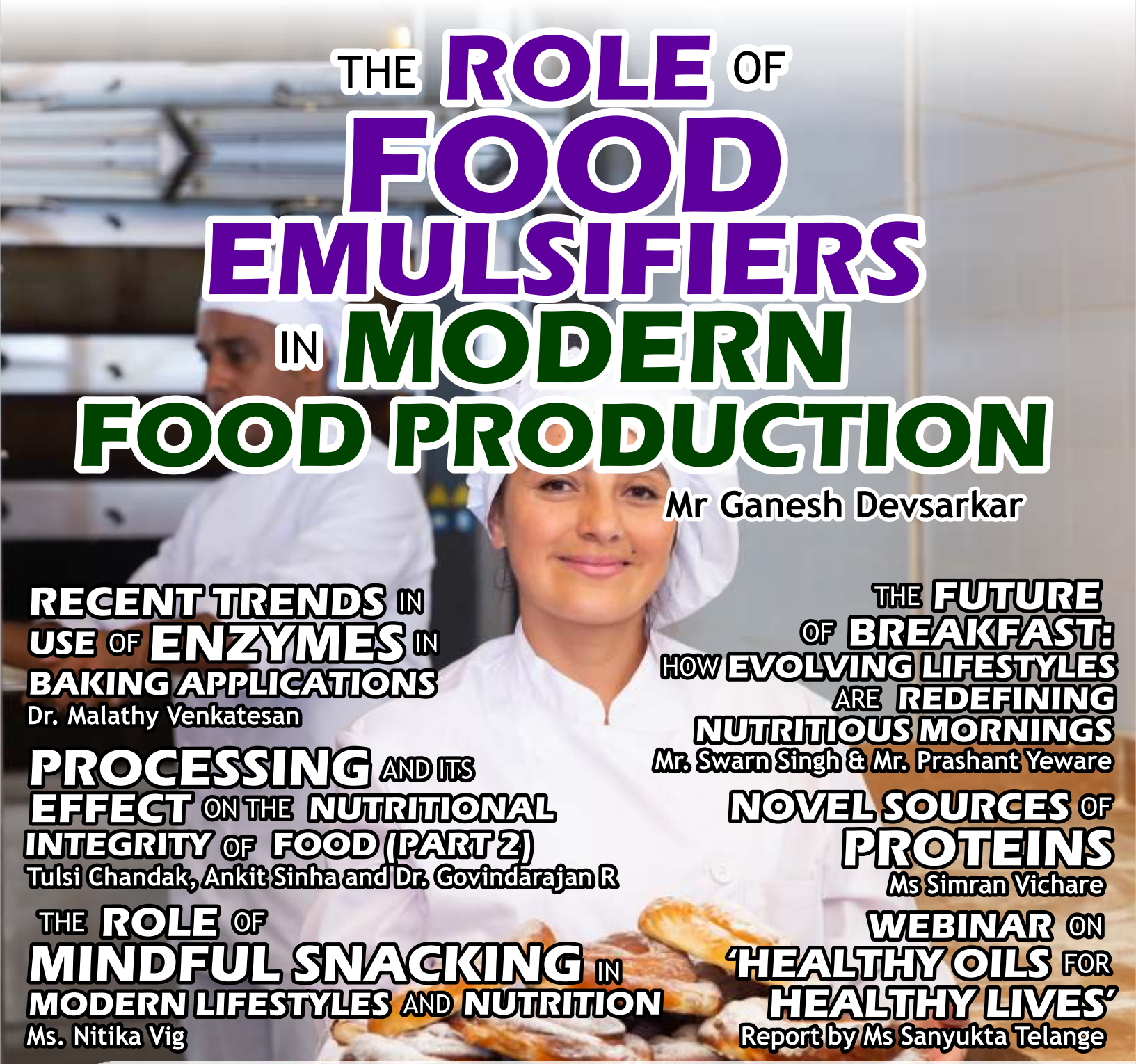
PFNDAI

FOOD, NUTRITION & SAFETY MAGAZINE

BULLETIN MAR 2025



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PROTEIN FOODS AND NUTRITION DEVELOPMENT ASSOCIATION OF INDIA

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Parameters	Control	T1	T2
Fat (%)	100	100	90
Emulsifier		Lecithin (322)	Finamul 4087L
Cream density	0.618	0.569	0.557
Avg. height of 10 biscuits (cm)	8.4	9.4	9.5
Avg. Weight of 10 biscuits (g)	111.2	111.5	114
Avg. Diameter (cm)	5.6	5.5	5.5
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ARE WE REALLY TRYING TO KEEP PEOPLE HEALTHY?

We have always been saying that the Recommended Dietary Allowance (RDA) is the amount of a nutrient needed to maintain health that is prophylactic. Anything above that is therapeutic dose amounting to medicine or drug.

When people are deficient in certain vitamin or mineral, over time they may manifest the deficiency disease symptoms. Then we need to give them therapeutic doses to cure the disease. So, if they are deficient in iron, then they will get anemia, the disease with symptoms such as fatigue, weakness, pale skin, fast heartbeat or shortness of breath, headache or dizziness, and some other symptoms. We need to cure this disease that requires several times the RDA doses for some time.

We should be getting balanced diet with adequate amounts of iron-rich foods to get enough iron so the RDA would be met. In case we do not get adequate iron through our normal diet, then we could eat iron-fortified food products so we could still meet the RDA. Our regulators don't allow, fortification with more than 1 RDA as they say anything higher than that is therapeutic and will be considered a medicine.

The problem lies when people are deficient in iron without showing any symptoms of anemia. If we try to give them fortified foods, that would only give them 1 RDA that is enough to use it for one day and every day, but it will not fill the deficiency. You supply 1 RDA; they use up 1 RDA and the net balance is still negative. We need to supply more than 1 RDA just to fill the deficiency over time. This is not therapeutic dose, because they are still not showing symptoms of the disease. They are just deficient and not diseased. So, supplying more than 1 RDA is not cure or medical treatment but ensuring that they do not fall ill with anemia.

