



PFNDAI

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UNDERSTANDING GLYCAEMIC INDEX AND GLYCAEMIC LOAD IN MANAGING BLOOD GLUCOSE LEVELS

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STORM OVER ETHYLENE OXIDE IN SPICES

A few days ago, some of Indian brand spices were recalled in a couple of foreign markets and there were comments about poor quality of our products and negligence of regulatory bodies.

Spices have always been our prized produce for centuries and have not just been consumed by Indians but the whole world not only for its flavour but also for their medicinal and nutritive values. We have been producing spices for long and consuming. Yes, sometimes because of some vagaries of nature and may be occasional negligence by some, there may have been problems of non-compliance to quality standards. However, there has always been a fairly good record of high-quality spices being marketed in domestic as well as global markets.

Because of our weather conditions, the spices are decontaminated with different methods. One is using agrochemicals like Ethylene Oxide (EtO). The other methods are irradiation by gamma rays and by steam sterilisation. Irradiation is okay with some but not all, while steam sterilisation reduces the flavour quality of spices.

Spices are consumed in very small quantities and although some agrochemicals have been used in preventing spoilage there has been no cause of worry, so Codex noted in 1991 Joint FAO/WHO Food Standards Programme that EtO "is used to a limited extent on herbs & spices and therefore is not considered a priority. There seems to be no toxicological data base to support residue levels."

This meant that in absence of Codex standards, individual country was free to make its own standard enforceable. Some countries continued to allow the use of EtO, whereas others including EU kept a limit of 0.1 ppm in spices. There were some countries which

wanted the presence below detectable level.

FSSAI wanted to have high standards for spices as it was one of our prized export commodities and decided to keep the strict EU standards of 0.1 ppm.

When sprayed with EtO, it decontaminates the spices and being gaseous EtO evaporates and within a few weeks the level goes below acceptable limits. There are sometimes higher level remaining in spices due to many reasons. One of course is due to excessive use for decontamination, which should be strictly avoided. It may also be due to weather conditions which causes changes in evaporation. Third may be due to cross-contamination in farms, warehouses etc. Whatever the reason, it is necessary to ensure by strict controls that no batches exceed the levels permitted by regulatory agencies especially of the country to which spices are exported.

It has been emphasised that EtO is carcinogen, especially related to breast cancer and stomach cancer. Indians eat much more spices than most other countries and are exposed to chemicals used therein. When FAO stats are checked, it can be seen that India has among the lowest incidence of breast cancer per 100,000 persons and stomach cancer is not very high compared to other countries. Because of large total population, these figures tend to look high. We should not be complacent about the situation. We should try to improve our quality of foods and ingredients that go into making them.

Spices are one of our prize commodities we should be proud of and we should maintain the highest possible standard not just for exports but for Indian markets as we should provide our own people the best. Regulators should be vigilant to see if any lapses occur and try to guide in the supply chain how this could be avoided rather than just taking punitive action.

Prof Jagadish Pai,
Editor, PFNDAI

Cookies are the most sought-after snack in India. However due to its higher fat content (+20%) consumer trend is more toward low fat options. Hence, manufacturers are finding ways to reduce the fat content without affecting textural & sensorial attributes.

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Avg. Weight of 10 biscuits (g)	111.2	111.5	114
Avg. Diameter (cm)	5.6	5.5	5.5
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FOOD FOR THOUGHT OR THOUGHT FOR FOOD



By **Dr Sesikeran. B, MD**
Former Director, National
Institute of Nutrition (ICMR)
Hon. Scientific Director, PFNDAI

Dietary Guidelines for Indians (DGI) are published by ICMR-NIN once in each decade and it follows the publication of a technical document called the Recommended Dietary Allowance or RDA.

The first DGI was published in 1998 followed by one in 2011 and now in 2024. The purpose of this document is to translate the information from RDA into practical dietary guidelines, to help people choose a range of foods from the food groups in quantities adequate to provide the recommended requirements for each nutrient.

Every healthy, apparently "Normal" individual who can consume food is the target person for whom these guidelines are intended. The guidelines are 17 in number providing dietary information literally from "The Womb to Tomb". They also lay emphasis on lifestyle related issues like physical activity, understanding food labels and making informed choices and

the need to minimize the use of High Fat Sugar Salt foods (HFSS) and those containing added sugars.

There are 10 food groups and a MYPlate which shows a proportionate sectoral distribution of these groups and the foods within those groups to choose them appropriately in each meal without monotony. The nutrient quantities factored into each meal would provide the Estimated Average Requirement (EAR) of both macro and micronutrients. Higher than the EAR up to RDA can be recommended for individuals who have a biochemical or clinical deficiency, and these would be left to professional advice. It is to be understood that supplements are discouraged since almost all nutrients except may be B12 in Vegans can be obtained through natural foods. A healthy individual can stay healthy with a balanced diet and may not require the support of supplements. The guidelines do not make recommendations for diseased states. Breast feeding as per norms and home-made complementary foods are recommended with recipes and methods rather than commercial foods.

With so much of misinformation on processed foods being harmful, table 15.2 clearly helps the consumer understand the different levels of processing and their relative advantages and disadvantages to human nutrition. Standardized food measurements that are culturally appropriate, clearly understandable, will be helpful to the food maker to reproduce the recipes without compromising the quality.

Finally considering that many individuals may be in varying phases of diabetes, some information on the glycemic indices and glycemic load of the ingredients as well as prepared meals or recipes are provided. This could also benefit healthy individuals choose the lower GI and GL foods to stay in a normoglycemic status and be within a healthy BMI or body weight range. The entire emphasis or the philosophy or the scope of these dietary guidelines is in the judicious use of this information to prepare and consume home cooked food, freshly prepared balanced meals that meet the average nutrient requirements of most healthy individuals to stay healthy. They may not be applicable for people with any deviations in their health or those who may have special or therapeutic needs wherein the wisdom of the clinician or dietician shall prevail.



WHO HAS THE ANSWER FOR WHY STANDARDS ARE DIFFERENT?

AUTHOR

Dr Joseph I Lewis,
Chairman, Regulatory Affairs,
PFNDAI



Social media has become a public commentator on food regulations. When credible responses are absent, the narrative created is they are not proper.

Standards are routinely raised by administrations for businesses to follow. Under PFA, adopting standards and maximum limits set by Codex, US FDA or EU, did not call for scientific reasoning. It was not a concern, that they were based on other country realities. That they also differed did not evoke enquiry. It was just a matter of choice. Now, when reports “uncover double standards” e.g., pesticide residues appearing two decades ago or sugar content in infant foods, there is an outrage of wrongdoing. And everyone wants to know “why our standard is different” and

not good enough. But who sets the standards?

Countries may have different standards for fulfilling outcomes of health, safety and consumer choice for their populations. Borrowing standards is easy but should not be the only way to make them. Despite knowing the popularity of chutneys, India adopted a Codex standard for mango chutney with a minimum of 50% total soluble solids (sugar) for all chutneys, virtually eliminating hot, spicy and tangy flavours, possible only with less sugar. So why a standard with so much sugar? There is no answer except to say we just borrowed it. You may borrow your neighbour's recipe but check whether the dish suits your home. That no one made a noise reflects a time when social network slacked today's

gadgetry.

Let's look at the presence of ethylene oxide in spice exports as it is in the news. EU set a limit of not more than 0.1mg/kg for ethylene oxide (Eto) and 2-chloroethanol (2-CE) taken together, which is the limit of quantification, irrespective of source. FSSAI set a similar limit of 0.1mg/kg using an adoption matrix. If not in FSS (CTR) 2011, then check Codex, and then check whether it is unregistered or unassigned.





The science behind allotting the limit is unknown or unshared. When residues arise from environmental sources and not from direct or indirect use on the commodity an extraneous maximum residue limit (EMRL) is assigned. It is the lowest instrument-validated residue, irrespective of where it came from. Spice manufacturers have responded that they do not use Eto, so how did it get there? Secondly, since Eto is classified as a Group 1 carcinogen by IARC, deriving a health-based reference value without risk is not possible, as a threshold for

the effect cannot be set. Population exposure risk is incomplete without a threshold level or a quantitative hazard characterisation. When standards are made, supporting science should be given. This would set the basis for an authoritative response from the regulator.

Finally, the answer to standards lies in the risk management option taken. Often countries impose standards stricter than our own. Aflatoxins are a family of toxins found in peanuts among other food crops. IARC has classified them as Group 1 carcinogens with aflatoxin B1 being the most potent. The EU has set the maximum total limit for Aflatoxins B1, B2, G1, and G2 as 4µg/kg and 2µg/kg for Aflatoxin B1, for direct

human consumption. FSS(CTR) 2020 has set an MRL of 15µg/kg for total aflatoxins and 10µg/kg and Aflatoxin B1 for ready-to-eat foods. To most, these will appear as 'double standards' and in the absence of science, newsworthy. Standards are also raised as disguised trade barriers. Codex has similar limits as India but even so, the regulator must share why the particular risk option was taken.

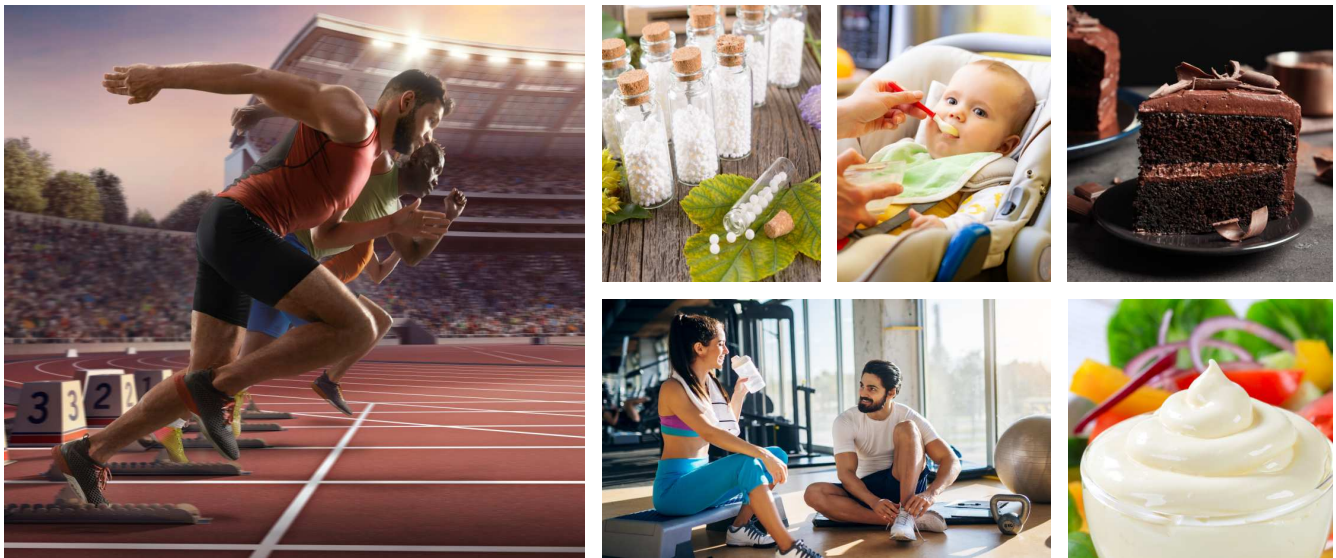
Standards are made for good reasons and every country has its own. When the science is clear and explained by experts and authoritative institutions false narratives in media are challenged in creating their truth. Readers will have a counterpoint and build confidence in the rulemaking process.





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UNDERSTANDING GLYCAEMIC INDEX AND GLYCAEMIC LOAD IN MANAGING BLOOD GLUCOSE LEVELS

AUTHORS



Ms. Simran Vichare,
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Globally, the prevalence of type 2 diabetes (T2D) has been rising rapidly, with developing nations—China and India in particular—accounting for the majority of this growth. According to a recent study by the Indian Council of Medical Research—India Diabetes (ICMR-INDIAB), the country's current rates of prediabetes and diabetes are 10.3% and 7.4%, respectively (1). Diet is a



Dr B. Sesikeran,
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major determinant of health and a primary modifiable risk factor for noncommunicable diseases (NCDs) including Diabetes. Maintaining stable blood glucose levels is crucial for overall health, particularly for individuals with diabetes or those at risk of developing it. Diet plays a significant role in managing blood glucose levels, and understanding concepts like Glycaemic Index (GI) and

Glycaemic Load (GL) can be invaluable in making informed dietary choices.

What is the Glycaemic index (GI)?

Glycaemic Index (GI) is a measure of how quickly carbohydrates in food raise blood sugar levels compared to a reference food, typically glucose or white bread. Foods with a high GI are digested and absorbed rapidly, causing a rapid spike in blood sugar levels, while foods with a low GI are digested and absorbed more slowly, resulting in a slower, more gradual increase in blood sugar levels.



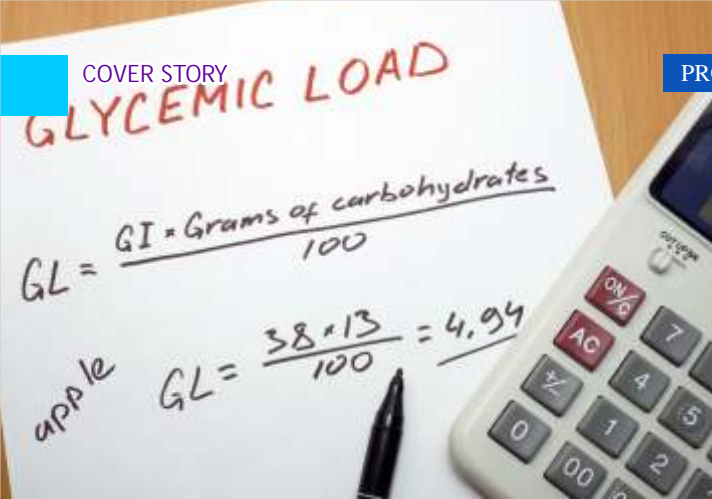
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How do we calculate whole meal GI?

Meal GI = [(GI x amount of available carbohydrate) Food A + (GI x amount of available carbohydrate) Food B + ...] / total amount of available carbohydrates.

Food diversity, ripeness, processing, and cooking are known to alter GI values, so estimating the average GI value of a meal or diet using the published GI values of individual foods may not be suitable. In contrast to direct measurements of meal GIs, the estimation of meal GIs utilizing published GI values of specific items was overstated by 22 to 50% in research by Dodd et al. (2). Let's understand how different food combinations affect postprandial plasma glucose levels with the help of an example- A low GI meal containing rice with sugar/jaggery will show high postprandial plasma glucose in comparison to a low GI meal containing rice with legumes and non-starchy vegetables.

Does fibre play a role in managing blood glucose levels?

There is a predictive role of

fibre in glucose level management and its impact on postprandial responses. It is commonly recognized that the main factors influencing postprandial glucose and insulin responses to food intake are the quantity and type of carbohydrates consumed. In this way, the glycaemic index and fibre content of meals have been linked to postprandial glucose levels. Patients with type 2 diabetes may benefit from better glucose management by following a low-GI, high-fibre diet, which also helps to prevent the development of metabolic syndrome and coronary artery disease.

According to a study, plasma glucose was found to be significantly higher following consumption of a high-GI and low-fibre breakfast than following a low-GI and high-fibre breakfast. However, there was no significant difference in postprandial glycaemic responses (GR) between high-GI and low-GI breakfasts of similar fibre content. The same has been depicted in the table below. (3).

Ranges to categorize foods as high, moderate, or low GI based on their carbohydrate composition are:

- high ≥ 70 i.e. foods with simple sugars like glucose and fructose that digest quickly,
- moderate 56-69 i.e. foods with complex carbohydrates that digest relatively quickly, and
- low ≤ 55 i.e. foods with complex carbohydrates that digest slowly.

This is relative to pure glucose (GI= 100).

What is Glycaemic load (GL)?

The Glycaemic Index is a useful tool for understanding how different foods impact blood sugar levels, however, it does not take the quantity of carbs ingested into consideration. Glycaemic Load (GL) is relevant in this situation. The concept of Glycaemic Load accounts for both the quantity and quality of carbs in a given dietary portion. It gives a more realistic impression of how a specific food may impact blood sugar levels.



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Breakfast option	Plasma glucose	Postprandial glycaemic responses
High-GI and low-fibre	High	-
Low-GI and high-fibre	Low	-
High-GI and low-GI breakfasts of similar fibre content	-	No significant difference

Amongst some of the commonly consumed Indian cereals, Quinoa, bajra, and whole wheat flour have the highest total fibre content while raw milled rice and refined wheat flour have the lowest total fibre content (g%). However, various factors influence glycaemic responses, like, ethnicity, metabolic status, and eating habits for example the degree to which one masticates, this provides insights into the differences between Asians and Caucasians. As found in a study iAUC (incremental areas-under-the-curve) was higher in Asians than Caucasians for the same meal. The postprandial capillary blood glucose concentrations were assessed at 2-hour incremental areas-under-the-curve (iAUCs) after breakfast cereal and a glucose beverage was consumed. When the glucose beverage and cereal were given, the mean difference in iAUC was greater in the Asian group (GI of cereal 77) than in the Caucasian group (GI of cereal 61). Therefore, based on research, dietary advices should be given based on

ethnic groups for those with diabetes and those at risk of developing Type 2 diabetes. (4)

Glycaemic Index v/s Glycaemic load

The formula for calculating Glycaemic load: $GL_{Food} = (GI_{Food} \times \text{amount (g) of available carbohydrate Food per serving}) / 100$.

For a typical serving of a food, GL would be considered:

- high with $GL \geq 20$,
- intermediate with GL of 11-19,
- and low with $GL \leq 10$.

