



PFNDAI

FOOD, NUTRITION & SAFETY MAGAZINE

BULLETIN MAR 2022

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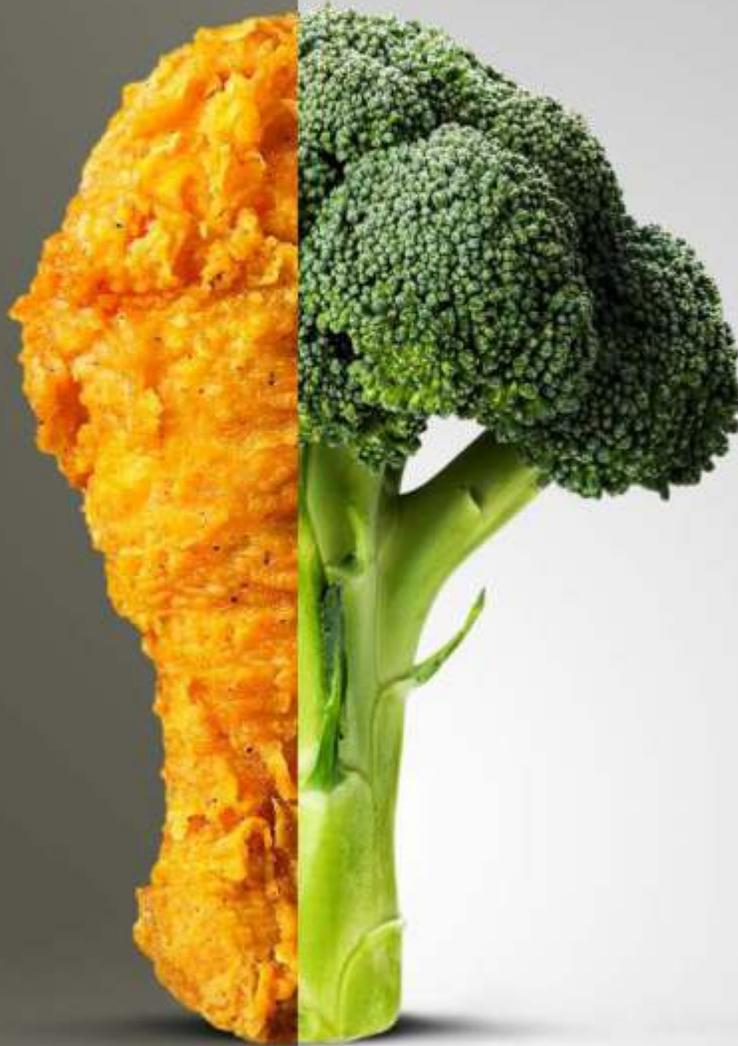
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EDITORIAL



Micronutrients are very important for our diet but we should also not lose the sight of macronutrients.

We talk so much about iron, calcium, zinc etc. along with some important vitamins such as D, C and others as they provide immunity especially in the times of pandemic wherein the infections can be so much more expensive than consumption of some good foods that provide them. If the diet does not provide we can always fall back to dietary supplements.

We do not give that much importance to macronutrients as the lack of these will cause problems slowly and over longer periods. Nevertheless, these are important for our health and we must pay adequate attention to them.

We talk about protein deficiency among Indians. We also know that due to vegetarian diets of most Indians they must take care to include high quality proteins to make up for the deficiency. Milk can provide such proteins which complement adequately to vegetable proteins to make up for the deficiency.

However, a good number of people are going for vegan diet and many are not too happy with soya which can also provide high quality proteins. Actually there are many misconceptions about soya but it can provide high quality protein at quite low cost. However, people look at some exotic options like chia seeds, quinoa and many other sources.



There are high protein powders or bars etc., which have high quality proteins that will provide necessary amounts.

Many products have started appearing in the market with higher protein contents. Industry is responding to the needs of consumers and offering different products with higher protein so people can get their amounts of extra proteins through eating ordinary foods.

There is also need for higher proportion of dietary fibre. Our diets have changed over time so we are consuming much less fruits and vegetables along with refined cereal products. We need both soluble and insoluble fibre which can also be obtained from whole grains and pulses. There are many seeds that can also provide these fibres which are extremely essential as prebiotics that maintains the right proportions of healthy microbes in our gut. This also provides some control over blood sugars and cholesterol. So we also need this group of carbs in the macronutrients.



Finally the fats we are consuming should have adequate amounts of monounsaturated fatty acids and omega 3 fatty acids. These are also with many health benefits and we need to ensure adequate amounts in our diets. These are obtained from food sources but in case there are dietary restrictions, then we need to resort to supplements. Thus let us give adequate attention to all nutrients so we keep healthy.

It would always be better to have proteins requirements through our diet but at times it may be advisable to ensure sufficient amount and quality of proteins

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MAKING STREET FOODS HEALTHY

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When a food is changed from its original state in any aspect it is called as "Processed Food".

Food has been processed almost since the origin of mankind for the purpose of preservation, safety or improving sensory attributes. But, over the years somehow processed foods have gained a bad reputation due to which the word "Processed foods" has become synonymous with "Unhealthy". Well, there are some categories of processed foods, which can be unhealthy but not all.

More specifically a food product can be unhealthy due to the ingredients it contains. But if these ingredients are replaced with better ingredients, then these not so healthy food



products can become better. Hence generalizing all processed foods to be unhealthy is wrong. There are many processed foods, which can be a great addition to our healthy diet. We just have to be an aware and informed consumer.

One such category of processed food is "Street foods".

Street foods are everybody's all-time favourite. They are cheaper by price, fill up the stomach and also taste great. But they are often termed as unhealthy. So, what if we want the street foods to be a part of our healthy diet, is it possible? Let's find out.

What are street foods?

According to FAO, "street foods are ready to eat foods and beverages prepared and/or sold by vendors or hawkers especially in the streets and other places". Street foods

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

There are many reasons for street foods being very popular. They are affordable, accessible, available instantly, prepared fresh, very palatable, achieve satiety and gives a wide range of choice. Also, street foods reflect the culture of the location by providing both traditional and non-traditional foods, food preparation is visible to the consumer and hence street foods provide income to many people.

There are several types of street foods-

- Foods prepared at home and sold on streets
- Foods prepared on site using ready to use processed raw materials
- Foods prepared in nearby food factory/makeshift kitchen
- Established FBO's or restaurants vending through mobile units or trucks
- Static and mobile vendors
- Consumers eating on site or carry home types



If street food provides so many advantages then why is it considered to be unhealthy?

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There are several factors responsible for this like compromised hygiene, poor quality ingredients and water, poor sanitization of surrounding and waste disposal, selling the food at public places like side walk, improper cooking practices, food is high in fat, salt, sugar and energy. These factors may cause certain health hazards-

Health Hazards Due to Unhygienic Practices-

The main concern with the street food is hygiene. Unhygienic practices may lead to health hazards due to bacteria (Shigella, Salmonella, Campylobacter). Also, street foods may cause viral (diarrhoea, hepatitis A&E) and protozoan (amoebiasis, giardiasis) diseases. The waste generated while making street foods can block the drains and breed the rodents, arthropods.

Health Hazards Due to Poor Quality Ingredients-

Health hazards may also occur due to poor quality ingredients like toxic unapproved colours and flavours, artificial ripening agents for fruits and vegetables, damaged and fungal infested agricultural products, poorly preserved dairy products, vegetables grown on banks of drains and contaminated water, adulterated



raw materials etc. Also, coliform bacteria from poor quality water, chemical contaminants from the

vessels, pesticide and heavy metal contamination can lead to health hazards.

To overcome these health hazards and ensure food safety and healthy nutrition, FSSAI has initiated a project called "Project Clean Street Food". The objectives of this initiative are-

- Make a global brand of Indian

Street food and increase its popularity

- Raise health, hygiene and safety standard of street food for all consumers
- Reduce the incidence of street food borne diseases
- Help the street vendors in improving quality of food thereby attracting more customers and also helping in uplifting the socio-economic status of the people at the bottom of the pyramid

So, now the question comes if the street foods can provide any nutrition or not? Let us dig deep into it.



Nutrition from street foods-

When we hear the word "street food", we often categorize it to be unhealthy and non-nutritious. Well, it is true for some street foods. But not all street foods are non-nutritious. Some do provide nutrition. Street food contributes significantly to the diet of children and adults in terms of energy, protein micronutrients. A wide variety of street foods includes major food groups.

- According to a study, street foods contribute up to 50% energy in Nigeria and around 19% energy in Hyderabad. The energy from street foods serves as a replacement for home cooked foods but when consumed along with home cooked foods it adds energy (+1000kcal) to the energy intakes from home food.
- When it comes to protein from street foods comparatively fewer data is available. In Kolkata (India), a street food meal comprised of 20-30gm of protein. Hence based upon various studies the protein from street food was about 50% of RDA.
- According to a study, in Kolkata (India), a street food meal of 500 gm comprised of 12-15 gm of fat and 174-183 g of carbohydrates.

Street foods contribute significantly to the intake of total fat and sugar, which may contribute to the development of obesity and non-communicable diseases.

- When it comes to micronutrients, a wide variety of street foods in other countries provide calcium, iron, vitamin A, vitamin C and thiamine.

To summarize, street foods are affordable, accessible and provide palatability and satiety. Hence, they are a major part of the diet of people from low-income group. Many street foods like soft drinks, candies, fried snacks, cakes can have high amount of sugar, fat, salt and energy, which can contribute to obesity and non-communicable diseases. But that is not the case with all street foods. So, it is wrong to consider all kinds of street foods to be unhealthy. There are some street foods, which include fruits, vegetables, legumes, dairy-based products, which can be considered as healthy. If the street vendors are trained to follow hygienic practices and modify the process of making food, then street foods can be healthy and safe. When we look at Indian street foods, there are many Indian traditional snacks which can be a part of healthy diet like dosa, idli, pav bhaji, corn cob, bhel, dhokla, chach (buttermilk), lassi, paratha and many more. So, street foods can be a part of our healthy diet if we are aware of what we eat.

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PRE-PACKAGED FOODS ALONE CANNOT REDUCE DIETARY HEALTH RISKS



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In an earlier article (PFNDAI January 2022), “the practice of appearing to solve without intent to solve” was raised. This article relates to the same question.

When nutrition labelling addresses only pre-packaged foods by completely ignoring the larger consumption of home cooked foods the regulatory measure may not achieve its intended outcome e.g. a public health goal. Where population dietary habits are staple-based implying household preparation and consumption, packaged foods are unlikely to be a significant part of the daily diet; but if they are, we should be concerned. To be concerned, the health risk posed by these foods should be known. We have been consuming staples and packaged foods such as sauce, pickle, papad, butter for decades, yet their per capita consumption has not been factored into estimating their contribution to the overall dietary health risk. A regulatory measure not based on evidence, runs the risk of not



achieving what it is intended to do. Secondly there is an undeniable case that what consumers read on labels at point of purchase is not the same as what concerns they have while consuming food. The former relates to single product (s), often purchased by habit and brand, the latter to household meals and diets. They would have a better understanding of nutrition if daily intakes from labelled servings replaced the mathematical calculation based on 100g or 100ml. Today, numerical amounts instead of servings overpower the discourse on nutrition labelling and communication.

Buying food is different from serving food. Commodity buying as we call it is about buying staples like rice, oil, dal, milk, tea for the household to last a week or month. So also in retail, buying of pre-packaged foods is by weight or volume, e.g., 500g pack of sugar, 100g biscuits or a litre milk. The “purchase intent” here other than the single serve packs, is food for the household. When food is served, it is to individuals, who customarily (and traditionally) ask for a plate of rice, bowl of dal, eat 2 biscuits and drink a cup of coffee. You will notice immediately the switch from talking quantity (weight or volume) at purchase to individually consumed household measures,

bowl, “katori”, plate, cup, and spoon. So, the big question is, whether nutrition information is for the household or the individual. Nutrition information is more likely to be intelligibly conveyed using the colloquial form of servings, than mathematically derived amounts from 100g or 100ml.



The language of consumption is different. We do say, ‘let’s have a cup of coffee’ but not “let’s drink 100ml”? When lunch is served, you don’t hear requests for,

“100g or rice, 80ml dal or 60g salad. And there is no weighing scale on the table to hand out your request. You don’t ask and there is never a scale. Food has a different metric; it should be conversational. It can convey prudence “just one serving for me” or indulgence “have another piece of cake” or a “glass of wine”. However, when shopping at the grocery store you do purchase 5kg rice or 1 litre cooking oil and pick fruits to be weighed at checkout. What is clear here, is the different occasions and context between buying (purchase) and consumption



(eating). When setting up regulations, in this case labelling, context is key.



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Nutrition is a personal thing, proprietary in a sense that each one has different food habits, tastes, likes, and dislikes. You can standardize foods, but you cannot standardize consumers and their diets. Even the simplest food product made from wheat flour, water, salt, and oil, has many names, textures, tastes, and preferences; roti, chapati, pulka, naan. Food is eaten not only to meet physiological needs but also to satisfy emotional and psychological needs. Don't we often consume more cups of tea at office than we would at home, satisfying the psychological need for bonding? Or when scolded by our parents have, we not used a highly effective emotional tantrum of refusing food to get their attention? Nutrition is about diets; individual foods are about recipes and culinary delights. A single food does not make a diet, but a diet is made from single foods. If diets are to be "in balance and varied", there must be a choice of foods for setting them up. Diets will always be either prudent, some not, and some occasionally festive and celebratory. Nutrition information is about showing consumers how a balance is achievable between occasional indulgence and prudent practice. Consumer behaviours are fostered not forced.

The traditional Indian thali is a brilliant example of balance and variety, prudence and indulgence, with a fixed menu of single katoris (consumer language) of soup, salad, curd, vegetables, pulse and sweet (dessert). Once served the only option is asking "for more"; an additional katori of rice or 2 puris. There is this conscious pause before

the request for "more of the same" is made. This is nutrition information in action; pure and simple and uncomplicated. It is about consumers making intelligent choices of combining several katoris (serving measure) to balance taste with variety; there are even thali offerings of Gujarati, South Indian, Maharashtrian, or the highly regarded coastal Konkan fish thali. Nutrition in this case is imbibed unobtrusively through measured servings. Unfortunately, official, and authoritative messaging is either too strident or too preachy and does very little in explaining the true meaning of "balanced and varied" diets. The concept of serving size goes far beyond its limited understanding of being an alternate way to declare nutrient amounts. It is the fundamental basis of conversational nutrition.



When setting up regulations, in this case labelling, context is key. Context exposes the level of a health risk prevailing and what it will take for a regulatory measure to mitigate the risk. In a previous article (PFNDAI August 2018), a dipstick survey(s) provided broad indications of where health risks exist and the behaviour change that should happen for achieving the intended public health goal. For example, against the Acceptable Macronutrient Distribution Range (AMDR) set by FSSAI for a healthy diet, the daily fat intake is 67g (30% of Energy), whereas the survey showed an average daily consumption of 76g with pre-packaged foods accounting for 10.5g (13.8%); the major portion 65.4g (86.2%) coming from home cooked foods. Similarly average daily consumption of sugar is 22g (77%) in home cooked foods with 6.6g (23%) from pre-packaged foods; the AMDR for sugar is 50g. In the case

of salt of its total daily consumption of 9.1g, home cooked foods account for 8.9g (96.8%) with 0.3g (3.2%) from pre-packaged foods. Another study measured consumptions at the 95th percentile; the amounts for fat in home cooked foods is 67g, and pre-packaged foods 15g; sugar is 35g for home cooked foods and 26g from prepacked foods, whereas salt in home-cooked foods is 11g and pre-packaged foods 1.8g. The broad indications suggest that pre-packaged foods are not major contributors to high intakes of fat, salt and sugar. The traditional narrative that home cooked foods are safe may be true but whether they provide better nutritional outcomes needs deeper examination.

It may be the case that pre-packaged foods are preferentially selected because they alone carry labels. Seemingly, a good thing of packaging foods for safe and secure delivery, may have unwittingly placed the sector under a regulatory microscope. However, there is no debate on labeling food packages, they should and must carry a label. The real issue here is whether health issues are important enough to let science prevail over sentiment so that achievement of public health goals becomes realistic.

What emerges from limited but directionally pertinent data, is that pre-packaged foods do not present a health risk. With less than 2g salt coming from pre-packaged food, reductions from them are unlikely to reduce dietary health risks. Achieving a public health goal through labelling of pre-packaged foods alone is illusory. Much more needs to be done for a measurable outcome.



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APPROVAL FOR **NON-SPECIFIED FOOD** AND **FOOD INGREDIENTS,** **INDIAN REGULATION** IN CONTEXT OF GLOBAL APPROACHES

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awareness of the healthy diet has also given industries an opportunity to come up with new food products and processes. Therefore, both new and pre-existing sources, are being subjected to experiments involving new production approaches.

The revolutionary zeal for innovations in food is evolving simultaneously in consumers and food business operators. An increasing awareness and demand for health and nutrition in consumers is creating opportunities for food business operators to explore the novel. In order to ensure the safety of

these novel foods, various food regulatory systems have come up with the regulations to ensure that there are no adverse effects on consumers' health. This article outlines the risk assessment principles, the pre-market approval requirements deployed by FSSAI and other global bodies from a regulatory perspective.