By denying them higher than 1 RDA through diets, we are pushing them to a state where they will be anemic, showing symptoms of the disease and then we will try to cure them. We should think of keeping people healthy and not push them to become sick and then try to cure them. That way, doctors certainly will be very happy but people will not be cared for. This is a bureaucratic way of regulation and not scientific. We should try to maintain health as much as possible by common means available to people through diet and dietary supplement and in case of inevitable circumstances, doctors should be involved.

Over decades, our diets have changed due to urbanization and lifestyle changes and we started living far away from fresh foods. So, at times we need to ensure the supplementation of diet with essential nutrients so we do not fall ill with diseases. Nowadays cure is so much more expensive than prevention. Let us give enough opportunity for prevention.

Prof Jagadish Pai, Editor, PFNDAI

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- Alcoholic and non alcoholic products
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- Sweets.,confectionary and its products
- Bakery products
- Sugar, Honey & jaggery
- Process, canned food products
- Feeds
- Water
- Ready to eat
- Infant substitute
- Skim Milk Powder

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- Food additives, preservetives and artificial sweetners
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- Drinking water as per IS 10500
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HEALTH SUPPLEMENTS: AN UNPREDICTABLE BUSINESS DESPITE THE LAW

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PFNDAI

After considering stakeholders' objections and concerns of interested parties during public notice, health supplements were classified as food (FSSA 2006).The law finally settled preceding tussles between the Food and Drugs administrations, assuring market stability. When India's first health supplement regulation in 2016 stated that "mere combinations of vitamins formulated in tablets, capsules, and pills would not be covered under the regulation" - although this was reversed in 2021 - it was apparent the law was not final, to some. Who benefits from introducing unpredictability in business, aside from unease? Whose interests are served by dismantling an integrated food law through reclassifying health supplements as drugs? Why is a risk-based law (FSSA) regulating supplements effective in other countries but not India? These questions should evoke scrutiny.

Albert Einstein's quote deserves the attention of those discussing this matter: "If I were given one hour to save the planet, I would spend 59 minutes defining the problem and one minute resolving it." The Interministerial Committee (IMC) faces a dilemma in justifying the shift of health supplements (nutraceuticals) to drugs without supporting evidence or examination. A clear term of reference (TOR) would be: (a) determine whether the stated issues (actually symptoms) regarding false claims, GMP, safety assessments, and vitamin overlaps can be resolved within the risk-based framework of the FSSA, its rules, and regulations; and (b) if a finding of deficiency necessitates transitioning to another operating legal framework, demonstrate how it is superior or scientifically justified. Note that the finding should relate to the inherent competence of the respective Acts: the FSSA (2006) and the Drug & Cosmetic Act (1940). Administrative inefficiencies are internal matters prevalent in every ecosystem, and transferring responsibility does not resolve them.

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In a prelude to enactment of FSSA, the Joint Parliamentary Committee (JPC2004) noted that scientific evidence and logic were essential for enhancing India's regulatory capabilities. "This entirely new philosophy should be built on a fresh foundation with resources aligned to the new policy."

In reviewing the FSSAI's performance, JPC (2018) observed that infrastructure, qualified resources, and leadership had been lacking from the beginning. Instead, "existing employees and institutional structures were cobbled together to run the new system". Without adequate resources, FSSAI's best efforts were frustrated in delivering the Act's mandates. These observations are revealing and crucial to defining the problem. The IMC ignores these observations.

Legislation repealing PFA and consolidating multiple laws scattered across various ministerial departments was a visionary move (JPC 2004). The shortcomings in FSSAI's performance underscore a critical gap between a visionary framework and the pragmatic realities of implementation.

The persistent neglect of FSSAI's foundational capabilities suggests a systemic indifference towards progressive legislation, which is now being exploited. The IMC recommendation is merely increasing the distance from where problems are to another place of unknown capabilities. This is not a solution, but the foreseeable fate of any visionary legislation or government reform measure.

Interestingly, drug price control is raised as an issue, likely the real one.

The Economic Survey 2024-25 on deregulation notes "Quite a significant chunk of the complicated compliance requirements stems from the efforts of businesses wanting to keep out domestic and foreign competition to the detriment of other industries and the economy. Guess whose interests are being served in shifting health supplements to drugs?

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THE ROLE OF FOOD EMULSIFIERS IN MODERN FOOD PRODUCTION

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In today's rapidly evolving food industry, food additives play a crucial role in enhancing the quality, safety, and longevity of products we consume daily. Food additives, substances added during food processing, serve various functions, including improving texture, enhancing appearance, increasing shelf life, and maintaining nutritional value.

While their presence often raises eyebrows among consumers, additives are essential in delivering premium food products that meet the diverse needs of a global market. These additives are safe and permitted to use in foods to deliver certain objectives. Two prominent organizations involved in this approval process are the Joint FAO/WHO Expert Committee on Food Additives (JECFA) and in India, the Food Safety and Standards Authority of India (FSSAI). Each follows a meticulous procedure to assess the safety and efficacy of food additives, contributing to public health and safety across the globe. Their work helps ensure that food additives used in international trade are safe for consumption. This helps to protect public health and ensure food safety.

FAO/WHO JECFA Approval Process

1. Submission of Data: The journey begins with manufacturers submitting comprehensive scientific data regarding the food additive in question. This includes a detailed account of its chemical composition, intended use, and potential exposure levels consumers might face.

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2. Risk Assessment: Once the data is submitted, JECFA conducts an in-depth risk assessment. This critical step evaluates the toxicological data, assesses potential health effects, and provides an exposure assessment. Both animal and human studies are thoroughly reviewed to ensure safety.