For example: One serving of watermelon and a medium-sized doughnut have similar GI of 76. But watermelon has a GL of 5-8, while Doughnut has a GL of 38. Dietary GL is the sum of the GLs for all foods consumed in the diet. It should be understood that while low-GI foods are typically associated with healthy eating, this is not always the case.

Watermelon, bananas, and pineapple are examples of foods with intermediate-to-high GI that have low-to-intermediate GLs.

Now the question arises whether consumption of low-GI foods could improve overall blood glucose control in people with type 1 or type 2 diabetes mellitus?

The increasing prevalence of diabetes and its impact on morbidity and mortality have become global problems. Consuming foods with a high GI and GL can lead to rapid spikes in blood sugar levels, followed by crashes, which can leave individuals feeling fatigued and hungry shortly after eating. On the other hand, foods with a low GI and GL promote more stable blood sugar levels, providing sustained energy and helping to control appetite.

Long-term high-GI and high-GL diet consumption may raise postprandial blood glucose concentrations and cause excessive insulin production. This could potentially lead to the irreversible development of type 2 diabetes mellitus by impairing the ability of pancreatic β -cells to secrete insulin.



A meta-analysis of 19 randomized controlled trials that included 840 diabetic patients (191 with type 1 diabetes and 649 with type 2 diabetes) found that consumption of low-GI foods improved short-term and long-term control of blood glucose concentrations, reflected by significant decreases in fructosamine and glycated haemoglobin (HbA1c) levels.

For individuals with diabetes, understanding GI and GL can be particularly beneficial. Incorporating low GI and GL foods into their diet can help them better manage their blood sugar levels and reduce the risk of complications associated with diabetes. Studies have found out relationship between low-GI foods and improvement in blood glucose control in individuals with type 1 or type 2 diabetes.

Furthermore, there are factors that can lower or attenuate Glycaemic Response (GR) to High GI Carbs in diets. These factors include:

- Fibre particularly soluble fibre which is obtained from fruits and vegetables, whole grains, legumes, and nuts
- Prioritize the consumption of underripe climacteric fruits.
- Fat which will delay gastric emptying and slow down digestion one common



example can be Pasta with cheese (AUC down by 58%), Toast with cheese (AUC down by 30%)

- Complement meals rich in carbohydrates with foods rich in healthy fats (extra virgin olive oil, oily fish, nuts, and seeds).
- Combining carbohydrates with protein in the diet, either from animal origin (fish, meat, eggs, dairy, and its derivatives) or from plant origin (legumes, pulses, nuts, and oilseeds)
- Vinegar in diets lowers the GR- as it delays gastric emptying and inhibits enzymes
- Starch processing- Consuming foods that maintain their structure and integrity is crucial; whole foods should be prioritized over processed ones because any processing method that changes the food's original structure damages its internal components, exposing them to digestion, facilitating absorption, and changing blood glucose levels, all of which raise the food's GR (5).
- Cooking time- Long cooking times favours digestion and increase GR, while short cooking times,

such as pasta cooked al dente, will lead to a more controlled rise in glucose levels

- The importance of consuming whole foods and implementing culinary strategies to manage glycaemic response in people with type 2 diabetes is also important e.g. reducing the amount of cooking water increases the concentration of resistant starch while decreasing the GR, or by conservation and cooling- promoting starch retrogradation by cooling the cooked starch-rich foods.





In conclusion, incorporating the principles of the Glycaemic Index and Glycaemic Load into dietary choices can be a valuable strategy for managing blood glucose levels effectively. Along with it, one must consider that no single food GI/GL can be used as an index of safe food for diabetics. Every food and liquid consumed during the day has to be appropriate so as not to enhance the glycaemic response. It has been recognized that CGM i.e. continuous glucose monitoring has shown frequent post-prandial spikes in blood glucose can cause harm even if the average (HbA1c) is normal (6). By opting for foods with lower GI and GL values and paying attention to portion sizes, individuals can achieve better glycaemic control, reduce the risk of complications associated

with diabetes, and promote overall health and well-being. Empowering individuals with knowledge about GI and GL empowers them to make informed decisions about their diet, leading to improved quality of life and long-term health outcomes.

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PROCESSED FOODS – BENEFITS, MISCONCEPTIONS AND CHALLENGES



AUTHOR

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Director, VR FoodTech

Life without food is impossible - both nutritionally and socially. Sweets are distributed when a child is born, hearts are won and business deals are clinched over coffee. In India, feast is offered when a dear one departs. As Food is an inalienable part of one's life, everyone has an opinion and some idiosyncrasies about it. This should be expected as the food is consumed by individuals and directly affects them both positively and adversely.

Oxford dictionary defines

Food Processing as “*the action of performing a series of mechanical or chemical operations on food in order to change or preserve it.*”. The resultant food is a “Processed Food”. Food processing leads to many essential changes like converting raw food into edible form (removal of husk and other inedible parts), making a food safe (heat treatment of milk), extension of life of the product (aseptic packaging), new products and formats, etc.

Food processing, many times is erroneously considered as an “Industrial Activity”. Nothing can be far from truth than this. Let us look at the activities in our own kitchen. Right from washing the vegetables; chopping, seasoning, heating are all essential features of food processing. Converting

milk to curd, butter, ghee, pickling, etc. are processing methods for the preservation of food. Every food we eat is a processed food - either at home or factory.

Now the question arises - Why did “Food Processing” move from homes to factories. The reasons are very many. With the advent of rapid changes in life styles, disappearance of joint family, women stepping out of homes for work, movement of people in search of jobs has all led to this shift. “Processed and Packaged foods” is the result of social changes and not the other way round. Food industry identifies the need gap and fills it up. If everybody could have a cow at their back yard, then there would have been no necessity of milk collection unit, milk processing plant, packaging etc.



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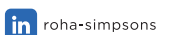
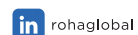
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taste. Combination of refined ingredients led to interesting and tasty products but also resulted in higher

In social and print media all kinds of comments, mostly negative, appear on food processing, right from its deleterious effects on health, presence of chemicals like preservatives etc., painting food processing as the villain. What is the truth? As in every case, the truth lies in the middle.

Whenever a new technology emerges, we tend to see only its advantages as the disadvantages become evident over long time after the technology is used. The classic example is invention of plastics. After decades of its usage, we now know its negative aspects. The pendulum cannot swing to the other side. We are making attempts to minimize its negative impacts. Similarly, many food processing steps were later found to have resulted in challenges.

Refining of primary foods like cereals, vegetable oil, etc, though it led to higher shelf life but resulted in loss of nutrients like fiber etc. Heat treatment, though it enhanced the shelf life, led to loss of nutrients and

concentration of nutrients of concern namely fat, sugar and salt. There are also negative perceptions about perfectly regulatory compliant and safe food additives. These challenges are being taken head-on by the food Industry.

The ill effects of refined foods were mitigated by fortification, achieving product- sterilization by high temperature and short time methods thereby preserving the taste and nutrients. Room temperature/low RH drying of fruits and vegetables, freeze drying, extrusion, controlled atmosphere storage, etc are some of the new technologies which have countered the negatives of food processing. Another challenge the industry faces from the social media is the push back on the use of additives. It is simply baffling to see perfectly legal and safe additives (complying with the regulation) getting a bad name. To buttress the social media push back, the

industry also puts a self-goal. Claims like "no additives", "no preservatives" feeds on the fears of the consumers. FSSAI must step in here and burst these myths on the basis of science. Consumers must be made to understand that the safety aspects of additives are continuously monitored and the unsafe ones are banned. Example - potassium bromates, trans fat.

The present biggest challenge faced by the industry is from the new category of processed foods called "Ultra Processed Foods". As per Nova Classification, not endorsed or adopted by WHO and many regulatory bodies, the processed foods are categorized into

- ▶ Group 1 - Unprocessed or minimally processed food - Cereals, Fruits, Vegetables, Milk - processed enough to make it edible
- ▶ Group 2 - Processed Culinary ingredients - Oil, Butter, Sugar, Salt
- ▶ Group 3 - Processed Foods - Prepared by adding Group 2 ingredients to Group 1. - Pickles, Jams. Characterized by fewer refined ingredients and additives



► Group 4 - Ultra Processed Foods - formulations using ingredients, mostly of exclusive industrial use, typically not found in kitchen - More number of refined ingredients and additives - Cakes, Chocolates, many traditional Indian sweets and savories.

The line between Group 3 and Group 4 could be blurred in certain cases. Group 4 foods, as they are formulated using refined ingredients, is likely to be high in fat, sugar and salt as compared to others and is also, unfortunately, likely to be tasty.

There are a few health concerns associated with the consumption of higher amount of fat, sugar, and salt. Therefore, the point of concern should not be the type of processing but what the processing leads to. The problem is aggravated by a combination of factors like affordability, availability and physical inactivity.



So, what is the way forward for food processing? How do we combat the real and imaginary challenges? Let us all be very clear. Processed foods are here to stay. Our endeavor should be to minimize the ill effects and to that effect all the stakeholders have an important role to play. Industry to continuously innovate both in processing methods and formulations to mitigate the negative aspects. Products may have to be reformulated with reduced nutrients of concern and yet not compromise on the taste, a

very tough task indeed. Consumers to take little more responsibility of their own health and not completely outsource it to the industry and the regulators and not to give into social media sensationalism.

More importantly they need to get up and be physically more active. Regulators must play the umpire's role, should formulate regulations which are equitable and science based, creating a win-win situation for both the industry and the consumers.



RISK ASSESSMENT (PART 1): HISTORY & FUNDAMENTALS#

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Introduction

Food is the primary need for life, fulfilling the requirements of energy and essential nutrients for good health. The area of concern in relation to food is its safety associated with physical, chemical, and biological hazards resulting in adverse health outcomes. Transparent approach along with systematic and constant implementation of laws ensures food safety thereby preventing economic burden due to food borne illnesses. The framework of policies and guidelines should be

scientifically evident aiming at consumer protection. Traditionally, risks have been managed empirically; however, a new approach towards risk analysis has been defined since 1995 introducing quantitative assessment of risk.

Risk, Risk analysis and its components

Risk can be defined as a function of the probability of an adverse health effect and its severity, consequential to a hazard(s)

in food (Codex Alimentarius, 1999). Thus, risk can be estimated two dimensionally in terms of probability and severity (Tuominen, 2008). Keeping in view public health considerations, risk based food safety system exhibits proactive approach based on systematic management plan supported by numeric data and analytical methodologies in conjunction with consumer perception, marketing and ecological factors (Wallace and Oria, 2010). However, there is no one way to perform a food safety risk assessment. Risk associated with foods could be assessed using different models and depending on the nature of risk, questions to be addressed and type of models used (FAO, 2005).



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- Antioxidants
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Risk based food safety system incorporates a number of interconnected steps namely, strategic planning; public health risk ranking; targeted information gathering and consideration of other factors; analysis and selection of interventions; designing an intervention plan; and monitoring and review (Wallace and Oria, 2010).

Risk analysis can be considered as a platform for organizing the relevant information and data in a well-defined structured manner so as to frame coherent policies and guidelines (Käferstein, 2000). The concept of risk analysis evolved from the first consultation on risk organized by FAO/WHO held in Geneva, Switzerland, 1995 focusing on application of risk analysis to food safety standards. A number of factors including increased consumer concern towards food safety, trade agreements, harmonization of standards, scientific approach, increasing transparency, reducing regulatory assets were recognized during the consultation requiring a

wide application of risk assessment (FAO, 1997). Risk analysis is a diversified and multi-disciplinary field including assessment, management and communication methodologies thereby, expressing the principles and requirements forming the fundamentals of food safety (Kindred, 1996). It is a valuable tool for the regulators providing the factual information required for formulating food safety policies and guidelines. Risk analysis is a repetitive and continuous procedure in which steps reoccur as and when required based on new scientific data or modifications in the problem. Risk analysis involves rigorous interaction and communication amongst internal and external stakeholders. Codex definition of risk analysis expresses the same qualitatively as well as quantitatively along with prediction of uncertainties (FAO, 2005).

Quantitative risk analysis includes three distinct and closely connected components namely, risk assessment, risk management, and risk

communication aiming to achieve food safety rationale by maintaining the level of risk below specified threshold. Each of these components is of great significance playing a critical role in successful implication of risk analysis. Risk management refers to the process of weighing policy alternatives in the light of the results of risk assessment and, if required, selecting and implementing appropriate control options, including regulatory measures whereas risk communication is defined as an interactive process of exchange of information and opinion on risk among risk assessors, risk managers, and other interested parties (Codex Alimentarius, 1999).

All the three components are interrelated addressing different questions in relation to risk analysis where risk assessors answer the related questions scientifically, risk managers focus on policy alternatives while risk communicators aim at exchange of information amongst different stakeholders (Boer, 2022).



Risk assessment and its components

Risk assessment forms the basis of risk analysis being its first key component which draws the information from various sources with the objective of characterizing and estimating the risk scientifically. Risk assessment along with other components may affect management policies and decisions (Kindred, 1996). The characteristics of good risk assessment include recognition of questions to be addressed; collaborative efforts of experts from various scientific disciplines; effective utilization of time, funds, available data and workforce; based on scientific data, well formulated and unbiased hypotheses and measurements of uncertainties; considers significant risks; comprehensive documentation; validation of results; scope of re-evaluation as and when required; and conducive to learning (FAO, 2005).



The motive of risk assessment includes detailed understanding of risk profile through elaborated research; explaining risk qualitatively

and quantitatively; prioritizing the risk amongst present hazards depending on its severity; assisting food safety regulators in framing conclusions; effectively managing the identified risk; narrating data and information useful for developing international food safety standards.

As per Codex Alimentarius (1999), the term risk assessment can be described as a scientifically based process consisting four sub components namely, hazard identification, hazard characterization, exposure assessment, and risk characterization. Hazard identification is carried out by risk managers in collaboration with risk assessors who assist the former to choose the hazard of the greatest concern amongst the probable hazards. Moreover, where hazards have already been recognized by risk managers, risk assessors furnish further information on the hazard's characteristics (FAO, 2005). Hazard characterization involves developing overall profile of the type and severity of the hazard identified. During hazard characterization, dose response methodology could be useful to assess some



types of data including epidemiological studies and human exposure data etc. (CAC, 2013).

The exposure assessment describes scientific perception of the hazard in the food. It gathers data related to frequency and amount of harmful substance in the food along with the probability of its exposure to the consumers providing an estimation of the number of disease causing microbes in a serving of food or quantity of food additive consumed per day (FAO, 2005). Risk characterization estimates risk by combining the proofs narrated in the above mentioned steps.

Furthermore, it addresses the questions raised by the risk managers. It summarizes the outcomes of hazard exposure and determines its adverse effects. Moreover, risk characterization should describe gaps in the present data, hypothesis and uncertainties so as to assist risk managers analyse its closeness to that of reality. It provides a detailed prospect of risk in actual (FAO, 2005).



Qualitative- and Quantitative risk assessment

Food safety risk assessment utilizes scientific information and relevant data accessible to food regulators. Depending on the nature of risk assessment various analytical tools are used in conjunction with appropriate methodologies resulting in two dimensional interpretations i.e. qualitatively and quantitatively (FAO, 2005). Qualitative risk assessment can be described as a risk assessment based on data which, while forming an inadequate basis for numerical risk estimations, nonetheless, when conditioned by prior expert knowledge and identification of attendant uncertainties permits risk ranking or separation into descriptive categories of risk (Codex Alimentarius, 1999). Ranking systems used in retail sectors and food establishments is a classic example of qualitative risk assessment (FAO, 2005).

Quantitative risk assessment is referred to as a risk assessment that provides numerical expressions of

risk and indication of the attendant uncertainties (Codex Alimentarius, 1999). It relies on the numerical analysis of scientific data taken into account the uncertainty distributions and utilizes two approaches namely, deterministic and probabilistic. Numeric estimation of risk using various analytical techniques and mathematical models foster critical assessment of risks (Kindred, 1996). Inclusion of risk assessment to food safety incorporates a range of activities such as monitoring, surveillance, inspection systems, managerial pathways, and regulatory resources to address all types of food hazards. Moreover, risk assessment approach would enable consumer health protection and food trade more effective and efficient (FAO, 1997).

How to carry out risk assessment?

In order to carry out risk assessment, initially a risk establishment policy is being developed by risk managers in coordination with risk assessors. As per the Codex, the term risk assessment policy is referred to as "documented guidelines on the choice of options and associated judgements for their application at appropriate decision points in the risk assessment such that the

scientific integrity of the process is maintained". In addition to that, documentation of risk assessment policy is of paramount importance preserving the scientific basis, uniformity and transparency and thus, providing assistance in decision making and handling uncertainties (FAO, 2005). Risk assessors determine the magnitude of risk and uncertainty parameters on the basis of which risk managers can take appropriate actions to control risks so as to protect consumer's health (Lammerding, 2006). Whenever a situation arises to carry out risk assessment, a risk assessment team needs to be established by the risk managers in collaboration with risk assessors. After constituting the team of skilled members from all the relevant areas, it is important to express and acquiesced to the objectives, resources, format, expected outcome, and documentation which need to be communicated effectively amongst different stakeholders. Risk assessors submit the scientifically evident relevant information regarding nature of hazard, its severity and magnitude of uncertainties.