An increasing realization of the need for ensuring sustainable food availability is pushing scientific community to explore new food sources, which are inexpensive and accessible. Growth in consumer





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Approval for Non-Specified Food and Food Ingredients, Indian Regulation in Context of Global Approaches.



Development of such newer food production approaches is rapidly outpacing consumer understanding. This calls for better communication as well as advancement in policies to ensure effective checks and balances in place before such food products are introduced into the marketplace. The globalization of food supply and the rapid advances in technology have brought a new wave of new food product developments across the markets.

While safety of traditional food and ingredients is generally accepted basis their history of use, lack of such historical data in case of novel food ingredients and novel production processes have parallelly imposed the need for development of approaches to determine their safety.

Most of the developed parts of the world with robust food regulatory systems have already put a system in place to evaluate and assess these new foods.

This article explores the approaches taken by Food Safety & Standards Authority of India (FSSAI) in comparison with the approaches taken by regulators from some other countries.



1. Regulatory Approaches taken in India:

a. Classification/ Categorization of foods:

Indian food regulatory framework has used various terminologies for the purpose of deciding the kind of regulatory approach to be taken for safety evaluation. While much of these terminologies are quite aligned to global approaches (e.g. Novel Foods), there are some terminologies (e.g. Proprietary Foods, Non-specified Foods) which are quite unique to Indian approach and developed to address some needs arising because of the way local regulatory framework is constructed. Some of the important terms used in Indian food regulations are as below:



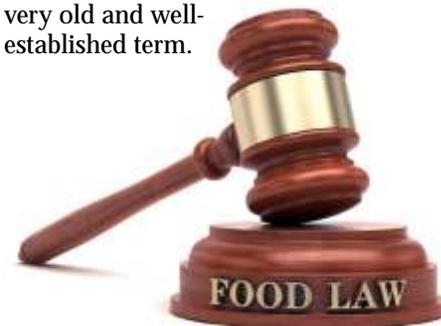
Proprietary Foods: FSSAI issued a regulation (F.No.11/12/Reg/Prop/FSSAI-2016, dated 10th October, 2016), which has defined this term as “Proprietary food means an article of food that has not been standardised under these regulations, but does not include novel foods, foods for special dietary uses, foods for special medical purposes, functional foods, nutraceuticals, health supplements and such other food articles which the Central Government may notify in this behalf.”

From a regulatory oversight perspective, proprietary foods don't need a pre-market approval. This regulation was supported through some clarifications and FAQs, issued at various times, and the



understanding which exists today is that proprietary foods are those foods which have not been standardized under the regulations, but they may contain ingredients which have been standardised or allowed in FSSAI regulations or listed in NIN publication about Nutrient Values of India Foods. Use of additives is covered through Food Safety & Standards (Food Additives and Food Products) Regulations.

Proprietary foods are also referred as non-standardized foods in some research publications and international regulatory frameworks, however proprietary foods in Indian food regulations is a very old and well-established term.



However, the categories of novel food, food for special dietary uses, functional foods, nutraceutical and health supplement are excluded from the scope of proprietary food. Proprietary and novel foods are not unsafe, provided these do not contain any of the prohibited foods and ingredients.





From a regulatory oversight perspective, all Non-specified Foods requires pre-market approval, before they can be placed in market in India.

Food Safety and Standards Act, 2006 (India), refers “Proprietary and Novel food” as an article of food for which

standards have not been specified but is not unsafe. The regulations notified by Food Safety and Standards Authority of India outlays standards for food products and the required approval for their manufacture, distribution, sale, or import is only one time while starting the business. While the act provides a common over-arching definition for both terms, regulations provides clarity and differences in the way regulatory oversight is practiced on both these kind of foods. While Novel Foods always require pre-market approval, proprietary foods don't require pre-market approval for manufacture, distribution, sale, or import.

Novel food is referred to the type of food that does not have significant history of consumption or is produced by a method that has not previously been used for food. Food Safety and Standards (Food or Health Supplements, Nutraceuticals, Foods for Special Dietary Uses, Foods for Special Medical Purpose, Functional Foods, and Novel Food) Regulations, 2016, has defined Novel Foods as “For the purposes of these regulations novel food is a food that-

- (a) may not have a history of human consumption; or
- (b) may have any ingredient used in it which or the source from which it is derived, may not have a history of human consumption; or
- (c) a food or ingredient obtained by new technology with innovative engineering process, where the process may give rise to significant change in the composition or structure or size of the food or food ingredients which may alter the nutritional value, metabolism or level of undesirable substances.

From a regulatory oversight perspective, all Novel Foods requires pre-market approval, before they can be placed in market in India.

Non-specified food: These regulations may be called the ‘Food Safety and Standards (Approval for Non-Specified Food and Food Ingredients) Regulations, 2017 has defined this category as: “Non-specified Food means any food other than proprietary food or food ingredients, including additives, processing aids and enzymes for which standards have not been specified in any regulation made under the Act.”



b. Risk Assessment

The general principles for safety assessment of novel foods have been addressed by the Organization of Economic Cooperation and Development (OECD) and the World Health Organization (WHO/FAO). The fundamental requirement is to carry out a science-based safety assessment prior to putting novel food and ingredients in the market. If possible, a comparative approach may assure safety by drawing analogies with traditional food having history of safe use, followed by detailed analysis and evaluation focusing critical differences.



Approval for Non-Specified Food and Food Ingredients, Indian Regulation in Context of Global Approaches.

According to Codex Alimentarius Commission (CAC), risk assessment is a scientifically based process consisting of the following four steps: i) hazard identification; ii) hazard characterization; iii) exposure assessment; and iv) risk characterization. Usually, the first step in detailed pre-market risk assessment of non-specified foods is to identify any hazard that might be posed, i.e., any adverse health effects. This involves toxicological and nutritional evaluations using *in-vitro*, *in-vivo* and modelling methods. This is followed by second step, characterizing hazard, developing dose response data. Third step involves quantifying intake levels of food/ingredient by consumers, which involve target population. The last step is risk characterization, where hazard characterization and intake assessment are combined to estimate the risk.

In case of novel foods, it may not always be feasible to achieve high margins of exposure in toxicology studies using levels of administration above the anticipated intake. Therefore, a post-market monitoring is recommended to ascertain the safety of the new food or ingredient. Post-marketing monitoring (PMM) is not a routine requirement for approval of novel food/ingredients. It is a hypothesis driven, scientific methodology for obtaining information through consumer investigations relevant to the safety of a novel food after market-launch. PMM can have a role as a complement to but not as a replacement for, a comprehensive pre-market safety assessment. It provides reassurance to observations in pre-market assessment. PMM is inadequate to test hypothesis on absence of significant effects observed in pre-market analysis.

Approval for Non-Specified Food and Food Ingredients, Indian Regulation in Context of Global Approaches.



Globalization in food industry has led to advances in food supply, technology leading to an upsurge in Novel Food development. Therefore, different countries have their own ways of assessing these novel and non-specified food and food ingredients. In US, the requirement is for a pre-market approval from the FDA for all the dietary ingredients. Similarly, in EU, EFSA regulates the approvals basis the safety criterion of novel foods. In India, FSSAI introduced regulations in 2017, laying down the rules and procedures for grant of approval to non-specified foods/food ingredients and this covers Novel Foods as well. Let's evaluate them in the context of global developments in this area.

c. Regulations for “Approval for Non-Specified Food and Food Ingredients” In India

The present Regulatory framework for Non-specified food in India provide Food Business Operators (FBO) the opportunity to innovate food products. The regulations are known as “Food Safety and Standards (Approval for Non-Specified Food and Food Ingredients) Regulations, 2017”. By definition as given in regulations, “Non-specified food” means any food other than proprietary food or food ingredients, including additives, processing aids and enzymes for which standards have not been specified in any regulation made under the Act. “Approval” means a permission to manufacture or import any article of food or food ingredients, intended directly or indirectly for human consumption, that has not been specified under any other regulations made under the Act;

The regulation covers the following articles of food or food ingredients:

1. Novel food or novel food Ingredients or processed with the

- use of novel technology
- 2. New additives (not listed or listed but from unlisted source),
- 3. New processing aids including enzymes (not listed or listed but from unlisted source)
- 4. Articles of food and food ingredients consisting of, or isolated from microorganisms, bacteria, yeast, fungi or algae. (probiotics, prebiotics)

Therefore, any non-specified food and by extension, novel products from the first time use of technologies that have the potential to alter the compositional and nutritional characteristics of traditional foods, and standards for which are not specified in any regulations, are all covered under this regulation. Each of these requires a detailed pre-market risk assessment.



Procedure for grant of prior approval.

The manufacturer or importer of non-specified food shall apply in FORM – I of these regulations along with the necessary documents and fee to the Food Authority. Each application should suffice the brief manufacturing process, functional and intended use, regulatory status in different countries, risk assessment, toxicity studies, adverse effects in specific population groups and the general information about the applicant and organization. A Certificate of Analysis (COA) from third party National Accredited Board of Laboratories (NABL) or International Laboratories Accreditation Cooperation (ILAC) recognized laboratories is required as per the specifications in the regulations.

Additional detailed specific information also needs to be provided. Say in case of novel food or novel food ingredients or food processed with the use of novel technology, the target group, detailed composition and technology details, safety, toxicity and allergenicity data and history of consumption with supporting documents is to be furnished. Similarly, INS no., ADI, Colour index, specifications, enzyme activity and residual levels, as may be, are to be provided in case of, new additives and new processing aids. In case of articles of food and food ingredients consisting of or isolated from microorganisms, the details of microbe, source: indigenous or imported or isolated, repository details, GM and GRAS status are to be provided. The supplemented data and documentary evidence as provided by the applicant shall be from international peer reviewed journals or international bodies including World Health Organization (WHO) and Food and Agricultural Organization (FAO).

The Food Authority shall scrutinize the application and information provided by the applicant and may direct the applicant to submit additional supporting documents, data or clarifications, if required. The approval or rejection of the application is given as per FORM-II, based on the safety assessment of the article of food. When an approval is granted, the food business operator shall submit a COA to the Food Authority. The regulations secures are view petition, that may be filed by any food business operator, aggrieved by the decision of the food authority. The Food Authority may suspend or revoke any approval granted to any food business operator, for reasons to be recorded in writing.





2. GLOBAL PERSPECTIVE:

As we get into the details of the approval systems, it is important to understand how each country has defined a new ingredient or novel food. FSSAI has defined 'novel foods' as food that does not have a history of consumption, or food that has an ingredient or the source of that ingredient that does not have a history of consumption, or food manufactured through novel technology. Other countries have employed a yardstick of time to define novel foods. In the US, the term "new dietary ingredient" means a dietary ingredient that was not marketed in the United States in a dietary supplement before October 15, 1994.



Similarly, in the EU, a novel food is defined as 'food and food ingredient that have not been used for human consumption to a significant degree in the EU before May 15, 1997 as defined by Regulation (EU) 2015/2283. Singapore defines novel food as food that was not used for human consumption by a significant population in Singapore or by a significant population in a region outside Singapore before January 1, 1997, and is from an unconventional food source or is prepared by an unconventional process. Health Canada defines novel food as a substance, including a microorganism (a living thing so small you need a microscope to see it), that does not yet have a history of safe use as a food or something that has been produced/manufactured with a

novel process. They have also included genetic modification under the definition of novel foods.

Touching down now at the approval systems, if we look at the United States of America, the FDA has a very exhaustive process known as New Dietary Ingredient Notification through which every new dietary ingredient has to obtain a pre-market approval before they are placed in the market. In Canada, Novel Foods are subjected to safety assessments, under the Food and Drugs Act and Regulations and all Novel Foods must be assessed by Health Canada before they can be sold in Canada. Even in the EU, EFSA has a centralized assessment and authorization procedure for scientific risk assessment of all Novel Foods.

Novel Foods in Australia/New Zealand are regulated under the Food Standards Code, specifically Standard 1.5.1, by Food Standards Australia/New Zealand (FSANZ). Among the Asian countries, the regulation of Novel Foods and ingredients in China are regulated according to the Administrative Measures for Safety Review of New Food Materials (2013). Pre-market approval of Novel Food materials is conducted by the National Health and Family Planning Commission (NHFPC).

The main objective of these pre-market safety assessments and authorization by the Health Authorities is to ensure that:

1. Whether the novel food concerned is safe
2. Whether the composition of the novel food and the conditions of its use does not pose a safety risk to human health



3. A novel food, which is intended to replace another food, does not differ from that food in such a way that its normal consumption would be nutritionally disadvantageous to the consumer

The aim of the assessment is to make sure the food is safe. Since we are talking about novel foods here, which do not have a significant degree of human consumption, it is imperative that the documentation required to obtain authorization for these novel foods has to be detailed, scientifically substantiated, and should contain evidence of safety.

Similar to the documentation requirements in India, all these countries generally require the following documents to be submitted along with a novel food application dossier:

- Description of the novel food
- Manufacturing process and specifications
- Composition of the novel food
- Analysis methods
- Safety and toxicological data
- Allergenicity
- Proposed uses, use levels, and anticipated intake
- Evidence of safety
- Approvals in any other geographies

As we can see from this, the process and documentation for approval of novel foods are almost similar in all countries globally, including India. However, since the FSSAI introduced regulations and systematic process in 2017, there are certain areas, which need to be ironed out to ensure a smoother process.

Approval for Non-Specified Food and Food Ingredients, Indian Regulation in Context of Global Approaches.



A simplistic reading of the regulation may create challenges when it comes to understanding the scope of this regulation. As there are multiple categories of foods covered by the same regulation, this may lead to overlapping approaches for different kind of products. A non-specified food may not necessarily be a novel food. It could be non-specified for the Indian market just because it is not listed in the FSSAI regulations. This means that it is different from a novel food altogether and does not require the same rigor of scientific risk assessment like that of a novel food. Along with this, some other areas

may emerge as areas of concern:

- Longer time to receive response (approval/rejection) from the FSSAI
- Data on the local populations, especially for global products
- Various manufacturers/importers of the same ingredient which has already received approval, have to still apply for approval to the FSSAI until the same is included in the



regulations

- Limited guidance available on the



specific dossier requirements
In order to overcome these challenges, following may be helpful:

- Novel foods and non-specified foods should be subjected to different degree of scrutiny.
- The timeframe to receive a response may be specified to provide a visibility on timelines to applicants.
- Guidance documents may be made available on Authority portals for a step-by-step process, and the kind of documents which are accepted against all aspects which are subject of scrutiny.



COMING EVENTS

Nutrition Awareness Activity by PFNDAI in Collaboration with Lady Irwin College during April 2022 including

Recipe Contest: Innovative Recipes for Iron-Rich Meals
Poster Contest: Women's Health at Every Age & Stage

Webinar on 9th April 2022 on Topic:

Women's Nutrition: Importance, Challenges & Way Forward
Contests open to Students of Delhi Colleges only. Webinar open to all. Registration Link will be provided shortly on PFNDAI social media pages

Webinar by PFNDAI sponsored by Amway
29th April 2022
Nutraceuticals & Dietary Supplements: Production &

Evaluation
Registration Link will be provided shortly

Global Conference on Food Science and Technology
Apr 11 - 13, 2022
Time: 9:00 AM - 5:00 PM ECT
Portugal Porto 1000
Register:
<https://www.pagesconferences.com/food-science-technology/registration.php>

International Conference on Clinical Nutrition & Dietary

Lifestyle
May 20 & 21, 2022
ITC Richmond - Bangalore
Call OR Whatsapp : +91-93455 31807 / +91 90873 88638
Email : foodandnutrition@bioleagues.com

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

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



FORTIFIED BEVERAGES: A NUTRITIOUS WAY TO HYDRATE YOURSELF

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Consumers' increasing interest in health is not just a random interest anymore, it's the lifestyle that they believe in. The desire to live and experience their healthiest versions has put their choice of functional foods and nutrition in the spotlight. A thriving number of customers are looking to consume fortified food and beverages regularly allowing them to enjoy their functional benefits like energy, strength, mental focus, and health support every day. Since adequate hydration is always recommended as a part of a

healthy, active lifestyle, the launch of fortified waters represents one of the best discoveries in therapeutic foods and the nutraceutical world.

Here is a look at the top fortified water trends expected for 2022:

1. Protein Water

Protein water is a soluble form of protein powder that carries protein equal to the whole-food sources of protein, helping one in building their bones and muscles. This protein water is high in protein but low in calories than some other forms of protein supplements, making it one of the better sources of protein than the protein shakes available in the market.

Hence, Protein Water Demand is highly driven by the Sports Nutrition Sector where the global protein water market alone is growing at a compound annual growth rate (CAGR) of 5.5% over the forecast period (2020-2025).

2. Immune Support Water

With a good source of Zinc to help support immune function, Immune Support Water is zero-sugar fortified

water having 100% Daily Value (DV) vitamin C and 30% DV zinc. While water is a natural immune booster, extra dosage of

immunity can help one fight several infections and even deadly viruses like COVID. While consumers across the globe are looking to strengthen their immunity during a pandemic, Immune Support Water can be your daily savior.