3. Establishing Acceptable Daily Intake (ADI): Following the risk assessment, JECFA determines an Acceptable Daily Intake (ADI). This figure represents the amount of the food additive that individuals can safely consume each day over a lifetime without significant risks to their health.

4. Exposure Assessment: The committee then assesses potential exposure to the additive through food consumption, estimating its levels in various food products. This estimation is critical as it allows for a realistic understanding of how much of the additive people might typically consume.

5. Safety Evaluation: Subsequently, JECFA evaluates the overall safety of the additive by combining the findings from both the toxicological data and exposure assessments. If deemed safe, the committee issues recommendations regarding its use, including any specific conditions or limitations necessary to mitigate risk.

6. Publication of Findings: JECFA then publishes its findings, including the rigorous risk assessment, established ADI, and any accompanying recommendations in monographs and reports. These documents are made publicly accessible and provided to regulatory authorities for further action.

7. Codex Alimentarius Commission (CAC) Review: Finally, JECFA's recommendations undergo a review by the Codex Alimentarius Commission, which may adopt these findings into internationally recognized food standards, guidelines, or codes of practice, thus influencing food safety regulations globally.

FSSAI Approval Process

1. Application Submission: Food Business Operators (FBOs) initiate the process by submitting a detailed application for the approval of food additives. This application includes essential information about the additive, its intended use, and supporting scientific evidence.

2. Preliminary Scrutiny: Upon receiving applications, FSSAI performs a preliminary scrutiny to ensure that all requisite documents and information are provided.

3. Risk Assessment: Similar to JECFA, FSSAI conducts its own risk assessment, reviewing toxicological data and evaluating potential health effects. This involves a thorough review of safety studies submitted in support of the additive.

4. Expert Committee Review: The application is then examined by an expert committee that assesses the safety of the additive based on the data submitted and the findings of the risk assessment.

5. Public Consultation: FSSAI may further seek public comments on the proposed approval, thereby allowing stakeholders to weigh in on the potential use of the additive, fostering transparency and inclusivity.

6. Final Decision: After considering the expert committee's recommendations and public feedback, FSSAI makes a final decision regarding the additive's approval. If granted approval, the additive is added to the list of permitted substances with specific conditions for its use.

7. Notification and Publication: Finally, FSSAI notifies the approval outcome, publishing the details in the official gazette and updating relevant regulations accordingly.

Food additives can be classified into several categories, each with a specific function:
-Colours: Enhances the visual appeal of food by providing various colours. Commonly used in beverages, candies, cakes and snacks.
-Preservatives: Extends shelf life by preventing the growth of bacteria, yeast, and fungi. Calcium propionate often found in breads, whereas sorbic acid or potassium sorbet founds in cakes, fruit juices, various snacks & Etc.
-Emulsifiers: Aid in mixing components that usually don't blend well, such as oil and water. Used in products like margarine, chocolate, and baked goods. Monoglycerides in bakery products, PGPR (Polyglycerol Polyricinoleate) & AMP (ammonium phosphatide) it's a lecithin alternative used in chocolate production to achieve similar properties to phospholipids, but without the typical soya bean odour and flavour.
- Acidity Regulators: Maintain optimal pH levels for stability and flavour. Citric acid commonly used in soft drinks, candies, seasonings and canned fruits.
- Antioxidants: Prevent oxidation, which can lead to rancidity and loss of quality. Generally mixed tocopherols are used in products like fried & baked snacks, cured meats.
-Anticaking Agents: Ensure that powdered products remain free-flowing.
-Antifoaming Agents: Reduce foam formation in products.
-Sweeteners: Provide sweetness without the caloric load of sugar. Typically used at low dosages (around 1%), these substances are categorized as Specialty Additives due to their high functionality.

Key Drivers and Trends in Food Additives

As the food landscape changes, several key drivers are shaping the industry:
1. Health and Wellness Emphasis: Increased consumer focus on health has led to a demand for natural additives and reduced contents like sugar and artificial sweeteners.
2. Disposable Income Surge: Economic growth has led to a rise in premium and exclusive food products, pushing manufacturers to innovate and enhance offerings.
3. Urbanization and Changing Preferences: A shift towards convenience and ready-to-eat foods has increased the reliance on additives to ensure product stability and shelf-life.
4. E-commerce and Quick Commerce Growth: The rise of online shopping and fast delivery services has heightened the need for preservatives and stabilizers, allowing products to remain fresh during transport.
5. Consumer Awareness and Transparency: With growing health-consciousness, consumers are more informed than ever about ingredient lists, pushing brands toward cleaner formulations.

Challenges Faced by the Food Industry

Despite the innovation and demand, the industry encounters multiple challenges, including:
- Shifting consumer behaviours and preferences.
- Price fluctuations and availability of raw materials due to increased globalization and regional instabilities (for example: Indian Bakery & Chocolate industries are dependent on other oils & cocoa producing countries from APAC & African region, thus it has a direct impact on the growth of domestic market).
- An increasing focus on health-conscious products, leading to demands for reduced sugar, salt, and fat content. These additives play a vital role concerning taste profile and mouthfeel for the consumers, thus creating a big challenge for the manufacturer to reduce it from the food without affecting its sensory and mouthfeel.
- Handling storage and distribution issues, such as short shelf life and product breakage.

Specific Challenges in Chocolate Confectionery

For chocolate manufacturers, several pain points arise:

1. Moulded Chocolate:
Common issues include weight variability, visual defects, and cracks during demoulding. Such problems often stem from incorrect viscosity during production.

2. Enrobed Chocolate:
Likewise, issues such as variable weight and loss of surface gloss can be attributed to viscosity challenges.
The use of superior emulsifiers like high-performance PGPR (Polyglycerol Polyricinoleate) and AMP (Ammonium Phosphatides) can effectively address these issues, ensuring a smoother production process and higher-quality end products.

