap in the global supply of omega-3 fatty acids. At the same time, it would provide considerable relief to the world's oceans.

Cognition boost:  
Curcumin and iron combination raises neuro growth factor BDNF in six-week study  
By TingminKoe 28-Jul-2020  
NutraIngredients Asia



Consuming a curcumin-enriched iron supplement for six weeks is able to significantly raise the level of brain-derived neurotrophic factor (BDNF), which is essential for normal neuronal function and energy homeostasis, as well as being linked to

improved cognitive function.

Existing studies have shown that low or excessive levels of iron in the brain will reduce the expression of BDNF. There are also studies which suggest that curcumin supplementation can increase BDNF levels in humans. To find out if iron and curcumin combined could amplify the benefits, researchers from the University of Westminster and Coventry University conducted a six-week trial, with the findings published in Antioxidants recently. Funded by Gencor Pacific, the trial recruited 155 healthy subjects between 19 and 40 who were then randomised into five groups.

The experiment matrix consisted of subjects who took 1) low dose iron (18mg) with no curcumin or 2) low dose iron (18mg) with 500mg curcumin or 3) high dose iron (65mg) with no curcumin or 4) high dose iron(65mg) with 500mg curcumin, or 5) placebo. A highly bioavailable curcumin commercially available as HydroCurc was used in the trial. It is a proprietary formula developed by Pharmako Biotechnologies – the sister company of Gencor Pacific.

Findings showed that subjects who have taken both iron and HydroCurc saw a steady increase in terms of mean BDNF levels. In subjects who took low dose iron and curcumin, mean BDNF

had increased from 30.28 ± 1.54 ng/mL to 31.42± 1.02 ng/mL halfway through the study. By the end of the study, their mean BDNF had reached 39.17 ± 4.96ng/mL. In those who took high dose iron and curcumin, mean BDNF grew from

30.85 ± 1.99 ng/mL to 32.00 ± 1.29ng/mL to 39.16 ± 4.96 by the end of the study, but the results were not statistically significant.

No significant increase in BDNF was seen in the group which took only low dose iron, while a slight increase was seen in the group which took only high dose iron. "The addition of curcumin may therefore provide a novel approach to iron supplementation and possibly enhance the iron-associated cognitive benefits linked to increased serum BDNF levels," the researchers said, adding that the findings were supportive of previous studies.

However, as there was an absence of a curcumin-only group in the current study, they could not confirm if the increase in serum BDNF was solely due to curcumin or the synergic effects of both iron and curcumin. In addition, the researchers pointed out it was subjects with a lower ferritin (the protein that contains iron) levels that had a greater increase in BDNF after supplementing iron and Hydrocurc.

This was evident when the participants were sub-grouped according to their baseline ferritin values. As compared to subjects with normal baseline ferritin values, those with low ferritin values showed a greater increase in BDNF. "This suggests that the addition of curcumin to 18 mg iron supplementation, in particular, may be most effective at enhancing serum BDNF levels in individuals with low ferritin levels," the researchers said.

This is the Gencor Pacific's first scientific study on the effects of iron and Hydrocurc combined. It is expected to publish two more studies on Hydrocurc and its effects on iron metabolism, as well as how the formulation could impact the quality of life. "Today, cognition is a huge area and is one of the hottest

areas in our field. Our study with Hydrocurc is a path-breaker for proving cognitive health benefits of Hydrocurc when co-administered with normal dietary intake of 18 mg iron, as the two combined can increase BDNF levels," CEO Ramasamy Venkatesh told NutraIngredients-Asia.

He added that the company hoped to strengthen the science and function of curcumin via its research on the highly bioavailable curcumin formulation. "People are confused between the terms turmeric, curcumin, and what do they do because the number of market players is high, the messaging has been all over the place, that is why we are very focused on dealing with the science," he said. At present, Hydrocurc is used in beverages for promoting calm and focus as seen in GNC's Moji. It can also be applied to powder, capsule, tablet, RTD mix and shakes products.

### Experts and health organizations call for 'stronger, better-funded' federal nutrition research

By Mary Ellen Shoup 23-Jul-2020 - Food Navigator USA

The US must strengthen and increase funding for federal nutrition research to accelerate critical discoveries, and most importantly, improve public health, say a group of research, policy, and government experts in a new report.

In a paper published in the American Journal of Clinical Nutrition, the authors identified "stark national nutrition challenges" within the US, which have only been exacerbated by the on-going COVID-19 pandemic and could be alleviated by coordinated cross-departmental efforts and additional funding.

According to the report, the number of adults with diabetes has more than doubled over the past 20 years, and today, half of all American adults suffer from diabetes or pre-diabetes. In addition, cardiovascular disease affects about 122 million Americans and causes roughly 840,000 deaths each year.

"Every day, our country suffers massive health, social, and economic costs of poor diets. The COVID-19 pandemic has further highlighted the burdens of diet-related diseases on population resilience," said principle investigator of the paper, Dr P.H. Dariush Mozaffarian, M.D., dean and Jean Mayer Professor at the Friedman School of Nutrition Science and Policy at Tufts University.

"The nation has come together to achieve major science challenges in the past, such as putting a man on the moon. We need a similar major national effort to address current nutrition challenges, generating the critical science to rapidly treat and prevent diet-related diseases, improve health equity, increase population resilience to COVID-19 and future pandemics, and drive fundamental and translational discoveries for better lives." Currently, nutrition research is separately conducted and supported by more than 10 federal departments and agencies. However, their relative investments in nutrition research have remained flat or declined over several decades— even as diet-related



conditions and their societal burdens have climbed, noted authors of the paper. “Coordination also remains suboptimal, documented by multiple governmental reports over 50 years. Greater harmonization and expansion of federal investment in nutrition science, not a siloing or rearrangement of existing investments, has tremendous potential to generate new discoveries to improve and sustain the health of all Americans,” authors of the paper stated.

The paper proposed two strategic recommendations to harmonize and pool together efforts in the area of nutrition research and public health policy. First, authors recommended improving cross-government coordination of nutrition research, through policies such as a new Office of the National Director of Food and Nutrition in the White House Office of Science and Technology (OSTP) and a new US Task Force on Federal Nutrition Research modelled after other timely task forces such as the Combating Antibiotic-Resistant Bacteria, which resulted in a comprehensive national action plan that united agencies under a “common critical agenda.”

“Modelled on that successful task force, the leadership, members, and general functions of a Task Force on Federal Nutrition Research would develop and report to the President on a major new National Action Plan for accelerating and strengthening nutrition discoveries.” A major disadvantage to this plan, however, is that a task force usually has a defined scope over a set time period and does not provide sustained leadership and coordination into the future, noted authors.

The paper’s second key recommendation is strengthening and accelerating nutrition research within the National Institutes of Health (NIH), including creating a



new National Institute of Nutrition and the return of the Office of Nutrition Research (ONR) on the NIH Office of the Director. “These strategies were found to be complementary, together catalysing important new science, partnerships, coordination, and returns on investment,” the paper added.

The paper also identified additional opportunities within the USDA including increased investment in nutrition research for the Agricultural Research Service (ARS) and its network of Human Nutrition Research Centers, the National Institute of Food and Agriculture (NIFA) extramural research programs, and the Economic Research Service (ERS) programs, which assess demographic, social, informational, and economic determinants of dietary consumption and associated health outcomes.

“The identified specific options would help create the new leadership, strategic planning, coordination, and investment the nation requires to address the multiple nutrition-related challenges before us, and grasp the corresponding opportunities,” the paper stated. “The opportunities to be gained by greater coordination and investment in federal nutrition research are clear, with potential for large and rapid ROI,” said the authors.

## Gut-liver axis: Probiotics and prebiotics show promise against non-alcoholic fatty liver disease - review

By Guan Yu Lim 30-Jun-2020  
-Nutralngredients Asia

Researchers say a new review reveals that probiotics, prebiotics and synbiotics exhibit potential to treat non-alcoholic fatty liver disease (NAFLD) by targeting the gut microbiota.

NAFLD is a prevalent metabolic disorder with increasing incidence rates worldwide. It is often caused by poor diet, insulin resistance and life-related factors. Often it leads to fibrosis, advanced cirrhosis, hepatocellular carcinoma (HCC) or even death.

There are currently no approved drugs to treat NAFLD, and conventional antibiotics are given to alleviate NAFLD symptoms, although they can cause side effects and potential bacterial resistance. Researchers from South China University of Technology and Guangzhou Medical University said the intestinal microbiome contains fungi, viruses, and bacteria, which are associated with various liver diseases. “Therefore, it is logical to target the gut-liver axis, especially the microbiota, in order to alleviate the symptoms of NAFLD.”

So far there have been seven clinical trials focusing on a probiotic or symbiotic interventions for NAFLD. The trials were conducted in US, Spain, Germany, US and Iran, and this review was published in the World Journal of Gastroenterology. They detailed that in rodent models, administering probiotics to mice fed a high fat diet was found to significantly slow the progression of hepatic steatosis and fibrosis. Researchers reported that most studies on NAFLD rodent models have been aimed at preventing, rather than treating diet-induced liver disease.