Fortified Beverages: A Nutritious Way to Hydrate Yourself



3. Collagen Water

Collagen is the primary structural protein found in the body's several connective tissues, contributing 25% to 35% of the whole-body protein content. Collagen water is basically water with dissolved collagen. It's an exciting innovation in functional nutrition for all the consumers looking for beauty-from-within beverages for healthy skin, ligament, and better joint health, optimizing their mobility and performance. The global collagen market size was valued at USD 8.36 billion in 2020 and is expected to expand at a CAGR of 9.0% from 2020 to 2028.



4. Botanical Flavors Water

Botanical Flavored Water is made out of Botanical ingredients like herbs, spices, and florals that enhance the function as well as the flavor of fortified beverages. The increasing desire for light and refreshing fortified waters has increased the demand for Botanical Flavored Waters where the consumers value the intrinsic health benefits derived from their deep-rooted ancient foods. It is real, natural, organic, and low sugar where the flavored water market alone is valued at \$17,788.9 million in 2020 and is estimated to reach \$31,264.2 million by 2030, registering a

CAGR of 5.5% from 2021 to 2030.

5. Sleep Support Water

Sleep Support Water is another fortified beverage made from nutrients like L-theanine, GABA, and melatonin that help one in relaxation and sleep. This zero-sugar, calorie-free beverage is available in many flavors in the market that can be used to relax and unwind. People dealing with insomnia can consume a simple Sleep Support Water for better sleep rest rather than gulping sleeping pills that can harm their bodies in the long run. Due to an increase in sleep deprivation and disorders, the demand for Sleep Support Waters and similar sleep support aids has increased, generating a revenue of \$78.7 billion in 2019 which is predicted to progress at a CAGR of 7.1% from 2020 to 2030 to attain a value of \$162.5 billion by 2030.

6. Vitaminised Water

Vitamin water is the enriched version of water that comprises vitamins and minerals. Today, packaged vitamin drinking water is widely available for consumption targeted to address the nutrient deficiency. Entrepreneurs saw a great business opportunity with the introduction of vitamin water. While water hydrates our body, vitamin water adds the goodness of vitamins and minerals to that hydration. The rise in lifestyle disorders and urbanization has given a rise in the demand for vitaminized water. It is an innovative fortification approach that will drive customers' attention towards organic drinks. Vitaminised water is also significant to spread



awareness regarding empty calories that impact our nutrient intake. There is staggering growth in the sales of vitamin water

in the past two years. It is expected that the revenue of vitamin water will grow at a CAGR of 10% until 2025.

7. Electrolyte Water

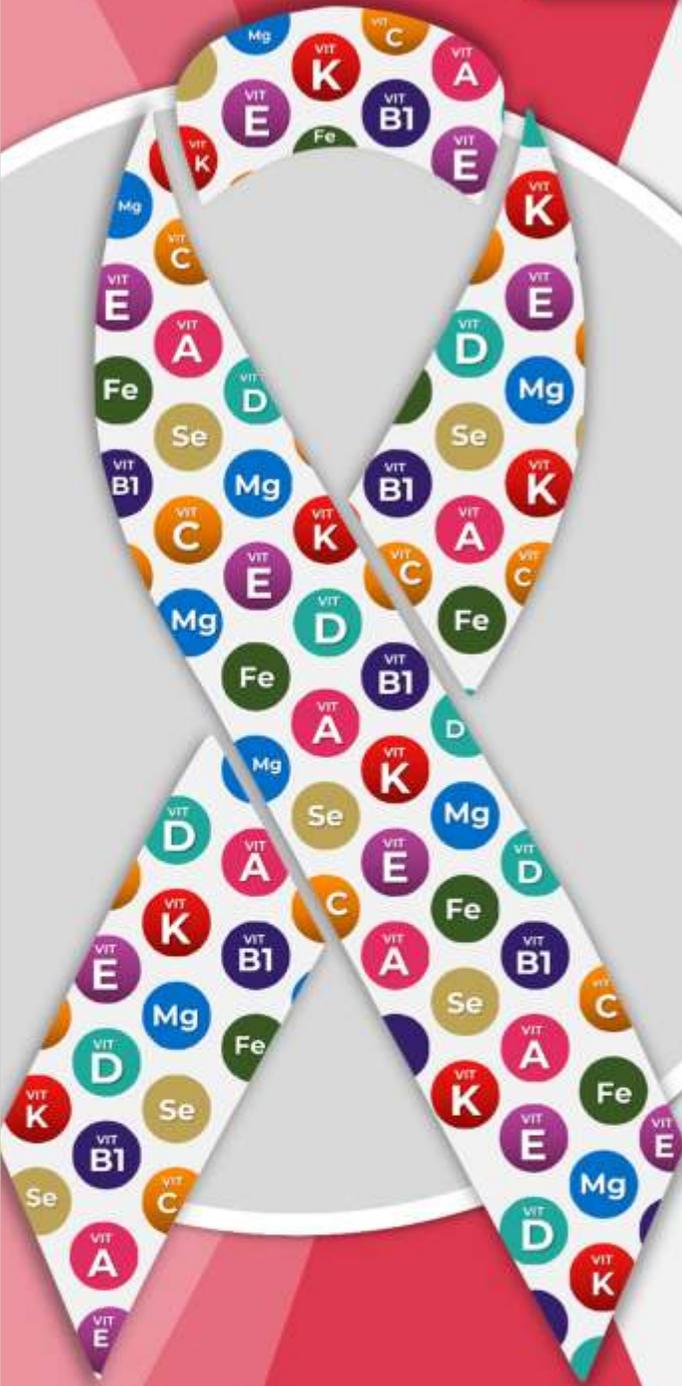
Water infused with electrically charged minerals including magnesium, calcium, sodium, and potassium is recognized as electrolyte water.



Whether it is tap water or bottled drink, it contains some amount of electrolytes in the form of salts. Brands have been launching electrolyte powders to bring the richness of electrically conducted minerals. WHO prepared an oral rehydration solution that helps in energizing the body and facilitating body functions. Electrolyte water is beneficial for preserving fluid balance and regulating blood pressure in the body. It is also helpful in maintaining the acidity in the blood. Electrolyte water is majorly being used in the fitness and physical stimulation. Global brands were seen investing in electrolyte drinks during the COVID-19 pandemic phase. As a result, the market was valued at USD 1.4 billion in the year 2021. It is expected to grow at a CAGR of 3% taking the annual revenue to USD 1.82 billion by 2026.



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Fortified Beverages: A Nutritious Way to Hydrate Yourself



8. Detox water

Detox water is water that has been infused with the flavors of fresh fruits, vegetables, or herbs. It's sometimes referred to as fruit-infused water or fruit-flavored water. It's a prebiotic water and can be enhanced with electrolytes and vitamins. They are able to boost the metabolism, flush out toxins, help your body release fat cells, and keep the mood elevated. The digestive system and liver are crucial to detox and these infused waters help them both. Being hydrated also reduces constipation.



Functional beverages to support mind-body wellness

Our morning starts with a beverage and ends with one! While the fortification market is growing so fast, it's easier and more effective to address these Trends with Functional Ingredients. By adding the essential nutrients to our daily beverages we make our functional and regular nutrition more accessible and consistent. Brands today are keeping a track of this growing demand and the potential it has to deliver delicious, refreshing, and healthy functional beverages. E.g. fortified coffee, tea, juices, and milk.

Fortified Coffee beans/powder
Coffee is one of the most widely consumed beverages in the world. In 2020/2021, around 166.63 million 60 kilogram bags of coffee were consumed worldwide, a slight increase from 164 million bags in the previous year. The entire industry comes up with innovative ways to brew and serve coffee, one of them being the fortification of coffee powder /beans. This simple procedure targets the interior of the bean by adding essential nutrients to it, that maintain the rich taste profile and high quality of the coffee. As coffee helps in managing weight and energy levels, wouldn't it be great if it also fuels your immune system?



Fortification of tea powder
Tea as we Indians fondly call it chai, is not just a beverage but an emotion. A deep-rooted history of Indians consuming tea for decades speaks volumes about the potent Indian market for this beverage. The consumption volume of tea in India alone was approximately 1.1 billion kilograms during the financial year 2021. Consumption of this hot beverage has increased consistently throughout the years. Hence Tea is a tremendous scalable vehicle for fortification with folate and vitamin B12 in India and has the power to eliminate hematological and neurological complications arising from insufficient dietary consumption or absorption of folate and vitamin B12.

Similarly, the Fortification of juices is an emerging phenomenon with the development of many

protein-fortified fruit-based ready-to-serve beverages. Juices may quench your thirst but they have a very negligible amount of nutrients. Fortified juice is a huge market that may witness certain hurdles in its growth owing to the fluctuating prices and region-specific availability of raw materials. Brands are focusing on their R&D activities to introduce fortified juices with innovative flavors and fortifying ingredients, to acquire a larger customer base. The juice drinks can be fortified with essential nutrients like vitamin A, zinc, iron, vitamin C, and lysine. The Fortified Juices Market is expected to garner a revenue of USD 8 billion by 2024 with a CAGR of approximately 5.2% during the forecast period, 2019–2024.



Fortified milk, other dairy product and plant-based (vegan) beverages

One of the newest discoveries of nutritive supplements is the natural, all organic plant-based vegan beverages. Plant-based vegan beverages involving Plant-based milk alternatives are fluids created through the process of reduction and modification of plant materials like (cereals, pseudo-cereals, legumes, oilseeds, and nuts). These are extracted in water and further homogenized into such fluids, resulting in particle size distribution in the range of 5–20 μm which tastes just like cow milk. The appearance and the consistency of this plant-based vegan milk match the regular cow milk making them our next best choice to imbibe in our daily lives. Following are some of the types of plant-based vegan beverages.



based alternatives like vegan milk has also started rising. These plant-based beverages are often fortified with vitamins A and D, B-complex vitamins, and calcium, with some also providing DHA omega-3s or probiotics, they are becoming popular for serving high sensory experiences that match the taste profile of mass-consumed beverages, enabling consumers to accept and make a change towards plant-based beverages more easily.

Beverages for targeted health benefits like better brain cognition, bone.

Today individuals with a hectic lifestyle are prone to multitask!

With millions of things going on in our minds, it's difficult to stay focused in today's world. Parents today want their kids to learn and perform better.. Even at work one needs to stay focused with enhanced Working memory, quick response, and focus. During such times, maintaining cognitive functions can be difficult. Cognitive health beverages made out of Generally



Cereal-based: Oat milk, Rice milk, Corn milk, Spelt milk.

1. Legume-based: Soy milk, Peanut milk, Lupin milk, Cowpea milk.

2. Nut-based: Almond milk, Coconut milk, Hazelnut milk, Pistachio milk, Walnut milk.

3. Seed-based: Sesame milk, Flax milk, Hemp milk, Sunflower milk.

4. Pseudo-cereal-based: Quinoa milk, Teff milk, Amaranth milk.

Their consistent health benefits have proven effective, as millennials and Generation Z form the largest segment of consumers choosing plant-based beverages. Plant-based alternatives like coconut and almonds were highly used before but now the demand for other plant-



Recognized as Safe (GRAS) like Docosahexaenoic acid (DHA), an omega-3 fatty acid can serve many essential functions for our bodies, including improving memory and focus. These beverages provide some brain-boosting nutrients that aid

with better cognitive functions with the required anti-oxidants and amino acids, further stimulating the production of neurotransmitters that affect mood, memory, and focus.

Hence, the scientifically proven “water plus nutrition” approach to hydration is undoubtedly offering the best benefits of both worlds. Fortified waters including water plus protein, amino acids, fiber, healthy fats, vitamins, and minerals, or bioactive botanicals are one of the most effective ways to quench your thirst and boost your immune system to fight the worst.





WHY ARE MALTODEXTRINS AND DRIED GLUCOSE SYRUPS KEY TO THE FOOD INDUSTRY?

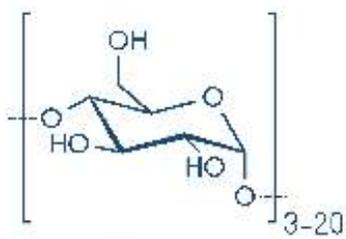
OVERVIEW OF THEIR USE AND VERSATILITY IN FOOD APPLICATIONS

Maltodextrins are known to food formulators as a GRAS (Generally Recognized As Safe) ingredient. It is commonly mentioned on the back of your favorite packs of cake bars, biscuits, in the seasoning mix of your chips, and in many more products on the shelf. Now, when the food industry is booming at an alarming rate, innovations and newer categories of products are being launched on the market at super speed. Smarter and versatile ingredients are being given importance. Let's learn more about the industrial use of maltodextrins and dried glucose syrups are derived and the different ways in which they provide beneficial attributes to our favourite products.

What are maltodextrins composed of?

Maltodextrins are derivatives of starch, a food component found concentrated in carbohydrate-rich foods like corn, wheat, tapioca, potato, rice, etc. Starch is the main carbohydrate in our diet and forms a major part of our staple foods. Structurally, starch is a polymeric carbohydrate consisting of numerous glucose units joined by glycosidic bonds. This polysaccharide is produced mostly by green plants for energy storage.

Since most of the maltodextrins are derived from corn carbohydrates,



maltodextrin

the process of obtaining this starch is called corn wet milling. The corn milling process includes grain cleaning, pretreatment, enzymatic treatment, germ separation and recovery, fibre separation and recovery, gluten separation and recovery, and starch separation. The final product of this corn milling process yields a starch slurry called starch milk. The minor constituents of the grain, like the recovered husk, germ and gluten are in high demand in the poultry and cattle feed industry.

This starch milk undergoes a series of hydrolysis processes in the presence of enzymes. These enzymes act in two roles: liquefaction and saccharification. The starches

are broken down by beta-amylase and alpha-amylase into sugars, principally maltose-dextrins, and with the deactivation of the enzymes, gives liquid maltodextrin. The rate of hydrolysis is the key to

manufacturing a large range of maltodextrins, based on their dextrose equivalency (DE). This liquid using spray drying is converted to the white-colour, bland fluffy powder called maltodextrins, with a moisture level of 3% to 5%.



Ms Charmie Patel,
Application Scientist,
Roquette India



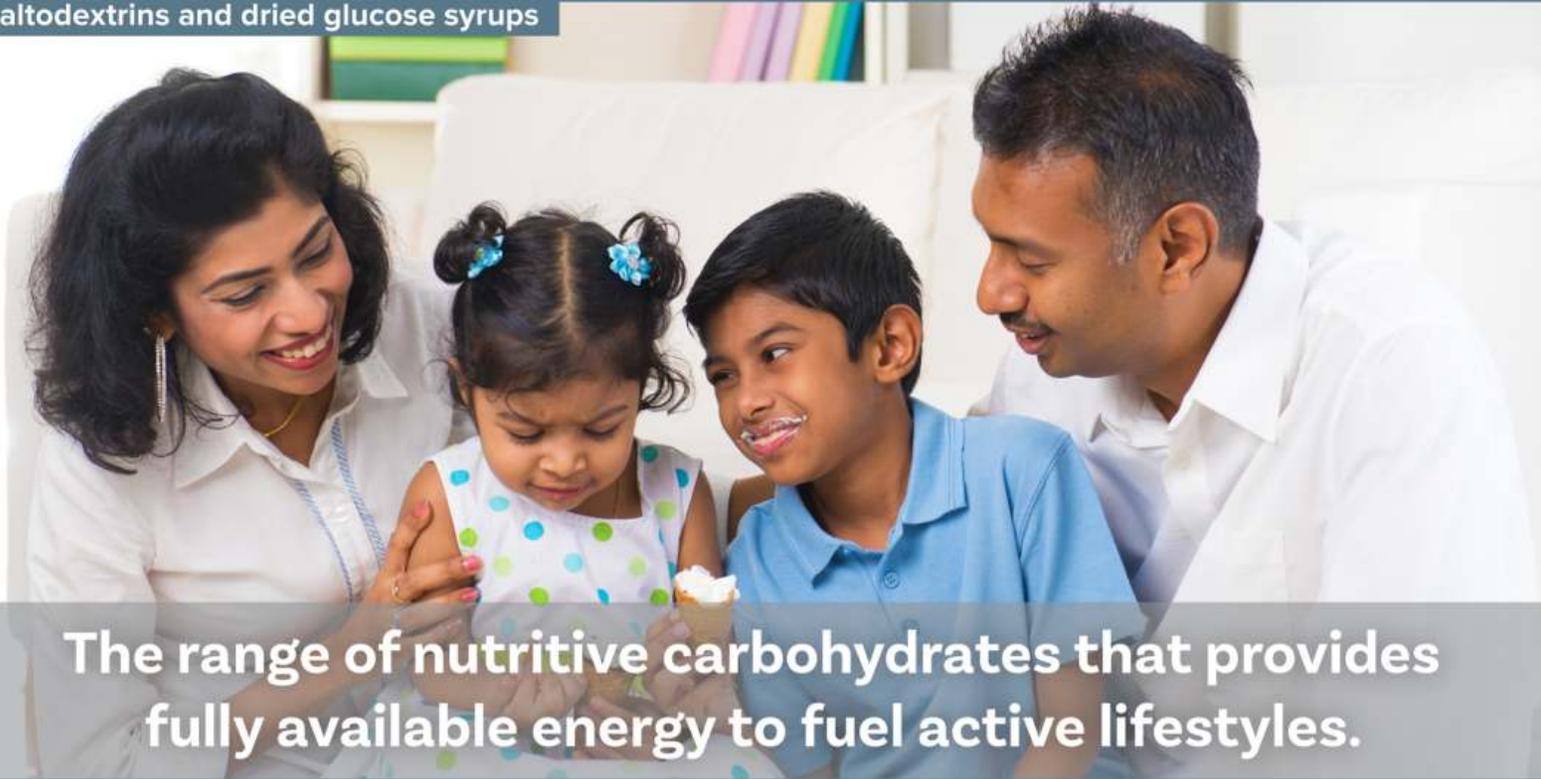
Mr Rohit Salgaonkar,
Application Development
Team Leader, Roquette

AUTHORS



Glucidex®

Maltodextrins and dried glucose syrups



The range of nutritive carbohydrates that provides fully available energy to fuel active lifestyles.