Challenges in Bakery Products

Bakery items also face distinct challenges:

1. Bread: Problems like side wall collapse, uneven mesh structure, and staling can arise due to weak flour quality and other factors.

2. Cookies: Surface shine, spread ratio, and stack height can be affected by uneven fat dispersion and baking temperature.

Utilizing the right emulsifiers, such as DATEM (Diacetyl Tartaric Acid Ester of Monoglycerides), SSL (Sodium Stearoyl Lactylate), and DMG (Diglycerol Monostearate), can help overcome these barriers and enhance product quality. The integrated blends can provide the benefits of fat reduction and value addition at the same time by using them at minimum dosages for the baked snacks.

Emulsifiers

Emulsifiers are integral to food production, as they allow for the combination of components that typically resist mixing. These substances work by stabilizing emulsions—mixtures of water and oils—essential for a variety of food products. To classify emulsifiers, the Hydrophilic-Lipophilic Balance (HLB) scale is indispensable. This numerical scale, ranging from 0 to 20, measures the balance between an emulsifier's hydrophilic (water-attracting) and lipophilic (fat-attracting) characteristics.

Water-soluble emulsifiers have an HLB value of 10-20, ideal for applications where water is the continuous phase. Oil-soluble emulsifiers fall between 0-10 and are suitable for fat-based formulations.

Based upon your food matrix and objective, these emulsifiers can be selected and can be used in combinations. For ex. in whipped toppings PGE, PGMS, SMS, SSL are been used along with other additives.

Conclusion

Food additives, including emulsifiers, are crucial in producing high-quality food products by enhancing their quality, safety, and longevity. As consumer preferences shift towards healthier options, the food industry must adapt by using advanced ingredients to meet these demands. Organizations like JECFA and FSSAI ensure the safety and efficacy of these additives through rigorous approval processes.

Emulsifiers help mix components that typically resist blending, such as oil and water, and are essential in products like margarine, chocolate, and baked goods. The Hydrophilic-Lipophilic Balance (HLB) scale classifies emulsifiers based on their water and fat-attracting characteristics.

Challenges in chocolate confectionery, bakery, and ready-to-eat products can be addressed using superior emulsifiers like PGPR, AMP, DATEM, SSL, PGE, PGMS, and DMG, which enhance product quality and production efficiency.

Overall, food specialty additives, particularly emulsifiers, play a vital role in modern food production, ensuring products are safe, high-quality, and meet consumer expectations. Knowledge of these additives and their applications is essential for success in the dynamic and competitive food industry.

In this dynamic and competitive landscape, knowledge of food additives and their applications is not just beneficial—it's essential for success.

RECENT TRENDS IN USE OF ENZYMES IN BAKING APPLICATIONS

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Introduction:

Baking has been a staple food of human culture for thousands of years, with evidence of bread-making dating back to the Neolithic period. Over time, the process of baking has evolved and been influenced by various cultures, technologies, and ingredients. The earliest evidence of bread-making comes from ancient Egypt, where flat-breads were made using barley and emmer wheat. The process involved grinding the grains into a flour, mixing it with water and yeast, and then baking the dough on hot stones or in clay oven. This process was slow and labour-intensive, with bread-making being primarily done by women in households. Over time, new grains were discovered and used to make breads, such as wheat and rye.

In India flat-breads (roti or chapatti) have been known since ancient times with use of vertical ovens called “tandoor”. Wheat-based breads became popular throughout Europe during the Middle Ages, and has remained the most popular form of bread. The availability of commercial yeast in the 19th century made it easier for bakers to make yeast-leavened breads on a larger scale. The industrial bakery also enabled the production of a variety of different types of breads, such as whole wheat, rye, and multigrain.

Bread is usually made from wheat flour as raw material, which is a mixture of starch, gluten, lipids and non-starch polysaccharides. The fermentation process results in breakdown of starch due to amylase enzymes from yeast. During the process of fermentation, CO_2 is released by the yeast along with flavour molecules. Gluten is formed due to addition of water which gives strength to the bread as well as helps in maintaining the structure when steam along with CO_2 is released from the starch gel on heating. Heating of this fermented dough results in gelatinization of starch, release of steam and CO_2.

Proteolytic enzymes from flour and yeast also contribute to increase the extensibility and elasticity of the gluten, helping in the retention of gas as the gluten network expands without rupturing. Wheat flour contains a small concentration of

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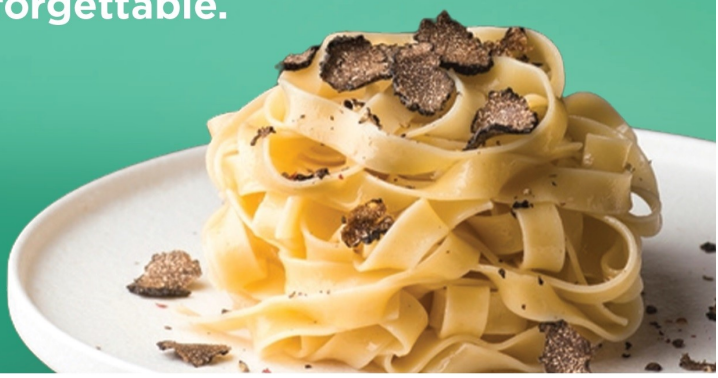

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arabinoxylans which also contribute towards bread formation. The endo-xylanases in wheat flour result in partial breaking of the arabinoxylan polymer which in turn can stabilize gas cells in the dough and contribute to gas retention at the fermentation stage. The broken arabinoxylan has good water retention, which can increase bread volume and moisture content, reduce the hardness, and slow down staling of bread.

Availability of enzymes commercially that could be added additionally has helped to improve the control of the baking process, reducing process time, slowing-down staling, compensating for flour variability and substituting chemical additives.