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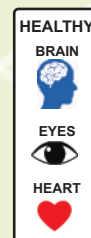
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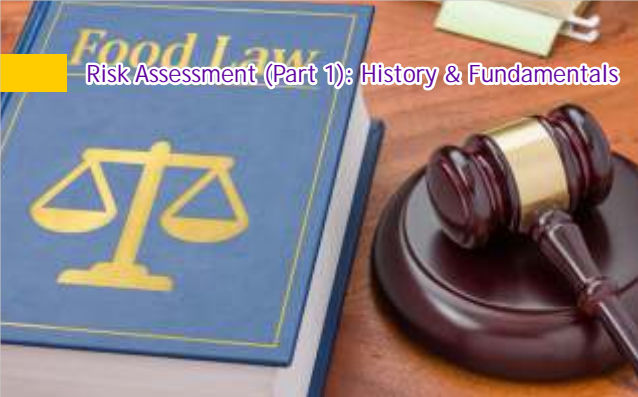


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After the completion of risk assessment procedures, an analysis is performed by the risk managers so as to assess whether satisfactory response is produced with regard to the questions asked; thereafter interpretation of results is being carried out (FAO, 2005).

Role of regulatory authorities

Increasing product complexity and changing consumer patterns pose a greater responsibility of regulatory authorities towards food safety which can only be achieved with appropriate regulatory actions. Therefore, there is an urgent need to adopt structured and systematic procedures in food regulations. Traditionally, managerial decisions on risk were based on its qualitative assessment.

However, to be more precise and taking in to account the broader aspects of risks involved, regulators need to assess risks formally and quantitatively so as to prepare comprehensive policy documents (Kindred, 1996). Food safety is matter of global concern and

international agreements advocate the safety of consumers thereby protecting their health, governments owe the responsibility for ensuring food safety in their regions. Regulatory authorities need to materialize risk based assessment and management to maintain the level of food safety as declared by the government. Risk assessors and managers need to follow various techniques that weigh the probability and severity of risks in conjunction with the upper limits of acceptability (Tuominen, 2008).



A transparent framework along with precisely described regulatory scheme enables effective characterization and management of associated risk. Regulatory authorities should be capable of analysing risk and interpreting assessment. They should facilitate the appropriate measures of risk

assessment, management and communication (Misra, 2008).

Conclusion

Food risk analysis is a complicated matter. An integrated risk analysis approach establishes a valuable platform for food safety governance, where all the stakeholders can work together to achieve the goals of food safety. Risk assessment is an intricate process which assesses and interprets the information scientifically including risk characterization, basis for the assumptions, measurement of uncertainties and different methodologies thereby

facilitating decision making by the regulatory authorities. It also forms the sound basis for comprehensive guidelines and effective communication amongst different stakeholders.

Therefore, ensuring public health through food safety requires effective implementation of risk analysis framework by the regulatory authorities.



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ROLE OF NUTRACEUTICALS IN CHRONIC SYSTEMIC INFLAMMATION

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in turn, lead to several diseases that collectively represent the leading causes of disability and mortality worldwide, such as cardiovascular disease, cancer, diabetes mellitus, chronic kidney disease, non-alcoholic fatty liver disease and autoimmune and neurodegenerative disorders³.

Nutraceuticals include pharmacologically active substances and dietary supplements like proteins, vitamins and minerals, and compounds derived from natural sources. They provide health and medical benefits that delay, prevent and treat chronic inflammatory diseases due to the presence of phytochemicals⁴. Moreover, nutraceuticals could perform as cellular and functional modulators contributing to the homeostasis of physiological processes.

Introduction

The term 'Nutraceutical' is defined by the Food Safety and Standards¹ regulatory body as a category of food which consists of extracts, isolates and purified chemical compounds that have a physiological benefit, help to maintain health, and are not intended to treat or cure any medical condition, disease, or disorder.

Conceptually, the term "nutraceutical" was proposed by DeFelice in 1984 as any substance that can be a food or part of a food that provides health benefits, including the prevention of disease². Chronic inflammatory

diseases, defined as non-infectious diseases where chronic inflammation is a key component of the etiology and progression of disease, are indicated as one of the main causes of morbidity worldwide, reducing quality of life and longevity³. Systemic chronic inflammation (SCI) is broadly defined as persistent, non-resolving, low-grade, age related inflammation with collateral damage and no standard canonical biomarkers.

Certain social, environmental and lifestyle factors can promote systemic chronic inflammation (SCI) that can,

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Therefore, in an inflammatory microenvironment, these functional foods could act on the immune system by modulating or balancing the exacerbated proinflammatory response⁵.

Definitions, modes of action and examples

Inflammation is a necessary and evolutionarily conserved process characterized by the activation of immune and non-immune cells that protects the host from bacteria, viruses, toxins and infections by eliminating pathogens^{6,7}. It also promotes tissue repair and recovery. Acute inflammation, regarded also as a normal inflammatory response, is characterized by the short-term, high grade, restricted upregulation of inflammatory activity that occurs when a threat is present but resolves once the threat has passed^{6,8}. However, the presence of certain chronic infections, physical inactivity, (visceral) obesity, intestinal dysbiosis, diet, social isolation, psychological stress, disturbed sleep and disrupted circadian rhythm, and exposure to xenobiotics (eg: air pollutants,

hazardous waste and biological factors) has been linked to promotion of a persistent, non-resolving state of low-grade, non-infective (that is, 'sterile') systemic chronic inflammation (SCI) that is characterized by the activation of immune components that are often distinct from those engaged during an acute immune response. While there are no canonical standard biomarkers for SCI, the consequences include metabolic syndrome, type 2 diabetes, non-alcoholic fatty liver disease (NAFLD), cardiovascular disease, cancer, depression, autoimmune diseases, neurodegenerative diseases, sarcopenia, osteoporosis and immunosenescence³.

Diet is an important lifestyle determinant of health and can influence inflammation according to the individual components of food⁹.

Nutraceuticals represent an active option for health or to regulate the inflammation associated with these pathologies. Dietary supplements like proteins, vitamins and minerals, or compounds derived from natural sources such as polyphenols, MUFAs, carotenoids, sulforaphane, or other phytochemicals (Please refer to review by Alba G et al.,⁵ for more examples) could be beneficial by either delaying or

preventing chronic inflammatory diseases⁴. This could be brought about by, but not limited to their^{4,10}:

- a. **Anti-inflammatory effects:** by inhibiting activation of NF- κ B, blocking the overexpression of tumor necrosis factor and interleukin-1, down regulating the overexpression of cell adhesion molecules and inhibiting phospholipase A2, COX-2, lipoxygenase.
- b. **Antioxidative role** that can reduce the level of ROS and free radicals and increasing ability to scavenge ROS.
- c. Effects on the process of **lipid oxidation** that inhibit or slow the formation of free alkyl radicals and cut off free radical chain reactions.

Inflammation plays a large role in metabolic syndrome, type 2 diabetes (T2DM), and cardiovascular disease (CVD)³. Benefits of nutraceuticals have been demonstrated by clinical evidence including observational studies, randomized clinical trials and meta analyses. For example, inflammation is indicated as an obligatory marker of atherosclerotic cardiovascular disease.





A position paper by the International Lipid Expert Panel has indicated omega-3 fatty acids, red yeast rice, soy, flavanols, curcumin as beneficial nutraceuticals based on outcomes of multiple randomized clinical trials or their meta-analysis while omega-6 fatty acids, garlic and berberine could also have beneficial effects derived from a single randomized clinical trial or large non-randomized studies. While safety concerns need to also be considered in parallel, use of nutraceuticals to help to prevent CVD has largely focused on lipid-lowering to date⁹.

It has also been observed that dietary interventions, specifically fiber intake, can reduce inflammation, in

part due to their effect on the gut microbiome. The microbiome overall includes bacteria usually associated with health (anti-inflammatory) and opportunistic pathogens (pro-inflammatory responses). A systematic review of clinical trials with a dietary intervention of whole diet change or fiber supplement (>5g/day) investigated the gut microbiome in patients diagnosed with chronic inflammatory diseases including type 2 diabetes (T2DM). The outcome from the systematic review indicated that high-fiber plant-based dietary interventions were consistently more effective at reducing disease-specific outcomes and pathogenic bacteria, as well as

increasing microbiome alpha diversity and short-chain fatty acid (SCFA)-producing bacteria, indicating dietary interventions with higher fiber intake seem most effective at improving disease-specific outcomes as well as beneficially altering the gut microbiome in patients with chronic inflammatory diseases, especially T2DM¹¹.

There are many more nutraceuticals that are being evaluated pre-clinically and clinically to understand the dosage, modes of action and efficacy in human physiological conditions (Tables 1 & 2)

Table 1: Examples of nutraceuticals that have shown some positive outcomes in clinical trials⁵

NUTRACEUTICAL(S)	EFFECT
Macronutrients	
• Total CHOs	Low CHO, low serum levels of IL-1Ra and IL-6 in diabetic patients
• GI based	High GI diet increased the activation rates of NF-κB in mononuclear cells in lean healthy subjects
• Fiber	15 g/1000 kcal decreased blood CRP levels in diabetic patients
• Fats	Low-fat diet associated with lower plasma IL-6 levels in diabetic patients
• Protein quality and quantity	Framingham heart study: plant protein intake inversely associated with IL-6 & CRP; High animal protein intake associated with increased levels of CRP, IL-6, TNF-α, IL-8
Micronutrients	
• Vitamins	Vitamins C&E, or carotene was inversely associated with high serum CRP probability in American adults
• Minerals & trace elements	Mg-lower CRP, sTNF-R2, and IL-6 in postmenopausal women
Bioactive compounds	
• Polyphenols	Total flavonoid intake in American adults was inversely associated with serum CRP concentration
Specific foods	
• Red meat	Multiethnic Cohort Study: red & processed meat consumption positively correlated with serum CRP

CHO: carbohydrate; CRP: C-Reactive Protein; GI: Glycemic Index; IL-1Ra: Interleukin-1 Receptor Antagonist; IL-6: Interleukin -6; NF-κb: Nuclear Factor Kappa; Stnf-R2: Serum-Soluble Tumor Necrosis Factor Receptor 2

Table 2: Examples of Vitamins or Bioactives indicating anti-inflammatory effects that have shown some positive outcomes in clinical trials¹²

Vitamin A	Pregnant and lactating, Multiple sclerosis
Vitamin B1	Hyperglycemia, Crohn's disease
Vitamin C	Healthy, obesity, hemodialysis, COVID
Vitamin D/D3	Ulcerative colitis, Obesity
Vitamin E	Diabetes, Hemodialysis
Folic acid	Healthy, overweight, Post-menopausal, Alzheimer's, mild cognitive impairment, CVD
K1	RA, post-menopause
Cr	PCOS, NAFLD, T2DM
Mg	Healthy, overweight, sleep, COPD
Se	T2DM, CHD, PCOS, GDM
Zn	Obesity, PCOS, depression, migraine
Anthocyanin	Healthy, T2DM, dyslipidemia, Sedentary
EGCG	T2DM, Obesity,
Hesperidin	Metabolic syndrome, T2DM, MI,
Quercetin	Healthy, Women, RA, obese

CHD: Congenital heart disease; COVID: Coronavirus disease; CVD: Cardiovascular Disease; GDM: Gestational diabetes mellitus; MI: Myocardial infarction; NAFLD: Nonalcoholic fatty liver disease; PCOS: Polycystic ovary syndrome; RA: Rheumatoid Arthritis; T2DM: Type 2 diabetes mellitus

CONCLUSIONS

Given the growing attention to the nutritional value and risk of foods, as well as their possible beneficial effects on health, there is an increasing need to provide correct information on the foods consumed every day. People are looking for minimally processed food with nutritional benefits in order to live healthy. The aging, fast rising population, changing lifestyle, lifestyle induced diseases, healthcare research, increasing cases of cancer,

economic and public problems are directing people to benefit from better choices. Nutraceuticals are alternative or functional foods or ingredients that act as adjuvants in decreasing inflammatory and oxidative stress induced diseases, or preventing the inflammatory responses in healthy individuals. Recent evidence on the beneficial effects of nutraceuticals on oxidative stress and inflammatory related diseases has been discovered. Usage of nutraceuticals in

pharmacology and scientific studies are seeing huge growth. In conclusion, based in recently emerging evidence, nutraceuticals can contribute to a state of well-being, to a reduction in the risks related to certain pathologies, and to an improvement in the quality of life.



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FUNCTIONAL FOODS & NUTRACEUTICALS PRODUCTS: STATUS & PROSPECTS GLOBALLY AND IN INDIA



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Rapid industrialization in the 20th century had both benefits and disadvantages.

The positive effects were, there was an improvement in methods of agriculture increasing the yield of crops and providing food to people who are not in agriculture. There was also tremendous development in the methods of food preservation and processing which helped in reducing the losses of agricultural products and making them available for longer time and at large distances from the place of produce as preserved and processed food. Industrialization

resulted in urbanization that led to the migration of populations from villages to cities. There was a change in the lifestyles of both physical activities and eating habits. From heavy physical work on farms and related activities, it became a sedentary lifestyle in offices. From eating foods that included fresh fruits, vegetables, and whole grains which are made at home it changed to many times eating foods that are more refined and processed. There was control over communicable water-borne or vector-borne diseases such as TB, HIV, and Cholera because of developments in the Medical and Pharmaceutical sciences. At the same time changed lifestyle and eating habits resulted in a rise in Non-Communicable Diseases (NCDs) such as Diabetes, Cardiovascular diseases, and

Chronic respiratory diseases Globally as well as in India. The rise of NCDs in India was in the later part of the 20th century because industrialization happened in the second half of the century. As per one report (1) by the Government of India, there is an increase in the contribution of NCDs from 30% of the total disease burden disability-adjusted life years (DALYs) in 1990 to 55% in 2015. The NCDs cannot be controlled by conventional medicine and there is a need to change the lifestyle that includes eating healthy with more physical activity.

This underlines the importance of dietary solution to control the NCDs. Once this need for foods as medicine for modern ailments was realized, it triggered interest in

VITAMIN D KI TAAKAT





Companies and Governments to develop a category of foods which offer physiological benefits beyond providing nutrition. These are generally termed "functional foods".

Functional foods originated in Japan in the mid-1980s when the Japanese Government provided financial assistance for research into such kinds of products. Functional foods are poorly defined. The FAO definition(2) is as follows, "a foodstuff that provides a health benefit beyond basic nutrition, demonstrating specific health or medical benefits, including the prevention and treatment of disease." However, this definition could create confusion. (3)

Many commonly consumed foods like beetroot, peanuts, pomegranate, strawberries have phytochemicals and bioactive compounds which offer health benefits. That way many foods we consume can be classified as functional which are actually, "healthy foods". Categorizing many substances as being providing health "beyond basic nutrition" can also

lead to confusion. According to this term, dietary fiber cannot be functional food. Carotenes in general are pro-vitamin A and get

converted to vitamin A in the body, which is part of basic nutrition. Whereas, lutein and lycopene have no Vitamin A activity but play specific functions "beyond basic nutrition".

A more pervasive definition of functional foods can be, "Foods that are formulated so that they can have substances and microorganisms that have possible health-enhancing or disease-preventing value and at a concentration that is safe and sufficiently high to achieve the benefit".

Based on this definition following are a few examples of functional foods:

1. Added nutrients:

These could be products like orange juice with added Calcium or margarine added with added Omega 3 fatty acids. These kinds of foods give protection against some ailments. Omega 3 fatty acids may be protective against cardiac disease, memory, and cognitive impairment.

2. Microbiomes: The importance of microbiomes is proven

because of their many health benefits. Probiotics are important for gut health as well as immune functions and weight loss. Innovative products based on useful microbiomes beneficial for health could be developed which can be called functional foods.

3. Prebiotics: Prebiotics help to grow healthy gut microflora. Products based on beta glucan or fructans are examples of such products.

4. Plant sterols and Phenols: Products like margarin and some foods added with plant sterols can be beneficial in the reduction of blood cholesterol as well as LDL cholesterol.

5. Catechins: They are flavonoids extracted from tea that are known to be protective against obesity, metabolic syndrome, type 2 diabetes, cardiovascular disease, and cancer. Products based on catechins which are non-vitamin organic substances have beneficial health effects.



6. Anthocyanins: They belong to a class of compounds called flavonoids which have antioxidant effect and are believed to be health protective against many diseases and products manufactured based on these compounds may be health enhancing.

Nutraceuticals are substances in Foods or botanicals that provide benefits beyond nutrition. When added to foods, they become functional foods. Therefore, in the above examples of foods containing anthocyanins, catechins, or plant sterols are functional foods.

These kinds of products are occupying a large space in the markets(4). The global market of functional foods was estimated to be USD 280.7 Billion in 2021 and is expected to grow at a rate of 8.5 % from 2022 to 2030. Many manufacturers are focussing their attention on developing these kinds of products and are also adopting new strategies like selling them online. Several factors drive the market growth. The main reason is rising awareness of wellness and healthy eating. This is by individuals and is also enhanced because of awareness campaigns by Governments, NGOs, and companies.

Other factors such as increasing life expectancy, and a rising elderly

population can be drivers for boosting market growth. A variety of product trends are becoming popular. Products are based on fortifying with nutritional additives such as Omega 3, probiotics, Vitamins, Minerals, and fibres. A range of food and beverages can be developed based on this. Functional dairy products like yogurts, milk, cheese, and frozen desserts are gaining popularity.

In this segment, market-based on carotenoids (which include Lutein, Lycopene, beta carotene, astaxanthin, zeaxanthin, canthaxanthin, and annatto) is expected to grow at a CAGR of 7.2% between 2022 to 2030. Vitamin based functional foods segment is expected to grow at a CAGR of 9.7% during the same period. Consumption of dietary fibre has many health benefits including bowel health, cholesterol reduction, and blood sugar control. The market based on this is also expected to grow faster.