Meanwhile, clinical trials on NAFLD patients have shown that Lactobacillus, Streptococcus, and Bifidobacterium strains play a role in restoring the serum levels of the liver enzymes aspartate aminotransferase (AST) and alanine aminotransferase (ALT). High levels of AST in the serum are a sign of liver damage. A randomised controlled trial conducted on overweight children with NAFLD showed significant improvement in fatty liver condition and BMI following treatment with VSL3 formulation (*S. thermophiles*, *Bifidobacterium breve*, *Bifidobacterium longum*, *Bifidobacterium infantis*, *Lactobacillus casei*, *Lactobacillus plantarum*, *Lactobacillus acidophilus*, and *L. bulgaricus*).

VSL3 was found to alleviate chronic liver diseases by protecting the intestinal barrier and reducing endotoxemia and oxidative/nitrosative stress. Researchers said further research to optimise the efficacy, safety, sustainability of probiotics for treating NAFLD is required. Researchers also think prebiotics may be a suitable therapeutic tool against NAFLD through fat loss, improved blood glucose control, restored gut microbiota and lower inflammation. Prebiotics are typically dietary fibres and studies found it to stimulate the growth of Bifidobacteria and normalised plasma endotoxin levels, which improved glucose tolerance and subsequently resulted in weight loss in obese individuals. Oligofructose, a mixture of nondigestible fermentable dietary fibre is studied for its ability to reduce liver oxidative stress and inflammation. Researchers also say there is strong potential for synbiotics – probiotics and prebiotics – to assist against liver diseases.

In one study, patients with non-alcoholic steatohepatitis (NASH), a form of NAFLD was treated with

*Bifidobacterium* and a prebiotic, fructo-oligosaccharides (FOS) for six months. They exhibited significantly lower serum ALT and AST levels compared to the placebo group. Another study showed that synbiotic supplementation containing seven probiotic strains (*Lactobacillus casei*, *L. bulgaricus*, *Lactobacillus rhamnosus*, *Lactobacillus acidophilus*, *Bifidobacterium breve*, *B. longum*, and *S. thermophilus*) and FOS for 28 weeks, along with healthy lifestyle modifications, was more beneficial in reducing inflammation and BMI in NAFLD patients compared to lifestyle changes alone.

A meta-analysis of 15 randomised controlled trials which included 782 NAFLD patients showed that synbiotics improved ALT, AST, high-density lipoprotein, low-density lipoprotein, triglyceride and cholesterol levels. Through these studies, researchers concluded that probiotics, prebiotics and synbiotics could be a safe and effective alternative to conventional antibiotics for treating NAFLD. In addition, they said further studies can explore the genomes of NAFLD patients to develop more personalised treatments.

### Hop help: Kirin's mature hop bitter acid aids cognitive health in older adults -RCT

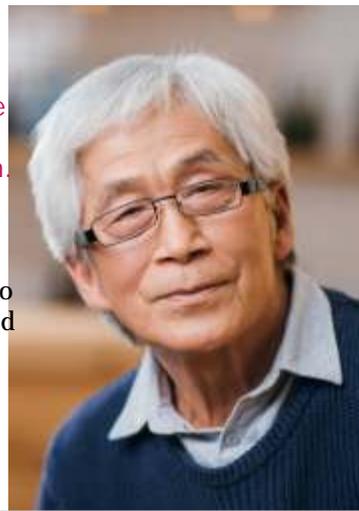
By Guan Yu Lim 21-Jul-2020 - NutraIngredients Asia

Supplementation with Kirin's mature hop bitter acid (MHBA) for 12 weeks has been found to improve attention and reduce stress in healthy older adults in Japan.

The Kirin-funded study was conducted on 98 adults aged 45 to 69 years with perceived subjective

cognitive decline (SCD), but were otherwise healthy. Published in the Journal of Alzheimer's Disease, researchers said the findings suggest that early intervention through MHBA in people with SCD could be successful in improving cognitive function. This present study follows a recent study on 60 human participants where MHBA was reported to specifically improve memory recall. Previously, Kirin had also conducted a study on its MHBA cognitive functions in a mouse model.

However, it must be pointed out that SCD was self-reported, and not formally diagnosed. SCD can consist of symptoms ranging from memory complaints, depression, or people with high neuroticism. Participants were divided into the treatment (MHBA) and placebo groups. The treatment group was given a capsule containing 35mg of MHBA to consume daily, while the placebo capsule contained 35mg of dextrin. MHBA is manufactured from the raw material of beer, hops, which are then heated and oxidised. It contains 4'-hydroxy-allohumulinones, 4'-hydroxyalloisohumulones, tricyclo-oxy-isohumulones A, hulupones, and humulinones, which are oxidants of and -acids. The intervention was carried out over 12 weeks, although there was no indication of the recommended time for consumption. One of the researchers, Takafumi Fukuda from Kirin Central Research Institute, told us: "In this clinical trial, we do not determine the timing, except for taking it once a day. Therefore, it is possible to interpret the effect as being achieved no matter when you take it." A series of tests were then carried out to assess attention and memory scores as primary outcomes.



Attention was evaluated using the Symbol Digit Modalities Test (SDMT), memory (word and shape recall) using the Rey Auditory Verbal Learning Test (RAVLT) and Wechsler Memory Scale-Revised (WMS-R). To measure stress levels, saliva was collected at baseline (week zero) and week 12 of the intervention, analysing cortisol, CgA, -amylase, and -endorphin levels. It was reported that the SDMT scores were significantly higher in the MHBA group compared to the placebo group ( $p = 0.045$ ) after 12 weeks of intervention. In the memory assessment, there was no significant difference between groups, although both treatment and placebo groups observed higher scores at week 12, compared to their baseline scores. In assessing stress levels, researchers found that -endorphine levels were significantly lower in the treatment group from baseline to week 12 than in the placebo group ( $p = 0.043$ ).

-Endorphin is a marker to evaluate psychological stress and found in higher levels in people with depression. Researchers said the findings of MHBA improving attention and reducing stress in older adults were significant, especially for adults with perceived SCD who they added were important candidates for early intervention when it comes to dementia prevention. "Early intervention through MHBA supplementation in persons with SCD could be successful in improving cognitive function."

While MHBA supplementation could be beneficial for improving brain function, they explained that a study on functional MRI was required to confirm its findings. The researchers acknowledged several limitations in their study. "We could not evaluate whether MHBA supplementation prevented age-related cognitive decline due to the relatively short study length. Future long-term studies would be required to assess the effects of MHBA

supplementation on ageing-related changes. Additionally, the mechanism underlying the cognition-improving effects of MHBA via vagus nerve has not been confirmed, therefore further study is required to elucidate the mechanism."

MHBA has a similar chemical structure to iso- -acids, which stimulate the vagus nerve and found to improve cognitive function and depression in animal models. Besides MHBA effects on cognition, it has also been studied for its effect in reducing body fat. Last year, the company released its non-alcoholic beer-taste beverage (Kirin KaradaFree) which contains MHBA. The beverage has been clinically tested for its ability to reduce belly fat if consumed once daily for 12 weeks.

In the present study, researchers explained that obesity is known risk factor for dementia and MHBA may prevent dementia by improving metabolic function. "In the future study, we will design the clinical trial to evaluate the effect of MHBA on the association of energy metabolism with cognition," they wrote. Ataka Takashima from Kirin Holdings' corporate communication department told us the company was continuing its research of MHBA with a focus on its health benefits.

### SHIFT20: Consumer health perceptions of plant-based meat are evolving, reports IFIC

By Mary Ellen Shoup 28-Jul-2020 - Food Navigator USA

The buzz around plant-based meat alternatives is strong, but what is the full consumer perception of plant-based protein products in terms of nutrition and

healthfulness compared to animal meat, and what motivates consumers to buy plant alternatives? At SHIFT20, the virtual IFT Show, the International Food Information Council (IFIC) presented its findings from a recent survey of 1,000 US adults, which sought to answer these questions.

Consumer definition of plant-based eating  
Before diving into consumers' nutritional perceptions of plant-based meat alternatives, IFIC asked respondents to characterize what they believe denotes a plant-based diet. According to survey results, the top response to this question was a plant-based diet is a "vegan diet in which you avoid all animal products, including eggs and dairy." The next top response was "a diet that emphasized minimally-processed foods that comes from plants, with limited consumption of animal meat, eggs, and dairy." "I found this fascinating because it didn't necessarily align with what my definition of a plant-based diet is. So, it's always important to consider where the consumer is in terms of understanding or perceptions of certain topics," said Kris Sollid, RD, senior director of nutrition communications, IFIC, during the SHIFT20 virtual presentation.