Recent trends show that consumers prefer baked products with whole wheat flour (containing more bran), wheat substitutes such as millets and gluten free baked products with minimum or no additives. Use of enzymes in processing of has helped the baker for providing the customer with a similar experience as wheat flour-based products. Enzymes useful in such applications include amylases, transglutaminases, proteases, and hemi-cellulases etc.

Incorporation of millet in wheat flour for baking applications

Nutritionally, millets contain 60–70% carbohydrates, 1.5–5% fat, 6–19% protein, 12–20% dietary fibre and 2–4% minerals. However, millets are gluten free which is a challenge for structure and texture of baked products such as bread and sheeting in flat bread as well as biscuit processing. Millet-based breads often exhibit shortcomings such as lower gas retention, specific volume, dense crumb, and a harder texture. One solution that was studied was to incorporate millet into wheat bread.

Wheat flour has an extraordinary ability to form visco-elastic dough with gas holding power due to gluten proteins. incorporating millet into bread offers a promising avenue for enhancing nutritional value with added dietary fibres and phytochemicals.

Bread baking from wheat and millet flours in different ratios was investigated. 1 Optimization of bread quality produced from a wheat/ proso millet composite flour in the ratio 50:50 was studied by adding emulsifiers and enzymes. Xylanase exerted a crumb softening effect. Addition of transglutaminase improved crumb pore structure and both enzymes increased bread volume. Combined addition of xylanase and transglutaminase significantly increased volume of a 50:50 wheat/millet bread by 25%. Overall, with the addition of emulsifier and combination of enzymes bread could be produced from 50:50 wheat/millet flour, which was of acceptable quality (1).

Gluten free products

Gluten-free bread has several technical problems such as unfavourable texture, low volume, quick staling, and weaker colour and taste compared with the wheat flour products. Gluten free breads show poor crumb and crust characteristics as well as poor mouth-feel and flavour. The commonly encountered defects with gluten-free bread arise due to inefficient gas expansion and retention during leavening, resulting in reduced volume bread with low crumb softness (2).

Diverse approaches have been used by researchers to improve the quality of gluten-free products; some approaches involve addition of non-gluten proteins, hydro-colloids, starches, emulsifiers, and combinations. An alternative approach could be the use of enzymes for gluten-free product preparation, as they are more natural and have higher specificity. Enzymes are safe substitutes for chemical compounds that have the ability to catalyse reactions. During baking, enzymes are denatured and are not active in the final product.

In one study, gluten-free bread was created by substitution of millet flour with proteins from different sources at level of 10% (pea, rice and whey protein concentrate) in order to assess their potential as a techno-functional component. In addition, the effect of different concentrations of the enzyme transglutaminase (0.5, 1.0 and 1.5% w/w in flour -protein blends) was studied on dough rheological properties as well as bread textural and sensory quality. Besides the nutritional benefit, the incorporation of proteins improved technological quality of millet bread, including structure strengthening, specific volume increase as well as sensory quality. The highest value of specific volume was obtained for millet breads with whey proteins. Overall, the substitution of millet flour partially with pea, rice and whey proteins caused significant reduction of bread hardness and complete loss of bitter taste originating from millet(3).

Gluten-free bread with various substitution of quinoa (0%, 15%, and 25%) was produced and the effects of lipase and protease enzymes on the quality of bread were investigated. The gluten-free bread properties like physicochemical properties, rheological properties, and bread microstructure were evaluated. Moreover, the sensorial properties were assessed. The results have demonstrated that gluten-free bread with quinoa flour has favourable properties. Also, lipase and protease enzymes could improve the quality of the bread containing quinoa. Protease and lipase enzymes increased the bread volume, specifically in sample containing 15% quinoa substitution. Moreover, the staling was delayed in sample 25% quinoa substitution. The bread was accepted by consumers, and the highest score belonged to 25% substitution of quinoa flour(4).

Gluten free biscuits:

Combination of the enzymes trans-glutaminase -xylanase and guar gum- Xylanase and at 1% concentration was beneficial in the development of gluten free biscuits from nutrient dense quinoa and foxtail millet. These biscuits were superior in quality even compared to commercial gluten free biscuits which are generally prepared from wheat starch, fat and sugar (5).

The enzyme xylanase (from Aureobasidium pullulans) was utilized in a mulberry and rice flours-based gluten-free cookie formulation. Cookies were made using either rice flour or wheat flour without enzymes or other additions for comparison. Incorporation of xylanase into all cookie recipes resulted in softer cookie dough with lower absolute stickiness.

The hardness and absolute stickiness of the cookie dough prepared by the mixture of mulberry and rice flours decreased by the addition of the enzyme into the formulation in a concentration-dependent manner. Incorporation of xylanase into the cookie recipes resulted in increased spread ratio in an enzyme concentration-dependent manner for all cookie type(6).

Gluten free products from rice

Flour from rice (Oryza sativa) possesses unique nutritional properties; it is hypoallergenic, colourless and has a bland taste. Compared with other cereals, rice has a higher lysine content and its glutelin has a more evenly balanced amino acid profile than wheat prolamin, which is deficient in lysine and tryptophan. However, rice proteins lack the ability to form the necessary network for holding the gas produced during the fermentation during baking. Rice on the other hand is low in prolamins (2.5–3.5%) and therefore a visco-elastic dough is not formed when rice flour is kneaded with water. Consequently, the gases produced during proofing and baking are not retained and the resulting product has a low specific volume, and does not resemble wheat bread.

In a study it was observed that transglutaminase enzyme catalyses cross-links in rice proteins as suggested by the decrease in the free amino groups. This cross-linking resulted in a dough with an improved elastic and viscous behaviour. The improvement in the viscoelastic properties of the rice dough was associated with an improvement in the ability of rice flour to retain the carbon dioxide produced during proofing, resulting in rice bread with higher specific volume and crumb strength. Treatment with the enzyme transglutaminase can thus partially replace the HPMC in the baking of rice bread (7).