Improved strength



Uniform mix



Freezing point depression



Improved mouthfeel



Sugar substitution

BOOST PERFORMANCE & RECOVERY

- **HYDRATION** = low osmolarity
- **ENERGY** = excellent digestive tolerance, glucose for the brain
- **CONVENIENCE** = full range, limited sweetness
- **QUALITY** = non-GMO plant-based ingredients

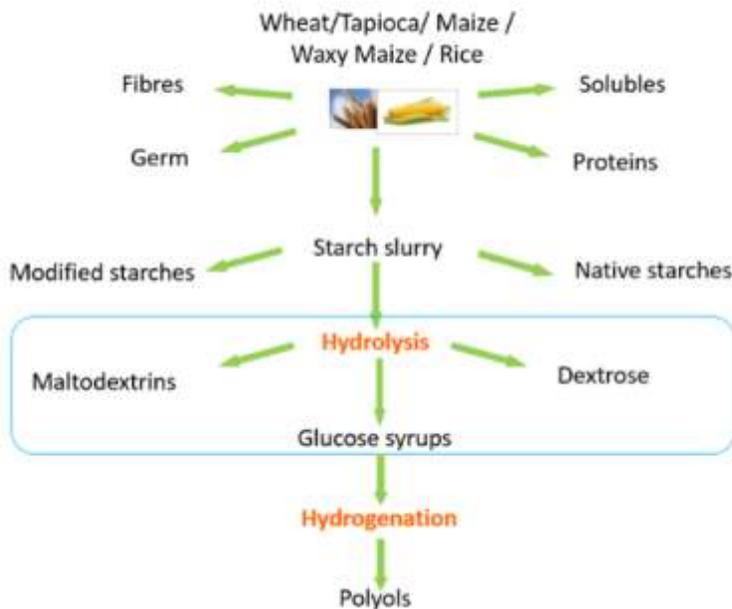
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Derivatization of Starch and different sugars from different botanicals



Depending on the grade used, these products can help adjust and control the following attributes in the finished product:

- Viscosity and texture
- Sweetness
- Anti-crystallizing power
- Browning reactions
- Ferment ability by yeasts
- Freezing point depression

However, the different grades are very similar to each other; their different ratios of sugar composition make them unique in their functionalities.

The key functionality is highlighted in each of the following applications with respect to the challenges faced in the industry.

- Beverages and Premixes
- Challenge: Premixes are formulated to add ease to the customer's experience. The common challenge lies in optimizing the premixes and their micro-components like acidity regulators, flavours, anticaking agents in the block that can be conveniently used by the end-users. Measuring them with precision for the right dilution should not pose a challenge. Commonly, sugar of different particle sizes is used as a bulking ingredient. Regular consumption can invite health challenges like diabetes and imbalanced blood sugar levels.

The powders that have a DE value of less than 20 are called maltodextrins, and those that have DE higher than 20 are called corn syrup solids or dried glucose syrup solids. Being nutritive carbohydrates in nature, their calorific value is constant across all grades at 4 Kcal/g or 17KJ/g and are generally regarded as a high glycemic index.

Why are maltodextrins and dried glucose syrup such an integral part of the food industry? Maltodextrins are used for their neutral taste, low sweetness, and low hygroscopicity. They are soluble in water and offer a high standard of organic, mineral, and bacteriological purity. They are demineralized to ensure a controlled mineral content and good stability. This is

particularly important for such applications as infant foods or sports drinks.

- They have numerous applications in the food and dietetic food industry such as the following:
- Bulking agents
 - Carriers
 - Flavour enhancers
 - Moisture-holding agents
 - Dispersing agents
 - Film-forming agents
 - Encapsulating agents, and the like.

The range of dosage of incorporation varies from a few percentages to providing higher bulk and functionality with 80-90 % of the product formulation, especially in the 2nd level (intermediate) ingredients.

Saccharide profile of Maltodextrins for partial sugar reduction.

SACCHARIDE COMPOSITION OF COMMERCIAL MALTODEXTRINS
MALTODEXTRIN

Dextrose equivalent	Dextrose, %	Maltose, %	Saccharides from trito hepta, %	Polysaccharides, i.e. above the hepta-saccharides, %
5 DE	less than 1%	1-2	5-7	92
10-13DE	1-2	3-4	20	75
17DE	2-3	5-6	24	68
20DE	4-5	8-10	28	58

☑ Solution: Maltodextrins provide nutritive carbohydrates. They enable cost optimization verses the use of other hydrocolloids, impart texture and viscosity in the end-product. Its key attributes include quick dispersibility and solubility without lump formation or settling down.



Mostly used DE are 10 to 12 with reduced DP1+ DP2; they can be used partially to reduce the formulation's sugar load. They are best suited as low fermentable substrates for alcohol-free beer and drinks.

• Flavour Manufacturing

● Challenge: The operational challenges in flavour manufacturing arise in identifying an extremely neutral profiled co-ingredient that only supports adding bulk and does not impart any flavour, colour or influence the viscosity of the final spray drying slurry. High saccharide ingredients are observed to stick in the spray drying chamber, ruling out the use of sucrose or dextrose.

☑ Solution: Maltodextrins are extremely good carriers. They can be spray-dried to help encapsulate the flavours; being low in saccharide content leads to no charring in the drying, and the higher glass transition causes faster drying as well. Mostly used grades have DE 6 to 19. These protect the flavour (oxidation, losses...), improve its dispersion and flow properties, and control the release (boosting, long-lasting, masking, etc.) when used with other emulsifying starches. Also, for dry mix flavours, higher granulated grades of maltodextrins prove more effective than the standard grades available in the market.

• For Confectionery

● Challenge: Already a high-in-sugar product, there are challenges like hygroscopicity onset, excessive sticking to the packaging material and unappealing finished product and deformity. Use of high-cost hydrocolloids is done to control the cold flow in soft candies.

☑ Solution: Maltodextrins and dried glucose syrups with higher DE value perform to control hygroscopicity and reduce the

sticking on the packaging. Maltodextrins also enable the reduction of tooth packing, which is in most cases due to thick caramel syrups. Maltodextrins of DE value 2 to 10 stay the most applicable.

• For Dairy

● Challenge: Dairy applications are the most sensitive organoleptically. Any deviation and staleness in the product is easily identified by regular consumers. High sugars and the use of dried milk solids have a huge cost impact on the formulation due to their fluctuating cost. Gum and hydrocolloids are used as well for improved mouthfeel but add equivalent high cost.

☑ Solution: To overcome these challenges, maltodextrins of DE 12 grades enable to have improved mouthfeel and when combined with dried glucose syrup solids, brings in rounded sweetness. Thus, it requires lower sucrose. Maltodextrins and dried glucose syrups also enable increased total dissolved solids without imparting any starchy or cerealic notes to non-dairy creamers products that are used in 3-1 premix formulations. In frozen products like ice creams, sorbets and gelatos, these smart carbs help reduce the freezing point depression and even slow the melting of the ice crystals in non-milk frozen forms like sorbets and ice lollies.

• Spray Dried Specialty Ingredients

● Challenge: The role of a co-ingredient is extremely important. Often observed as a challenge that rises to QC checks and rejections is the onset of off-flavours or carryover of cerealic-starchy notes from the carrier into the main fruit/vegetable component. This also negatively affects the organoleptic attributes.



☑ Solutions: Products like spray-dried fruit and vegetable powders, colours and bright white products like coconut milk powders, use a high amount of maltodextrins. That's mainly to add bulk, and ease the operational challenges. Since they are neutral profiled and clear in dissolution, they have the highest functional role to play in both production and processing.

• Bakery:

● Challenge: Bakery products are generally made with wheat flours or similar flours, which are mainly rich in amylose content. Based on time and process, amylose tends to retrograde resulting in a weaker crumb formation. Retrogradation is nothing but loss of water molecule from starch matrix. Loss of moisture in bakery products over a period can also lead to textural and sensorial challenges causing the product to lose its acceptability. Another challenge manufacturers face is in terms of fat reduction. At 50% levels, a significant reduction in cake volume is observed.

☑ Solutions: Maltodextrins are carbohydrate-based fat replacers which in presence of water mimics fat by forming a smooth gel with similar flow properties to that of a fat gel. Primary function of fat replacers is to increase the viscosity and to impart mouthfeel similar to that of fat. Low DE maltodextrins are best suited for such applications as they possess binding properties similar to starch and can function more effectively. Laxminarayan et.al, 2006 mentioned Maltodextrin, thanks to its oil binding properties, improves the crumb grain and texture in cakes prepared with 50% fat reduction. Maltodextrins can be used as fat replacers due to their ability to form smooth, fat-like gels and their relatively high viscosity.



Exchanging fat for malto-dextrins, on a w/w basis, will reduce the energy content of the food, as maltodextrins contain less energy/g.

Recent findings suggest that the use of maltodextrins in high-energetic food products may help reduce the fat content up to 50%, thus reducing energy density without altering important properties and characteristics of these products. It also significantly improves the crust colour, crumb grain, texture and taste of the cake.

• Snacking Industry

■ Extruded Snacks

● Challenges: Extruded products are tricky and needs to be carefully formulated. Ingredients used in such formulations should not just help derive the right product with the right texture but also bring ease to the manufacturing process.

☑ Solution: Maltodextrin when used in the formulation helps with food lubricity because of its water holding capacity, which is a very important factor when it comes to pellets and extruded snack bars or energy bars manufacturing process.

When you extrude without Maltodextrin you have

- ♦ over expansion with possible retraction before setting
- ♦ Large and irregular cells
- ♦ brittle and fragile texture which will lead to more breakages in package

When you extrude with Maltodextrin you have

- ♦ Medium expansion
- ♦ Quick setting
- ♦ Small and even cells
- ♦ Crunchy, harder texture- thanks to smaller and even air pockets.

● Challenges: Fried snack industry another important parameter to consider is preventing the seasoning from segregation and falling off

which can cause flavour to be off-

balance. Seasonings are one of the greatest cost contributor to a food matrix and loss of all the seasoning to a drier during manufacturing or in the package is not only an economic waste but can be a taste issue as well.

☑ Solution: The ability to adhere the particulates to the surface will be supported by the oil binding properties of Maltodextrin it will not only help adhere better but also retain the volatiles of the flavour compound. In addition, 1 percent of Maltodextrin added to a water-based system is 1 less percent of water molecule to be dried which helps increase manufacturing efficiency by shortening the processing times. Addition of Maltodextrin also minimizes the chances of any textural damages within the snack due to possibility of moisture migration.

■ Batter and Coated Products

● Challenge: Frying is a process of heat and mass transfer. As oil penetrates the food, moisture and other soluble materials are transferred from the core to the external environment. Which results in a typical texture of deep-fried foods. In fried foods, batter and breading plays a crucial role as they enhance the functional and sensory properties. It helps in maximizing the product yield and also improves the crispiness while improving the flavours of the fried product. if the batter system is not formulated wisely, then it will cause difficulty in maintaining the viscosity resulting in higher batter pickup and high oil uptake. the coating in such a process will be much thicker, and it will take a longer time to cook.

☑ Solution: Maltodextrin can add value to the formulation. Maltodextrin will act as diluent, and it will help manage the viscosity as desired. It will help in low batter pick-up resulting in a crisp, oil reduced final product with even browning. Pineda et al., 2020 stated that batter containing Maltodextrin with respect to the crispiness had highest values and maximum force

needed to be applied immediately after frying. Wheat flour when

replaced with Maltodextrin partially helps obtain a more intense gold-brown colour in the final product, with a low pick up eventually resulting in a lower final oil content.

● Challenge: Another challenge in frying industry is to maintain the quality of the oil and to increase the number of frying for reusability. During frying, the batter particles separate from product due to weak binding of the batter. Continuous burning of these particles results in degradation of oil due to formation of free fatty acids, polar compounds.

☑ Solution: Additions of maltodextrin can help reduce the batter pick up along with its adherence to the substrate, it will limit the batter separation which will increase the number of frying up to 7-8 times.

Maltodextrin in Sports

● Challenge: Muscle fibre glycogen content is closely related to high intensity contractions due to its ability to execute it repeatedly; hence, to reduce fatigue, it's important either to increase the glycogen content or to reduce the rate of glycogen breakdown.

☑ Solution: Hofman et al., 2015; examined the effects of maltodextrin ingestion during exercise and could conclude that ingestion of maltodextrin decreases net glycogen breakdown during extensive exercise.

Hofman et al., 2015 states that a combination of maltodextrin with protein and/or amino acids can promote enhanced glycogen recovery and stimulate muscle protein synthesis following an intense exercise protocol. Some observations suggest that effects on post-exercise glycogen recovery and muscle protein synthesis can be enhanced when a combination of different CHO and protein is used



To summarize and ask for the right grade:

Application	Role Use of Maltodextrins	Specific Grades of MDP and DGS	Properties of Maltodextrins that Play Important Roles
Powdered Flavours	Encapsulating agent	DE 19	Absolutely neutral profile, higher glass transition temperature, non-viscous at higher dosage
Beverage Premixes	Reduce sugar, Optimize sweetness, Enhance mouthfeel	DE12, DE 21	Lower DP1 +DP2 sugars, Higher polysaccharides for enhanced mouthfeel, impart mild sweetness
Carriers in Drying Drum/Belt/ Fluidized/Freeze	Processing aids	DE 19	No viscous, higher rate of recrystallization, higher Tg (glass transition temperature)
Confectionery	Fat reduction, cold flow, replace gelatin	DE 2, DE 12	The ability to form gel-like structure and enhance mouthfeel
Chocolates	Sugar reduction, Slow-melting	DE 12, DE 19	No processing challenge in conching and size reduction
Dairy	Improve viscosity	DE 12	Optimize cost of other hydrocolloids, Slower melting of sorbets and freezing point depression
Frozen Dairy, Ice Lollies	Quick freezing, increase total solids	DE 12, DE 19, DE 21	Higher polysaccharides that add to the total solids and positively affect the freezing point depression
Dips and Sauces	Reduce water activity, improved mouthfeel, fat reduction	DE12, 18, 28	Fat mimicking property, no process change required
Batter and Coatings	Diluent	DE12	Lowers batter pick up, improves crispness
Baker	Crumb formation, fat reduction	DE 12, DE 18	Increases viscosity and also imparts mouthfeel

The other main demand for starches and their derivatives arises also from the textile, paper, and construction industries besides the pharmaceutical industry. The use of these derivatives in the food industry is growing, and there is a lot of potential for the corn starch processing industry in the years to come.

Thus, the versatility of maltodextrins in the food industry stands highly untapped and unexplored.



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HEALTHY PLANT-BASED CARBS: MALTODEXTRINS & GLUCOSE SYRUP IN DEVELOPING HEALTHY FOODS: A REPORT



AUTHOR
Ms Prerana Patil,
 Food Technologist,
 PFNDAI



Protein Food & Nutrition Development Association of India (PFNDAI) conducted a webinar in association with Roquette on the topic "Healthy Plant-Based Carbs: Maltodextrins and Glucose Syrup in Developing Healthy Foods".

After Dr. J. S. Pai, Executive Director, PFNDAI welcomed the audience, Ms. Dolly Soni, Executive- Marketing & Digital, PFNDAI introduced the speakers.

Know Your Carbohydrates- Dr. B Sesikeran

Dr. Sesikeran in his talk emphasized the role of carbohydrates and their importance in our diet.

Carbohydrates have a wide range of variety so considering all carbohydrates to be the same is wrong. Here are some highlights from his presentation-

- Carbohydrates as an energy source follow the process of digestion and absorption in the small intestine. Carbohydrates that provides glucose for metabolism are referred to as glycemic carbohydrate. For example, most mono and disaccharides, some oligosaccharides, maltodextrins, and rapidly digested starch.

Carbohydrates that pass to the large intestine before being metabolized is called non-glycemic carbohydrate e.g.- remaining oligosaccharides, NSPs, and RS.

- Glycemic response to carbohydrates depends on the intrinsic properties of food and also extrinsic factors such as the composition of the meal, the overall diet, and the biological variation of the

host.

- The healthiest carbohydrate sources include unprocessed or minimally processed whole grains, vegetables, fruits, and beans. And unhealthy sources of carbohydrates include white bread, pastries, sodas, and other highly processed or refined foods.

- Carbohydrates play a major role in energy management as they readily generate energy compared to fats and proteins.