According to the consumer survey, about half of respondents have eaten a plant-based alternative. When asked what motivated them to try a plant-based meat alternative,



the most common answer was curiosity –41% of respondents reported "I like to try new foods" and 30% said "I've been hearing about them plant alternatives to animal meat and was curious." "The adventurous eater and the curious eater seem to be driving trial of plant alternatives to animal meat," said Sollid.

When asked what they liked most about plant-based meat alternatives (among the sample that had tried these products), 53% reported liking the taste, 35% said they liked the texture, and 34% said the products taste like meat. Among the sample of respondents who had not tried plant-based meat alternatives, when asked why, 31% said anticipation of not liking the product was the top reason for not trying plant alternatives. To assess consumer health perceptions of plant-based meat vs animal meat, IFIC performed an exercise in which it presented respondents with two blind nutrition labels: Product A (plant alternative to beef) and Product B (a 100% beef product). "What we found after comparing nutrition facts is that nearly half of people said that the plant alternative is healthier than animal meat," said Sollid. About a quarter of respondents said Product B (100% beef product) was the healthier product.

Next, IFIC included the product labels with its ingredients (thereby divulging which product was plant-based and which was the 100% animal beef product). After the ingredients list was divulged, slightly fewer respondents (40%) said Product A was healthier and conversely the number of people that said Product B was healthier grew from 25% to 29%, according to the survey. "I think I find that most interesting, the effect wasn't as large as we might have assumed it would be after we divulged the ingredients list to our survey take. The big question is if these products are here to stay? My personal perception is

that they are," said Sollid.

In its survey, IFIC asked consumers about purchasing intent of plant-based meat alternative products. "What you see is that the responses are a little bit mixed," noted Sollid. The survey revealed that 18% of consumers said that they have purchased plant alternatives to meat and do not intend to buy them again. At the same time, 27% of respondents said they have purchased these products before and they do intend to buy them again. "On the reverse side in terms of this question we do see that about half of our sample has not purchased these products, I certainly think there's a lot of room to grow for these products, the consumer mindset is there, and I think only time will tell how much they follow through on that," said Sollid.

### Tailoring functional rice flour to different applications

06-Jul-2020  
Food Navigator  
USA

Rice (*Oryza sativa*) belongs to the family Poaceae or Gramineae, and is one of the most ancient foods in the world, known and cultivated for at least 5,000 years.

Rice originated in Asia and most of the world's production of it comes from that region of the world. There exist many types of rice; for all of them, the main basic distinction is between brown rice (whole grain) and white rice (in which the bran and germ are removed). While brown rice seems to be more valuable from a nutritional point of view, also because of its higher content in fibres, white rice is the most popular.



Rice is a great source of important nutrients. Carbohydrates are the first element, making up almost 80% of it, while proteins represent approximately 7.5% and fat 1.3%. The main carbohydrate in rice is called starch, which is made of two long chains of glucose called amylose and amylopectin. Manufacturers make many products from rice, including rice flour, rice syrup, rice bran oil, and rice milk.

### Pregelatinized rice flours made in Italy

Naturis is an Italian company specialized in the development of high added value products that are economically accepted by the market, easy to use and innovative, and based on naturally treated cereals and pulses. The ingredients are versatile and adapt to different applications in the food industry. Best Matching is Naturis' line of functional rice and pulses flours. Pregelatinized rice flours can be used in food preparations to bind, thicken, stabilize, and emulsify. They are 100% natural ingredients for a true clean label. Pregelatinized rice flours maintain their natural structure and — via a delicate process based on natural elements such as heat, air, and water — are transformed into ingredients with great properties.

The first basic step is to identify the perfect rice variety, knowing the right amount of energy and water to be added, the best dehydration process, and right milling capacity to get the desired performance. Naturis pregelatinized flours are white, odourless, and disperse easily. They work as functional agents: thickeners, emulsifiers, taste-maskers, viscosity enhancers, and coatings. They can substitute

starches and even modified starches. They are “clean” and can be declared as “rice flour”.

#### Clean-label functional rice flours for a variety of applications

Pregelatinized rice flours are a great ingredient for a range of food applications. For example, being very digestible, they are used in baby foods and infant cereals. Rice flours can be used as a:

- raw material: rice noodles, by itself or with corn and legumes
- basic ingredient: conventional and gluten-free bakery
- texturing, thickening, or gelling agent: soups, ready meals, vegetable cheeses, candies
- fat replacer: spreadable products and homemade ice cream
- filming agent: deep fried products
- filling agent: fillings for fresh pasta

Rice flours are also great for gluten-free bakery products (bread and derivatives) and for the production of pasta. The key ingredient in these rice flours is starch. Perfect know-how and expertise in mastering the two entities of starch — amylopectin and amylose — in a way to get the best of the benefits of these chains is fundamental to get a perfect and functional product.

High amylose content reduces stickiness; therefore, extrusion can go faster and with higher yields. Flours with these characteristics are particularly indicated in bakery for the production of bread and derivatives (especially gluten-free), as guarantees the stability and qualitative consistency of the product; especially in gluten-free bread it grants optimal absorption and retention of the water required during the mixing phases.

In the production of gluten-free pasta such flour allows a mechanical workability superior to normal rice flours, thanks to visco-elastic characteristics. Low molecular weight chains form highly resistant films when used in a batter mix and fried. This coating capacity has been

proved to have a good resistance to freeze-thaw process (frozen, fried food) creating a good barrier for moisture loss during the entire life of the finished product. This is how other flours deliver functionality.

Other flours are optimal for increasing the viscosity in any formulation, even after the mix has cooled down. This combination of partially hydrolysed amylopectin and high values of viscosity (see figure 1, assessing pasting properties of such a flour, Y110) will also provide a nice creamy texture to the final product.

Other flours are well suited to creams, sauces, and desserts, even in challenging manufacturing processes, due to their ability to link fats and proteins. Naturis Pregelatinized Functional Rice flours are distributed in the US market by FaravelliInc, the US subsidiary of Faravelli. Faravelli began operating in its native Italy in 1926, before going on to establish a presence in North America in 2014.

#### FAO predicts a global shortage of protein-rich foods

DAILY NEWS July 8, 2020

According to the Cornell Alliance for Science, a new report out from the Food and Agricultural Organization (FAO) of the United Nations predicts there will be a global shortage of protein-rich foods this year due to COVID-19 and other factors.

With fewer people able to consume protein due to the lack of availability, health problems among children could be exacerbated.

Expansion in the world's meat sectors has slowed due to market disruptions caused by the global pandemic, the report noted. COVID-19-related economic hardships, a steep decline in demand from the foodservices

sector due to lockdowns, logistical bottlenecks, substantial volumes of unsold meat products, limitations in shipping, and port backlogs are some of the factors restraining growth in the world meat trade. Total worldwide meat production in 2020 will fall by 1.7% from 2019 totals, while international meat prices have dropped 8.6% from January 2020, resulting in economic losses to producers. World exports of milk and dairy products are forecast to contract by 4% in 2020 due to faltering import demand as a result of COVID-19. However, world milk production is showing resilience, possibly growing by 0.8% this year.

The pandemic will continue to affect seafood markets as fishing fleets lay idle. Aquaculture harvests are being delayed and stocking targets drastically reduced, affecting the production of heavily traded commodities such as shrimp, salmon, pangasius, tilapia, seabass, and seabream. Worldwide demand for both fresh and frozen shrimp is declining significantly, while demand for salmon is expected to drop by at least 15% from 2019 levels. Retail sales, particularly of fresh salmon and trout, have significantly fallen—a market that is not expected to recover for some time, the report said.

Plant sources of protein, such as soya bean, also are being impacted negatively. Oilseed crop production is expected to decline in 2019–2020 from the previous season's record level, with pronounced drops in soybean and rapeseed outweighing gains in the other crops, the FAO reported.





# & FOOD SCIENCE & INDUSTRY NEWS

## COVID-19's impact on lifestyles and eating behaviors in Asia

DAILY NEWS July 28, 2020

As might be expected, there are high levels of concern among Asian consumers about the impact COVID-19 is having, both directly on their own lives and on a global scale.

According to Innova Market Insights' COVID-19 Consumer Survey (conducted in March 2020) in China, India, and Indonesia; personal concerns center on health, personal income, and the availability of healthcare and products to buy.

Personal health and the health of family and friends tops the list of concerns across all three countries, with impact on personal income/finances ranked as second.

Indian consumers were the most concerned, with 73% stating that they were very concerned about their health and that of their families and friends. This is

compared with 58% in China and 52% in Indonesia.

Health considerations have become more influential on purchasing decisions, with consumers trying to eat more healthily and consuming products in a bid to boost immunity.

These include ingredients such as turmeric in India, chrysanthemum and cordyceps flower in China, and royal jelly, ginger, and mint in Indonesia. Familiarity, comfort, and improving mood are also seen as increasingly important factors for food and beverage choices during the crisis.

Health, shelf life, and cost are taking on a greater significance with regard to purchasing decisions, while factors such as flavor and indulgence appear to be declining in importance.