If the products-based market growth is to be considered, the dairy segment occupied more



than 38%, followed by bakery and cereals. The dairy segment is expected to grow at a CAGR of 7.9% in the forecast period. The bakery and cereals segment accounted for 26% of the market share by revenue. Demand for bakery and cereal-based products will be increased. The market for cereal bars, protein bars, and nutrition bars will grow. Demand for soy products is expected to rise at a CAGR of 9.9% from 2022 to 2030. There is a large scope for products with specific applications. This will include products for sports nutrition, weight management, cardio health, immunity, and digestive health.

India has great potential for the market and growth of functional foods. According to one report(5) of August 2023, over the last five years, the health and wellness sector in India is growing at a rate of CAGR 7.7% which is faster than the rest of Asia.





With sales of US\$10.3 billion for health and wellness food and beverages, India was the 15th largest market globally in the sector. Growth is forecasted to accelerate through 2026 with a CAGR of 8.8% from 2021 - 2026. Health and wellness sector grew 5.75% in the last five years which was 3.74% in Asia Pacific and 1% in the world year-over-year. In 2021, 73.3% of the total health and wellness market was by packaged foods.

Beverages contributed 26.7% of the market which includes naturally healthy and fortified beverages. The same report mentions, that of the 8961 new product launches of functional foods and beverage products in India, 6084 were of functional foods and 2877 of functional beverages in the period January 2018 to December 2022.

Growing disposable incomes, also the new generation being more focussed on health and wellness, and obtaining optimum nutrition can be major driving

factors to boost the market of functional packaged foods in India. (6) Ayurvedic products including Chyavanprash, and botanicals such as Ashwagandha, and Brahmi, are still acceptable for their health benefits.

Fortification of foods is another growth area of the market. Regulators in India have come out with regulations obligatory fortification of maida, atta, rice, salt, milk, oil, and vanaspati and there are fortified food products available in India. Now functional foods in India are regulated by standards for regulating these kinds of foods.

The correct solution to get rid of rising incidences of NCDs, which is an immense problem as a result of the lifestyles of the people is to have the right balanced diet

with regular exercise. This is not always possible in modern living as people find it difficult to practice because of their busy lives, functional foods will be a probable answer and they will stay and grow.

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CHILLI PEPPERS ADD ZING & COLOUR TO FOODS ACROSS WORLD



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The chilli is the fruit of the *Capsicum annuum* and *Capsicum frutescens* plants, which belong to the Solanaceae family that also includes tomato and potato. The name "capsicum" comes from the Greek word "kapsimo," which means "to bite." Originating in South and Central America, their popularity is spreading throughout the globe thanks to their easy cultivation, often strong flavour, and appealing appearance. For these spices, there are over 200 common names in use. The most popular ones are bell pepper, paprika, and chilli pepper (1).

Chillies were brought to the world by Christopher Columbus in 1493, who mistook America for India and mistook chilli as a "black pepper." He brought chilli pepper back to Spain, where it became a famous spice. Chillies were cultivated around the globe after Columbus's arrival, with the first chillies being grown in Spain's monastery gardens. They spread rapidly to India, China, and Japan, with the monks discovering their culinary potential and using them as legal currency. Chillies are now an integral part of South Asian and Southeast Asian cuisine. They are considered one of the most important commercial spice crops and are widely used universal spices, known as the wonder spice (1).

Chilli peppers are mostly used to spice your food. In the curries, gravies, vegetables, soups,

marinating meat, etc. Red & green chilli sauce is used in dishes like fried rice, and noodles, as a dip with samosas, sandwiches, kebabs and other snacks. Chilli flakes are used in pizzas, pasta, parathas, etc. Chillies can be pickled, used as seasonings, and as vegetables. They are added to food to give it taste, colour, and pungency. They are used to make pickles, sauces, soups, salad dressings, and curry paste.





Types of Chilli Peppers

Among the most popular varieties of chilli peppers are bell peppers, jalapenos, cayenne peppers, habanero peppers, ghost peppers & some common Indian varieties.

The bell pepper, sometimes referred to as the sweet pepper, is a widely grown vegetable crop that is native to South and Central America. Sweet peppers come in a variety of shapes, but the majority have a bell-shaped form, which is why this variety is more commonly referred to as bell peppers. They are members of the same species as numerous *Capsicum annum* hot chilli pepper types and cultivars. Bell peppers are classified as "sweet," whereas chilli peppers are classified as "hot."

This is the main distinction, in addition to the bell pepper's typical bigger shape. Around the world, bell peppers are frequently used as a cooked vegetable for a broad range of cuisines as well as a fresh vegetable in salads and sandwiches (2).

The Spanish term "jalapeno" refers to "Jalapa" (sometimes written "Xalapa"), the capital of Veracruz, Mexico. The name comes from the fact that jalapenos were first grown there. The

French Guiana city of Cayenne is where the word "cayenne" originates. Cayenne goes nicely with meats and seafood, pizza, soups, and sauces. Cayenne pepper usage through diet is thought to be extremely safe. However, because cayenne is a very spicy pepper, those who have peptic or gastric ulcers may experience pain and discomfort from this pepper (3).

The Bhut Jolokia plant is an amazing gift from nature since it produces some of the hottest chillies on the planet along with a pleasant smell. The second-hottest chilli in the world is the "Bhut jolokia," often known as the "Ghost chilli." Bhut jolokia is used as food and spice. In addition to its medicinal properties, the fruit is pickled and added to curries to add flavour (4). Some of the other popular chillies are Piri Piri, Tabasco, and Chiptole.

Apart from Bhut Jolokia, the other Indian varieties include Kashmiri,

Guntur, Boriya, Byadgi, Jwala, Lavangi, etc.

Taste intensity of chilli peppers

In humans, capsaicin produces a burning or heated sensation. Chilli peppers are a widely used ingredient in cooking due to their spicy taste. Chilli pepper heat is regarded by Asian culture as one of the six primary taste sensations, along with bitter, sweet, sour, salty, and umami. Capsaicinoid sensations play a significant role in our appreciation of diverse cuisines overall. It is common knowledge that certain cuisines require certain types of chilli peppers to be used when seasoning food for it to taste authentic. Beyond the "prickle and burn," chilli's heat profiles influence traditional recipes worldwide. (5).

Scoville Heat Units (SHU) is a commonly used measure to determine the level of spiciness, or heat, of chilli peppers and other spicy substances. The measurement is based on the concentration of capsaicinoids present, of which capsaicin is the primary substance.





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Nowadays, the Scoville organoleptic test has been largely replaced by chromatographic methods, which are considered to be more reliable and accurate. The High-Pressure Liquid Chromatography (HPLC) method is used to determine capsaicin content in various fresh and dried peppers.

Some examples of SHU of some Indian chilli varieties include Guntur chilli (35,000-3,50,000), boriya chilli (55,000-65,000), jwala (20,000-30,000), and bell pepper (0). The hottest chilli in the world is the Carolina Reaper. Its SHU ranges from 1,400,000 to 2,200,000.

Harvesting and processing of chilli peppers

Harvesting is completed when the pods are fully ripened and starting to wither inside the plant. After being picked, the pods are stored in piles indoors or in the shade away from direct sunlight for two or three days to produce a consistent red colour. Even green chillies are harvested for fresh use. Lowering the

temperature increases the shelf life of chillies. Fresh spices have a short shelf life. Slow respiration, water loss, colour change, and deterioration are all slowed down

by proper refrigeration. There are also green chilli products available such as green chilli sauce, powder, pickle, thecha, paste, etc. These products have a longer shelf life as compared to the fresh chillies.

After that, they are spread out on clean, dry polythene sheets, cemented or concrete drying yards, etc., and dried in the sun. To avoid discolouration and mould formation, pods are spread out in thin layers and stirred frequently during the drying process to ensure uniform drying. The dried pods are piled up and wrapped with fresh polythene sheets or gunny sacks. Dry pods are maintained at 8-10% moisture content. A better drying mechanism might be employed to guarantee the product's uniform colour and cleanliness. Once unnecessary parts such as plant parts have been removed, thoroughly dried pods should be placed in dry, clean gunny bags and kept dry to prevent moisture build-up.

Long-term storage of chillies may cause degradation. However, the product may be kept for eight to ten months provided cold storage facilities are utilised. It is important to take comprehensive measures to keep animals, including rats and insects, out of the area where chilli is kept (6).

After harvesting, the chillies are graded, packed, and stored. For the modern commodity economy, trading, and marketing, grading is essential. Before being sold, Indian chillies are sorted by farmers according to size and colour. Important quality criteria are also moisture and stalks. After grading, packaging is an important step before storing the chilli peppers. Packaging is usually done to protect the chillies from damage during transportation, storage, etc. Produce marketing has incorporated packaging more and more in recent years. The packaging preserves quality while lowering marketing expenses. After, packaging the chilli peppers are stored.



To produce chilli powder, the peppers are first harvested, dried, sorted, graded, cleaned, crushed, sieved, and packed. The drying process can be done either under the sun or with mechanical drying systems. Once the peppers are dried, they are sorted and graded based on their size, weight, shape, and other factors. The next step is to clean them to remove any dirt, dust, or foreign matter, and to remove the stems using machines. After that, the peppers are ground or milled into a fine powder. The powder is then sifted through a centrifugal sifter with a fine mesh, ensuring that it is of high quality. Finally, the chilli powder is packed, labelled, and stored (7).

Cuisines that use chilli peppers (8)

Owing to their distinct heat, chilli peppers are an essential component of numerous cuisines worldwide, including Chinese (particularly Sichuanese cuisine), Mexican, Thai, Indian, and numerous other South American and East Asian cuisines.

Mexican- Mexican cuisine is known for its consistently spicy flavours, featuring fresh and dried chillies in dishes, pickled chillies, and chilli-bearing salsas. Dishes like chile rellenos and chiles en nogado feature chillies as

the centrepiece. Southern Mexican dishes like chilate de pollo and sopa de Camarones are also spicy. Salsas like green and chipotle are the hottest.

Korean- Korean winters are long and arduous, leading to a preference for spicy hot food. Thick pork, seafood, or fresh tofu stews called jigaes are cooked with sterno on butane flames. The extreme spiciness comes from red chilli paste or kimchi, a fermented condiment made with Napa cabbage and crushed red chillies. Cold salads often have mustard, which must be mixed with the meat and vegetables. Green chillies are also used in Korean cooking.

Indian- India's signature pepper is the green finger chilli, but long green chillies are also used in appetizers like chilli pakoda. The Maharashtrian thecha made from green lavangi chilli is a very popular dish with Bhakri. Spice mixtures called masalas use powdered chillies to adjust the spice level. Some spicy dishes include lamb or chicken vindaloo from Goa, chicken chettinad from Chennai, chilli paneer from Indo-Chinese



cuisine, and spicy vegetarian dishes like mysore masala dosa and hot pepper uttapam.

Conclusion

Chillies, are a popular spice in South and Central America, India, China, and Japan. They are used in curries, gravies, vegetables, soups, and marinating meat, and can be pickled. Popular varieties include bell peppers, jalapenos, cayenne peppers, habanero peppers, ghost peppers, and some common Indian varieties. Chillies are a key component in Asian cuisine due to their spicy properties, which are considered one of the six primary taste sensations. They are harvested when fully ripened and stored indoors or in the shade for two to three days. Chilli powder is produced through harvesting, drying, sorting, cleaning, crushing, sieving, and packing.





As we approach 2024, the spicy food and hot sauce industry is expected to witness a surge in distinctive spice blends and fusions, an increase in the popularity of lesser-known cuisines, and a shift towards speciality peppers and sauces. These trends are expected to bring about a more diverse range of flavours and culinary experiences. So, get ready for a spicy and flavoursome future ahead!

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REGULATORY ROUND UP



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Dear Readers,
Please find below new notifications, orders, etc. since the last round-up

[Clarification regarding categorization of 'Health Drinks / Energy Drinks' on ECommerce website :](#)

Products such as Dairy Based Beverage mix, Cereal Based Beverage mix, or Malt Based Beverages are sold as "Energy Drink" or "Health Drink" on e-commerce websites, whereas they are licensed as "Proprietary Foods". This practice is incorrect because of two reasons. As per the FSS (Food Products Standards and Food Additive) Regulations, the term "Energy Drink" is permitted for Carbonated and Non-

Carbonated water-based flavored drinks. "Health Drink" is nowhere defined in the FSS Act 2006 or Rules. This order has brought clarity and all the e-commerce FBOs are advised to remove or de-link such products from such categorisation. This order will help consumers to make informed choice without any misleading information.

[Registration of Foreign Food Manufacturing facilities as per FSS \(Import\) First Amendment Regulations, 2021](#) : Registration of Foreign Food Manufacturing Facilities (FFMF) who intend to export products to India which are under high-risk

categories is mandatory from 1st April 2023.

Registration is done on the website ReFoM based on information provided by competent authorities of the exporting countries. The import of high-risk categories from unregistered manufacturers is allowed till 31.08.2024. All unregistered Foreign manufacturers are requested to register.

[Maximum Residue Limits \(MRLs\) of Pesticides for Spices and Culinary Herbs :](#)

This order gives a revised methodology based on the scientific opinion and is approved by the Food Authority. MRL is fixed based on the field data received through the Central Insecticides



provider. Such FBO also should provide the permanent address of authorised signatory within any Indian state / UT.

Board and Registration Committee (CIB&RC), Monitoring of Pesticide Residues at National Level (MPRNL). If the pesticide is registered with CIB&RC for other commodities, then MRLs defined under Codex shall be applicable. If MRL is not specified in codex then MRL of 0.1mg/kg is considered as the upper limit. In case the pesticide is not registered, then also MRL 0.1mg/kg is applicable.

[Proof of Premises for the purpose of making licensing application through FoSCoS in case of Shared Workspaces](#)

: This advisory is about licensing of Kind of Businesses (KoBs) where activities are restricted to only office-related functions and do not need any storage of food items. In the case of such FBOs, the licensing application through FoSCoS can provide relevant proof for the premise between the FBO and Workplace

[Clarification on the requirement of document for Proof of Premises for the purpose of making licensing application through FoSCoS](#)

: This advisory clarifies regarding the proof of Premises. The documents. As proof, includes any of the following: a) Sale deed, rent or lease agreement b) In case of owned premises the address proof such as an Aadhaar card, voter ID etc. c) Premise registration with land authority d) Property tax receipt. e) Utility Bills.

[Clarification with regard to display of information such as declaration of calorific value, allergen, nutritional information etc. by Food Service Establishments](#)

: This order clarifies regarding the display of information by food service establishments as per FSS (Labelling and Display) Regulations 2020. Calorific value can be displayed on

menu cards, boards or booklets. food allergens and veg, non-veg logo information on menu cards or boards. Nutritional information and information on organic/ non-organic food or ingredients on booklets, handouts, or websites. The same order clarifies that E-commerce businesses should display nutritional information on their websites. This order will give clarity and help businesses avoid the suspension of licenses.

[Annual Return Submission by the Food Businesses](#)

: This advisory gives information about annual returns submission on FoSCoS. Eligible FBOs should file returns every year before 31st May for the previous financial year. Other provisions such as penalties for defaulters, rules for revised returns, etc are also mentioned.

[Validity of FSSAI recognized Food Testing Laboratories](#)

: The latest list of FSSAI recognised laboratories with the validity of their accreditation as on 23rd April is published along with the validity.



RESEARCH IN HEALTH & NUTRITION

Bridging diet, microbes, and metabolism: Implications for metabolic disorders

Boyce Thompson Institute, ScienceDaily February 20, 2024

Overall, the research conducted by scientists at the Boyce Thompson Institute and Cornell University sheds new light on the intricate relationship between gut bacteria, fatty acids, and metabolic health.

The discovery that certain fatty acids produced by gut bacteria directly influence fat metabolism in animals, and that the host organism may have acquired the ability to produce similar compounds through horizontal gene transfer from bacteria, opens up new possibilities for understanding and potentially combating metabolic diseases.

The findings from this study, published in Nature Communications, suggest that the interplay between microbiota metabolites and host lipid metabolism is

crucial for maintaining overall health and wellness. By further investigating these host-bacterial interactions, researchers may uncover new pathways for managing obesity and metabolic dysfunction in humans.

Through a deeper understanding of the molecular mechanisms involved in fat metabolism and its regulation by specific compounds derived from the diet and gut bacteria, scientists hope to develop new strategies for improving human health outcomes. This research not only advances our knowledge of basic biological processes but also paves the way for future exploration in the realm of human health and disease management.

(Fox, et al. Evolutionarily related host and microbial pathways regulate fat desaturation in *C. elegans*. Nature Communications, 2024; 15 (1) DOI: [10.1038/s41467-024-45782-2](https://doi.org/10.1038/s41467-024-45782-2))

Protein-rich breakfast boosts satiety and concentration

Aarhus University, ScienceDaily, 15 February 2024

This Danish study explored the link between diet and cognitive function, specifically focusing on the effects of different types of breakfast on satiety and concentration.

The study followed 30 obese women aged 18 to 30 and found that a protein-rich breakfast, specifically consisting of skyr (a sour-milk product) and oats, increased satiety and concentration in the participants compared to a carbohydrate-rich breakfast or skipping breakfast altogether. The study also found that protein-rich meals can increase a sense of satiety, potentially helping to prevent weight gain.





However, the researchers noted that simply eating a protein-rich breakfast may not be enough to effectively reduce daily calorie intake and combat obesity. The study highlights the importance of considering overall diet and nutritional strategies in conjunction with consuming protein-rich meals.

The results of the study suggest that replacing a carbohydrate-rich diet with a protein-rich diet could have satiating effects, as evidenced by the difficulty some participants had consuming the entire protein-rich breakfast. This difference in satiety effect highlights the potential benefits of incorporating protein-rich foods into meals to promote feelings of fullness and potentially reduce overall calorie intake.