- Red blood cells, brain, eye lens, renal medulla, adipose tissues, and muscles significantly use glucose. Dr. Sesikeran concluded his presentation by emphasizing that carbohydrates are essential so considering all carbohydrates unhealthy is wrong. Hence choosing wisely is the best option.



The speakers for the webinar were, Dr. B Sesikeran, Former Director, NIN, ICMR, Hyd., Chairman - Sci. Advisory Committee, PFNDAI, Mr. Rohit Salgaonkar, Application Development Team Leader, Roquette, Mr. Damien Pierre LESOT, Head - Technical Developers, Roquette, and Ms. Charmie Patel, Head - Technical Developers, Roquette. Ms. Meenu Yadav, Manager, Technical Regulatory Affairs, Marico, Mr. Shashank Joshi, Head - GM operations, Chitale Bandhu Mithaiwale, Dr. Madhavi Marathe, Senior Manager, Healthcare Nutrition Science, Danone, and Mr. Rohan Rajeshirke, R&D Group Leader AMEA, Mondelez India were panelists.



Protein Foods & Nutrition Development Association of India



**In collaboration with Roquette
had organized Webinar on**



"Healthy Plant- Based Carbs : Maltodextrins & Glucose Syrup in Developing Healthy Foods"



**Dr B Sesikeran
(Moderator)**



Dr Jagadish Pai



**Mr Damien Pierre
LESOT**



**Ms Charmie
Patel**



**Mr Rohit
Salgaonkar**

Healthy Plant-Based Carbs- Maltodextrins & Dried Glucose Syrups in Developing Healthy Foods -Ms. Charmie Patel & Mr. Rohit Salgaonkar

The second presentation was given by Ms. Charmie Patel and Mr. Rohit Salgaonkar. In their talk, they enlightened the participants about the role of maltodextrin and glucose syrup in developing different products to overcome the challenges that may occur while developing a product. Here are highlights from their presentation-

- Carbohydrates are an important food group and are an indispensable part of a healthy diet. As a macronutrient, they are essential for proper body functioning and they are needed in large amounts.
- Starch can be hydrolyzed to obtain different products like dextrose, maltose, fructose, glucose, and maltodextrin. Waxy maize, wheat, potato, and pea are commonly used for deriving these products.
- Depending on the rate of hydrolysis different plant-based carbs can be obtained e. g. maltodextrin (DE less than 20), dry

- glucose syrup (DE greater than 20), and glucose (DE=100).
- As the DE increases the properties like viscosity, binding power, water activity, anti-crystallization, freezing point decrease. Whereas the properties like sweetness, hygroscopicity, browning, flavour enhancement, fermentability, and osmolarity increase with the increase in DE.
- Maltodextrin and dried glucose syrup solids help in solving formulating challenges. They can be used in flavour manufacturing, beverages, dairy, spray drying, confectionery, and bakery.

• While developing a product challenges like retrogradation, high-fat content, higher oil degradation textural challenges, adhesion, high viscosity, breakage, uneven expansion and loss of volatiles may occur. So here maltodextrin comes into play by enabling the manufacturer to overcome these challenges.



Applications of Carbohydrate Ingredients in Food Industry: Global

Scenario with Indian Glimpse - Mr Damien Pierre LESOT

Mr. Damien Pierre explained the global scenario for the application of carbohydrate ingredients. Following are some key points from his presentation-

• There are different consumer trends when it comes to carbohydrates due to factors like a healthier diet, sugar being in the spotlight, sports going mainstream, and specific needs for each life stage.



reduce the sugar leading to reformulation.

• Carbohydrates are the major energy source and are important in sports nutrition. For athletes, carbs are required along with proteins for endurance efforts to prepare for recovery.

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

After the completion of all the expert talks, a panel discussion on the various aspects of plant-based carbs and their role in developing a product was conducted. The panel discussion was moderated by Dr. Sesikeran.

After the completion of the panel discussion, Ms. Charmie Patel declared the results of the recipe and poster competition.

1. Recipe contest-

The recipe contest was conducted in two rounds and under different



categories. The judges for the recipe contest were Ms. Nitika Vig, Nutrition Manager, Marico Limited and Ms. Ruby Sound, Nutritionist & Consultant Dietitian Proprietor, Eatwise Nutrition & Wellness Clinics Secretary-IDA, Mumbai Chapter. Here are the results for both rounds-

Round 1- Creativity unlimited with millet flour

1. Ms. Vidhi Tukaram Prabhu – Millety Spinach Pesto
2. Ms. Mital Chetan Shah- Millet Norimaki Sushi
3. Ms. P. R. Durga Devi- Plant-based Yoghurt using Foxtail Millet



To address the challenges of carbohydrates sugar management, energy management and staying active are three ways. For sugar management maltodextrin and

dried glucose syrup can be used to partially



Round 2- Creativity unlimited with Roquette ingredients

A] Functionality-

1. Ms. Pranali Rajesh Patil- Cheese Powder
2. Ms. Dolly Jain- Choco Cookies

B] Innovation-

1. Ms. Ishwari Milind Desai- Baked Oatmeal Cup
2. Mr. Saamir Akhtar- Vege Dosa Waffle

C] Nutrition-

1. Ms. Khushdeep Kaur- Multigrain vadda



2. Poster contest-

The judges for the poster contest were Dr. Jagmeet Madan, Principal- Dept. of Food, Nutrition & Dietetics, SVT College of Home Sci., President, IDA and Ms. Sukhada Bhatte, Sr Manager- Regulatory & Nutrition Hexagon Nutrition Ltd. Registered Dietitian, IDA. Here are the results of the poster contest-

1. Ms. Vidhi Tukaram Prabhu- Health carbs in a balanced diet
2. Ms. Khushi Ashish Karia- Don't Fight carbs eat the right ones
3. Ms. Aamna Qaisar- Healthy Carbs In Balanced Diet



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



**Dr B Sesikeran
(Moderator)**



**Dr Jagadish
Pai**



**Ms Meenu
Yadav**



**Mr Shashank
Joshi**



**Dr Madhavi
Marathe**



**Mr Rohan
Rajeshirke**



**Ms Dolly Soni
(Webinar Convenor)**

Panel Discussion

REGULATORY ROUND UP



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

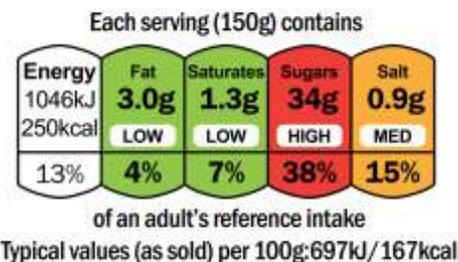
Dear Readers

Please find below FSSAI notifications, advisories, orders, etc since the last round up. Front of the pack labelling (FOP) of nutrients of concern is hotting up. FSSAI is conducting series of meeting with the stakeholders to arrive at the style best suited for India. The process adopted by FSSAI has been very transparent which is very heartening.

FSSAI had another round of meeting with the stakeholders

regarding FOP labelling on 15.02.2022. [The minutes are published.](#)

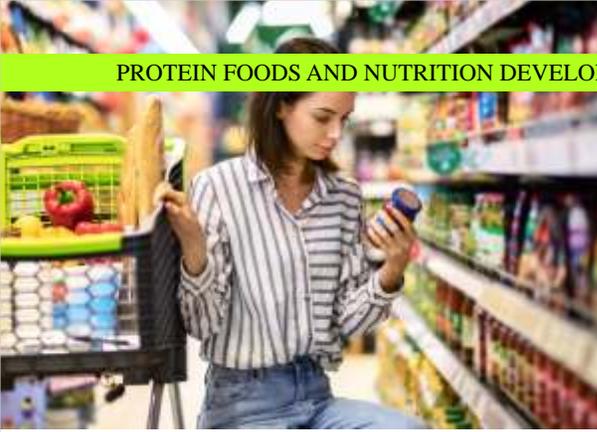
FSSAI had requested Indian Institute of Management – Ahmedabad (IIM A) to identify the FOP labelling best suited for India taking all aspects into consideration. The



report was submitted and discussed in the meeting. The minutes gives a synopsis of various FOP labelling and the study protocols adopted by IIM A. The study has revealed that

Health Star Rating (HSR) is best suited for India. [The detailed IIM A report is also published.](#) A few NGOs have raised concern about the findings and are on record to state that Traffic Light style of FOP labelling is best suited to address the health concerns. However, FSSAI has noted their objections but have decided to go ahead with HSR. A draft regulation detailing HSR would be published soon for wider circulation and comments. It was also decided that FBOs can adopt the standards voluntarily from 2023 and a transition period of 4 years for mandatory adoption.





Notification

[Final notification amending import regulation.](#) The amendment is regarding sampling of consignments which are imported exclusively for the manufacture of products that are meant for 100% export.

In another development, a few NGOs and religious organisations have approached the High Court seeking full disclosure of ingredients on the label. Their main concern is the use of ingredients which could be of animal origin in products declared as vegetarian.



The petitioners also have demanded the withdrawal of labelling exemptions given to compound ingredients below five percent in the final product. The high court has requested FSSAI to respond. Never a dull moment in food industry.



Advisories, Orders and Clarifications.

[Special permission for the import of hypoallergenic infant milk substitutes have been withdrawn as these products are covered under the Infant Nutrition Regulation.](#)



[New directions are issued by FSSAI regarding used cooking oil. The format for recording the generation and disposal of used cooking oil has been amended.](#)

[FSSAI approved list of Inborn Error Metabolism products.](#)

[FSSAI list of products approved, rejected and under consideration applied under Non-Specified Food Regulation.](#)



RESEARCH IN HEALTH & NUTRITION

Phospholipids to maintain cognitive health with age

06 Dec 2021 Nutrition Insight

A naturally occurring component of milk fat - phospholipids - are positioned to revitalize healthy aging food and beverages, according to Finnish dairy supplier Valio.

Brain-supporting dairy

While older consumers require many important nutrients to maintain health, Valio notes phospholipids have gained increased attention in recent years.

"Phospholipids have shown potential to prevent cognitive decline," says Michael Healy, sales manager at Valio Food Solutions. "They have been found in clinical research to support the development of cognitive function in early adults and to help maintain cognitive development over time.

Phospholipids are able to cross the blood-brain barrier, so it's an interesting ingredient that can add a lot of benefits to the finished product."

Opportunities at many life stages

Phospholipids will be important in more categories other than senior nutrition in the years to come, such as infant nutrition. Sari Vahla, Valio Food Solutions' sales manager and team lead comments: "Consumer needs are almost the same at the beginning of life and at the end. Infant nutrition and healthy aging nutrition are quite close to each other." She adds the infant and adult nutrition segments are key growth

areas worldwide and phospholipids can help lay the foundation and maintain cognitive health for adults.

By Missy Green



Probiotics improve nausea and vomiting in pregnancy, study finds

Findings also provide clues to why some people experience more stomach upset during pregnancy
Science Daily December 4, 2021

In a first-of-its-kind study, researchers at the UC Davis School of Medicine found that probiotics significantly improve the symptoms of pregnancy-related nausea, vomiting and constipation. The findings were published in the journal *Nutrients*.

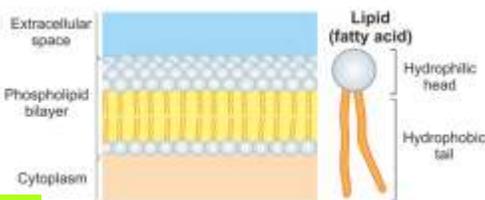
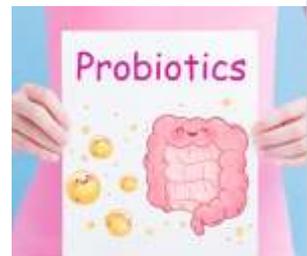
Nausea and vomiting affect about 85% of pregnancies and can significantly impact quality of life, particularly during early pregnancy. "The cause of nausea and vomiting during pregnancy is unknown to this date. Various theories have been proposed, but none of them is conclusive," said Albert T. Liu, lead author for the study and a professor of obstetrics and gynecology.

"Nausea, vomiting and constipation during pregnancy can significantly diminish the quality of patients' lives. Once nausea and vomiting during pregnancy progress, they can become difficult to control, and sometimes the patient even needs to be hospitalized," Liu said.

Beneficial microbes

Probiotics are referred to as "beneficial bacteria." They can be found in foods like yogurt, kimchi, kefir, sauerkraut and tempeh. Probiotics are also available as food supplements. According to the National Center for Complementary and Integrative Health, other than vitamins, probiotics or prebiotics were the third most commonly used dietary supplement for adults. Probiotics are thought to support the community of different microbes, often referred to as the "gut microbiome," found in the gastrointestinal tract. During pregnancy, hormones like estrogen and progesterone increase, bringing about many physical changes. These increases can also change the gut microbiome, which likely affects the digestive system functions and causes unwanted symptoms like nausea, vomiting and constipation.

The researchers set out to determine whether supplementing with a probiotic could be beneficial for gastrointestinal function during pregnancy. The study lasted for 16 days. A total of 32 participants took a probiotic capsule twice a day for six days and then took two days off. They then repeated the cycle. The probiotics were available over-the-counter and mainly contained *Lactobacillus*, a type of good bacteria. Each capsule contained approximately 10 billion live cultures at the time of manufacture. Participants kept 17 daily observations of their symptoms during the duration of the study, for a total of 535 observations for the researchers to statistically assess.





What the researchers found was that taking the probiotic significantly

reduced nausea and vomiting. Nausea hours (the number of hours participants felt nauseous) were reduced by 16%, and the number of times they vomited was reduced by 33%. Probiotic intake also significantly improved symptoms related to quality of life, such as fatigue, poor appetite and difficulty maintaining normal social activities, as scored by questionnaires. Probiotics were also found to reduce constipation significantly. "Over the years, I've observed that probiotics can reduce nausea and vomiting and ease constipation. It's very encouraging that the study proved this to be true," said Liu. "Probiotics have also benefited many of my other patients who weren't in the study," said Liu.



New clues from gut microbes and by-products

Participants also contributed fecal specimens before and during the study. The samples were analyzed to identify the type and number of microbes and the different by-products of digestion. This allowed the researchers to examine whether biomarkers in the fecal specimens corresponded with more severe nausea and assess how the probiotics affected participants who began the study with different baseline biomarkers. One finding was that a low amount of bacteria that carry an enzyme named bile salt hydrolase, which generates bile acid to absorb nutrients, was associated with more pregnancy-related vomiting. Probiotics increase bile salt hydrolase-producing bacteria, which may explain why



the supplements decreased levels of nausea and vomiting.

Another

finding was that high levels of the gut microbes Akkermansia and A. muciniphila at the beginning of the study were associated with more vomiting. The probiotic significantly reduced the amount of those particular microbes and also reduced vomiting. This suggests Akkermansia and A. muciniphila may be reliable biomarkers that can predict vomiting in pregnancy. Another finding was that vitamin E levels increased after taking probiotics. Higher levels of vitamin E were associated with low vomiting scores. "This research provides key insights about the impact of gut microbes on gastrointestinal function during pregnancy. Our gut microbiota explains why we are what we eat, and why bacteria-generated metabolites and products have a huge impact on our health," said Wan. "They affect the gastrointestinal tract as well as skin health and neurological function."

Although the findings are intriguing, the researchers caution that due to the small sample size, further studies will be needed to confirm the effects of the probiotics. "Our previous work showed the benefits of probiotics in preventing liver inflammation. The current study might be one of the first to show the benefits of probiotics in pregnancy," said Wan. "It would be interesting and important to further test whether probiotics can reduce nausea and vomiting caused by chemotherapy in cancer patients." Additional authors on this study include Shuai Chen from the Department of Public Health Sciences, and Prasant Kumar Jena, Lili Sheng and Ying Hu from the Department of Pathology and Laboratory Medicine at the University of California, Davis.

The sunshine vitamin that 'D'elivers on cardio health
 Science Daily
 December 6, 2021



Free from the sun, vitamin D delivers a natural source for one of the hormones essential to our bodies, especially the bones. But when you're down on this essential nutrient, it's not only your bones that could suffer, but also your cardio health, according to new research from the University of South Australia.



In the first study of its kind, researchers from the UniSA's Australian Centre for Precision Health at SAHMRI have identified genetic evidence for a role of vitamin D deficiency in causing cardiovascular disease. The study, which is published in European Heart Journal today, shows that people with vitamin D deficiency are more likely to suffer from heart disease and higher blood pressure, than those with normal levels of vitamin D*. For participants with the lowest concentrations the risk of heart disease was more than double that seen for those with sufficient concentrations.

Globally, cardiovascular diseases (CVDs) are the leading cause of death worldwide, taking an estimated 17.9 million lives per year. In Australia, CVD accounts for one in four deaths and costs the Australian economy five billion dollars each year, more than any other disease. Low concentrations of vitamin D are common in many parts of the world, with data from the UK Biobank showing that 55 per cent of participants have low levels of vitamin D (<50 nmol/L) and 13 per cent have severe deficiency (<25 nmol/L). Low

levels of vitamin D are recorded by an estimated 23 per cent of people in Australia, 24 per cent of people in the US, and 37 per cent of people in Canada.