Research from Innova Market Insights indicated that the main changes in attitude/behavior in India and China included more cooking/preparing of homemade food, more healthy eating, and more eating/drinking products to boost

immune health.

Fresh fruit and vegetables and juices and nectars are some of the top categories benefitting from this trend, as consumers look to them as a means of boosting health. At the same time, consumers claimed to be purchasing lower levels of less healthy, indulgent, and highly processed options, such as ice cream, pizza, cakes, and pastries.

There has also been an acceleration in the growth of online grocery shopping as movements are restricted and physical stores cannot easily be accessed.

The rise in grocery apps in China, for example, encompasses developments in supermarkets, dedicated grocery apps, and food delivery platforms. Restaurants have been quick to offer home delivery, but many consumers are also willing to order online and go out and pick up takeout. In China, 37% of consumers claimed to be ordering more restaurant/café food online, while 34% were picking up takeout food and meals more often.

## Overcoming fortification challenges in pandemic-stricken world

22 Jul 2020 Nutrition Insight

Food fortification is “one of the safest, most effective and affordable ways” to help consumers meet recommended daily intakes of micronutrients.

Notably, it can be used as a preventive means of warding off obesity, immune diseases and anemia.

Amid the “exciting opportunities” of fortifying food with vital minerals and vitamins, NutritionInsight speaks with industry experts about regional differences in consumer demand, the risks and challenges of fortifying foods and in what direction this trend is headed.

According to a 2019 DSM Global Health Concerns study, 43 percent of the 17,000 questioned consumers from 23 countries worry they do not get the right nutrients from their diet.

Another 34 percent of consumers consider a product fortified with vitamins to be more nutritious.

This demonstrates “an opportunity to support consumers in getting the right nutrients, in the right amounts through fortification,” says Rona Weekes, Global Director General Nutrition at DSM Nutritional Products.

A driver of the fortification trend is increased awareness for preventive healthcare, notes Dr. Christina Mesch, Product Manager at

SternVitamin. Consumers are taking their health into their own hands and are increasingly relying on “alternative channels” to self-diagnose, to identify targeted health needs and to choose the right nutritional “support”.

WHO data reveals that over 30 percent of the world’s population is anemic, many due to iron deficiency.

“As we’ve seen, the pandemic is changing people’s consumption patterns and their focus on health issues. Health prevention is suddenly more important than



all over the world and cause serious diseases, such as anemia,” she flags. According to the World Health Organization (WHO), two billion people – over 30 percent of the world’s population – are anemic, many due to iron deficiency.

Meanwhile, adding soluble fiber to common foods is a logical step in the fight against overnutrition, says Dr.LaetitiaPetrucci, Product Manager at IFF Health.

“Soluble fiber is known to reduce appetite and can be a powerful ally in combating obesity. Very few people meet the recommended 25-38 g of fiber per day. Currently, dietary fiber intakes among US adults only average about 15 g per day.”

Meanwhile, vitamins A, C, D, E, B12, folate, iron and zinc play important roles in the immune system. Hence, it is essential that older people get an adequate supply of these critical micronutrients.

Two of the most popular vehicles for fortification are cereal and dairy products like milk and yogurt, Weekes at DSM continues.

before. That will not change after the end of the COVID-19 outbreak,” Dr.Mesch affirms.

### Concerns of lacking fiber and iron

The fortification of foods with minerals and trace elements provides an opportunity to address several health issues via diet optimization, says Dr. Sonja John, Product and Area Sales Manager Business Unit Food/Animal Nutrition at Dr. Paul Lohmann.

“Especially iron deficiencies occur

This is thanks to their widespread consumer acceptance. “Substitutes like meat and dairy alternatives are also often enriched with nutrients to create plant-based solutions with a high-quality nutrition profile that resembles that of the original product.”

### Risks and challenges of fortification

On the one hand, there are some risks in fortifying food, according to Dr.Mesch of SternVitamin. “There might be a risk for hypervitaminosis,

especially for children, if a customer orders a micronutrient premix where the micronutrients highly exceed the Nutrient Reference Values (NRV), especially for fat-soluble vitamins such as vitamin A.” On the other hand, Weekes notes that as long as food is fortified in line with national regulations and standards, there is no associated risk. Despite the nutritional enhancement of food, fortification also bears some R&D challenges, says Dr. John. Mineral salts may influence the properties of the final application in terms of taste or texture, while Weekes adds that there are challenges in color and scent.

Cereal and dairy products are popular vehicles for fortification, thanks to their widespread consumer acceptance. This is because many vitamins are susceptible to stress factors that occur during a production process such as heat, humidity and oxygen. Dr. Mesch names vitamin B1 as an example, which is “very heat sensitive, so the losses after baking can be high.”

#### Solutions to fortification challenges

Besides changes in organoleptic properties, high concentrations of iron and fiber fortification can also lead to gastrointestinal side effects, Dr. Petrusa details. “Gas and bloating

are common side effects after increasing fiber in the diet suddenly. Finding the most suitable format for iron is also a real challenge, as these problems increase the likelihood of fortified products or food supplements with high doses of iron being rejected by consumers.”

In this space, IFF Health offers microencapsulated iron AB-Fortis, which protects the iron and keeps it stable by a natural, organic layer to avoid the release of free iron. As a result, there is no metallic taste and greatly reduced oxidation or negative gastrointestinal side effects.

For fiber fortification, IFF’s FenuLife is a unique source of deodorized galactomannans produced from fenugreek and contains 85 percent dietary fiber content, acting as a prebiotic. Because fenugreek fiber is fermented extremely slowly, it can help prevent gas build-up.

#### Regional differences

Lastly, keeping up to speed with evolving regulatory requirements is a challenge in itself. This can vary between specific countries and regions – particularly regarding the recommended amounts of certain micronutrients. In the US, the biggest consumer health concerns include weight, energy levels and eye health, as well as resistance to disease, says Weekes of DSM.

Meanwhile, Dr. Petrusa identifies that both the North American and the European markets add iron to supplements and functional foods for women and children as well as vegetarian meat analogs. Asia and Africa add iron to commodity foods for general fortification to supplement the whole population, she adds.

The rise of the Plant-Based Revolution may also give way to micronutrient-deficient “elimination diets,” flags Weekes of

DSM. Directly catering to the iron fortification demand, SternVitamin developed a product concept for dairy alternative drinks for the Latin American market – as plant-based products are a big trend there – with a premix containing iron, as well as other minerals and vitamins.

#### Future prospects

The experts identify the surge of one of Innova Market Insights Top Ten Trends for 2020, the Plant-Based Revolution, to coincide with increased fortified food product development. More consumers are adopting what Weekes calls “elimination diets,” coupled with flexitarian, vegetarian and vegan lifestyles.

“Elimination diets can result in individuals missing out on essential nutrients. Fortifying plant-based food and beverages with essential vitamins and minerals helps consumers avoid the micronutrient gap. We expect to see a growing demand for free-from products, like plant-based or gluten-free solutions, that offer an improved nutritional profile.”

Similarly, Dr. Mesch at SternVitamin points to a recent study that showed that dairy alternative drinks lack the calcium and vitamins found in cow’s milk. “This means that indiscriminate substitutions might reduce intakes of certain micronutrients for consumer groups like older women.

Thus, fortification is an option to provide important micronutrients, also with plant-based products. Ultimately, she concludes that the COVID-19 pandemic has heightened consumers’ attention to health and wellness topics and has pushed the increased awareness for preventative healthcare. Micronutrient-fortified products supporting these health topics will be even more in demand in the future.

By AnniSchleicher





### Cambridge Commodities unveils heat-stable probiotic for bakery

16 Jul 2020 Nutrition Insight

Responding to the growing trend for food fortification with probiotics, Cambridge Commodities has launched a new probiotic strain called ActiBio BS01.

The latest strain from the ActiBio shelf-stable live cultures range contains *Bacillus subtilis*, a spore-forming, lactic acid-producing bacteria that is stable throughout a wide range of temperatures and extreme acidic conditions. This is particularly advantageous for food applications, considering commonly used probiotics in food with lactic acid-producing bacteria are generally limited in application range due to their low tolerance to heat and acid.

ActiBio BS01 builds off of Cambridge Commodities' original *Bacillus coagulans* strain, ActiBio BC01. "The latest strain launch is exciting because it allows us to make multiple strain shelf stable formulations. Probiotic products that have combinations of up to 12 different strains are very common but these products can often have less efficacy due to shelf stability. With our new addition, customers can now combine two different shelf stable strains, increasing the

diversity and helping to further promote gut health," Zeke Stevens, Product Innovation Specialist at Cambridge Commodities, tells NutritionInsight.

ActiBio BS01 comes as a gray-white color in powder form and provides 15 billion colony forming units per gram. Product applications include capsules, drinks and powder blends, but also snacks, bakery and other foods. The temperatures used in baking muffins and cakes, for example, do not inactivate the spores. A report from early May detailed that consumer demand for fortifying takeout food with probiotics is rising. Moreover, this demand could be met by adding functional ingredients to the foodservice sector.