In some parts of India, flat-bread is made from rice-flour. However, this is made fresh and eaten warm due to loss of textural quality and retro-gradation of starch on storage. Flat bread made using rice flour has challenges in texture, volume when compared with wheat flour. Retro-gradation is a major challenge which affects commercial processing of rice flour baked products.

Chapattis were prepared from rice flour so as to make this product available to patients suffering from gluten intolerance (celiac disease).The textural properties of the fresh and 24 h stored rice flour chapati were determined. Incorporation of fungal α-amylase into the rice flour alone and in combination with the hydrocolloid resulted in further improvement in the texture. Chapattis containing hydrocolloid and/or α-amylase showed lower retrogradation after storage. Rice flour chapattis can be made available to celiac disease patients and the undesirable textural changes, which take place in chapati as a result of starch retrogradation, can be delayed by the incorporation of hydrocolloids and α-amylase (8).

Bread from rice flour is very difficult to bake as it lacks gluten like proteins but modification of the rice flour proteins with enzymes like glucose oxidase to improve its bread making properties is an interesting option.

Glucose oxidase an oxidative enzyme is gaining interest in the baking industry as an alternative to commercial chemical oxidizing agents. Due to oxidation of sulfhydryl groups, glucose oxidase forms cross-linking of albumin and globulin, resulting in the formation of non-disulfide and disulfide bonds. Glucose oxidase treatment increased dough strength and stability, increased loaf bread volume and improved crumb structure and softness by promoting protein cross-linking (9).

The effect of glucose oxidase enzyme was studied on rice flour dough rheology and protein modification. The enzyme modified the rice flour proteins by lowering the thiol and amino group concentration. The addition of glucose oxidase promoted an increase in the elastic and viscous modulus. Bread from rice with better specific volume and texture was obtained with addition of glucose oxidase thus allowing the decrease of the hydroxy-propyl methyl-cellulose (HPMC) levels in the rice bread recipe 9

Effect of enzymes in improvement of whole wheat flour (atta) products

In India whole wheat flour is made by grinding wheat grain using stone mills which result in high temperatures during processing, thus degradation of gluten precursors. This affects the texture as well as volume of the bread. Significant improvement in textural properties of whole wheat bread has been reported by the addition of xylanase enzyme. The partially broken arabino-xylans due to action of xylanase help to maintain the structure of starch-gel as a substitute to gluten. There are reports on addition of xylanase to have significantly improved the organoleptic properties of whole wheat bread. Xylanase addition reduced the fermentation time and increases the bread aroma intensity (10).

Chapattis made from atta are a staple food in many parts of India. The flat bread is freshly prepared with a shelf life of less than a day. The main challenge associated with the shelf life of chapatti is staling due to retrogradation of starch. Thus, production of chapattis commercially is restricted to freshly packed product in local areas. The combination of enzymes (bacterial α-amylase and xylanase; 25.12 U) in treatment of flour elicited some modifications in the microstructure of chapattis. Enzyme treated chapattis were softer, more pliable, and better acceptability (11).

Conclusion:

Baking without gluten causes many problems including a crumbling bread texture, poor colour, a weak or poorly developed dough structure and other quality defects making its replacement a major technological challenge for the food industry.

Applications of enzymes have been proposed as processing aid resulted in improvement in the product quality of gluten free products. Examples are fungal α-amylase, transglutaminase, xylanase, protease and glucose oxidase.

Use of enzymes in the formulation of gluten-free products has many advantages since (a) they are considered as clean label compounds, (b) they can be used as best and safest alternative to chemical compounds,'(c) they do not remain active after bread making process due to their protein structure being denatured during baking, and (d) they can add various improvements in dough handling properties, fresh product quality and shelf life.

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PROCESSING AND ITS EFFECT ON THE NUTRITIONAL INTEGRITY OF FOOD (PART 2)

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Processing a boon or hazard?

Based on meta-studies conducted through various studies, various benefits, shortcomings, and mitigation are collected and adapted [17], [18], [19][4]

Table (i): Benefits, shortcomings and mitigations

Benefits	Shortcomings	Mitigation
	Food Safety and Quality	
Controlled processing & formulation to decrease toxin formation (e.g.acrylamide)	Loss of heat sensitive nutrients due to high heat loads required for microbial food safety	Optimize process conditions e.g., time & temperature
Prolongation of shelf-life	Formation of undesired compounds	Adding back lost nutrients via formulation, fortification

Benefits	Shortcomings	Mitigation
	Food Safety and Quality	
Inactivation of food- borne pathogens		Food reformulation & process adaptation
Inactivation of natural toxins & enzymes		Hazard Analysis and Critical Control Points (HACCP)
Remove pesticides & toxins (e.g., aflatoxin)		
Contributes to easing food shortages		
	Nutrition & Health	
Inactivation of antinutritional factors	The nutritional density of food can be lowered because of processing e. g., losses of certain (essential) nutrients due to chemical reactions	Optimize processing parameters to achieve food safety & nutrient quality
Gelatinization of starches & denaturation of proteins to increase digestibility	Excess public health–sensitive nutrients (salt, fat, sugar)	Reformulation
Low-temperature and/ or short-time processing & rapid freezing to optimize vitamin retention	Increased eating rates of energy-dense liquids, soft foods	Portion sizing
Fortification of foods to address nutrient gaps & deficiencies		
Functional health benefits: e.g., probiotics, prebiotics, flavonoids, texture for swallowing disorders, removal of allergens		
	Sensory	
Make numerous ‘new cuisines’ available to the masses	Loss of texture, discoloration, etc.	Optimize formulation & process conditions
	Environment	
Conversion of processing waste streams into new products to decrease food prices & decrease waste	Greenhouse gases (GHGs)	Formulation with ingredients of low environmental impact
More energy-efficient processing equipment	Low consumer acceptance	Use of clean energy & energy efficient processes
Use of processing, additives, & packaging to increase shelf-life and decrease food waste		Valorizing side streams