Chief investigator, UniSA's Prof Elina

Hyppönen says

appreciating the role of vitamin D deficiency for heart health could help reduce the global burden of cardiovascular disease. "Severe deficiency is relatively rare, but in settings where this does occur it is very important to be proactive and avoid negative effects on the heart. For example, deficiency can be a problem for people living in residential care who may have limited exposure to sun," Prof Hyppönen says.

"We can also get vitamin D from food, including oily fish, eggs and fortified foods and drinks. This said, food is unfortunately a relatively poor source of vitamin D, and even an otherwise healthy diet does not typically contain enough. If we don't get any vitamin D through the sun, this is one of the rare nutrients for which we sometimes need to take a daily supplement to keep up with the requirements.

"Understanding the connection between low levels of vitamin D and CVD is especially important, given the global prevalence of this deadly condition. Our results are exciting as they suggest that if we can raise levels of vitamin D within norms, we should also affect rates of CVD. In our study population, by increasing vitamin D-deficient individuals to levels of at least 50 nmol/L, we estimate that 4.4 per cent of all CVD cases could have been prevented."

This large-scale Mendelian study used a new genetic approach that allowed the team to assess how increasing levels can affect CVD risk based on how high the participants actual vitamin D levels were. The study used information from up to 267,980 individuals which allowed

the team to provide robust statistical

evidence for the link between vitamin D deficiency and CVD.

"It is not ethical to recruit people with vitamin D deficiency to a randomised controlled trial and to leave them without treatment for long periods. Prof Hyppönen says. "It is exactly this type of difficult setting which demonstrates the power of our genetic approach, given we can show how improving concentrations affects the risk in those most in need, without exposing participants to any harm.

"Those with the lowest concentrations are likely to have the strongest effects, yet a population-wide approach to eradicate vitamin D deficiency could reduce the global burden of CVDs."

*The Australian and New Zealand Bone and Mineral Society (ANZBMS) and Osteoporosis Australia (OA) guidelines (2012) classify vitamin D results as follows:

- 25-hydroxy-vitamin D of less than 30 nmol/L is deficient
- 25-hydroxy-vitamin D of 30-50 nmol/L is mildly deficient
- 25-hydroxy-vitamin D of greater than 50 nmol/L is sufficient for the health of bones

A diet rich in plant-based products reduces the risk of cognitive impairment in the elderly
Metabolomics to study the impact of diet on health

December 9, 2021 Science Daily

A diet rich in plant products reduces the risk of cognitive impairment and dementia in the elderly. This is the result of a

study by the Biomarkers and Nutritional Food Metabolomics Research Group of the Faculty of Pharmacy and Food Sciences of the University of Barcelona (UB) and the CIBER on Frailty and Healthy Aging (CIBERFES).

This European study, part of the Joint Programming Initiative "A Healthy Diet for a Healthy Life" (JPI HDHL), was carried out over 12 years with the participation of 842 people aged over 65 in the Bordeaux and Dijon regions (France).

Metabolomics to study the impact of diet on health

The study analyses the relationship between the metabolism of dietary components, intestinal microbiota, endogenous metabolism and cognitive impairment. As Mireia Urpí-Sardà, from the Department of Nutrition, Food Science and Gastronomy and CIBERFES, notes, "what we analysed in the cohorts under study is the modulating role of the diet in the risk of suffering cognitive impairment." Urpí-Sardà points out that "the results show a significant association between these processes and certain metabolites."

The results reveal a protective association between metabolites derived from cocoa, coffee, mushrooms and red wine, microbial metabolism of polyphenol-rich foods (apple, cocoa, green tea, blueberries, oranges or pomegranates) and cognitive impairment in the elderly.

The analysis of plasma samples indicated that some metabolites are related to the progression of cognitive impairment and dementia. As Professor Cristina Andrés-Lacueva explains, "for example, 2-furoylglycine

and 3-methylanthine, which are biomarkers of coffee and cocoa consumption, had a protective profile, while saccharin-derived from the consumption of artificial sweeteners- is associated with a damaging role."





Mercè Pallàs, professor at the Faculty of Pharmacy and Food Sciences and member of the Institute of Neurosciences (UBNeuro) of the UB, stresses that "the study of the relationship between cognitive

impairment, the metabolism of the microbiota and food and endogenous metabolism is essential to develop preventive and therapeutic strategies that help to take care of our cognitive health."

Dietary changes for a healthy cognitive aging

Therefore, changes in lifestyle and diet are decisive as a strategy to prevent cognitive deterioration and its progression in neurodegenerative diseases such as Alzheimer's and other dementias. "A higher intake of fruits, vegetables and plant-based foods provides polyphenols and other bioactive compounds that could help reduce the risk of cognitive decline due to ageing," says Cristina Andrés-Lacueva.

Teams from the Department of Pharmacology, Toxicology and Therapeutic Chemistry of the Faculty of Pharmacy and Food Sciences, and the Department of Genetics, Microbiology and Statistics of the Faculty of Biology have also participated in the study. The University of Bordeaux and the INRAE Center of the University Clermont-Ferrand (France), King's College London (United Kingdom), the University of Amsterdam (Netherlands) and the Paracelsus Medical Private University (Austria) have also collaborated in the study. The research has received funding from the International Joint Programming Actions PCIN-2015-229, from the European Regional Development Funds (ERDF) and from the former Ministry of Economy, Industry and

Competitiveness (MINECO), through the Joint Programming Initiative "A



Healthy Diet for a Healthy Life."

Dietary fibre improves outcomes for melanoma patients on immunotherapy

Science Daily December 23, 2021

Melanoma patients receiving therapy that makes it easier for their immune system to kill cancer cells respond to treatment better when their diet is rich in fiber, according to a large, international research collaboration that includes the Oregon State University College of Pharmacy.



Published today in Science, the study led by the University of Texas and the National Institutes of Health is a promising development in the fight against multiple types of cancer including melanoma, the most deadly form of skin cancer, the researchers said.

Nationwide, melanoma is the fifth-most common cancer. Roughly 100,000 new melanoma cases will be diagnosed in the United States in the coming year, and more than 7,000 of those patients are expected to die, according to the American Cancer Society. One of the most aggressive cancers, melanoma kills by metastasizing, or spreading, to other organs such as the liver, lungs and brain. The new study focuses on a therapeutic technique called immune checkpoint blockade, often referred to by its initials of ICB, which has revolutionized treatment of melanoma, and cancer in general. ICB therapy relies on inhibitor drugs that block proteins called checkpoints that are produced by certain immune system cells -- T cells, for example -- and also by some cancer cells.

Checkpoints help prevent immune responses from being too strong, but sometimes that means keeping T

cells from killing cancer cells. Thus, when the checkpoints are blocked, T cells can do a better job of killing cancer cells.

"ICB has been a game-changer in cancer therapy, and the influence of the gut microbiome on therapeutic response has been demonstrated in numerous studies, in preclinical models and also in research involving human cohorts," Morgun said. "A person's microbiome is shaped by a wide range of environmental factors including food and medications, while human genetics accounts for a much smaller proportion of the microbiome variation from person to person."

The human gut microbiome is a complicated community of more than 10 trillion microbial cells from about 1,000 different bacterial species. It has remained unclear whether dietary fibre intake and the use of commercially available probiotics affect immunotherapy response in cancer patients, Morgun said. Morgun and collaborators on this study looked at hundreds of melanoma patients, analyzing their gut microbiomes, dietary habits, use of probiotics, disease features and treatment outcomes. Most of the patients were being treated via ICB, typically a type known as anti-programmed cell death protein therapy, abbreviated to anti-PD-1.

A parallel study involving mice implanted with tumours was also part of the research. In the human, observational cohort portion of the study, higher dietary fibre intake was associated with disease non-progression among patients on ICB; the most pronounced benefits were found in patients with strong dietary fibre intake and no probiotic use.





The mouse model generated similar results. "We showed that

dietary fibre and probiotic use, both known to impact the gut microbiome, are associated with differing ICB outcomes," Morgun said. "From the human cohort results we can't assign causality -- there may have been other things going on with those patients that we didn't measure in this study." But Morgun said the results in the mice support the idea that anti-tumour immunity is strongest with a high-fiber diet and no probiotics.

To help make sense of microbiome complexity, Morgun and Natalia Shulzhenko of Oregon State's Carlson College of Veterinary Medicine earlier invented a computer modelling technique known as transkingdom network analysis. The model, used in this latest work, integrates multiple types of "omics" data -- metagenomic, metabolomic, lipidomic, proteomic, etc. -- in determining how interactions among specific types of gut microbes help or hinder biological functions in the host. In this case, the microbial interactions involved how well the host responds to immune checkpoint blockade.

It's important to note, Morgun said, that transkingdom network analysis in mice showed a family of bacteria, Ruminococcaceae, among the organisms increased by the high-fibre diet; the same bacteria were found in the current study involving humans and in previous, related research with people. Double-blind, randomized dietary intervention studies will be critical for establishing whether a targeted, achievable diet change at the start of ICB therapy can improve patient outcomes, he said. "And though the findings suggest that some commercially available probiotics

may be harmful for patients on ICB, more research is needed to determine which probiotics could actually be beneficial," Morgun said.

Leading the study were Jennifer Wargo, Lorenzo Cohen and Carrie Daniel of the University of Texas and Giorgio Trinchieri of the National Institutes of Health. Approximately 80 scientists took part in the research.

Healthy diet in early pregnancy reduces risk of gestational diabetes

Science Daily
December 29, 2021



Obesity is a significant risk factor for developing gestational diabetes mellitus, and an increasing number of pregnant women are overweight or obese. Dietary habits have an impact on both obesity and the onset of gestational diabetes mellitus.

The mother-child study conducted at the University of Turku and Turku University Hospital in Finland examined the connection between dietary intake and onset of gestational diabetes in 351 overweight or obese women.

The women's nutrient intake was calculated from food diaries, on the basis of which two dietary patterns, a healthier and an unhealthier dietary pattern, were recognised. In addition, the overall quality of the diet in reference to that recommended was described with a diet quality index and the inflammatory potential with a dietary inflammatory index. "Our research results show that following a healthy diet in early pregnancy reduces the risk of gestational diabetes, says first author," Doctoral Candidate Lotta Pajunen from the Institute of Biomedicine at the University of Turku.

Diet that increases body's inflammation heightens the risk of gestational diabetes

The study also found that a higher dietary inflammatory index, meaning a diet that increases the low-grade inflammatory markers in the body was connected to an increased risk of developing gestational diabetes mellitus. Furthermore, a higher consumption of fat and especially saturated fats was connected to gestational diabetes. This is of interest as the intake of saturated fats is known to increase the body's inflammation.

Several methods were used in the study to examine the dietary intake in early pregnancy. These analyses revealed that a diet comprehensively promoting health is associated with a smaller risk of developing gestational diabetes.

"Eating vegetables, fruit, berries, and wholegrain products as well as unsaturated fats is particularly important. These nutrients and foods reduce inflammation in the body and therefore also the risk of gestational diabetes. Mothers who are overweight or obese already before the pregnancy would most likely benefit from dietary guidance in early pregnancy," says Associate Professor in Nutrition Kirsi Laitinen from the University of Turku, the PI of the Early Nutrition and Health research group that conducted the study.

Study finds that Nordic diet lowers cholesterol and blood sugar, even if you don't lose weight

by University of Copenhagen (Medical Xpress Mar 8, 2022)





A healthy Nordic diet can prevent a range of diseases.

Until now, the health benefits that researchers had attributed to a Nordic diet primarily focused on weight loss.

But in a new study, University of Copenhagen researchers and their Nordic colleagues found clear evidence that a Nordic diet can lower blood sugar and cholesterol levels even without weight loss. In particular, they point to the composition of dietary fats as a possible explanation for the diet's positive effects. Berries, veggies, fish, whole grains and rapeseed oil: These are the main ingredients of the Nordic diet concept that for the past decade, has been recognized as extremely healthy, tasty and sustainable. The diet can prevent obesity and reduce the risk of cardiovascular disease, type 2 diabetes, high blood pressure and high cholesterol.



Iceland, Dragsted examined blood and urine samples from 200 people over the age of 50, all with elevated BMI and increased risk of diabetes and cardiovascular disease. The participants were divided into two groups—one provided foods according to Nordic dietary recommendations and a control group on their habitual diet. After six months of monitoring, the result was clear.

"The group that had been on the Nordic diet for six months became significantly healthier, with lower cholesterol levels, lower overall levels of both saturated and unsaturated fat in the blood, and better regulation of glucose, compared to the control group. We kept the group on the Nordic diet weight-stable, meaning that we asked them to eat more if they lost weight. Even without weight loss, we could see an improvement in their health," explains Lars Ove Dragsted.

"We can only speculate as to why a change in fat composition benefits our health so greatly. However, we can confirm that the absence of highly processed food and less saturated fats from animals have a very positive effect on us. So, the fat composition in the Nordic diet, which is higher in omega-3 and omega-6 unsaturated fats, is probably a considerable part of the explanation for the health effects we find from the Nordic diet, even when the weight of participants remains constant," concludes Lars Ove Dragsted.



A high-fiber diet may reduce risk of dementia

By University of Tsukuba (Medical Xpress FEBRUARY 21, 2022)

We're always hearing that we should eat more fibre. It's known to be vitally important for a healthy digestive system and also has cardiovascular benefits like reduced cholesterol. Now, evidence is emerging that fibre is also important for a healthy brain.

In a new study published this month in the journal *Nutritional Neuroscience*, researchers in Japan have shown that a high-fibre diet is associated with a reduced risk of developing dementia. "Dementia is a devastating disease that usually requires long-term care," says lead author of the study Professor Kazumasa Yamagishi. "We were interested in some recent research which suggested that dietary fibre may play a preventative role. We investigated this using data that were collected from thousands of adults in Japan for a large study that started in the 1980s."

Until now, Nordic diet research has primarily been linked to the diet's positive health effect following weight loss. But a new analysis conducted by University of Copenhagen researchers, among others, makes it clear that a Nordic diet has positive health benefits, regardless of whether one loses weight or not. "It's surprising because most people believe that positive effects on blood sugar and cholesterol are solely due to weight loss. Here, we have found this not to be the case. Other mechanisms are also at play," explains Lars Ove Dragsted, a researcher and head of section at the University of Copenhagen's Department of Nutrition, Exercise and Sports.



The fat makes us healthy. Instead of weight loss alone, the researchers point to the unique composition of fats in a Nordic diet as a possible explanation for the significant health benefits. "By analyzing the blood of participants, we could see that those who benefited most from the dietary change had different fat-soluble substances than the control group. These are substances that appear to be linked to unsaturated fatty acids from oils in the Nordic diet. This is a sign that Nordic dietary fats probably play the most significant role for the health effects seen here, which I hadn't expected," says Lars Ove Dragsted.

Fats in the Nordic diet come from fish, flaxseeds, sunflower and rapeseed, among other things. As a whole, they constitute a highly beneficial mix for the body, although the researchers have yet to accurately explain why these fats seem to lower both blood sugar and cholesterol levels.

Together with researchers from Finland, Norway, Sweden and





Participants completed surveys that assessed their dietary intake between 1985 and 1999. They were generally healthy and aged between 40 and 64 years. They were then followed up from 1999 until 2020, and it was noted whether they developed dementia that required care. The researchers split the data, from a total of 3,739 adults, into four groups according to the amount of fibre in their diets. They found that the groups who ate higher levels of fibre had a lower risk of developing dementia.

The team also examined whether there were differences for the two main types of fibre: soluble and insoluble fibres. Soluble fibres, found in foods such as oats and legumes, are important for the beneficial bacteria that live in the gut as well as providing other health benefits. Insoluble fibres, found in whole grains, vegetables, and some other foods, are known to be important for bowel health. The researchers found that the link between fibre intake and dementia was more pronounced for soluble fibres.

The team has some ideas as to what might underlie the link between dietary fibre and the risk of dementia. "The mechanisms are currently unknown but might involve the interactions that take place between the gut and the brain," says Professor Yamagishi. "One possibility is that soluble fibre regulates the composition of gut bacteria. This composition may affect neuro-inflammation, which plays a role in the onset of dementia. It's also possible that dietary fibre may reduce other risk factors for dementia, such as body weight, blood pressure, lipids, and glucose levels. The work is



still at an early stage, and it's important to confirm the association in other populations." In many countries today, such as the U.S. and Australia, many people consume less fibre than is recommended by nutritionists. By encouraging healthy eating habits with high dietary fibre, it might be possible to reduce the incidence of dementia.

Eating protein from a greater variety of sources may lower risk of high blood pressure

by American Heart Association
Medical Xpress MARCH 10, 2022



Eating a balanced diet including protein from a greater variety of sources may help adults lower the risk of developing high blood pressure, according to new research published today in *Hypertension*, a peer-reviewed journal of the American Heart Association.

Nearly half of the U.S. population has hypertension, or high blood pressure—one of the leading contributors to cardiovascular disease. When left untreated, high blood pressure damages the circulatory system and is a significant contributing factor to heart attack, stroke and other health conditions. "Nutrition may be an easily accessible and effective measure to fight against hypertension. Along with fat and carbohydrates, protein is one of the three basic macronutrients," said study author Xianhui Qin, M.D., of the National Clinical Research Center for Kidney Disease at Nanfang Hospital, Southern Medical University in Guangzhou, China.