(Dalgaard et al. A dairy-based protein-rich breakfast enhances satiety and cognitive concentration before lunch in young females with overweight to obesity: A randomized controlled cross-over study. *Journal of Dairy Science*, 2023; DOI: [10.3168/jds.2023-24152](https://doi.org/10.3168/jds.2023-24152))

Nutrients direct intestinal stem cell function and affect aging

University of Helsinki. ScienceDaily, 12 February 2024.

As we age, the ability of intestinal stem cells to maintain this delicate balance is reduced, leading to a decline in gut function and overall health.

The researchers at the University of Helsinki have found that this decline is partially due to alterations in the nutrient adaptation mechanisms of intestinal stem cells. By understanding the intricate relationship between nutrition and stem cell function, scientists may be able to develop new strategies to support the functional capacity of the ageing gut.

This new discovery has important implications for the development of potential interventions to help maintain gut health in the elderly. By targeting the nutrient adaptation pathways of intestinal stem cells, researchers may be able to slow down the age-related decline in gut function and improve overall health and well-being. Further research in this area could lead to new therapies and dietary recommendations that promote healthy ageing and support the longevity of the



gut.

Understanding how nutrient status affects stem cell function and differentiation is crucial for developing potential strategies to promote tissue regeneration and repair. The findings from the University of Helsinki study shed light on the complex regulatory mechanisms that govern the adaptation of stem cells in response to changing nutrient conditions. The discovery of region-specific variations in the nutrient adaptation of stem cells within different areas of the gut suggests a level of specificity that was previously unknown.

These insights could have important implications for the treatment of intestinal diseases and age-related decline in tissue regeneration. By uncovering the intricate ways in which nutrients influence stem cell behaviour, researchers may be able to develop targeted interventions to optimize stem cell function and maintain tissue homeostasis.

The dynamic nature of stem cell size regulation in response to dietary cues highlights the remarkable adaptability of these cells, offering exciting possibilities for future research in the field of regenerative medicine.

The researchers' findings on the ability of intestinal stem cells to adapt to changes in nutrient status in older animals shed light on the importance of maintaining this adaptability for tissue health and longevity. The observed reduction in the ability of stem cells to react to nutrient status in older animals could potentially contribute to age-related decline in tissue functioning. The research also highlights the potential benefits of intermittent fasting in preserving stem cell function and overall tissue health in ageing organisms.



The similarities in nutrient adaptation mechanisms between human and fruit fly stem cells suggest that these findings may have broader implications for understanding the ageing process in humans. The researchers' ongoing work on the nutrient adaptation of stem cells may provide

valuable insights into potential strategies for slowing down age-related tissue dysfunction and prolonging lifespan. By better understanding how nutrient adaptation affects stem cell function, researchers may uncover new approaches for promoting healthy ageing and combating age-related diseases. (Mattila et al. Stem cell mTOR signalling directs region-specific cell fate decisions during intestinal nutrient adaptation. Science Advances, 2024; 10 (6) DOI: [10.1126/sciadv.adi2671](https://doi.org/10.1126/sciadv.adi2671))

Physical activity is insufficient to counter cardiovascular risk associated with sugar-sweetened beverage consumption

Université Laval. ScienceDaily, 8 February 2024.

The study, which looked at data from over 100,000 people, found that even when individuals were physically active, those who consumed sugar-sweetened beverages had a significantly higher risk of developing cardiovascular disease compared to those who did not consume these beverages.


This suggests that the harms of sugary drinks on heart health are so significant that they cannot be counteracted by physical

activity alone. It's clear that reducing the consumption of sugar-sweetened beverages is crucial for heart health.

A recent study conducted by Drouin-Chartier and her team, which followed around 100,000 adults for 30 years, found that even regular physical activity does not fully counteract the increased risk of cardiovascular disease associated with frequent consumption of sugar-sweetened beverages.

The study revealed that individuals who consumed these beverages more than twice a week had a significantly higher risk of developing cardiovascular disease, regardless of their level of physical activity. In fact, while physical activity did reduce the risk by half, it did not eliminate it entirely. This highlights the importance of addressing not only the individual choices people make regarding sugary drink consumption but also the pervasive presence of these beverages in the food environment.





With even daily consumption further increasing the risk of cardiovascular disease, the findings serve as a stark warning about the potential health consequences of regularly consuming sugar-sweetened drinks.

This study adds to the growing body of evidence suggesting that artificially sweetened drinks can be a beneficial option for individuals looking to reduce their sugar intake and lower their risk of developing cardiovascular diseases. However, it is important to note that water is still considered the healthiest beverage choice.

Overall, these findings are encouraging for individuals who are looking to make healthier choices when it comes to their beverage consumption. By replacing sugar-sweetened drinks with artificially sweetened options, individuals may be able to lower their risk of cardiovascular diseases without sacrificing taste. (Pacheco et al. Sugar-sweetened or artificially-sweetened beverage consumption, physical activity, and risk of cardiovascular disease in adults: a prospective cohort study. The American Journal

of Clinical Nutrition, 2024; DOI: [10.1016/j.ajcnut.2024.01.001](https://doi.org/10.1016/j.ajcnut.2024.01.001))

Experts urge to improve obesity care as latest research supports effectiveness

26 Feb 2024 Nutrition Insight

Overall, the research from University of Michigan Medical School highlights the importance of obesity care and the effectiveness of various weight management treatments, such as nutrition counselling, medically supervised meal replacements, anti-obesity medications, and bariatric surgery.

The studies show that receiving treatment from healthcare providers increases the likelihood of achieving weight loss compared to trying these options independently.

Additionally, the interdisciplinary treatment approach tested on obese adolescents in Brazil resulted in weight loss and improvements in inflammatory and cardiovascular risk biomarkers, lowering insulin resistance and diabetes risk. This less intensive treatment model proved to be effective in reducing inflammation and cardiometabolic risk factors, making it a

promising option for treating obesity.



The research emphasizes the need for healthcare providers to offer a variety of evidence-based weight management options to individuals with obesity and to increase access to these treatments. By addressing obesity through comprehensive care and personalized treatment plans, individuals can see significant improvements in their health and well-being. (<https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2815174>)

Lutein and zeaxanthin enhance vision and cognition in children

22 Feb 2024 Nutrition Insight

Findings from a supplementation study with a proprietary extract of lutein and zeaxanthin



isomers developed by OmniActive Health Technologies, show that supplementation improves visual and cognitive performance in children. The supplement is designed to provide macular carotenoids in a similar ratio as found in the diet, aiming to support eye health and cognition in children who may not consume enough of these nutrients through their regular diet.



The study demonstrated that supplementation increased blood levels of lutein and zeaxanthin, enhanced visual processing speed, reduced eye strain caused by digital devices, improved attention span, focus, memory, and processing speed. The research highlights the importance of lutein and zeaxanthin in supporting eye health and cognitive function in children.

This research on lutein and zeaxanthin supplementation in children builds upon previous studies in adults and aims to address the nutritional gap in children's diets. The company's Integrated Actives platform

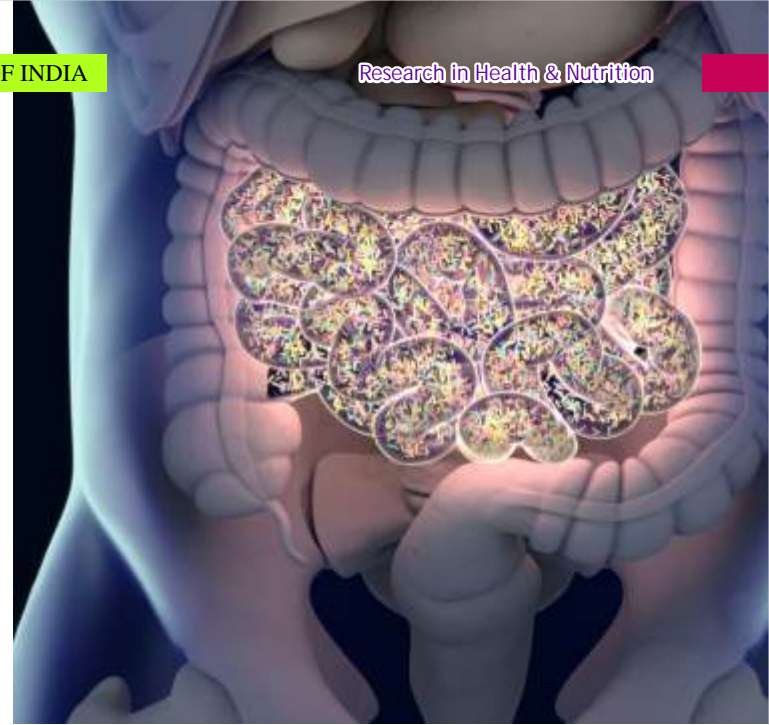
allows for multiple active compounds to be delivered in concentrated, smaller doses, showcasing innovation in the field of supplementation for eye and brain health.

Supplementation with lutein and zeaxanthin may have significant benefits in supporting eye health and cognitive function in children, and further research is needed to explore the potential impact of supplementation on prenatal and infant populations. The findings of this study contribute to the growing body of evidence supporting the use of lutein and zeaxanthin supplements to promote overall health and well-being. (<https://link.springer.com/article/10.1007/s12325-024-02785-1>)

Gut microbiome diversity protects against harmful pathogens through nutrient competition

19 Feb 2024 Nutrition Insight

This research suggests that diverse communities of resident bacteria in the human gut can protect against harmful pathogens by consuming nutrients that the pathogens need.



The study found that a single strain of bacteria is only protective when combined with others, and that combining multiple species into diverse communities can greatly limit pathogen growth. The researchers also found that certain bacterial species with a high degree of metabolic overlap with the pathogens play a crucial role in community protection.

The findings of this study could potentially lead to the development of new strategies to optimize gut health and prevent infections. The researchers suggest that these findings may pave the way for the design of probiotic communities targeted against specific pathogens using bacterial genomes. However, more research is needed to explore the application of these ideas in clinical settings.

Overall, this research highlights the importance of microbiome diversity in protecting against pathogens and emphasizes the role of nutrient blocking in this process.

Understanding the mechanisms behind colonization resistance could lead to new approaches for promoting gut health and reducing the need for antibiotics.

(<https://www.science.org/doi/10.1126/science.adj3502>)

Spotlight on advancing research and innovations in prebiotic fibres

15 Feb 2024 Nutrition Insight

As consumer interest in gut health grows, the demand for products containing prebiotic fibres is on the rise. With the increased focus on the gut microbiome and its impact on overall well-being, consumers are actively seeking out foods that can promote a healthy balance of bacteria in their digestive system.

Industry experts are continually researching and developing new prebiotic ingredients to meet this demand and provide consumers with a wide range of options for improving their gut health. Ultimately, with the right education and information, consumers can make informed choices about incorporating prebiotics into

their diet to support their digestive health and overall wellness.

As consumer awareness of the gut microbiome's crucial role in digestive and overall health continues to grow, the demand for products containing prebiotics like chicory root fibres is on the rise. Beneo is at the forefront of expanding the knowledge surrounding the health benefits of prebiotic chicory root fibres, which extend beyond gut health to include blood sugar management, immune support, weight management, and even mood improvement. These fibres can also enhance the nutritional profile of various food and beverage products.

Additionally, prebiotics have been shown to modulate microbial composition and diversity in the gut, leading to the production of beneficial metabolites like short-chain fatty acids that support a healthier immune response.

By influencing intestinal epithelial cells and gut barrier function, prebiotics play a direct role in bolstering the body's immune system. Ultimately, consumers are increasingly recognizing the interconnectedness of the gut

microbiome with other organs in the body, fuelling the demand for products that support a healthy digestive system and overall well-being.

DuBow emphasizes the importance of continued research in the field of prebiotics and their impact on gut health and overall well-being. As studies progress, the understanding of the intricate interactions within the gut microbiome and its effects on various aspects of health is expanding. The potential benefits of prebiotics in supporting beneficial bacteria and immune function, as well as their role in areas like skin health and mood, are becoming increasingly evident.

While research on postbiotics and specific probiotic strains continues to evolve, DuBow and other experts acknowledge the need for further studies to better define the mechanisms of action and optimal intake levels for achieving desired health effects. As the science advances, the potential for prebiotics to enhance overall wellness is becoming more promising.



Ambrožic emphasizes the importance of transparency in labelling and marketing to ensure consumers are informed about the benefits of including prebiotics in their diets. He predicts that as more research is conducted on the benefits of prebiotics, their popularity and acceptance will continue to grow. Overall, it is clear that prebiotics, probiotics, and postbiotics all play a vital role in supporting gut health and overall well-being, and with continued education and innovation, the possibilities for utilizing prebiotics in various industries are endless.

Study shows salt substitutes reduce risk of CVDs in aging populations

14 Feb 2024 Nutrition Insight

A recent study has brought attention to the benefits of using salt substitutes to improve heart health and reduce the risk of cardiovascular disease and hypertension in older adults.

Hypertension, or high blood pressure, is a major risk factor for heart-related issues and mortality worldwide, underscoring the importance of managing this condition effectively. The study, focusing on the

DECIDE Salt diet, evaluated the impact of sodium reduction strategies on blood pressure in elderly adults in care facilities in China. With hypertension affecting billions of adults globally and leading to millions of deaths annually, finding ways to combat this issue is a top priority. Lead author Dr. Yangfeng Wu emphasizes the importance of making healthier dietary choices and increasing awareness of lower-sodium options to promote heart health.



These results showcase an exciting breakthrough in maintaining blood pressure that offers a way for people to safeguard their health and minimize the potential for cardiovascular risks, all while being able to enjoy the perks of adding delicious flavour to their favourite meals. The significant heart-health findings demonstrated the effectiveness of using a salt substitute in reducing the incidence of hypertension in older adults. This strategy

not only helps control and maintain healthy blood pressure levels, but also does so without increasing the risk of low blood pressure episodes. The use of salt substitutes could be a valuable population-wide approach for preventing and managing hypertension and cardiovascular disease, providing a simple yet effective way for individuals to take charge of their health and well-being.

While the study on salt substitutes in hypertension management shows promise, there are limitations that need to be acknowledged. The post-hoc analysis and lack of pre-specified study outcomes may introduce bias into the results. Additionally, the loss of follow-up visits in some patients could impact the overall findings. However, sensitivity analyses support the validity of the results, suggesting that salt substitutes could be effective in managing hypertension.

Dr. Rik Olde Engberink underscores the importance of further research to address remaining questions and challenges. He suggests that early adoption of salt substitutes in the food industry could have a significant impact on improving blood pressure outcomes by enhancing the sodium-potassium ratio in processed foods.



Further investigation and collaboration between researchers and the food industry may lead to more impactful interventions for hypertension management in the future.

(<https://www.jacc.org/doi/10.1016/j.jacc.2023.12.013>)

Vitamin K2 MK-7 linked to reduced heart disease risk

02 Feb 2024 Nutrition Insight

The study found that vitamin K2 MK-7, specifically the K2Vital Delta form, played a significant role in inhibiting the progression of CAC, which is a key indicator of arterial stiffness and potential cardiovascular issues.

These results are promising for individuals looking to improve their heart health through supplementation, as vitamin K2 MK-7 has been shown to have a positive impact on cardiovascular health. This research helps to further solidify the importance of vitamin K2 in supporting overall heart health and may pave the way for new developments in heart health solutions. As

more studies like the AVADEC trial are conducted, we may see even more evidence of the benefits of vitamin K2 MK-7 for heart health.

This research highlights the potential benefits of vitamin K2 MK-7 and D supplementation in specific subgroups at high risk for coronary artery calcification. The findings suggest that this intervention can slow down the progression of CAC scores and may also reduce the occurrence of adverse events in these populations. Further research is needed to uncover the mechanisms behind these benefits and to determine the optimal dosages and duration of supplementation for maximum effectiveness. These results provide valuable insights for healthcare providers and patients seeking alternative strategies for cardiovascular health management.

The promising potential of Vitamin K2 MK-7 in improving arterial health is gaining attention through various clinical studies. A recent 24-week study showed a reduction in the progression of arterial stiffness in chronic hemodialysis patients with diabetes after

taking 375 µg/d K2 MK-7. Another trial demonstrated improved arterial elasticity in vitamin K-deficient kidney transplant recipients following 360 µg/d K2 MK-7 intake. Balchem's K2Vital Delta ingredient, which provides a high percentage of all-trans, bioactive K2 MK-7, is known for its purity and stability. Additionally, a study utilizing Kappa Bioscience's K2Vital Delta solution found that supplementation with vitamin K2 menaquinone-7 may be more effective in improving vitamin K status than a vitamin K-rich diet. The introduction of USDA organic-certified all-trans, bioactive vitamin K2-MK7 for oil-based health applications by Kappa Bioscience in 2022 marks a significant advancement in the field. Overall, these findings highlight the promising benefits of Vitamin K2 MK-7 in promoting arterial health and addressing deficiencies. (<https://www.jacc.org/doi/epdf/10.1016/j.jacadv.2023.100643>)





Could eating beans aid cancer prevention?

By Donna Eastlake

05-Feb-2024 - Food Navigator

The results of the study showed that participants in the intervention group who added navy beans to their diet had a significant increase in the diversity of their gut microbiome compared to the control group.

This increase in diversity is important because a greater variety of gut bacteria has been linked to a reduced risk of colorectal cancer. In addition to the positive changes in the gut microbiome, the participants in the intervention group also experienced improvements in circulating markers and metabolites associated with cancer development.