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Breakfast Cereal. Creative Visualization. *40% lower in comparison to commonly cereal based breakfast / snack recipes ie Dosa, Sooji upma, poha, potato paratha & vegetable sandwich. Recipes & serving as mentioned by NIN, ICMR. #Dietary fiber helps maintain normal digestive function, EFSA, 2010

Benefits	Shortcomings	Mitigation
	Affordability	
Economy of scale for production	Nutrient dense foods are often more expensive	
Obtaining raw materials at scale to decrease food prices		
	Convenience	
	Packaging waste	Recyclable packaging
Enhances the annual availability of many goods, allows for long distance transportation of delicate perishable items, resulting in easy access to a vast range of food	Overconsumption	Portion sizing
Less time required for food preparation		

Some everyday examples of Processed Foods Available

Table (ii): Examples of everyday processed foods available in market

Materials	Processes	Processed Food Products
Grains, cereal & legumes with may need dairy and other ingredients	Milling, Grinding, and sifting, being used for	Flour, milled rice, oat bran/ grain
	Rolling, steaming, puffing, drying, extrusion, and frying are being used for	Breakfast cereal, crispy snack foods, meat analogues
	Cooking, steaming, sterilization, baking, fermentation, and kneading are being used for:	baked products like bread and cakes, as well as ready-to-eat foods like rice that has already been cooked, beer, wine, and other nutritious grain drinks.
Dairy Products	Pasteurization, sterilization, separation, homogenization, high pressure processing, and pulse electric field are being used for-	Liquid whole cream, skim and flavoured cold pasteurize, pasteurized and UHT milks, cream
	Fermentation, agitation, shearing and mixing are being used for-	Yoghurt, cheese, butter, and whipped cream
	Evaporation, sterilization, drying, separation are being used for-	Whey protein isolate, whey protein concentrate, milk powder, condensed milk, and evaporated milk.

Materials	Processes	Processed Food Products
Fruits and vegetables	Pulse electric field, high pressure processing, pasteurisation UHT, crushing, maceration, and vacuum concentration are being used for-	Concentrates, juices and juice mixes etc.
	Fermentation, picking, and drying, are being used for-	Jams, dried fruits and vegetables, kimchi, and other types of pickled or preserved foods
	Freezing & sterilization are being used for-	Frozen and canned fruits and vegetables products
Meat and Poultry	Slaughtering, cutting up, and boning, are being used for-	Frozen, refrigerated in bulk or retail packs
	Comminuting, fermentation, extrusion, and drying, are being used for-	Small products include surimi, cured dry pork or fish products, jerky, bologna, sausages, and salami
	Sterilisation, pasteurisation, cooking, and high-pressure processing are being used for-	Luncheon, prepared food, meal components, or canned fish or meat products

Some myths and Fact

The ongoing trend of people preferring more organic food over processed ones is typically based on certain myths and some realities.

I) Myth: Processed foods offer no benefits [1]

Fact: Many foods that we would not normally be able to eat are made possible by food processing.
Explanation: The wide range of food items we see on shop and supermarket shelves would undoubtedly not exist without food processing. Foods with short growing seasons can now be consumed all year round thanks to food processing. Examples include canned and frozen meat items, fruits, and vegetables. UHT (ultra-high temperature) milk and canned salmon are highlighted instances.

II) Myth: Processed foods are not as nutritious as fresh foods [1]

Fact: Many processed foods are just as nutritious or in some cases even more nutritious than fresh foods that have been stored depending on the manner in which they are processed.
Explanation: For example, when it comes to frozen goods, frozen vegetables are usually made within a few hours following harvest. Because there is little nutrient loss during the freezing process, frozen vegetables retain their high vitamin and mineral content. In contrast, fresh vegetables are picked and brought to the market. Vitamins gradually deteriorate over time, and even with careful transportation and storage, vegetables may not reach the dinner table for days or even weeks.

III) Myth: The additives in processed foods are not necessary and harmful for consumption [1]

Fact: Food additives are crucial for maintaining processed foods' freshness, safety, flavour, texture, and appearance. Food additives are added for specific reasons, such as maintaining food quality during a product's shelf life or ensuring food safety.
For instance, preservatives stop fats and oils from going rancid, whereas antioxidants stop it.

Emerging Technologies and Future of Processed Foods

The processing of foods with health-promoting promises and futures also depends upon technological updates.

Many studies highlight that combined with advances in clinical, genetic, and metabolic medicine, evolving food processing approaches will encourage and enhance healthy lifestyles [2]
Similar few highlights are mentioned in the table (iii) below:

Table (iii): tabulates the innovative technology and its consumer benefits

Challenge	Innovative technology	Consumer benefits	References:
Reduce calorie intake	Digestion-resistant starches · Changing starch structures in plants · Modifying starch chemistry	Reduce risk of obesity, diabetes, and related morbidities while maintaining diverse and enjoyable diet	[20][21]
	Naturally derived noncaloric sweeteners		[22]
Enhance gut health	Novel types of fibre such as water-soluble	Optimize digestive tract performance and reduce risk of disease	[23]
	Development of prebiotics and probiotics and effective bio-delivery systems		
Enhance health benefits of foods	Stabilized omega-3 fatty acids and DHA enrichment of foods	Improved dietary quality with enhanced nutrients and bioactive compounds	[24]
	Targeted bio-delivery with the use of nanotechnology of antioxidants		
Produce age-specific products	Optimize nutrients for · Infants · Children · Pregnancy · Athletes · Midlife · Older adults	Improve growth and development; enhance mental acuity	[25][26][27]
Reduce allergy	Nanotechnology approaches to block antigenic agents	Prevention of allergic responses to foods to enhance quality of life	[28]

Conclusion

Food processing stands as a double-edged sword, offering immense benefits such as enhanced safety, accessibility, and sustainability while presenting challenges like nutrient loss and environmental impacts. Mitigation strategies, including optimization of processing parameters and adoption of innovative technologies, are essential for maximizing benefits while minimizing drawbacks. The future of food processing relies on embracing advancements like nanotechnology, digital tools, and tailored nutrition to address emerging challenges and consumer demands. As global food systems evolve, fostering collaboration among stakeholders and promoting consumer awareness are vital to achieving a balanced approach that prioritizes health, sustainability, and innovation.