There is a strong association between poor diet quality and increased risk of cardiovascular disease and death from

cardiovascular disease. In its 2021 dietary guidance to improve cardiovascular health, the

American Heart Association advises people eat healthy sources of protein, mostly from plants and may include seafood and low-fat or fat-free dairy products, and, if desired, lean cuts and unprocessed forms of meat or poultry. The American Heart Association recommends eating one to two servings, or 5.5 ounces, of protein daily.



The study authors analyzed health information for nearly 12,200 adults living in China who were part of at least 2 out of 7 rounds of the China Health and Nutrition Survey from 1997 to 2015 (surveys taken every 2-4 years). Participants' initial survey was used as a baseline, while data from their last round was used as a follow-up for comparison. Participants were an average age of 41 years, and 47% were men. The survey measured dietary intake in three consecutive 24-hour dietary recalls and a household food inventory. A trained interviewer collected 24-hour dietary information over 3 days in the same week during each round of the survey. Participants were given a protein "variety score" based on the number of different sources of protein eaten out of 8 reported: whole grains, refined grains, processed red meat, unprocessed red meat, poultry, fish, egg and legumes. One point was given for each source of protein, with a maximum variety score of 8. The researchers then evaluated the association for new onset hypertension in relation to the protein variety score. New-onset hypertension was defined as systolic (top number) blood pressure greater than or equal to 140 mm Hg and/or diastolic (bottom number) blood pressure greater than or equal to 90 mm Hg, taking blood pressure-lowering medicine, or self-reporting that a physician diagnosed high blood pressure since their last survey visit. Average time to follow-up was 6 years.

The analysis found:

- More than 35% of the nearly 12,200 participants developed new-onset high hypertension during follow-up.
- Compared to participants with the lowest variety score for protein intake (less than 2), those with the highest variety score (4 or higher) had a 66% lower risk of developing high blood pressure.
- For each of the 8 protein types, there was a window of consumption amount where the risk of hypertension was lower. Researchers described this as the appropriate level of consumption.
- When total quantity of protein intake was considered, the amount consumed was divided into five categories (quintiles), from least to most intake. People who ate the least amount of total protein and those who ate most protein had the highest risk for new onset of hypertension.

"The heart health message is that consuming a balanced diet with proteins from various different sources, rather than focusing on a single source of dietary protein, may help to prevent the development of high blood pressure," Qin said. A limitation of the study is its observational design. Because researchers used prior health information, they could not definitively prove protein intake of any kind or quantity caused or prevented new-onset hypertension.

How to make your diet more sustainable, healthy or cheap, but without giving up nutrients

by Brad Ridoutt, The Conversation Medical Xpress FEBRUARY 16, 2022

People choose certain foods or change their diets for a range of reasons: to improve their health, lose weight, save money or due to concerns about sustainability or the way food is produced.

Consider the trend



toward low-fat products in the 1980s and low-carb diets in the 1990s, and now, the rise in plant-based protein products and ready-to-eat meals. But before you abandon your traditional food choices, it's important to consider the nutritional trade-offs. If you're replacing one food with another, are you still getting the vitamins, minerals and other nutrition you need? A recent paper sought to raise awareness of nutritional differences between foods by producing a new index specific to Australia. It aims to help Australians make better-informed dietary choices and get the nutrients recommended for good health.

Nutrients: Are we getting enough?

The Australian Bureau of Statistics publishes tables showing the usual intake of selected nutrients across the population. The tables also show the proportion of Australians whose usual nutrient intake is below what's known as the "estimated average requirement." While Australian adults eat in diverse ways, they generally get enough of some nutrients regardless of their diets. For example, most people seem to obtain adequate niacin (Vitamin B3) and phosphorus. And the tables suggest 97% of Australians get enough vitamin C. However, inadequate intake of calcium, magnesium, vitamin B6 and zinc is common. Around two-thirds of Australian adults consume less calcium than what's recommended (which ranges from 840 to 1100 mg/day depending upon age). Worryingly, 90% of women aged over 50 don't get enough calcium. Inadequate zinc intake is most prevalent among Australian men—more than half aged over 50 consume below recommended levels.

So what about free sugars? These include added sugars and the sugar component of honey and fruit juices, but exclude natural sugars in intact fruit, vegetables and milk. It's recommended Australians limit free sugars to less than 10% of dietary energy intake.

However, almost 50% of Australian adults exceed this recommended limit.



Paying attention to under-consumed nutrients

Every food has a different nutrient composition. And as the Australian Dietary Guidelines show, we should eat a variety of foods to stay healthy. We should pay particular attention to foods that are important sources of nutrients for which large numbers of Australians are not getting enough. If possible, Australians should seek to include more of these foods in their diet.

At the same time, foods with free sugars should be eaten only in moderation. The new food index seeks to help Australians achieve this. It provides an overall nutrient composition score tailored to the Australian dietary context. The index includes eight vitamins (B1, B2, B3, B6, B12, Folate, A and C), eight minerals (calcium, phosphorus, zinc, iron, magnesium, iodine, selenium and molybdenum), along with protein and free sugars. These 18 elements are weighted in proportion to the extent of inadequate or excessive intake in Australia. A higher score is better than a lower score. So, the index scores foods highly if they are low in free sugars, and rich in the elements many Australians need more of—calcium, magnesium, vitamin B6, zinc and vitamin A. Foods containing few nutrients but added sugar score very low. For example, a chocolate chip cookie weighing 35 grams scored 0.004 and a sugar-sweetened cola-flavored beverage scored below zero.

Swapping foods may not achieve like-for-like

The index can be used to compare foods that might be considered substitutes in pursuit of a diet that's healthier, more affordable or better for the environment. In the case of dairy foods, 250ml of full cream milk scored 0.160, and reduced-fat milk almost as high at 0.157.

FOOD SCIENCE & INDUSTRY NEWS

WHO calls for anti-obesity initiatives and better food environments in latest nutrition targets

08 Dec 2021 Nutrition Insight

The World Health Organization (WHO) has revealed six new commitments to accelerate progress on its 2025 nutrition targets pushed off course during the COVID-19 pandemic.

These are:

- Expand initiatives to prevent and manage overweight and obesity.
- Step up activities to create food environments that promote safe and healthy diets.
- Support countries in addressing acute malnutrition.
- Accelerate actions on anemia reduction.
- Scale-up quality breastfeeding promotion and support.
- Strengthen nutrition data systems, data use and capacity.



“Malnutrition in all its forms is one of the world’s leading causes of death and illness,” says Dr. Tedros Adhanom Ghebreyesus, WHO director-general. “WHO is committed to supporting all countries to progressively expand access to essential nutrition services as part of their journey toward universal health coverage, and to strengthening sustainable food systems to support healthy diets for all people, everywhere.”

Climate impacts food security

Despite incremental improvements across all forms of malnutrition over the past decade, this progress has digressed with growing rates of inequity, climate crisis, conflict and global health insecurities. The multiple burdens of malnutrition, like stunting, wasting, micronutrient deficiencies, obesity and diet-related non-communicable diseases, are increasingly co-existing within the same community, household, and even within the same individual, states WHO.

With current trends projecting that one in two people will be malnourished by 2025, an estimated 40 million children will suffer from obesity or overweight in the next decade. In marginalized communities, child malnutrition and food insecurity are on the rise. Last year, 149 million children had

stunted growth due to poor diets, lack of access to clean water and health services, and other accessibility issues. Among 45% of children under five years of age that die, undernutrition was the underlying cause of death.

Nutrition diverted

While there are positive signs of progress, such as the world hitting the global target to increase exclusive breastfeeding by 2025, the COVID-19 pandemic has fuelled the nutrition crisis. This has particularly affected women and children and brought unprecedented challenges and diversion of resources away from the global systems for nutrition, including health, food, social protection and humanitarian assistance infrastructure.

“Today, less than 1% of global development assistance focuses on nutrition,” adds Dr. Francesco Branca, director of WHO’s Department of Nutrition and Food Safety. “There needs to be accelerated action to end unhealthy diets and malnutrition, and WHO’s new commitments to the Nutrition for Growth Summit reflect this.”





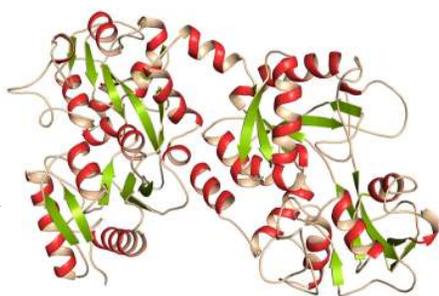
Lactoferrin dominates Chinese infant nutrition market as new trends poised to grow

16 Dec 2021 Nutrition Insight

As lactoferrin holds a dominant position in the Chinese infant nutrition market with consumers focused on premiumization, industry is observing potential in organic and goat-milk-based powders for the future.

“Because lactoferrin has become a key component in the Chinese market, its marketability will continue for several years,” Armor Proteines notes. “As for the new trends in organic products and goat’s milk-based infant formulas, observations are still slight if we look at the volume of sales, but they represent significant growth potential nonetheless.”

According to Innova Market Insights, the Asia Pacific (APAC)’s infant nutrition industry recorded a retail value worth US\$60.3 billion in 2020. China is observed to dominate the APAC region, with its retail value in infant nutrition reaching 74%.



Rise of lactoferrin

The origins of lactoferrin’s popularity in China stem from almost 15 years ago when scores of newborns were poisoned after drinking marketed infant formula that was tainted with melamine. As a result, many babies died, causing Chinese consumers to be extremely

wary of infant formula found on the market, the company states. This sparked a premiumization trend, with campaigns highlighting DHA and lactoferrin standards.

“Lactoferrin thus became a market standard for the sector, and 50% of its global production is used in China,” it adds.

The nutrient has been spotlighted globally for its links with immunity, leading FrieslandCampina Ingredients to ramp up lactoferrin production as demand for the protein jumped.

New players on the market

There are two new trends emerging in China right now, Armor Proteines suggests. Though they are still in their infancy, he outlines organic products are beginning to take hold of the market.

Currently, organic items represent 5% of the market; however their consumption and reputation are growing, the company notes. Additionally, goat milk-based infant formula has also been flagged for its potential. “Well-known for its non-allergic, easy-to-digest properties, goat’s milk is currently consumed mainly in rural areas, but urbanites are increasingly opting for this alternative,” the company says.

Earlier this year, Switzerland-based infant formula player Hochdorf unveiled its gut-friendly goat’s milk infant formula touted as easy to digest and a viable alternative to

traditional formula.

Tough regulations

The market in China has strict regulations that companies must adhere to. For starters, no more than three brands can be produced per production plant. Each brand is limited to producing no more than three products. “This means that a

production plant dedicated to powdered infant formulas is limited to nine different products,” the company explains.

The reasoning behind these regulations are two-fold. The first is protectionism, aiming to limit the number of offshore producers found in China while the second is quality control. A production plant restricted to nine different products should have better quality control, and therefore less food safety risk.



Furthermore, companies also face a mandatory product differentiation rule on the nine products. The rule specifies that “although their main ingredient is identical, their specific ingredients such as calcium, DHA or lactoferrin must be different. Thus, two products from the same plant will not contain the same properties.”

However, China’s regulation around human milk oligosaccharides may be loosening, after its Ministry of Agriculture and Rural Affairs confirmed the safety of six manufacturing strains to produce human milk.

Edited by Andria Kades





Beauty-from-within industry rich with delivery format potential, experts highlight

17 Dec 2021 Nutrition Insight

The beauty-from-within trend is opening up the cosmeceutical space for more expansion potential and innovation with delivery formats. “Looking at new product launches in this space, we observe a growing number of ‘multifunctional’ products addressing physical as well as emotional well-being, including mood, stress and lack of sleep, as well as appearance,” says Géraldine Blanc, head of marketing, Evolva.

The concept is in line with modern-day consumers who understand outer beauty as something intrinsically linked to inner wellness, notes Zev Ziegler, head of global brand and marketing, health, Lycored. “Beauty-from-within markets are growing worldwide, and there’s huge potential for continued expansion because consumers are increasingly open to the concept.”

Diverse applications

Technology is being utilized for innovation within industry, observes Ziegler. “Ready-to-drink beverages, powder mixes and concentrated tonics and elixirs are among the new formats becoming more common.”

A survey earlier this year revealed that 22% of UK consumers had purchased an ingestible skin care product over the past year. Almost 58% found the idea of a pill or supplement for their skin appealing, he adds. As men enter the cosmeceutical space, Ziegler stresses it is not an industry exclusively for

women. “In fact, one of our consumer surveys found that men were significantly more open to the concept of ingestible skincare than women. Three quarters (74%) of the men surveyed said the idea of taking a supplement for skin health or beauty was normal, compared to 58% of women.”

Another emerging trend for beauty-from-within is the possibility to combine premium quality topical applications with oral supplements, says Blanc.

Holistic approach

A significant driver behind cosmeceuticals is increased consumer awareness of the connection between beauty and overall health, notes Blanc. “Today, ‘beauty’ is a holistic body concept that goes far beyond the superficial aspect of the skin epidermis and hypodermis and is now more considered as a result of balanced



and ‘better-for-you’ dietary habits.”

Ziegler notes the importance of what beauty-

from-within emphasizes: that skin health starts from the inside and is linked to a range of emotional and mental factors, as well as nutrition. “A ‘healthy glow’ is a key goal for 72% of skincare consumers and that they understand the concept in holistic terms – as a quality with emotional and mental elements which can only be achieved through the right balance of ‘external’ and ‘from-within’ factors.”

These trends are also linked to sustainability concerns that consumers have, adds Blanc. “As sustainability becomes mainstream, we see a need for sustainable ingredients reaching all fields of nutra ingredients, cosmetic and personal care industry, and as a matter of fact the cosmeceutical space.”

Future market drivers Looking

ahead, Blanc says further research and NPD will continue to drive innovation in the space. “A strong business driver is a growing science around the so-called ‘gut-brain-skin axis’ which has not yet revealed its full potential in terms of research.”

Furthermore, Blanc highlights another key focus of interest for consumers is the healthy aging space. In fact, the beauty industry itself is making a turn toward “healthy aging” as opposed to “anti-aging” to steer away from negative connotations of the natural process of aging. Global brands are also seeking to take advantage of AI, spearheading digital beauty innovation and giving rise to advanced e-commerce, cosmetics tech and “phygital” solutions.

By Andria Kades



Technology to shape future of plant-based sports nutrition, Ingredient Optimized spotlights

20 Dec 2021 Nutrition Insight

The wellness market is in the grip of a transformation, with customers seeking better quality products, environmental considerations shaping their decisions and demands for more transparency. “Knowledge truly is power for consumers,” Chris Flynn-Rozanski, co-founder and CEO at Ingredient Optimized, tells NutritionInsight.

The US-based company uses biotechnology for its protein powders, which Flynn-Rozanski says are facing a shift from dairy and animal-based protein to more sustainable plant-based protein.





Environmental compromise?

The shift, however, comes with its own set of challenges, as consumers “are forced” to choose between a protein source that is better for them or a protein source better for the environment, he notes.

“We see an increase in consumers focusing on the environmental impact of what they eat and shifting to a more sustainable plant-based diet.” This mirrors the number one Top Trend for 2022 by Innova Market Insights, “Shared Planet,” where concern for planetary health outstrips personal health.

As companies observe these trends, last month, FrieslandCampina Ingredients announced it was moving into the plant-based protein arena with two new powder solutions developed with AGT Foods. The development was described as “quite significant” for the industry.



Nonetheless, Rozanski believes being “plant-based” will not be enough for the future.

“The novelty of products simply being ‘plant-based’ will likely wear off and we’re already starting to see some signs of struggle in the alternative protein market.

Consumers not only want more sustainable protein sources but a protein that works better for them,” he says.

This is where technology can help bridge these gaps and not require consumers to compromise, he states.

Technology reconciling quality

The technology behind Ingredient Optimized enables it to optimize proteins, enabling greater absorption. It boasts the ioPea protein that matches the nutritional attributes of standard whey protein and is three times more bioavailable than standard pea protein.

“We believe technology is important for the future of protein. Technology such as this allows customers to choose a more sustainable protein without sacrificing personal health and fitness goals,” Rozanski highlights.

“While whey protein is currently our highest volume protein, pea protein is growing at a faster pace.” Though the company’s products are the ioPea and ioWhey, the company wants to develop the protein applications that consumers are using, not force them to use new protein sources.

“For us, that means additional popular plant-based proteins such as soy protein as well as protein sources such as collagen that are more popular in the beauty and wellness categories.”



Demand for plant-based protein is increasing as consumers become more concerned about the planet's health.

Increasing information

According to Rozanski, a key trend observed within industry is how easy it is for consumers to gather more information about products and ingredients through the digital space.

“Customers no longer have to solely rely on the marketing that brands release to learn about their options.”

Importantly, consumers can easily share their experiences with certain products, thus increasing the knowledge pool of information available for users to engage in. “The market has been pushed toward creating higher quality, more transparent, more efficacious ingredients and products,” he notes.



Already, companies have flagged the importance of transparency, expecting it to shape the nutraceutical industry in the years to come. In fact, industry experts have noted transparency to be the “future of supplements.”