*Bacillus subtilis* is known for its ability to induce high levels of amylase and protease enzyme production in the intestine. This aids with digestion and the formation of gut diversifying biofilms, which support the growth of beneficial bacteria in the microbiome. Besides its heat resistance properties, ActiBio BS01 has proven gastric stability, very high sporulation efficiency and can be stored and transported without refrigeration. "[ActiBio BS01] is stable throughout a wide range of temperatures and can also survive extreme acidic conditions. Not only does this give confidence to shelf life but also ensures that the probiotics can more successfully pass through the stomach and reach the areas of the gastrointestinal tract that they need to proliferate and improve gut health," says Stevens.

**Gut health top of mind**  
Digestive health is increasingly becoming a priority for consumers' health and wellness rituals. Tapping into this lucrative market, the wholly owned subsidiary of OptiBiotix Health recently entered into a non-exclusive distribution

agreement with Cambridge Commodities for the UK distribution of ProBiotix's heart health-targeting probiotic products. Meanwhile, World Microbiome Day celebrated annually on June 27 highlighted the important role of microbial diversity to support gut health.

*Bacillus subtilis* has also been gaining popularity to support cognitive health and weight management. ADM's *Bacillus subtilis* PXN 21 was shown in a cellular model to inhibit the accumulation of a protein that is associated with Parkinson's disease progression. In similar strides, a study issued by Canada-based company Lallemand found *Bacillus subtilis* Rosell-179 deconjugated bile acids in overweight otherwise healthy adults. "The future of food fortification with bacterial strains will continue to grow. Consumer knowledge around the microbiome and the profound impact that it has on one's overall health will continue to increase, as will the demand to provide ingredients that allow us to formulate successfully," Stevens concludes.

By **AnniSchleicher**

### Tailored ready meals: Personalized supplement platform broadens reach

09 Jul 2020 Nutrition Insight

Personalized supplement company Baze is partnering with ready meal players to broaden its service. Baze customers will now receive food and meal recommendations that target specific nutrient deficiencies.



The company has developed an at-home, pain-free blood test for assessing micronutrient deficiencies and the addition of food to its targeted supplement program is touted as providing a more holistic way of addressing deficiencies. Baze's tests have already been proven to eliminate 73 percent of its customers' nutrient deficiencies within three months. However, by including food recommendations, it addresses the root cause of the issue – a need for nutrient-dense diets. "Baze's approach to personalized nutrition helps consumers understand their nutrient needs through industry-standard diagnostics [so they can] then optimize their nutrient levels. We are currently working with food and prepared meal companies and their dietitians to determine the micronutrient content of their offerings. We are now creating Baze nutrient-dense bundles with companies like Performance Kitchen," Philipp Schulte, Baze's CEO, tells NutritionInsight. "Through accurate nutrient reporting, coaching and educational content, users taking a personalized approach to nutrition and supplement regimens can actively correct nutritional imbalances, remeasure micronutrient levels every three months and adjust their dosing regimen to address lifestyle and environmental changes throughout the year," Schulte adds.

**A tailored approach**  
Baze, founded in 2014, has found that 93 percent of the US population is at risk of two or more nutrient deficiencies, even when following healthy diet guidelines. Baze's approach to personalized nutrition helps consumers understand their nutrient needs through industry-standard diagnostics [so they can] then optimize their nutrient levels. "Our objective has been to bring together the worlds of personalized dietary supplements and actionable food solutions. One thing that we are very aware of is that the current

state of nutrition solutions is very fragmented, resulting in a lot of complexity that makes it difficult for people to adopt and adhere to new diet habits," says Schulte. "We believe a holistic approach will result in even better results in achieving optimum nutrition, and will also reshape how our customers think about food as tools for addressing their micronutrition needs," he adds.

Baze says that for its products, which have been on the market for two years, to drive meaningful health impact through nutrition, it has to start with the right approach and with the most actionable data. Rather than relying on a "one size fits all" approach to supplementation, nutrition scientists and registered dietitians at Baze have developed a personal supplement program that is based on an individual's nutritional deficiencies. Baze customers submit blood samples and the company measures their micronutrient levels and, along with a questionnaire and digital biomarkers, they recommend a unique supplement regimen that is tailored to correct identified deficiencies. "Data privacy has been an issue and is becoming more and more of a concern for DNA collection. Some consumers can't discern the information that is gleaned from blood biomarkers versus DNA, which can lead to consumers thinking any sort of blood collection results in DNA extraction. Companies will have to continue to work harder to be transparent about how they are using consumer information in order to gain consumer trust. Health is as personal as it gets and we have to protect it at all costs," Schulte explains. Baze's privacy points include: No DNA analysis; no selling of data; and destroying samples post analysis.

**Partnerships pegged for success**  
Through partnerships like the one with Performance Kitchen, an emerging food innovator

developing healthy and convenient frozen meals, Baze has begun to identify leaders in the food industry who are creating nutrient-dense food options that can also have a measurable impact on improving customer's blood nutrient status. In addition, partnering with innovative grocery stores, such as Texan supermarket chain HEB, also adds to the endeavor, as well as getting Baze into retailers to reach as many consumer hands as possible.

Working with major supplement manufacturers like Nature's Way is fueling innovation and pushing the industry forward, he details. "Food and supplements go hand in hand. Historically, we've focused on helping you fill your nutrient gaps through personalized supplements. However, our long-term vision has always been to not only give you convenient ways to fill your nutrient gaps but also to provide you with personalized solutions to help you build your nutrient foundation," Schulte concludes.

By **KristianaLalou**

### Pinpointing ingredients' impact: US\$43m AI platform to slash R&D process "by years"

24 Jul 2020 Nutrition Insight  
MedicascyAI is a new artificial intelligence (AI) solutions platform that works within a matter of weeks to discover where ingredients can have a significant impact.

efficacyAI, the company that has the exclusive license, says that this will cut R&D time in the nutraceutical, supplement and cannabis industries by months or even years, while also improving the product. The platform has been in



the making for over 13 years and is backed by US\$43 million from the US National Institutes of Health (NIH), Georgia Tech, private donors and the Georgia Research Alliance. “When MedicascyAI is applied at the beginning of the process to a library of molecules or ingredients, it can identify those that have the highest confidence predictions for being safe and effective. In turn, the manufacturer or nutraceutical company can focus its efforts on the ingredients that can give the best potential outcome. The company’s resources can then be applied to testing those few with the highest confidence prediction, saving time and money,” Tony Bellezza, Chairman and CEO of efficacyAI, tells NutritionInsight. He adds that efficacyAI is now working with several prominent nutraceutical and cannabis companies on products that have the potential for a significant impact and benefit to consumers. There is currently a business plan for efficacyAI to commercialize the use of MedicascyAI in all regions. This growth strategy involves first working with US-based companies before building connections in international areas.

The technology works by screening the interactions of molecules with every human protein. “There will always be competition in this technology space of AI. However, unlike others, MedicascyAI is a technology solutions platform that only requires the chemical structure of a molecule. With this information, it then provides high confidence predictions on safety and effectiveness,” Jeffrey Skolnick, Creator of MedicascyAI, also tells NutritionInsight. He adds that MedicascyAI is much faster and outperforms the competition. “While it may not cover the whole spectrum of natural ingredients, we can tell you with high confidence which items in a library will go after a specific benefit. The competition requires far more experimental

information before making safety and effectiveness predictions. After you’ve invested all that time and money in the preliminary research, their algorithms can only predict yes or no.”

#### Steering toward more successful results

According to the company, MedicascyAI will reduce the nutraceutical industry’s reliance on secondary science and guide primary research toward more successful results. The technology works by screening the interactions of molecules with every human protein. MedicascyAI’s results are documented in over 50 major peer-reviewed papers. “A given molecule can interact with 58 different protein families. Some may do nothing. Some may be antagonistic and some may be helpful. We look at how those interactions may translate into potential benefits and side effects, as well as mode-of-action targets,” explains Skolnick. The tool also has confidence indices (CIs), which predict the probability that the prediction is correct. Skolnick estimates that MedicascyAI’s algorithms cover about 97 percent of all proteins and make reliable predictions for about 40 percent of molecules found in natural products.

According to Skolnick, MedicascyAI can:

- Predict what a molecule is good for. “It tells us when we may be right, which is about 70 percent of the time, and when we can ignore the predictions.”
- Suggest testing known supplements for other health benefits. “We have a high probability of accuracy in about 40 percent of these cases. With a minor investment, you may be able to repurpose your product for something you may not have considered.”
- Identify side effects. “We are correct about 78 percent of the time in identifying the worst side effects. While we can’t say what percentage of people will suffer the worst side

effects, this tool will help you assess if the risk is appropriate to the benefit you’re trying to achieve.”