These findings suggest that including foods rich in gut-supporting nutrients, such as navy beans, could be a simple and effective way to prevent and treat colorectal cancer. The study highlights the importance of maintaining a healthy gut microbiome for overall health and wellbeing. The results of the study are promising, as they suggest that incorporating navy beans into daily meals can

have a beneficial impact on gut health. The increase in diversity and changes in specific bacteria seen in the intervention group could have important implications for cancer prevention and treatment. Future research could provide more insight into the relationship between diet, gut microbiota, and response to immunotherapy, ultimately leading to more effective treatment strategies for cancer patients. The findings highlight the potential of prebiotic foods in promoting a healthy gut microbiome and improving overall health outcomes.

Navy beans, in particular, are a versatile ingredient that can easily be incorporated into a variety of dishes, from soups and stews to salads and dips. They are also a budget-friendly option that can help you stay healthy. With their high fibre content, navy beans can help keep you feeling full and satisfied, making them a great option for those looking to maintain a healthy weight or manage their hunger throughout the day. In addition to their gut-supporting benefits, navy beans are also a good source of plant-based protein, making them an excellent option for those looking to reduce their intake of animal products. They are also low in fat and cholesterol, making them a

heart-healthy option. With their nutrient-rich profile and environmental benefits as a nitrate fixer crop, navy beans are truly a superfood that can benefit both our bodies and the planet. So next time you're planning your meals, consider adding navy beans to your shopping list for a tasty and nutritious boost.

([https://www.thelancet.com/journals/ebiom/article/PIIS2352-3964\(23\)00439-5/fulltext](https://www.thelancet.com/journals/ebiom/article/PIIS2352-3964(23)00439-5/fulltext))

Dietary treatment more effective than medicines in IBS

Dietary treatment is more effective than medications in irritable bowel syndrome (IBS). These are the findings of a study conducted at the University of Gothenburg. With dietary adjustments, more than seven out of ten patients had significantly reduced symptoms.

These findings suggest that dietary adjustments may be a more effective and sustainable treatment option for individuals with IBS compared to medications. The study highlights the importance of personalized treatment approaches, as different individuals may respond better to different dietary interventions.





By identifying specific triggers and tailoring dietary recommendations accordingly, healthcare professionals can help patients effectively manage their symptoms and improve their quality of life.

Furthermore, the study points to the potential long-term benefits of dietary treatment for IBS. Even after participants in the dietary groups partially returned to their previous eating habits, a significant proportion still experienced symptom relief. This highlights the importance of ongoing dietary management and support for individuals with IBS in maintaining their symptom improvements over time. With further research and a focus on personalized treatment approaches, healthcare providers can continue to improve outcomes for individuals with IBS and enhance their overall well-being.

The Lancet
Gastroenterology &
Hepatology
([http://dx.doi.org/10.1016/S2468-1253\(24\)00045-1](http://dx.doi.org/10.1016/S2468-1253(24)00045-1))

Associations between
mango eaters and
moms-to-be: better

diets and improved nutrient intakes

Eurekalert 15-FEB-2024

These findings highlight the importance of including mangos in the diet of women trying to conceive, currently pregnant, or lactating.

By doing so, they can significantly improve their overall diet quality and ensure they are meeting their unique nutritional needs during this crucial time. The increase in intake of key nutrients such as vitamin C, fibre, folate, magnesium, potassium, and vitamin E, while simultaneously reducing intake of added sugars and unhealthy fats, can have a profound impact on both maternal and fetal health.

As researchers continue to uncover the benefits of specific foods in supporting women's health during pregnancy, it becomes even more evident that nutrition plays a critical role in ensuring a healthy pregnancy. The incorporation of nutrient-rich foods such as mangos can be a simple yet effective way to optimize maternal nutrition and reduce the risk of pregnancy-related complications. This study sheds light on the power of diet in promoting a healthy pregnancy and

underscores the importance of making informed dietary choices for women at all stages of the childbearing journey.

The findings of this study provide valuable information on the nutritional benefits of consuming mangos, particularly for older Americans who may have specific dietary needs. The higher HEI (Healthy Eating Index) scores among mango eaters suggest that including mangos in the diet may lead to overall healthier eating habits. The lower intake of cholesterol and saturated fat among mango consumers is especially important for maintaining heart health, while the higher intake of fibre and vitamin C supports digestive health and immune function.

The researchers' acknowledgment of the cultural significance of mangos in diets is also noteworthy, as it highlights the potential of this fruit to improve nutrition equity and promote healthy eating habits across diverse populations. While the study had certain limitations, such as relying on self-reported dietary recalls and the



observational nature of NHANES analysis, the strengths of using a larger sample size and the HEI-2020 scoring system provide valuable insights into the potential health benefits of incorporating mangos into the diet. Overall, these findings contribute to a growing body of research supporting the positive impacts of mango consumption on overall health and nutrition.

Kristin Fulgoni and Victor L Fulgoni "Mango Consumption Was Associated with Higher Nutrient Intake and Diet Quality in Women of Childbearing Age and Older Adults," *Nutrients* (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10820848/>)

Study reveals disturbing dietary trends in North India

Medical Express March 14 2024

The findings of this study highlight the urgent need for public health interventions to address the dietary habits of North Indian populations.

With the rise of non-communicable diseases in the country, such as hypertension, cardiovascular disease, and

chronic kidney disease, it is crucial to raise awareness about the importance of a balanced diet and to provide individuals with the necessary resources to make healthier food choices.

Moreover, this study underscores the significance of accurate and reliable methods for assessing nutrient intake, such as the 24-hour urinary excretion analysis used in the research. By using more precise measures, researchers can better understand the dietary patterns of individuals and populations, ultimately leading to more targeted interventions and improved health outcomes. Collaborative efforts between institutions like The George Institute for Global Health India and PGIMER in Chandigarh are vital in conducting comprehensive studies that can inform public health policies and interventions to combat the growing burden of non-communicable diseases in India.

The findings of this study underscore the importance of addressing dietary deficiencies and promoting healthier eating habits to prevent the onset of NCDs such as cardiovascular

diseases and kidney disorders. By emphasizing the need for personalized dietary interventions and accurate assessments, the study highlights the potential impact of tailored nutrition recommendations in reducing the burden of chronic illnesses in the community.

Furthermore, the recommendations put forth by researchers, including improving food labelling, reducing salt intake, and promoting the consumption of nutrient-rich foods, can serve as practical guidelines for policymakers and healthcare professionals to develop effective strategies for disease prevention. By implementing these suggestions, there is a significant opportunity to improve the overall health and well-being of North Indian populations and pave the way for a more sustainable and healthier future for all.

Prabhjot Kaur et al, Estimation of dietary intake of sodium, potassium, phosphorus and protein in healthy Indian population and patients with chronic kidney disease, *Frontiers in Nutrition* (2024). DOI: [10.3389/fnut.2024.1312581](https://doi.org/10.3389/fnut.2024.1312581)



FOOD SCIENCE & INDUSTRY NEWS

Refrigerate lettuce to reduce risk of E. coli contamination

University of Illinois College of Agricultural, Consumer and Environmental Sciences.
ScienceDaily, 29 February 2024

Leafy green vegetables such as lettuce, spinach, kale, and collards are important sources of dietary fibre and nutrients, but they can harbour harmful pathogens like E. coli.

A study from the University of Illinois Urbana-Champaign examined factors that affect E. coli contamination on different leafy greens.

The research found that factors such as temperature, leaf surface properties, and the presence of natural wax coating can determine the susceptibility of leafy greens to E. coli contamination. Lettuce is more susceptible to E. coli growth compared to waxy greens like kale and collard. However, cooking kale and collard can kill or inactivate E. coli, while lettuce is typically consumed raw.

Rinsing lettuce can help reduce E. coli

contamination, but it may not remove all bacteria due to their attachment to the leaf surface. The study also found that spinach, kale, and collard juice have antimicrobial properties that can protect against E. coli.

Researchers suggest using kale and collard juice as a natural antimicrobial agent to control foodborne pathogen contaminations. While it may be challenging to completely avoid pathogens in food, following best practices in the food industry and food supply chain can help ensure food safety.

Overall, the researchers emphasize that consuming fresh fruits and vegetables is still important for a healthy diet. It's essential to follow food safety guidelines, thoroughly wash leafy greens, store them in the refrigerator, and pay attention to any food safety recalls in your area.

(Dong et al. Fates of attached E. coli o157:h7 on intact leaf surfaces revealed leafy green susceptibility. Food Microbiology, 2024; 119: 104432 DOI:

[10.1016/j.fm.2023.104432](https://doi.org/10.1016/j.fm.2023.104432))

The future of bone health: Emerging trends, innovations and ingredients

29 Feb 2024 Nutrition Insight

The challenges of a growing aging population are being felt globally, prompting an increased focus on bone strength and health in the healthy aging space.

Innovations in the supplement industry are driving growth in products with bone health claims, with vitamin D3 being a key ingredient.

Experts from companies such as Gnosis by Lesaffre, Aker BioMarine, Balchem, and Tirlán are working to better understand the trends and innovations in the bone strength and health market. These experts highlight the importance of maintaining bone health across all ages, with a specific emphasis on the role of vitamin K2 in supporting bone and heart health.



Products like MenaQ7 from Gnosis by Lesaffre and K2Vital from Balchem are highlighted for their proven efficacy in supporting bone health. These ingredients have been shown to enhance bone mineral content, density, and strength, particularly in targeted age groups like children and postmenopausal women.

Additionally, proteins from Tirlán, such as Solmiko and Solago milk proteins, are recognized for their high quality and essential amino acid content. These proteins are crucial for maintaining bone and muscle health, with studies showing significant improvements in frailty scores with protein supplementation.

Krill oil from Aker BioMarine is also touted for its comprehensive health benefits, including support for bone health. The omega-3 content in krill oil can help reduce inflammation and preserve bone strength and integrity, making it a valuable supplement for healthy aging.

Overall, these experts are working to develop and promote products that address the growing concerns related to bone health in an aging population, offering solutions that are backed by scientific evidence and proven results.

Strong and Balanced Food for Women

Emily Little March 1, 2023
FOOD TECHNOLOGY MAGAZINE

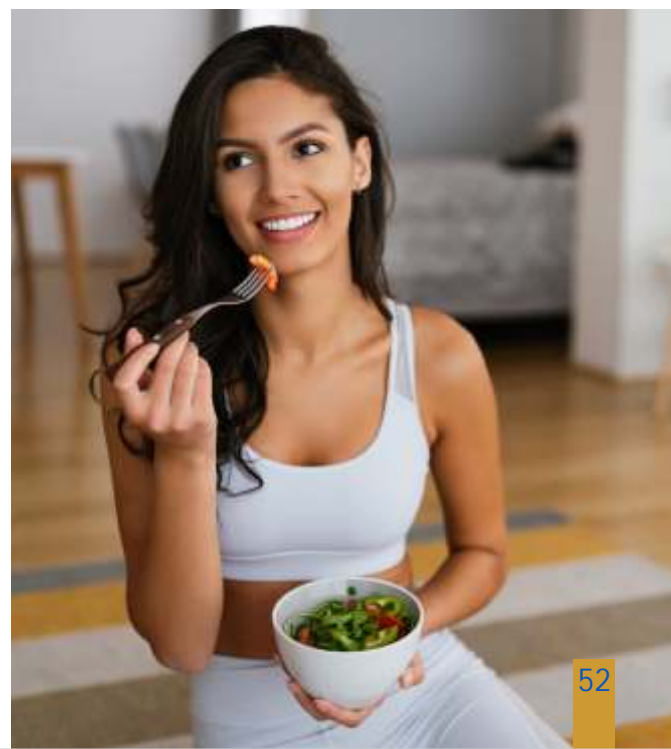
As the understanding of women's unique nutritional needs grows, the market for products tailored to women's health is expanding rapidly.

With differences in body mass, muscle mass, and life cycle factors such as pregnancy and menopause, women require different levels of macronutrients and micronutrients than men. This has led to an emergence of food and beverage products targeting women's health, with a substantial increase in launches in recent years. The rise in research on women's health issues further underscores the importance of catering to women's specific nutritional needs. As consumers become more health-conscious in the wake of the pandemic, personalized nutrition is likely to become even more significant for women seeking to address their health goals at various stages of life.

Menopause is a natural stage of life that all women go through, but it can bring along uncomfortable

symptoms that often go unaddressed. With the rise in women experiencing perimenopause, menopause, and post-menopause, it is important for companies like Bossa Bars to provide products that cater to these specific needs. By creating plant-based, low-calorie bars that help curb symptoms and satisfy cravings, Bossa Bars is not only providing a solution but also opening up a dialogue about menopause that is often shrouded in secrecy. With their innovative approach to addressing the needs of menopausal women, Bossa Bars is paving the way for women to feel empowered and supported during this transitional time in their lives.

With more women feeling the weight of the pandemic on their mental health, the demand for products that can help boost mood and reduce stress remains high.



Companies like The Functional Chocolate Company and Oat Mama are tapping into this market by creating products that not only claim to have mental health benefits but also taste delicious and offer a moment of indulgence. As the market for functional foods continues to grow, more innovative products are likely to emerge, providing consumers with new ways to support their mental well-being and enjoy a moment of self-care.

The physiological differences between men and women play a significant role in the sports nutrition category, with metabolism being a key differentiator. Registered dietitian Lyssie Lakatos notes that men tend to have a higher amount of lean muscle tissue, which requires more calories both during activity and at rest.

Despite these differences, research on women's nutritional needs in the sports industry is lacking. Dr. Linda Alvarez, co-founder of Levelle Nutrition, saw this gap firsthand and developed energy purées specifically designed for women. These products are made with organic ingredients and cater to the unique nutritional requirements of female athletes.

Alvarez warns against the

"shrinking and pinking" marketing strategy, emphasizing the importance of creating products that truly meet women's nutritional needs. By including women in the conversation and expanding the market for female-focused sports nutrition products, the industry can better address the physiological and nutritional differences between men and women.

(<https://www.ift.org/news-and-publications/food-technology-magazine/issues/2023/march/features/strong-and-balanced-food-for-women>)

Common food preservative has unexpected effects on the gut microbiome:

Matt Wood, Asst Dir of Communications, Biol Sci Div, Univ of Chicago February 2, 2024

It is important for food manufacturers to carefully consider the impact of preservatives on the complex ecosystem of the gut microbiome.

While preservatives play a crucial role in keeping food safe and extending its shelf life, they must be used responsibly to ensure that they do not disrupt the delicate balance of beneficial bacteria in the gut. Research into the

effects of lantibiotics and other antimicrobial food additives on the gut microbiome is essential in order to develop safe, effective preservatives that do not compromise our health in the long run. By better understanding the interactions between preservatives and the gut microbiome, we can work towards creating a food supply that is both safe and supportive of our overall well-being.

The study revealed that not only do lantibiotics like nisin target harmful pathogens, but they also have a significant impact on the beneficial bacteria in our gut. By targeting specific enzymes essential for the survival of both harmful bacteria and commensal bacteria, lantibiotics are able to disrupt microbial communities and promote a healthier gut environment. This discovery has important implications for the development of new antibiotics that can selectively target pathogens while leaving the beneficial bacteria unharmed, to minimize the risk of antibiotic resistance and maintain a healthy microbiome.



The use of nisin, a common antibiotic added to food to prevent contamination, has raised concerns about its impact on human gut microbes. Research led by Dr. Eric G. Pamer has shed light on the potential effects of nisin and similar antibiotics on gut bacteria. Through the study of gut bacteria genomes, they identified genes for producing antibiotics and found that these compounds were effective at killing both pathogens and commensal bacteria in the gut.

This discovery suggests that the use of antibiotics in food may have unintended consequences on gut health. However, further research is being conducted to harness the beneficial antimicrobial properties of antibiotics while minimizing their negative impact on gut microbes.

Are meal-replacement drinks a fad or the future of convenience food?

By Donna Eastlake
21-Feb-2024 - Food Navigator
USA

The surge in sales of meal-replacement drinks in recent years can be attributed to a variety of factors, including the rise of health and wellness trends, the convenience of on-the-go nutrition, and the increased awareness of the

importance of proper nutrition.

Brands like Huel have capitalized on the current consumer interest in healthy, convenient meal options by offering a range of flavours and options that cater to a variety of dietary preferences. While some may see this trend as a passing fad, it's clear that meal-replacement drinks are here to stay as a viable option for those looking to maintain a healthy lifestyle in a busy world. Only time will tell if this is just a foodie phase or a lasting trend that's just getting started.

With more people embracing busy lifestyles, meal-replacement drinks have become increasingly popular as a convenient and efficient way to meet their nutritional needs. These drinks offer a quick and easy alternative to traditional meals, allowing individuals to save time on both food preparation and consumption. The rise of e-commerce has also made these products more accessible to consumers worldwide. While some may dismiss meal-replacement drinks as lacking in nutritional value, manufacturers have been investing in improving the quality of these products, focusing on

providing essential nutrients for healthy development. As the industry continues to grow, research and development will play a key role in driving further innovation and growth in the market.

While many are turning to meal-replacement drinks for the convenience they offer, there is also a growing trend of using these beverages as a tool for weight loss. With the global market for meal-replacement shakes on the rise, manufacturers are catering to consumers looking for products that are nutritionally balanced and can aid in weight management. Additionally, governments in Europe are taking steps to combat obesity, and meal-replacement drinks are being seen as a potential solution to this growing health issue. The trendy packaging and celebrity endorsements associated with brands like Huel are also attracting a younger audience to the meal-replacement movement. Ultimately, the future growth of this market will depend on meeting customer demands and adapting to their preferences, with a focus on customization and innovation in formulations.





What is convenience? Universal definition need to better guide food and nutrition policy - new research

05-Feb-2024 - Food Navigator Asia

The review of 243 studies on convenience foods highlighted the lack of a clear and consistent definition of convenience and its interpretation within the food environment research.