By Andria Kades



REGULATORY NEWS

FDA classifies acacia gum as official dietary fibre²⁰

Dec 2021 Nutrition Insight

Acacia fiber has been classified as a dietary fibre in the US by the Food and Drug Administration's (FDA) new food and nutritional labelling rules, following a five-year campaign led by acacia gum manufacturer Nexira.

Nexira's ongoing discussions with the FDA were at the forefront of the effort, bringing together different acacia gum manufacturers to reinforce evidence supporting the beneficial

physiological effects of acacia fibre on blood glucose attenuation. The FDA confirmed that acacia gum has physiological effects that are beneficial to human health and therefore is in compliance with the dietary fibre definition.

"Considering the strong scientific evidence on acacia fibre we were confident, but we are satisfied with the FDA decision to add acacia fibre to the approved list of dietary fibres," declares Olivier Bove, Nexira regulatory affairs manager.



Clinical study illuminates the path to FDA approval

In 2019, Nexira launched a proprietary clinical study which supplied solid evidence that acacia gum consumption has beneficial physiological effects on human health by attenuation of postprandial blood glucose levels. On behalf of Nexira and

representatives of the acacia gum industry, Keller and Heckman submitted a citizen petition in January to request that Acacia be recognized as a dietary fibre for nutrition labelling and claims on F&B marketed in the US. The outcome allows Nexira's customers who use its inavea and Fibregum brands, to position products as a source of dietary fibre.

"Acacia fibre is easy to use in a large array of nutritional applications and we are convinced it has a huge potential for food and drink developers who want to formulate healthy, natural and organic products," says Mathieu Dondain, managing director of Nexira. Until the FDA completes the approval process, the agency will exercise enforcement discretion to allow manufacturers to include the amount of acacia fibre in the dietary fibre declaration on the Nutrition and Supplement Facts labels.

Nutrition labelling green light

Meanwhile, natural gums supplier Alland & Robert, along with a work group of other acacia gum

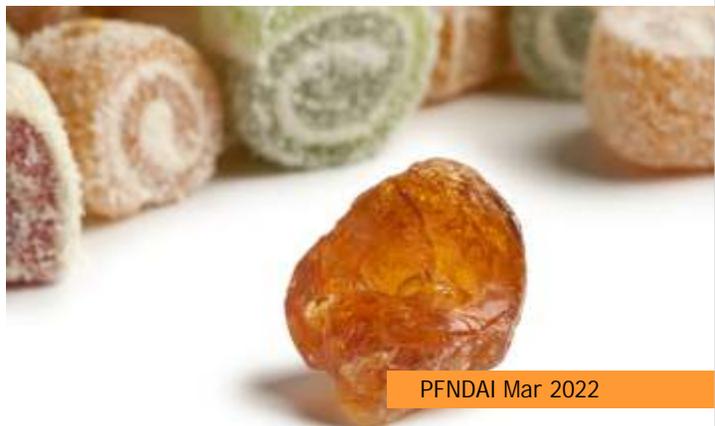
stakeholders submitted two science-backed citizen petitions in 2019 and 2020, in order to provide the FDA with data showing proof that acacia gum has physiological benefits to human health.

The company recently invested €11 million (US\$12.9 million) to install a fourth production line at its plant in Normandy, France.

"We have provided the FDA with numerous data coming from several clinical trials to support our request that acacia gum be recognized as a dietary fibre," says Dr. Isabelle Jaouen, R&D director at Alland & Robert.

A few of the benefits include the reduction of blood glucose and insulin levels after it is eaten with a meal containing a carbohydrate that raises blood glucose levels. The current FDA outcome will allow acacia gum to count as a dietary fibre on American Nutrition and Supplement Facts labels.

Edited by Inga de Jong





Grainsmart concept that support carbs, fibre and sugar levels in porridge

22 Dec 2021 Nutrition Insight

Nestlé scientists, in collaboration with experts from Tufts University in Boston, US, Nutrition Research Australia and the National University of Singapore, have developed and validated a new nutritional concept for carbohydrate quality in a porridge format.

The Grainsmart balance concept consists of a defined ratio between carbohydrates, fibres and sugars that aims to limit the number of free sugars and increase the number of fibres, which helps to shift to healthier products and balanced products diets. This ratio is 10: 1: 2 and indicates that for every 10 g of total carbohydrates, there should be a minimum of 1 g of fibre and no more than 2 g of free sugars when developing certain products such as cereals.

Products that meet the 10:1:2 ratio can include the Grainsmar



t balance logo on pack. Nestlé has launched the first products based on Grainsmart balance, consisting of a porridge product range with Nutri-Score A rating in Europe.

A boost for carbs
The Grainsmart nutritional concept aims

at providing better guidance to consumers on how to improve carbohydrate quality for a balanced diet. Carbohydrates are an essential part of a healthy diet, and it is recommended that carbohydrates provide between 45% to 65% of one's daily calories. Slow digestible carbohydrates and non-digestible fibres, which have a beneficial effect on gut health and blood sugar control, are often lacking in diets that rely primarily on easily



digestible sugars and starches.

"This nutritional concept aims at facilitating a choice of higher

quality carbohydrate products, helping consumers to increase their consumption of fibre-rich grain such as whole grains, while at the same time reducing their intake of added sugars," says Kim-Anne Lê Bur, a nutrition expert from Nestlé Research. "With Grainsmart balance, both goals are met while still ensuring a tasty product."



"We want to make sure consumers can trust products bearing the Grainsmart balance logo as healthy options for themselves and their family because of their composition, which has been co-developed and validated by internationally recognized nutrition experts," adds Mayank Trivedi, head of Nestlé Strategic Business Unit Dairy.

Edited by Elizabeth Green



FSSAI to soon finalise the draft regulations on Ayurveda Aahar
Food Safety and Standards Authority of India (FSSAI) CEO Arun Singhal said the regulator is also setting standards for usage of recycled plastics in food products

Press Trust of India Dec 22, 2021

Food regulator FSSAI is in the process of finalising the draft regulations on Ayurveda Aahar and also planning to frame rules for providing perpetual licences to food businesses that need not require renewals. Addressing a conference organised by industry body CII, Food Safety and Standards Authority of India (FSSAI) CEO Arun Singhal said the regulator is also setting standards for usage of recycled plastics in food products.



He said the Draft Food Safety and Standards (Ayurveda Aahar) Regulations, 2021, has already been notified. "Last year, we had also discussed the concept of Aayurved Aahaar. I am happy to say that that regulation has been published, it's been draft notified. "We have received lots of comments on it. There's a huge number of comments that we have and we are trying to analyse them because they pertain to Ayurveda," he said.



Singhal said the FSSAI is taking help of the Aayush ministry in finalising the regulations. "So, hopefully, within two or three months, if we have those regulations, then the industry will have an opportunity to leverage the ancient wisdom of Ayurved," he said. No person can manufacture, pack, sell, offer for sale, market or otherwise distribute or import Ayurveda Aahar unless the product comply with the requirements laid down in these regulations, according to the draft notifications.

Singhal said the authority has decided to reduce the number of vertical standards and to progressively move towards more and more horizontal standards. He added that there are around 750 vertical standards right now. Singhal noted that the plastic waste management rules have been revised at its (FSSAI's) instance. "And now, recycling plastic can be used for food products also. We are in the process of setting standards for recycled plastics. As soon as that is done. I think all of us can move towards reducing the plastic load of food industry in the country," he said.

Singhal complemented the food business operators (FBOs) for remaining operational throughout the COVID pandemic in order to feed the nation. "The employees of the food industry, I believe, are unsung COVID warriors who risked their safety to ensure citizens get food".

He said the pandemic has further stressed the importance of making food hygiene and safety at each step

of the food supply chain. "Fitness is the new mantra now and consumers are now increasingly looking for good hygiene and healthier food choices," Singhal said, and called for increasing awareness level on hygiene front.

The FSSAI CEO informed that one key regulation would come into force from the January 1, 2022, is to eliminate trans fat in foods. He asked the industry to ensure compliance of this regulation. Singhal also told the industry to ensure that the target of fortifying all rice supplied through public



distribution system (PDS), mid day meal scheme and other welfare schemes by 2024 gets achieved.

"In view of the demand from the industry we have harmonised all labelling regulations and shifted implementation date to first of July 2022.



So, there's some breathing time, but this is the final extension which are to be given and, therefore, we will expect compliance by July 1, 2022," the FSSAI CEO said. Singhal said the regulator is planning to go for perpetual licences. "There's no need to renew licences. That regulation also is in final stages. So maybe in three or four months it will be out."

India to Introduce Its First Vegan Food Safety and Labelling Standards

By Sally Ho Published on Sep 13, 2021
From GreenQueen.com.hk

India is set to introduce the country's first vegan food safety standards and labelling regulations. Having formulated its draft report, the Food Safety and Standards Authority of India



(FSSAI) will issue guidelines to define plant-based food products and help consumers identify the products.

The FSSAI has debuted its draft for the Food Safety and Standards (Vegan Food) Regulations 2021, representing India's first food safety standards dedicated to plant-based products. In addition to defining what constitutes vegan food, the guidelines will also introduce a new vegan food logo to help consumers identify such products.

Vegan food safety and labelling

According to the draft, vegan food will be defined as: "Foods or food ingredients that have not made use of any ingredients, additives and processing aids of animal origin

including milk and milk products, fish, poultry and meat, egg or egg products, honey or honey bee products, materials of insect origin." It also says that vegan food must exclude any

"ingredients that are clarified using animal sourced products," such as bone char used in sugar production, or the use of isinglass (fish swim bladder) in the clarification process of beer brewing. Furthermore, the regulations outline that producers must not use any animal testing, and that this will be included in the final product safety evaluation to ensure proper licensing for vegan products. Vegan products that adhere to the standards will be labelled with a new logo created by the FSSAI, helping consumers identify products that are 100% animal-free and vegan-friendly.





FSSAI Stiffens Rules for Foreign Companies Bringing Food Products in India

21 December 2021
 by Alpha Partners
<https://www.mondaq.com/india/food-and-drugs-law/1143284/fssai-stiffens-rules-for-foreign-companies-bringing-food-products-in-india>



India's plant-based industry The new standards come as India's plant-based industry continues its rapid growth. While North America and Europe are still the most mature plant-based markets, India is now home to a growing number of local food techs and brands developing vegan meat, egg and dairy alternatives.

Veganism is on the rise

Driven by rising awareness about health, sustainability and animal welfare, an increasing number of consumers in India are adopting veganism—or at least going “part-time vegan”, otherwise known as flexitarian. Earlier this year, global plant-based movement Veganuary released the results of its 2021 campaign, and found that India made it to the list of top 10 countries with the highest number of pledgers. India stood in third place, behind a tie between the US and UK and Germany, and represented the only Asian country to make it to the list.

6 cities in India were also listed on the top 15 cities with the most sign-ups for Veganuary, among them Bengaluru, Mumbai, Hyderabad, Chennai, Pune and New Delhi. According to Veganuary, as many as 85% of its participants this year now plan on making their newfound plant-based habit a part of their permanent lifestyle.

The Food Safety and Standards Authority of India (“FSSAI”), vide its notification dated 3 November 2021, has amended the Food Safety and Standards (Import) Regulations, 2017 by bringing into force the Food Safety and Standards (Import) (First Amendment) Regulations, 2021. These regulations shall become effect from 3 November 2021 and the Food Business Operator shall be required to comply with the new requirements with effect from 1 June 2022.

Under the amended regulations, the Foreign Food Manufacturing Facilities intending to export certain food products to India will be required to obtain registration with FSSAI, which will be subject to inspection by the food safety officials and suspension or cancellation in case of any non-compliance with the law in India regarding food safety and standards. The new regime is similar to the protocols being followed by international food safety regulators / agencies such as the US Food and Drug Administration.



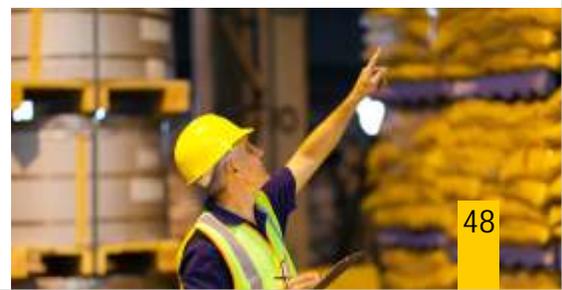
Key Highlights:

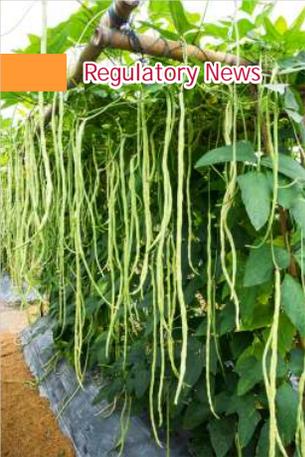
- Registration: The FSSAI may from time-to-time based on its risk specify the categories of food products intended for export to India for further regulatory control in terms of mandatory registration with the regulator. The Foreign Food Manufacturing Facilities falling under the said categories desirous to export such articles of food to India shall be required to

register with FSSAI before exporting to India. They may apply for registration either directly or through authorised representative in "Form 16" along with the prescribed documents.

- Inspection: The Foreign Food Manufacturing Facilities may be inspected if required in a manner specified by the FSSAI. The inspection can be done even after the registration has been obtained by the said facilities. It is to be noted that no inspection shall be required in case of such categories of food that are covered under mandatory Bureau of Indian Standards Certification Mark Scheme and where the Bureau of Indian Standards Scheme of inspection includes the requirements specified under Schedule 4 of the Food Safety and Standards (Licensing and Registration of Food Businesses) Regulations, 2011.

- Validity of registration and its renewal, suspension or cancellation: The registration shall be valid for two (2) years which may be renewed in the prescribed manner. If Foreign Food Manufacturing Facility or their food products intended for export to India are found not to be in compliance of Food Safety and Standards Act, rules and regulation made there-under, their registration shall be suspended or cancelled. However, the FSSAI may review the same after giving opportunity for hearing or clarification, as deemed fit.





Ghana resumes approval process for insect-resistant cowpea, its first GMO crop:
By Joseph

Opoku Gakpo

Now that it has a new governing board, Ghana's National Biosafety Authority says it is ready to resume its approval of insect-resistant Bt cowpea, the country's first genetically modified (GM) crop.

"We will be able to bring very soon to the public domain, cowpea at Tamale," a major cowpea growing area, said Board Chair Prof. Charles Antwi Boasiako at its inauguration in Accra. "Everything is ready. Like our friends and our sisters in Nigeria have done, we will see a well-regulated biotechnologically modified cowpea coming from the northern part of the country to serve Ghanaians."

Farmers, seed producers and scientists have expressed frustration over the government's delayed approval of the crop, popularly called beans, as the price of the commodity has doubled since the beginning of the year. The price hike has been partly blamed on pest damage, which the GM variety can resist.

Cowpea is a popular, protein-rich staple crop eaten by millions. But it's very vulnerable to the Maruca pod borer pests, which can destroy 80 to 100 percent of a farmer's crop. To control the pest, farmers typically

spray their fields with pesticides between eight and 12 times in the 12-week life cycle of the crop. The GM variety, which includes a gene from a naturally occurring soil bacterium known as Bt, is resistant to the pest. Confined field trials have shown farmers can reduce their spray regimen to just twice per season while gaining a five-fold increase in yield. "GMOs, this is what is going on in the whole world," Boasiako said. "We will ensure it benefits Ghanaians. We will not do anything that goes against the law."

Dr. Kwaku Afriyie, Minister for Environment, Science, Technology and Innovation, swore in the 13-member board and charged its members to make decisions using science-based approaches. "Look at the issue backed by science and not by sentiments. Because in my office I know that (there are) GMO-linked products which are waiting for go ahead for the next phase... You have to make sure that biological products are used for the benefit of the country," he urged. "It's a very contentious issue," Afriyie

continued. "It raises its head and cools down. But it will never go away. Because as you know, we are using a lot of GM products in this country. In fact, it's something that must be settled once and for all. So, your onus is to give education to Ghanaians."

Scientists at the state-run Savannah Agricultural Research Institute (SARI) of the Council for Scientific and Industrial Research (CSIR) submitted documents to the authority last January, requesting environmental release of the variety following 12 years of research. But

the National Biosafety Authority (NBA) asked the scientists to hold on and re-apply after a new governing board was named, following the expiration of the mandate of the earlier one.



"Now, with the board in place, they can submit," NBA Chief Executive Officer Eric Okoree told the Alliance for Science in an interview. "The board's role is to ensure risk assessment is done, the various processes are followed and a decision is taken on that. We have heard about the campaign of some Ghanaian farmers for the release of the Bt cowpea, which SARI has been working on. When the application gets into our hands, we will look at it transparently and objectively and seek public opinion in the decision." SARI scientists have indicated they will soon re-apply for environmental release of GM cowpea. Once the application is submitted, it will take between 90 and 180 days before the authority returns with a decision.



"It's supposed to be released into the environment," Okoree explained. "In doing so, we look at the information provided by the application, the risk assessment to be done

by the technical assessment committee, and then we look at the socio-economic considerations and then the information provided by the public. That is the transparency side." Added Boasiako: "The intention is not to cause any genetic erosion. We will make sure that when we use this cowpea, still our traditional varieties will play hand in hand."