MedicascyAI is employed at the start of the R&D process. When used on a library of molecules or ingredients, MedicascyAI provides various targets, with companies honing in on those with the highest confidence predictions for safety and effectiveness. “A company wants to focus only on those having the highest confidence predictions. Research and testing in animals or humans is still the best course to test out the ingredient,” Skolnick further adds.

#### Overcoming challenges

There is significant latent demand for non-drug solutions. Bellezza explains that, as is often the case with other start-ups or emerging and disruptive technology, the main challenge is helping people understand how MedicascyAI impacts their business model or industry.

“To build trust, we have done several proof-of-concept projects that clearly demonstrate how we can add value to a nutraceutical, supplement, cannabis or drug company. As a new venture, we are looking for the right partners who share our tireless and accountable work ethic, while engaging in and promoting a culture that cares about its stakeholders. It is time to change the way natural products are developed and to expedite real solutions that millions of people need,” he notes. Skolnick chimes in that there is significant latent demand for non-drug solutions. “However, the dietary supplement industry’s pricing model doesn’t support the type of due diligence used by pharma. MedicascyAI speeds up certainty with less overall cost by using a set of sophisticated algorithms that analyze compounds for safety as well as efficacy in relation to the biological processes that jeopardize good health,” he concludes.

AI is increasingly being used within the nutrition industry. Last month, Danone North America entered a new partnership with Brightseed to map novel plant nutrients to human health. Meanwhile, researchers recently developed whole-body computational models to further propel research into personalized medicine, including the role of diet on the microbiome. At a consumer level, ZOE is launching a test kit and app that uses AI to develop personalized eating plans based on a person's unique gut microbes and dietary inflammation.

By Katherine Durrell

### Game-changing sugar reduction solution? Better Juice scales up commercialization of enzymatic juice technology

By Mary Ellen Shoup 22-Jul-2020 - Food Navigator USA

Israeli startup Better Juice has signed agreements with US-based global beverage manufacturers to commercialize its patent-pending enzymatic technology, which can achieve up to 80% sugar reduction of naturally-occurring sugars (e.g. sucrose, glucose, fructose) in 100% fruit juice products by converting the molecules into dietary fibres.

"We found a way to convert all types of sugar to other types of molecules that are not digested by

our body," Eran Blachinsky, PhD, founder and CEO of Better Juice, told FoodNavigator-USA.

Better Juice entered a partnership with Brazilian juice manufacturer, Citrosuco, last year to deploy the sugar-reduction technology in the production of its juice products. The company is now installing its pilot plant in more markets including the US to achieve full commercialization of the technology within the year, said Blachinsky. "All these companies that we are in collaboration with desperately want it," he said. Since its founding in 2017, Better Juice has scaled-up its system and can process juice at a rate of up to 13.2 gallons per hour, a significant milestone for the company, he said. "Today there is no solution like this," claimed Blachinsky.

Better Juice uses natural enzymes from non-GMO microorganisms to convert simple sugars in 100% juice into non-digestible compounds (i.e. dietary fibres) without impacting the smell, vitamin composition, and to a large extent, taste, as the perceived sensory sweetness of the juice is reduced by 15% to 20% as a result of the conversion process, said Blachinsky. "It maintains all the benefits of juice. And the mouthfeel is the same," he noted. To do this, the company's technology modifies one short, simple pass-through step to the juice-making process, he explained.

The process uses a continuous-flow system containing immobilized non-GMO microorganisms (instead of live ones), and as the juice passes through, the enzymes within the 'dead' microorganisms bio-convert the juice sugars into dietary fibres and other non-digestible sugars "so there's no secondary metabolites produced by fermentation," said Blachinsky. The juice that comes out the other side of the system, is still 100% juice but with less sugar (anywhere between 30% to 80% sugar reduction) without the

addition of any other ingredients, according to Blachinsky.

No longer a trend but a normal consumer behaviour, 57% of US adults surveyed in The NPD's Group's Health Aspirations and Behavioural Tracking Service say they look for sugar content first when reading nutrition labels, followed by calorie content. HealthFocus International's 2019 USA Trend Study: Shoppers' Journey Towards Living & Eating Healthier (conducted in November-December 2018 with 2,000+ respondents) revealed that 45% of respondents said reducing sugar has become more important in their diets, and nearly 50% said 'lower sugar' statements are important to them when shopping for food and beverage products.

Blachinsky added that while many consumers' taste buds are hard-wired to prefer a sweeter product, its juice products have been well-received by consumers who have slightly less of a sweet tooth and are actively seeking ways to reduce their sugar intake, preferring a slightly less sweet taste profile. "It is aligned with the people that prefer drinking coffee without sugar or drinking a diet product. We are targeting people who want to try reduced sugar products," he said.

Better Juice has performed some consumer testing and found that more than 30% of participants preferred the juice made via the Better Juice process. While the technology can be applied to virtually any type of liquid containing naturally-occurring sugars (for instance, milk), the company is focused solely on the juice category for now, said Blachinsky. "The idea is to install the device in each [beverage] company where it will be another device in the production line," said Blachinsky. Better Juice is currently seeking investment and funding to help achieve full commercial scale of its technology, he added.



## Dark is rising: India's chocolate scene calls for healthy, unique innovations to court consumer favour

By Pearly Neo 27-Jul-2020 - Food Navigator Asia

Dark chocolate has emerged as a rising favourite for Indian consumers and one of the key drivers for new product development, along with other rising local trends such as sugar reduction, smaller packaging sizes and unique flavours.

Overall growth for the Indian chocolate market has been pegged at 12.8% over the five years from 2019 to 2024, by which time market value is expected to hit US\$1.8bn, according to Business Wire. Market intelligence agency Mintel has predicted a slightly more conservative but still double-digit growth of 10% by 2023. Recent research from the firm has also confirmed chocolate as one of the most popular confectionary items in India, with 61% of Indians eating chocolate daily or at least once a week. Importantly, health benefits such as sugar reduction emerged as some of the most important factors for consumers when choosing their chocolate – as showcased by some of the major local launches by major brands in the last year including Mondelez's Cadbury Dairy Milk 30% Less Sugar. "Cadbury Dairy Milk 30% Less Sugar is a product with no added artificial sweeteners, colours or preservatives. It is created to ensure the right texture and taste of the original Cadbury Dairy Milk bar to keep the consumer eat experience the same," said Mondelez India Director of Marketing for Chocolates Anil Viswanathan.

Another popular option for consumers in the health benefits category is dark chocolate, as these contain higher amounts of cocoa and naturally less milk and sugar. Cadbury also launched a Dark Milk

variant in response to this, marketing it as 'The Grown Up Chocolate' to emphasise its appeal for 'mature, advanced audiences'. Local dairy giant the Gujarat Cooperative Milk Marketing Federation Ltd (GCMMF) also has its eye on the healthier chocolate segment via its chocolate brand Amul, under which it has launched 75%, 90% and 99% dark chocolates – and even plans to roll out a 100% variant soon. "The aim is to upgrade existing chocolate consumers from a sugar-rich to cocoa-rich experience. Soon, we will be launching chocolates with 10% [cocoa content] to create a new niche in the chocolate industry," GCMMF Managing Director RS Sodhi told Hindu Business Line.

Chocolates which are higher in cocoa content and/or reduced in sugar are definitely a formative change for the Indian market, as the taste and flavour of these are in stark contrast to most traditional Indian sweets and desserts, which are generally accepted as 'extremely sweet' such as kheer (rice pudding) and gulabjamun (milk-based sweet). One reason for this fundamental transformation could be the Indian consumer's change in attitude towards snacks such as chocolates by seeing these more as meal replacements than the occasional indulgence.

"Snacks are increasingly being swapped for meals in India, with the average Indian adult now eating more snacks than meals on a given day," said Mondelez India via its State of Snacking Indian consumer snacking trends study. "73% of Indian adults say [they now] prefer to eat many small meals throughout the day, as opposed to a few large ones, and a further 67% plan to increase their snacking frequency in the next year."

Given these findings, it is unsurprising that there is a tilt towards healthier options, as despite increasing the occasions of snacking



and presumably chocolate consumption, the desire to maintain health and limit calorie intake would drive Indian consumers towards these along with chocolates sold in smaller packaging sizes. Introducing new and unique flavours have also been seen to be a key means of piquing consumer interest, and here Amul has also been attempting to innovate with creations such as Green T and Tropical Orange.

Confectionary giant Nestle India has also been innovating in this direction over the past few years, launching creations such as Kit Kat Dessert Delight, Kit Kat Strawberry Duo, and the local creation Nestle Munch's Crunch-O-Nuts. "Munch Crunch-o-nuts is a category first, bringing the explosive crunch of Cocoa balls and the deliciousness of peanut crème. It offers in every bite a multi textural experience and the balance of sweet and salty taste to leave consumers feeling excited," said Nestle India Chocolates & Confectionary General Manager Nikhil Chand.