Researchers noted that convenience is a significant factor in food choices and consumption, particularly in high-income countries like the United States. The predominant method for measuring convenience was through surveys or questionnaires, focusing on personal or home food environments and food acquisition or preparation behaviours.

There is a divergence in the conceptualization of convenience as a positive attribute related to time-saving practices as well as a negative attribute associated with unhealthy fast-foods or ultra-processed foods. This

ambiguity raises the question of whether convenience should be promoted or discouraged to improve public health nutrition.

The researchers recommended the development of assessment tools that can measure both perceived and objective aspects of convenience comprehensively in alignment with the multifaceted definition of convenience. Establishing a clear definition and assessment tools could aid in understanding how convenience influences consumer behaviour and inform policy interventions to promote healthy diets. (<https://www.sciencedirect.com/science/article/pii/S0195666323026600>)

Fats and oils: Healthy indulgence, targeting regional tastes and enhancing nutrition in the spotlight

31 Jan 2024 Nutrition Insight

The shift towards healthier options in the fat and oil sector is evident as consumers are becoming more conscious of their dietary choices.

Producers and suppliers are adapting to meet this demand by developing low-fat solutions and

products with minimal processing and fewer chemicals. Brands are innovating to create sustainable and versatile edible products that cater to the needs of health-conscious consumers. With a focus on clean label products, manufacturers are introducing new standards and technologies to enhance the sensory appeal of food while aligning with consumer values.

Companies like Cargill and Uelzena are leveraging their expertise to provide innovative solutions that deliver both nutrition and taste, meeting the growing consumer demand for healthier fats and oils in the market.

As the demand for healthy fats and oils continues to rise globally, it is important for companies in the food production industry to understand and cater to the diverse preferences of different regions. By offering a wide range of edible oils and oil blends that align with both local tastes and global standards, companies like ADM and Cargill are able to meet the needs of various consumer communities.





Through their global footprint and regional expertise, these companies are able to provide tailored solutions that not only meet consumer demands but also promote healthy eating habits across different cultures. With a focus on innovation and collaboration, these companies are setting a new standard for the development of globally accepted products that prioritize both taste and nutrition.

The traditional oil industry, like many other sectors in the food and beverage industry, is undergoing a transformation to become more sustainable in response to environmental concerns. At Oleon, transparency and traceability are key values when it comes to producing oil products. The company focuses on providing customers with plant and vegetable-based food oils that are not only high in quality but also have a lower environmental impact. Similarly, Uelzena is committed to sustainability in the dairy fat industry through projects that aim to reduce CO2 emissions and promote sustainable dairy farming practices. As the industry continues to

evolve, companies are anticipating consumer demands for healthier and more sustainable options. This includes developing oils that support overall health and wellness goals, as well as new extraction techniques to create heart-healthy fats without compromising taste or quality. Innovation is seen as a driving force in addressing these challenges and opportunities for growth in the industry.

Companies collab on natural ingredients, aim to replace banned ingredients

Cindy Hazen, Food & Beverage Insider, February 6, 2024

A range of natural betalain pigments spanning from yellow to purple have been created, offering a sustainable and efficient replacement for synthetic Red No. 3 in various food categories, with potential FDA approval pending.

The development of betalain pigments as a natural replacement for synthetic colours like Red No. 3 marks a significant milestone in the food industry. With the collaboration between Phytolon and Ginkgo Bioworks, the efficiency and affordability of producing these colours have been greatly improved. This advancement comes at a crucial time when there is

increasing pressure to find safe and sustainable alternatives to artificial colours that are facing bans in certain states.

The versatility of betalain pigments in spanning the entire yellow-to-purple spectrum opens up new possibilities for formulating naturally vibrant colours in a wide range of food products. The potential for these natural colours to replace synthetic dyes in various food categories, including savoury, dairy, ice cream, confectionary, and baked goods, highlights the positive impact on both the industry and the environment. The sustainability benefits of fermentation-based manufacturing further underscore the advantages of utilizing these natural pigments over agriculture-derived materials, leading to a reduction in greenhouse gases and overall carbon footprint. With FDA approval pending, manufacturers in the U.S. have the opportunity to explore the use of these innovative natural colours in their products, laying the groundwork for a more sustainable and colourful future in the food industry.





Sweet proteins may reduce sugar in foods, beverages by 90%

Rachel French, Contributing writer February 8, 2024

Sweet proteins are derived from fruits and berries found in West Africa and other equatorial environments. They boast a sweetness 5,000 times greater than sugar, as well as the potential to reduce sugar in foods and beverages by as much as 90%.

According to Jason Ryder, founder and CTO of Oobli, the sweet proteins are a class of proteins that deliver “a sugar-like sweetness but none of the negative health impacts. They are metabolized just like any other dietary protein – what makes them different is that they just happen to be sweet,” he said.

Sweet proteins are up to 5,000 times sweeter than sugar, according to Ryder. In fact, he said 1 gram of sweet protein is equivalent to about 2,000 grams of sugar. In application, it is possible to reduce sugar by as much as 90%. Sweet teas, for example, have 75% less sugar than other sweetened teas on the market. Further, to replicate the sweetness

in a bottle of orange soda, which has approximately 73 grams of sugar only 0.036 grams of sweet proteins would be needed.

Importantly, while sweet proteins are able to deliver a sugar-like sweetness, sweet proteins are biologically large molecules, while sugar and other sugar alternatives are small molecules. “This is important because it means they function differently in the body,” Ryder explained. “The latter (sugar and sugar alternatives) bombards the taste receptors on the tongue, whereas sweet proteins momentarily bind to them. Because of that, most people experience a slight delayed onset of the sweetness from sweet proteins.”

Similar to other high-intensity sweeteners, sweet proteins can’t be used to replace the bulking role that sugar often plays in certain foods. Chocolate bars, which slash sugar by 90% compared to traditional chocolate bars. “But because the typical chocolate bar can be made up of a whopping 50% sugar, we need to add something back in to replicate the bulking that the large amount of sugar provides,” Ryder explained. “We replicate that bulk with acacia fibre, which perfectly replicates the bulking of sugar but also adds about one-third of your

daily fibre requirement per serving.”

Oobli’s sweet proteins are also produced using precision fermentation, according to Ryder. “These plants are notoriously difficult to grow and fermentation allows us to produce sweet proteins at scale in a planet-friendly way that reduces our dependence on sugar production,” he said. The process of fermenting sweet proteins delivers a 60-90% improvement in land and water use compared to sugar and sugar alternatives.

Note:

Some of the most common sweet proteins include:
Thaumatococcus — 2,000-3,000x sweeter than sucrose, derived from the fruit of the katemfe plant in West Africa
Monellin — found in the fruit of the West African shrub, *Dioscoreophyllum cumminsii* (serendipity berry)
Miraculin — found in the berries of the Miracle Fruit plant, this one is kind of wacky; it’s not sweet in and of itself but binds to sweet receptors to cause sour-tasting acidic foods to be perceived as sweet.



So, you can actually ingest miraculin and then fully chomp into a lemon without making a Warheads face because it'll taste sweet. Cool, right?

Brazzein – from the oubli fruit, found in West Africa, 500-2,000x sweeter than sucrose, heat-stable, and highly soluble. (<https://oobli.com/blogs/news/what-are-sweet-proteins>)

Food and beverage businesses put sustainability into practice

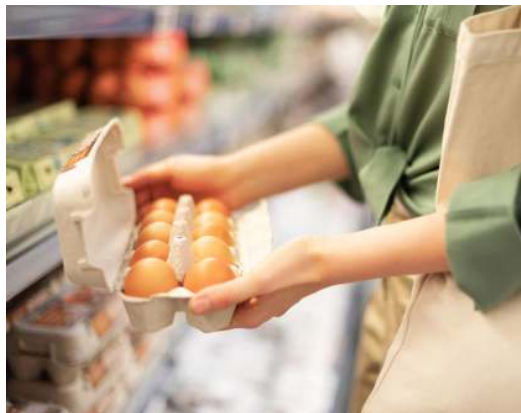
Kimberly Decker, Food & Beverage Insider February 22, 2024

Industry leaders are implementing innovative strategies, such as supply chain transparency, circular economy practices, renewable energy initiatives, fermentation technology and regenerative agriculture programs, to take responsibility for their environmental impact and create a more sustainable future.

By taking proactive steps to ensure transparency and sustainability in their operations, companies like Global Organics and Fiberstar Inc. are setting an important example for the food and beverage industry as a whole. In a world where the choices we make as consumers can have far-reaching effects on the

environment and on society, it is crucial for businesses to take responsibility for their actions and to work towards minimizing their negative impact.

The shift towards a circular economy, as exemplified by Fiberstar Inc.'s innovative use of byproducts and Global Organics' commitment to traceability, not only helps to reduce waste and minimize environmental harm but also opens up new opportunities for innovation and growth.



By closing the loop and repurposing materials that would otherwise go to waste, these companies are not only demonstrating their commitment to sustainability but are also creating products that are more environmentally friendly and socially responsible. As more companies in the food and beverage industry follow suit, we can hope to see a positive shift towards a more sustainable and responsible future for all.

By forgoing fossil fuels in their production processes, companies like World Centric and M2 Ingredients Inc. are making significant strides towards a more sustainable future. World Centric is not only using compostable packaging materials made from plants, but they are also focusing on increasing the percentage of their products made with renewable energy. They are directing a significant portion of their business spend towards third-party contract manufacturing facilities with on-site renewable energy and piloting an initiative to cost share renewable energy purchases from the grid at suppliers' facilities. M2 Ingredients Inc. is harnessing the power of fermentation to grow all their functional mushroom species in a sustainable manner.

Their solid fermentation platform minimizes land and water use, reduces carbon dioxide emissions, and eliminates the use of pesticides, herbicides, and processing solvents. By partnering with a family-run organic oats producer, M2 Ingredients Inc. is able to ensure the quality and sustainability of their products. These innovative approaches are not only benefiting the environment but also setting a positive example for the industry as a whole.



Regenerative agriculture is gaining traction as a necessary solution to the environmental challenges facing the agriculture industry. Companies like ADM and Cargill are leading the charge by implementing regenerative practices and programs that focus on soil health, biodiversity, and responsible resource management. These initiatives not only benefit the farmers and ecosystems involved but also contribute to sustainable food production and climate mitigation efforts.

The California almond industry is a prime example of how implementing regenerative practices, such as reducing water use and achieving zero waste, can lead to significant environmental benefits. By adopting innovative approaches like whole-orchard recycling and upcycling almond byproducts, these growers are setting an example for the industry as a whole. As we continue to prioritize regenerative agriculture, we have the potential to not only feed the world but also regenerate and sustain our planet's resources for future generations.

Sustainability and the meat industry: Balancing practical solutions with consumer choice

Rachel French, Food & Beverage Insider November 10, 2023

- Consumers are increasingly demanding more sustainable food options, according to representatives from Cargill and GFI.
- The focus on sustainability has led to innovations in alt-meat products, including plant-based and lab-cultivated meat.
- Both conventional and alternative proteins have a role to play in feeding the world's growing population sustainably.

Consumers are becoming increasingly aware of the impact of their food choices on the environment, leading to a shift towards more sustainable options. With research showing that a majority of consumers want food and nutrition brands to do more to protect the environment, the food industry is taking notice and responding with innovative solutions. One particular area of focus is the meat industry, which has been criticized for its significant contributions to greenhouse gas emissions. This has led to the rise of alternative meat products, such as plant-based alternatives and lab-cultivated meat,

offering consumers more environmentally-friendly options.

Priera Panescu, a plant-based specialist, highlights the inefficiency of animal agriculture, which utilizes a large portion of agricultural land but contributes a relatively small percentage of total calories. She advocates for a shift towards alternative proteins, which require significantly less land to produce the same amount of protein. Meanwhile, Jeff Fitzpatrick of Cargill emphasizes the importance of offering consumers choice when it comes to protein options, while also working towards more sustainable practices within the industry.

Through initiatives like Cargill's BeefUp Sustainability program and the use of technology to improve land management, the food industry is taking steps towards a more sustainable future. Ultimately, by providing consumers with a variety of protein choices and working towards more responsible practices, the industry is aiming to feed a growing population while minimizing its environmental impact.



Transparency, plant based, tech among top F&B trends in 2024

Rachel French, Food & Beverage Insider, February 1, 2024

The food and beverage industry is constantly evolving to meet the demands of shifting consumer preferences, new technologies, and emerging ingredients and diets. Here are four key trends identified by Mintel and International Food Information Council (IFIC) that are expected to hit foods and beverages in 2024.

IFIC's trend prediction, "More Than Just a Label," expects that consumers will place more emphasis on transparent food labelling in 2024 to help them make more informed decisions about the foods and beverages they consume. The organization predicts labels that consumers associate with healthfulness, such as "clean," "cold-pressed" and "fermented," will stay top of mind.

Similarly, Mintel's Global Food and Drink Trends report indicated as part of its "Trust the Process" trend prediction that consumers

are applying more scrutiny to processed foods and beverages. For example, 79% of Chinese adults ages 50 to 65 years said eating less processed foods is a very/somewhat effective way to improve health. In the U.S., 34% of adults said highly processed is a top concern when purchasing foods and beverages.

Looking specifically at plant-based trends, Mintel analysts forecast that the plant-based market could grow to \$160 billion by 2030. What's more, Mintel's Global New Products Database shows that the number of new CPGs with a plant-based claim increased by 302% between 2018 and 2022. Despite this, the plant-based market is being impacted by consumers' financial concerns, which are driving consumers away from more costly plant-based meat alternatives.

In its "Age Reframed" trend, Mintel predicts Gen X, the generation sandwiched between Boomers and Millennials, will forge a new path for healthy aging products that meet the needs of an "extended health-span," defined as the period of life spent in good health. With ages ranging from the mid-40s to the late-50s, Gen Xers are

actively seeking out products that will meet their health needs today and in the future, and will rely on brands in the coming year to guide them through the transition from middle to older adulthood.

On the other end of the age spectrum, IFIC points to the growing influence of social media on Americans' food and beverage behaviours in its "Swipe, Like, Eat" trend prediction. Compared to other generations, especially older generations like Millennials, Gen Z food behaviours are more likely to be shaped by social media — a trend IFIC predicts will continue in 2024.

Technology is expected to ramp up convenience by helping consumers meal plan, shop and cook, Mintel predicts in its "Eating, Optimized" trend. For consumers, convenience in the kitchen is shaped by saving time — a priority across the globe. For instance, 51% of Canadians consider the time it takes to cook when planning or preparing home-cooked meals, and 48% of U.S. consumers choose food that is quick to prepare all or most of the time, Mintel data show.



REGULATORY NEWS

Is Nutri-Score misleading? New research advocates for rigorous independent testing

14 Feb 2024 Nutrition Insight

A new comprehensive review of studies examining the Nutri-Score front-of-pack nutritional ranking system points out that many of the studies drawing positive conclusions about the system were conducted by its developers or associates.

The researchers call for the system to be evaluated by independent scientific food authorities and for real-life evidence of its benefits. "While it seems that the majority of study outcomes on Nutri-Score are favourable, the vast majority is carried out by team Nutri-Score," Dr. Stephan Peters, manager of dairy, nutrition, health and sustainability at the Dutch Dairy Association and one of the study's authors tells Nutrition Insight. The paper finds that the majority of papers conducted by

"authors who are employed by or connected with the developers of Nutri-Score" are favourable toward the system. In contrast, the majority of those conducted by "independent" researchers are found to be unfavourable toward it.

The authors further question the adequacy of a multi-nutrient algorithm like the Nutri-Score system, which scores items' healthfulness only within the food category it has been placed in but not against other categories, which could lead to confusion. "Nutri-Score does not function well for some product groups like cheese, potatoes, nuts and seeds, among others. The European Commission cannot make the Nutri-Score mandatory if it scores food groups incorrectly. First, these problems have to be solved," Peters states. "The golden bullet study on Nutri-Score's efficacy would be a study where it is applied in a complete supermarket assortment, and then based on actual

purchases, the effect on the algorithm should be applied. Such a study does not exist."

The scientific review of 180 papers about the Nutri-Score published in 2016-2023, 104 were found to be relevant to the investigation. Of those 52 were conducted by scientists affiliated with the ranking system and have findings that are positive of the system and only four negative. Meanwhile, 19 of the studies by non-affiliated scientists have positive findings and 30 negative. Addressing the possibility of an EU-wide adoption of a front-of-pack nutrition label, with Nutri-Score being the front-runner, Peters comments: "We advocate for more studies on the potential efficacy of Nutri-Score to be carried out independently of 'team Nutri-Score'. In addition, if Nutri-Score is a candidate for a mandatory front-of-pack label in the EU, then EFSA should make an independent opinion on its validation and efficacy."

The authors of the paper argue that to demonstrate the usefulness of the Nutri-Score, studies need to be conducted in a complete supermarket range in order to show that more products with a Nutri-Score A and B or fewer products with D and E have been purchased.

Discussing the feasibility of front-of-pack nutritional ranking system alternatives, Peters argues that they face many of the same issues as the Nutri-Score and should thus all be “considered as experimental.” “We do not know exactly what the real-life effects are. This is not unique to the Nutri-Score. If they do have a positive effect, it will be very small. With Nutri-Score, we have observed that the effect can even be negative.” Peters suggests consumers trying to navigate nutritional information to “ignore front-of-pack logos” and instead “look at the food-based dietary guidelines in your country and let those be the compass for healthy eating.”

By Milana Nikolova
(<https://www.sciencedirect.com/science/article/pii/S213434424000069?via%3Dihub>)

Nutri-Score creator doubles down on system accuracy amid industry opposition

28 Feb 2024 Nutrition Insight

Serge Hercberg, professor of nutrition at the faculty of medicine at Sorbonne Paris North University, France, whose work forms the basis of the Nutri-Score, speaks to Nutrition Insight about our recent interview with Stephan Peters, manager of dairy, nutrition, health and sustainability at the Dutch Dairy Association.

In the interview, Peters questioned the validity of the Nutri-Score and outlined the arguments presented in his recent literature review of scientific papers about the front-of-pack nutritional labelling system. The literature review, conducted alongside Dr. Hans Verhagen, a scientific and regulatory expert at the Dutch Food Safety and Nutrition Consultancy and former senior science coordinator at the European Food Safety Authority (EFSA), argues that the majority of positive papers on the topic were published by the actors associated with the Nutri-Score.

“Concerning the paper by Peters and Verhagen, it



represents an emblematic example of the strategy of lobbyists trying to cast doubt on the front-of-pack nutrition label Nutri-Score and to discredit a public health measure they consider as opposed to their interest,” Hercberg tells us. “This article is riddled with inaccuracies, inconsistencies and errors. The text presents biased arguments leading to erroneous conclusions,” he continues. “As such, it does not meet the standards of a true scientific article.”

Arguments against

A chief argument made by Hercberg against the paper criticizing the Nutri-Score, published in the journal *PharmaNutrition*, is that the Dutch Dairy Association funds it and that its authors are working for organizations involved in lobbying against the Nutri-Score, including the Dutch Dairy Association and Verhagen’s consultancy that includes the European Association of Sugar Manufacturers among its clients.





“Using the appearance of a scientific article, it is a pamphlet written by two authors that work for an industry trying to cast doubt on academic science and to make serious accusations toward public research teams to discredit the front-of-pack nutrition label Nutri-Score,” Hercberg says. He further argues that the paper by Peters and Verhagen targets a recent article published in *BMJ Global Health* (<https://gh.bmj.com/content/8/5/e011720.full>), which finds that a study is 21 times more likely to find unfavourable results about Nutri-Score if the authors declare a conflict of interest or if the study is funded by a food industry player.

A post responding to the paper published on the official Nutri-Score blog and supported by 16 scientists working in the field of food and nutrition suggests that the paper attempts to minimize the link between economic conflict of interest or funding and study results. Responding to the accusation that most positive studies on the

ranking system are conducted by academic researchers who developed the Nutri-

Score, stating that the validation studies on it have been conducted only with public funding and in collaboration with other research teams or public institutions, such as the WHO. The authors of the blog post state that it is hypocritical to accuse the Nutri-Score developers of bias without acknowledging their own conflict of interest.

Errors

The Nutri-Score blog post further questions the validity of Peters’ and Verhagen’s paper, stating that it is full of “inaccuracies, inconsistencies, errors and biased arguments leading to erroneous conclusions.” These include discrepancies and inconsistencies in the inclusion and exclusion criteria of scientific papers in the review, misclassification of papers as favourable, neutral or unfavourable to the Nutri-Score, errors in the number of studies included, inconsistencies between text and tables, biased definitions and conflict of interest.

Correcting for the perceived errors in the review, the Nutri-Score post states that “Of the 69 studies considered favourable to the Nutri-Score, only one (1,4 %) included declarations of a conflict of interest or indicated that the authors had received funding from a structure linked to a food company.”

“Conversely, 10 of the 24 studies presenting results which are unfavourable to Nutri-Score (41.7%) included a conflict of interest by the authors or had received funding from food professional organizations defending the interest of food companies or agro-food sectors.”

It concludes that the probability for an article to show results that are unfavourable to the Nutri-Score is 33 times higher when a paper is funded by the food industry or when the authors declare a conflict of interest. In April, the Belgian EU council presidency is set to hold a scientific symposium to discuss the implementation of an EU-wide front-of-pack nutrition labelling system. Nutri-Score is currently the frontrunner labelling system within the blog. In a recent interview with *Nutrition Insight*, Hercberg expressed his support for the EU-wide adoption of the system.

By Milana Niklova

EIT Food calls for improved labels and education to address confusion over ultra-processed foods

14 Feb 2024 Nutrition Insight

"As a result, consumers may be unintentionally consuming more UPFs than they realize, which can have negative implications for their health in the long run," he adds.

The EIT Food Consumer Observatory's research highlights the need for better education and awareness around UPFs and their impact on health. By providing clear information and guidance to consumers, the organization hopes to empower individuals to make more informed choices about their food consumption and ultimately improve their overall health and well-being.

The report emphasizes the need for clearer labelling, guidance, and education for consumers to better understand and engage with the issue of ultra-processed foods. It argues that concerns over processed food should be considered in the wider context of people's diets and overall well-being. Furthermore, the report stresses the importance of continually improving our understanding and agreement on how we classify, evaluate, and label



surrounding food processing and consumer preferences. Concerns over ultra-processed foods (UPFs)

foods, using the latest scientific knowledge to inform consumer advice. Overall, the report sheds light on the complexity and confusion surrounding ultra-processed foods, highlighting the need for increased awareness and education on the topic for both consumers and experts alike.

The report highlights the complex relationship between consumers and ultra-processed foods (UPFs). While healthier food choices are linked to a lower consumption of UPFs, a significant portion of consumers still believe these products can be part of a healthy diet. Convenience, price, and taste are the main driving factors behind the choice of UPFs, with many viewing them as a special treat. Despite concerns about the nutritional content of UPFs, many consumers do not see themselves cutting back on these products but instead aim to strike a balance with more homemade and less processed foods. The findings of this report shed light on the evolving attitudes and behaviours

may deter consumers from choosing plant-based alternatives to meat and dairy products, according to a recent report. Over half of consumers avoid plant-based substitutes due to worries about UPFs, particularly among those who typically consume meat and dairy. Many view options like vegetarian chicken pieces and vegan cheese slices as highly processed, even more so than their animal-based counterparts.

However, consumers who regularly opt for plant-based alternatives are less likely to perceive these products as unhealthy due to their ultra-processed nature.

Additionally, a large majority of consumers believe UPFs are harmful to the environment, with those who prioritize sustainability showing even greater concern. While foods derived directly from plants are perceived as more sustainable, UPFs are seen as resource-intensive and environmentally damaging due to the processing involved.



The report provides valuable recommendations for various stakeholders in the food industry to address the knowledge gap on ultra-processed foods (UPFs) among consumers. It calls for health institutions and scientists to clearly define UPFs and provide evidence-based information on their impact on health. Governments are urged to differentiate between whole foods and UPFs in national food recommendations to help consumers make informed choices. Manufacturers are encouraged to consider cleaner labelling for UPFs, especially plant-based substitutes, while retailers are advised to promote non-UPF packaged foods over UPFs.

Overall, the report emphasizes the importance of empowering consumers with the information they need to make healthier and more sustainable food choices, ultimately leading to a better food system for everyone. (<https://www.eitfood.eu/consumer-perceptions-unwrapped-ultra-processed-foods>)

Size matters when it comes to listing calorie counts, as customers may be more likely to choose a menu item when nutrition info is printed in a larger typeface.

By Patricia Cobe on Jan. 30, 2024 Restaurant Business Online

This information highlights the impact of font size on consumer decision-making when it comes to choosing between indulgent and healthier menu options.

The research by Dr. Ruiying Cai suggests that when calorie counts are displayed in a larger font size, customers are more likely to choose the healthier option, especially when feeling time-pressured. This effect is stronger for consumers who are not particularly health conscious.

The Food & Drug Administration requires larger restaurant chains to post nutrition information on menus, but some establishments voluntarily do so as well. Despite concerns about the cost and design impact of menu labelling, simple changes like increasing the font size of calorie counts could encourage customers to make healthier choices.

Overall, this research



suggests that font size can play a significant role in nudging consumers towards healthier options, making it an easy and inexpensive way for restaurants to promote better eating habits. (<https://www.sciencedirect.com/science/article/abs/pii/S0278431923001020?via%3Dihub>)

Fermentation-based stevia with 'cleaner, sugar-like profile' wins EFSA safety nod

01-Feb-2024 - Food Navigator

Avansya, the joint venture between ingredients majors Cargill and DSM-Firmenich, has achieved a significant milestone with the positive safety opinions for its EverSweet stevia sweetener from both the European Food Safety Authority (EFSA) and the UK's Food Safety Authority (FSA).



The EFSA Panel on Food Additive and Flavourings evaluated the production process of EverSweet, which involves fermenting simple sugars using a genetically modified yeast strain to produce steviol glycosides. The panel found that viable cells and DNA from the production strain were not present in the final product, and existing data on related steviol glycosides can be applied to EverSweet. With no safety concerns at the current acceptable daily intake, the sweetener is poised for final authorization in Europe. Available in North America, EverSweet offers a new innovative sweetening solution for food and beverage manufacturers.

EverSweet, developed by Evolva, Cargill, and DSM, stands out in the world of sweeteners due to its unique composition of steviol glycosides. Unlike traditional stevia sweeteners, which often have a bitter aftertaste, EverSweet contains a blend of steviol glycosides such as Reb M and Reb D that offer a cleaner, more sugar-like taste. This innovative approach has led to successful commercialization in the US in 2019 and pending regulatory approval in Europe. The partnership between Evolva, Cargill, and DSM under the Avansya JV showcases the

collaborative effort and dedication required to bring this groundbreaking product to market. With its potential to provide a healthier alternative to sugar without compromising on taste, EverSweet is poised to revolutionize the sweetener industry.

Avansya's innovative use of yeast to produce EverSweet allows for the creation of a high-quality, natural sweetener that mimics the taste of stevia leaf-derived glycosides. By carefully controlling the fermentation process, Avansya is able to produce Reb M and Reb D, the sought after sweet components, without any additives or chemicals. This process ensures that EverSweet is a pure and clean product that is safe for consumption. The rigorous regulatory approval process for EverSweet demonstrates the commitment to ensuring the safety and quality of this groundbreaking sweetener, setting a new standard for the industry.

EverSweet, touted as Avansya's 'premium' sweetener, represents a significant advancement in the realm of sugar reduction. CEO Ohmes highlights the improved sweetness profile of EverSweet, allowing for deeper reductions in sugar in a variety of food and beverage applications. The



company promotes its use in a wide range of products, including beverages, dairy alternatives, cereals, bars, and confectionery. Recent research suggests that consuming stevia sweetener, like EverSweet, does not negatively impact gut microbiota. However, the effectiveness of non-sugar sweeteners in weight management remains a topic of debate. Ohmes emphasizes the importance of EverSweet in meeting consumer demands for low or no sugar options. In addition to its health benefits, EverSweet is considered more environmentally sustainable than other stevia sweeteners, with less use-related impacts, a lower water footprint, and a reduction in carbon footprint.

'Vegan' labels don't always mean free from animal products

By Augustus Bambridge-Sutton02-Feb-2024 - Food Navigator Europe





In order to better protect consumers and ensure the integrity of vegetarian and vegan products, there is a growing call for the legal definition of terms like 'vegan,' 'vegetarian,' and 'plant-based.'

With no legal threshold for trace elements of animal products in 'vegan' labelled items, consumers are left vulnerable to unintentionally consuming meat or allergens. This lack of regulation not only puts individuals following a plant-based diet at risk, but can also have serious consequences for those with allergies. Establishing clear guidelines and standards for these labels would not only provide peace of mind for consumers, but also prevent potentially harmful situations. As the popularity of vegetarian and vegan diets continues to rise, it is important for lawmakers and regulatory bodies to take action to protect the health and safety of those who choose to follow these dietary lifestyles.

While there may not be a legal definition of 'vegan' in the EU, there are steps that can be taken by manufacturers to ensure their products are truly

vegan. By setting limits on trace amounts of allergens and ensuring that all companies adhere to these standards, consumers can have confidence in the accuracy of labels such as 'vegan' and 'plant-based.' Brigid McKeivith highlights the importance of transparency when it comes to ingredients, as products labelled as vegan may still contain non-vegan substances such as cochineal, isinglass, shellac, albumin, and vitamin D3. By enforcing stricter guidelines and holding manufacturers accountable for misleading consumers, the integrity of vegan products can be preserved, protecting not only those with allergies but also those who choose a vegan lifestyle for ethical reasons.

The lack of regulatory requirements for labelling products as 'not suitable for vegans' can pose challenges for consumers following a vegan lifestyle. Products that may contain hidden animal-derived ingredients, such as shellac on oranges for freshness, may not be clearly labelled as such. This means that vegan consumers need to carefully scrutinize ingredient lists and educate themselves on lesser-known animal-derived ingredients. The definition of 'vegan' is not regulated, leading to inconsistencies in labelling practices across different products and

stores. The Vegan Society's definition of veganism emphasizes the exclusion of all forms of animal exploitation and cruelty. Consumer confusion may arise from 'may contain' statements for dairy and milk on products labelled as vegan. Clearer regulations and labelling practices could help prevent this confusion and ensure that products marketed as vegan are truly free from animal-derived ingredients.

Ultimately, businesses must market their products as vegan in good faith to comply with food labelling rules.

FSSAI directs e-commerce FBOs to classify food being sold as health drinks

FSSAI noted instances of food licensed under Proprietary Food with nearest category Dairy-Based Beverage Mix or Cereal-Based Beverage Mix or Malt-Based Beverage being sold under category Health Drink

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Food safety standards regulator FSSAI on Tuesday directed all e-commerce Food Business Operators (FBOs) to ensure appropriate categorization of food products being sold on their websites.

The Food Safety and Standards Authority of India (FSSAI) has noted instances of food products licensed under 'Proprietary Food' with the nearest category Dairy-Based Beverage Mix or Cereal-Based Beverage Mix or Malt-Based Beverage being sold on e-commerce websites under the category Health Drink', Energy Drink', etc, it said.



"The FSSAI has clarified that the term Health Drink' is not defined or standardized anywhere under the FSS Act 2006 or rules/regulations made thereunder. Therefore, FSSAI has advised all e-commerce FBOs to promptly rectify this misclassification by removing or de-linking such drinks or beverages from the category of Health Drinks / Energy Drinks' on their websites and place such products in the appropriate category as provided under the extant law," the regulator said.

'Proprietary Foods' are items of food that are not standardized in the Food Safety and Standards (Food Product Standards and Food Additives) Regulation; and Food Safety and Standards (Health Supplements, Nutraceuticals, Food for Special Dietary Use, Food for Special Medical Purpose, Functional Food, and Novel Food) Regulations but use standardised ingredients.

FSSAI further said the term Energy' Drinks is permitted to be used only on the products licensed under Food Category System (FCS) 14.1.4.1 and 14.1.4.2 (Carbonated and Non-carbonated water-based flavoured drinks), standardized under sub-regulation 2.10.6 (2) of Food Product Standards and Food Additives Regulations 2011 (Caffeinated Beverage).

"This corrective action aims to enhance clarity and transparency regarding the nature and functional properties of the products, ensuring that consumers can make well-informed choices without encountering misleading information," it added.

(https://www.business-standard.com/industry/new/fssai-directs-e-commerce-fbos-to-classify-food-being-sold-as-health-drinks-124040201017_1.html)



SFA recalls Everest fish curry masala for presence of ethylene oxide

Srinivas, Deccan Chronicle, 20 April 2024 Hyderabad:

Singapore Food Agency (SFA) recalled Everest fish curry masala from India due to the presence of Ethylene Oxide at levels exceeding permissible limit.

The Centre for Food Safety (CFS) in Hong Kong has issued a notification on the recall of Everest fish curry masala from India due to the presence of ethylene oxide at levels exceeding permissible limit. As the implicated products were imported into Singapore, the SFA has directed the importer, Sp Muthiah & Sons Pvt. Ltd., to recall the products. The recall is ongoing.

According to SFA media release, Ethylene oxide is a pesticide that is not authorised for use in food. It can be used to fumigate agricultural products to prevent microbial contamination.



Under Singapore's Food Regulations, ethylene oxide is allowed to be used in the sterilisation of spices. Although there is no immediate risk to consumption of food contaminated with low levels of ethylene oxide, long term exposure may lead to health issues. Therefore, exposure to this substance should be minimized as much as possible.

Consumers who purchased the implicated products are advised not to consume it. Those who have consumed the implicated products and have concerns about their health should seek medical advice. Consumers may contact their point of purchase for enquiries. The CFS of the Food and Environmental Hygiene Department also announced that samples of several kinds of prepackaged spice

mix products were found to contain a pesticide, ethylene Oxide. Members of the public should not consume the affected products. The trade should also stop using or selling the affected products immediately if they possess any of them.

Product details are as follows: Madras curry powder (spice blend for madras curry), sambhar masala mixed masala powder and curry powder mixed masala powder, all three under the brand - MDH and Everest fish curry masala. A spokesman for the CFS said, "The CFS collected the above-mentioned samples from three retail outlets in Tsim Sha Tsui respectively for testing under its routine food surveillance programme. The test results showed that the samples contained a pesticide, ethylene oxide. The CFS has informed the vendors concerned of the irregularities and instructed them to stop sale and remove from shelves the affected products. According to CFS's instructions, the

distributors/importers concerned have initiated recalls on the affected products. Members of the public may call the respective hotlines above during office hours for enquiries about the recalls of the products concerned.

The spokesman continued, "The International Agency for Research on Cancer has classified ethylene oxide as a Group 1 carcinogen. According to the Pesticide Residues in Food Regulation (Cap. 132CM), a food for human consumption containing pesticide residue may only be sold if consumption of the food is not dangerous or prejudicial to health. An offender is liable to a maximum fine of \$50,000 and to imprisonment for six months upon conviction." The CFS will alert the trade, continue to follow up on the incidents and take appropriate action. Investigations are ongoing.

<https://www.deccanchronicle.com/nation/sfa-recalls-everest-fish-curry-masala-for-presence-of-ethylene-oxide-890327>