Notably absent amongst both international and local big brands though is any strong variety of localised flavours, something that has been very prominent in the Indian soft drinks sector but seems to have barely made any impact in the chocolate sector. Some smaller local players such as boutique firm Velvet Fine Chocolates have made

attempts at this, with its Bombay Curry chocolate bar, as has Tamil Nadu's Mason & Co. with its Chilli and Cinnamon variant – but even these are few and far between. Interestingly, such local Indian flavours are popular in overseas markets with many more small firms producing these, such as in the United Kingdom where brands like Duke of Delhi has a whole range containing various 'Indian' ingredients from coconut to lime to cinnamon, as does Rococo Chocolates with jasmine, chilli and even a Cardamom Dark chocolate. What this indicates is that localised chocolate flavours are not impossible or difficult to make, but as of yet, they have yet to curry favour with local Indian consumers as compared to Western countries where these can be considered exotic and unique. More importantly, if companies can do this well and appeal to local Indian palates, this could open up a whole new area for flavour innovation.

Flavours aside, India remains a top destination for companies looking to grow their chocolate market share in Asia – and this is the same for ingredients firms such as Cargill as well. The conglomerate has just chosen India to launch its first chocolate manufacturing operation in Asia, hoping to appeal to local food manufacturers with its more local approach given the new setup. "Opening a chocolate manufacturing operation in India allows us to increase our regional footprint and capabilities in Asia to better support both local Indian and multi-national demand in the region," said Cargill Cocoa & Chocolate Asia-Pacific Managing Director Francesca Kleemans. "It also demonstrates our commitment to supporting the local economy with the addition of 100 new manufacturing jobs." The new facility is expected to start operations in 2021, with an initial production target of 10,000 tons of chocolate compounds.

Another major chocolate and cocoa supplier that has its eye on the country is Barry Callebaut, which opened a local Indian manufacturing facility last year and dubbed India one of the 'fastest growing markets' with 'plenty of room for growth' in the region. "India is an exciting market where innovation in chocolate is well received by consumers. We have experienced double-digit growth in India over the last three years," Barry Callebaut India Managing Director DhruvaJyotiSanyal told us.

The firm's APAC President Ben de Schryver added that: "India will become an important cornerstone to our business in Asia Pacific. It is important to have the lab [locally] as every country has specific needs, [for example in India], distributing chocolate is a tedious process that requires a comprehensive cold chain."

### Plant-based products: How Mediterranean Umami enables salt reduction and flavour enhancement

13-Jul-2020 Food Navigator USA

Demand for plant-based products is growing quickly as consumers seek out more ethical, sustainable sources of protein.

Manufacturers have responded with innovative products that come closer to the taste and texture of meat and cheese than ever before. Yet, manufacturers continue to contend with off tastes and a lack of umami flavour compounds, leading them to add salt to compensate. In Mediterranean Umami, Salt of the Earth has developed a healthier, tastier solution to the problem. The market opportunity open to a better solution is clear. From 2017 to 2019, US grocery sales of plant-based foods grew 29% to hit \$5 billion. The overall US retail food market grew just 4% over the same period. At 37.8%, the growth of plant-based meat was particularly explosive over

the analysed period.

Manufacturers are just scratching the surface of the plant-based meat opportunity, though. Despite growing six times faster than the animal-based meat sector in 2019, plant-based products accounted for 1% of the overall market. If plant-based meats achieve the same penetration as non-animal milks, the market will be worth \$12 billion a year.

There are reasons to think plant-based meat can achieve that level of penetration. In 2019, one-third of US households contained at least one person who was either vegan, vegetarian, pescatarian, or flexitarian. There are likely more people who are interested in such diets. One survey found 73% of meat eaters think veganism is ethical, and 70% believe it is good for the environment. Those people were put off veganism by the impression that such a diet is inconvenient and not enjoyable.

Converting those people to plant-based diets would add to existing growth driven by demographic changes — young people are particularly likely to avoid meat — and the effect of mounting evidence that an "ambitious dietary change towards more plant-based, flexitarian diets" is needed to save the environment.

### Barriers to great-tasting plant-based products

The rapid proliferation of plant-based meats has made it easier than ever for people to cut animal products out of their diets, but, despite significant improvements, such products are yet to match the taste and texture of the real thing. Manufacturers have become good at turning plants into proteins, thereby mimicking what food-producing



animals do, but the resulting soy protein isolates, chickpea proteins, and other ingredients lack umami flavour compounds and can have off, in some cases bitter, tastes. Some manufacturers have responded to the flavour problems by adding salt, thereby making products taste better and more savoury. The downside is the resulting products contain salt levels that far exceed voluntary targets and the amounts found in equivalent meat products. The problem applies to plant-based products consumed at home and meals served at restaurants.

That is a problem for the plant-based food sector. One survey found 72% of people are reducing their consumption of animal products for health reasons. Only between 33% and 35% of people cited the environment, animal cruelty, and concerns about what meat contains as their main reasons, making health by far the most important issue for consumers interested in plant-based products. High levels of salt may deter health-conscious consumers from buying plant-based products. If the plant-based sector is to retain its current customers and win over meat eaters, companies will need to develop healthier, tastier products. Salt of the Earth wants to help manufacturers rise to that challenge.

#### Harnessing the flavour power of plants

Salt of the Earth harnessed the power of plants to develop a savoury flavour enhancement and sodium reduction ingredient. Specifically, Salt of the Earth looked to the umami-rich ingredients cooks in the Mediterranean region use to give their dishes flavour to create a product that can perform the same role in plant-based meats and other foods. Tomatoes, one of the ingredients selected by Salt of the

Earth, are richer in the glutamate amino acid that imparts umami taste than any other vegetable. Mushrooms, the second ingredient chosen by Salt of the Earth, are also high in glutamate. To further amplify the flavour, Salt of the Earth added one of the most umami-rich ingredients of all: seaweed.

The combination of plant extracts resulted in a naturally savoury liquid mixture that enhances flavour while reducing sodium. Salt of the Earth demonstrated the power of Mediterranean Umami by formulating it into vegetarian “chicken” nuggets. The addition of 0.5% Mediterranean Umami enabled Salt of the Earth to reduce salt levels by 27% while retaining the desired taste. “Chicken” nuggets are just one of the products Salt of the Earth has developed using Mediterranean Umami. Salt of the Earth also has experience of using the ingredient in sausages, hamburgers, and a wide range of other plant-based products and other foods and condiments.

Manufacturers can realize those benefits without compromising their clean labels. Mediterranean Umami is free from artificial ingredients, MSG, gluten, and genetically modified organisms, making it a clean-label solution and a good fit for plant-based products designed to satisfy consumer demand for healthy, natural, and ethical foods. Alternative flavour enhancers such as MSG and hydrolysed vegetable protein lack the clean-label credentials of Mediterranean Umami.

#### Innovating to drive sodium reduction

The application of Mediterranean Umami to plant-based products is part of a broader push by Salt of the

Earth to help manufacturers create healthier, tastier foods. Building on a history of innovating to achieve that goal, Salt of the Earth recently introduced Mediterranean Umami Powder, a 1:1 drop-in replacement for salt in snack products. Replacing salt with the powder enables manufacturers to reduce sodium levels without affecting the salty, savoury flavour that consumers crave. Salt of the Earth achieved a 40% reduction in sodium when it replaced 1.3% salt with 1.3% Mediterranean Umami Powder.

The ability of the salt replacer to drive such reductions without compromising on taste has caught the attention of multinational food manufacturers, some of which are already using the powder in iconic global brands. Applying Mediterranean Umami to those products has equipped Salt of the Earth to help companies reformulate their portfolios to include the ingredient. Salt of the Earth provides guidance on how to approach reformulating a particular product and has staff with the expertise to help customers craft a solution tailored to their specific needs. While no two reformulation projects are the same, Salt of the Earth knows what it takes to work Mediterranean Umami into great tasting, low salt products.

In supporting tweaks to those brands, Salt of the Earth has furthered the mission it embarked on when it first made Mediterranean Umami. Whether trying to create the perfect, healthy plant-based burger or lower the salt content of a widely loved snack, manufacturers can rely on Salt of the Earth to provide the great savoury flavour consumers want without compromising on health or clean label.





# REGULATORY NEWS

## Delivery debate: Which authority is best placed to help India reach its nutra potential?

By TingminKoe 06-Jul-2020 - NutraIngredients Asia

There is a lively debate among Indian experts around which Indian authority is best placed to help the nation's nutra sector reach its growth, experts and innovation potential. Writing for NutraIngredients-Asia recently, AmitSrivastava, founder of the Nutrifly India project, suggested the industry should come under the remit of the Ministry of Food Processing Industries (MoFPI)

He advocated a centralised ownership so that companies need not “run from ministries to ministries”, since the nutraceutical sector is currently under the charge of a number of ministries, including the FSSAI and Ministry of Health. In his proposal, MoFPI would own and drive the nutraceutical sector's development, including overseeing the biodiversity laws from the Ministry of Environment, Forest, and Climate Change (MoEF) and NaturalBiodiversity Authority (NBA).

However, other industry players fear that placing the nutraceuticals sector under the remit of MoFPI would

risk products being regarded as food for nutrition instead of products with specific health benefits. DilipGhosh, the director of Nutriconnect and advisor to Mumbai-based Health Foods and Dietary Supplements Association (HADSA), voiced his disagreements, preferring the status quo, having consulted leading figures and academicians from the nutraceutical industry.

“MoFPI is more about addressing the technical issues and less so on the regulations. To put nutraceuticals under the purview of MoFPI would be counterproductive as it would tend to tackle nutraceuticals as food for nutrition instead of products providing specific health benefits which is what a nutraceutical product is about,” he said.

To let MoFPI govern nutraceuticals would mean that there is a constant need to regulate nutraceuticals health claims and an inter-ministerial team might be required for performing this particular function, which he believes is counterproductive.

The other alternative, he said, was to emulate the success of Pharmaceuticals Export Promotion Council of India (Pharmexcil) and develop a council for the nutra and ayurveda sector. The Pharmexcil

was set up by the Ministry of Commerce and Industry.

The industry players on his camp include Dr CK Katiyar, who is the CEO Technical (Health Care Division) of health and wellness firm Emami Ltd and also sits on the editorial board of the Journal of Ethno-pharmacology, SanjayaMariwala, MD at nutraceutical firm OmniActive, and ayurveda scientist Dr DB Anantha Narayan.

“Nutraceuticals fall between food and drug and therefore are always intended to claim certain health benefits. “The examination of health benefit claims falls under the domain of FDAs worldwide as in the case of USFDA, HealthCanada, and Australia's Therapeutic Goods Administration,” he said. There are already ongoing suggestions on opening a special division termed “therapeutic nutraceuticals” within the Ministry of Health to focus on evidence-based nutraceuticals, he added.

A number of factors plaguing India's nutraceutical sector – which was officially recognised as a category only five years ago – has been identified. One problem is the inter-ministerial tussle that has limited the types of ingredients – especially ayurvedic herbs – that could be used in nutraceuticals.

“One may ask, now that FSSAI has allowed use of ayurvedic herbs in nutraceuticals, why is it that the sector is not booming as expected?”

“A reason is the inter-ministerial tussle between the FSSAI and the Ministry of AYUSH. While ayurvedic herbs have been permitted for use in nutraceuticals, it comes with the condition that they have to be used in the particular dose listed in schedule IV to make a health claim. But doing so means that the organoleptic characteristics of the ayurvedic herbs will go haywire,” Ghosh said.

On the other hand, India’s nutraceutical exports, including ingredients and formulation, are worth slightly lower than US\$250m. Asked the reasons behind low nutraceutical exports, he cited reasons such as the fear of non-compliance to laws of the importing countries, as well as the large amount of investment required to create manufacturing facilities that comply with the USFDA or Good Manufacturing Practice (GMP) standards.

Other factors include little knowledge of consumption habits in other countries and a lack of investment in quality testing labs. Nonetheless, he believes that exports would increase in the years to come as new regulations are being passed.

“After the new regulation was published in 2017, there is significant improvement in manufacturing quality as well as investment in clinical trials. We all believe that within a few years, evidence-based nutraceutical product export from India would increase significantly,” he said.



## Flatbread furore: India's latest food tax saga puts country's flaw-ridden GST system in the spotlight

By Pearly Neo 15-Jul-2020 - Food Navigator Asia

India's newest food tax saga stemming from Southern flat breads being taxed higher than Northern ones has placed renewed focus on the country's controversial GST system, provoking claims of 'cultural racism' from campaigners.

This latest controversy was ignited when food manufacturer iD Fresh Foods questioned the Karnataka Authority for Advance Ruling (AAR) – the local judicial body deciding on items' Goods and Services Tax (GST) classifications and issues – about differentiating levels of GST being applied to flatbread products.

Specifically, this year an 18% GST was levied on frozen parotta (a layered flatbread made with finely milled wheat flour common to Southern India) as opposed to 5% GST levied on roti (usually a single-layer flatbread usually made from whole-grain wheat flour and more common in the North)

At the heart of the issue was the fact that 'roti' is also traditionally used as a general term for all flatbreads –and the same has been done by iD Fresh Foods and many other flatbread manufacturers in previous years -but this was not accepted by

the AAR. “The Karnataka AAR has decided that parotta is not plain roti but is a distinct product as it still needs processing before consumption,” said the Ministry of Finance’s tax administration arm Central Board of Indirect Taxes & Customs (CBIC) in a formal statement. Hence, the AAR held that such frozen and preserved parotta will not be entitled to concessional GST rate as available to roti (5% GST), which is ready-to-eat. Frozen and preserved parotta will be subject to GST at the rate of 18%.”

The AAR’s decision ignited a flurry of heated debate on social media with many calling out the country’s tax laws and multi-level GST system, and various tax experts have also called for the system to be simplified. At present, there are four levels of taxation which apply to food items: For example, heavily processed foods are taxed 18%, preserved fruits are taxed 12%, sugar and coffee are taxed 5%, whereas basic fresh foods like dairy and meat are not taxed at all.

“The wide range of tax slabs [in India’s GST system] and lack of ambiguity in the law leaves scope for many such classification disputes,” said Ernst and Young Tax Partner Abhishek Jain in a statement. “Such disputes had also existed in pre-GST excise duty regime, but with time, the rates were broadly aligned and led to lower number of disputes. So, similarly in GST, reduction of rate slabs might help in lowering such cases.”

Accounting firm AMRG & Associates Senior Partner Rajat Mohan also warned that this decision places many food businesses in a risky tax position. “This classification dispute would give shockwaves to the entire supply chain engaged in 'ready to eat foods', and such businesses are looking at high tax risk in relation to the tax positions taken since 2017 [when the GST system was implemented,” he said.

Comments on social media were harsher, with 'We need fewer rates, fewer sub-categories, fewer compliance requirements and an overhaul of the law' and 'How true to the Indian taxation system to make simple law complex' being some of the most common sentiments.

In addition, a social media campaign under the hashtag #handsoffporottaemerged as a top Twitter trend after the CBIC's announcement, with many people calling out the decision as 'fascist' and 'culturally racist', referring to the supposed differential treatment between parotta common to South India and roti (by its whole-grain ingredient definition) which is more in the North.

"The government gave a very lame explanation that Porotta is taxed simply because it's not Roti. The flawed logic shows the north south divide in their politics," said one netizen, whereas another called out the government for being 'bigots' and asked why 'the Northie food is taxed less and the Southern hefty'.

That said, this is not the first time India's complicated tax system has caused confusion for the food industry –with the affected food manufacturers often on the losing end.

One of the more well-known recent cases took place last November when the Madhya Pradesh AAR ruled to classify Indian snack Fryums as a 'residual entry for food

items not specified elsewhere' (18% GST) as opposed to a flat snack known as papad (5% GST) after this was raised by local manufacturer Alisha Foods.

But examples of success do exist, especially with enough clout: Back in 1999, Nestle India battled and won against the Excise Department to classify Kit Kat as a 'wafer with a chocolate coating' (10% taxation) instead of a 'chocolate with a wafer inside' (20% taxation).

In a 22-point statement, the Mumbai Customs, Excise and Gold Tribunal (now the Customs, Excise and Service Tax Appellate Tribunal) found that 'while all chocolate must necessarily contain cocoa, it is not every cocoa product or preparation that is chocolate'.

"There is nothing to show that it was the presence of the chocolate alone as distinct from the chocolate and biscuits which gave the product its appeal to customers," said Justices S.T. Gowri and G. Srinivasan who were on the bench.

"On the other hand, the market advertising brief refers to the presence of the biscuit market as well as the chocolate market and it talks of the products as wafer covered with crisp chocolate, drawing from both the biscuit market as well as the chocolate market. Even on the assumption that the product is sold and known as chocolate, the classification confirmed as chocolate cannot be justified."

## Regulatory review: FSSAI's PABA ban

By TingminKoe 24-Jul-2020 - NutraIngredients Asia

The Food Safety and Standards Authority of India (FSSAI) has banned the sale of nutraceuticals containing ParaAmino Benzoic Acid (PABA).

Food safety departments across Indian states were told to enhance surveillance and enforcement to stop the sales of PABA-containing supplements. Such products should be immediately taken down once found, said FSSAI. PABA is a precursor of folic acid and exists in dairy products such as eggs, milk, and meat. It is usually used in dietary supplements to improve skin health.

RDA enforcement strife: India warns supplement firms to adhere to regulations

Health supplement firms have been threatened with enforcement action if they fail to adhere to permitted recommended dietary allowance (RDA) levels for vitamins and mineral products, regulator FSSAI has said. The Indian regulator has directed food safety commissioners of all states to ensure health supplements firms comply with the rule. Stringent actions may be taken against defaulters, which industry experts told us could include withdrawal of products from the market and revoking of the FSSAI license.





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