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THE ROLE OF MINDFUL SNACKING IN MODERN LIFESTYLES AND NUTRITION

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Maintaining a balanced diet and an active lifestyle is essential for overall health and well-being. While dietary guidelines clearly outline what and how much to eat, there is often less focus on the eating experience itself and the adoption of sustainable, healthy eating behaviors.

One key practice that has gained attention in this regard is mindful eating—an approach that encourages greater awareness and intentionality in food consumption.

Understanding Mindfulness in Eating

Mindfulness, as a concept, revolves around being fully present and attentive in the moment. Dr. Jon Kabat-Zinn, a professor at the University of Massachusetts Medical School, introduced the modern definition of mindfulness in 1990, describing it as “paying attention to the present moment on purpose, without judgment.(1)”

Originally applied to stress management and mental health, mindfulness has since been explored in various areas, including eating behaviors.

The Link Between Mindfulness and Eating Habits

In the late 1990s, research began examining how mindfulness could influence eating patterns. A pioneering clinical trial found that mindfulness-based techniques helped reduce binge-eating behaviors, paving the way for further studies on its impact on dietary choices and overall well-being.(2)

Today, mindful eating is recognized for its benefits in both at-risk groups—such as individuals struggling with obesity or emotional eating—and those simply seeking a healthier relationship with food.

2 cups of Bournvita contains 50% RDA of Vitamin D, Iron and Zinc that support bones, cognitive and immune function thus supporting strength. For children (7-9 yrs.), ICMR -NIN, 2020. For more details, refer to the pack.

WHILE MINDFUL EATING COULD BE BENEFICIAL FOR ALL EATING OCCASIONS, IT IS PARTICULARLY RELEVANT IN THE CONTEXT OF SNACKING as snacking often occurs in response to habit, convenience, or emotions rather than true hunger. Many people snack while distracted—whether working, watching TV, or scrolling through their phones—leading to mindless eating, overconsumption, and reduced satisfaction from food.

Snacking is a universal practice that transcends cultures, serving as both an energy boost and a mood enhancer in daily routines. It plays a key role in social interactions and festive traditions worldwide, though its frequency and contribution to daily energy intake vary significantly. In China (3), people snack about once a day, while in France (4) and Denmark (5), it can be up to four times daily. The proportion of daily energy derived from snacks ranges from 4% in China to 22% in the US and 29% in Nordic countries. In India , snacking is deeply embedded in daily life, with nearly 9 out of 10 consumers engaging in the habit—70% of them twice a day. For Millennials and Gen Z, snacking provides a brief escape from their busy lives and fosters social connection. Over the past five years, changing lifestyles have influenced snacking behaviors, with more than 70% of Indian consumers now paying closer attention to hunger cues and savoring snacks for a richer sensory experience. This shift highlights a growing focus on personalized choices, emphasizing health, nutrition, and portion control as key factors in snack selection.

What are the benefits of eating mindfully?
Emerging science tells us eating mindfully (7A to 7K)

Helps reduce overeating and control the portions :
A review of 15 studies of mindfulness-based interventions in adolescents found that mindfulness techniques were associated with reduced concerns about body shape, less dietary restraint, decreased weight, and less binge eating.

Support Digestion
As traditionally said eat your food slowly for it to digest better. Mindful eating promotes slower eating, which aids digestion. Chewing your food thoroughly breaks down more easily, allowing your digestive system to process it more efficiently. This can result in reduced bloating, gas, and indigestion

Supports Nutrient Absorption:
When you eat fully and chew your food thoroughly, your body can absorb the nutrients from your meals more effectively. This can improve your overall nutrient intake and support better health and well-being

Reduced Emotional Eating
Many people turn to food for comfort during stress or emotional distress. Mindful eating allows you to be more aware of your eating habits and their reasons. By identifying emotional triggers for eating, you can develop healthier coping strategies and reduce emotional eating.

Help manage Stress

Focusing on the present moment and fully engaging in the eating experience can help reduce stress and anxiety. Mindful eating allows you to slow down, relax, and enjoy a peaceful day.

Greater Awareness of Hunger and Satiety

By practicing mindful eating, you should tune into your body's natural hunger and fullness cues. This increased awareness allows you to eat when you're starving and stop when you're comfortably full, fostering a healthy relationship with food.

Improved Relationship with Food

Mindful eating encourages a nonjudgmental approach to food. Rather than labeling food as "good" or "bad," you learn to appreciate all foods in moderation. This can reduce guilt or shame around eating and promote a healthier, more balanced relationship with food.

Enhanced Enjoyment of Food

Mindful eating involves savoring each bite and inhaling the food's flavors, textures, and fragrances. This can enhance one's overall enjoyment of meals and make eating a more pleasurable and satisfying experience

How can we train ourselves to snack mindfully (8)?

Snacking mindfully can be practiced in easy and practical steps which covers 6 behaviors below:

- Tune in to your emotional & functional needs and snack preferences at the present time (satisfy hunger, provide energy, simply a treat…)
- Check your hunger level before snacking
- Be aware of emotional and external cues that can trigger snacking – such as social settings, convenience, and time of the day

- Be intentional about choosing a portion according to your emotional and hunger needs in the moment

- Focus on the smells, tastes, textures, shapes, and colors of foods to enjoy the snacking experience.

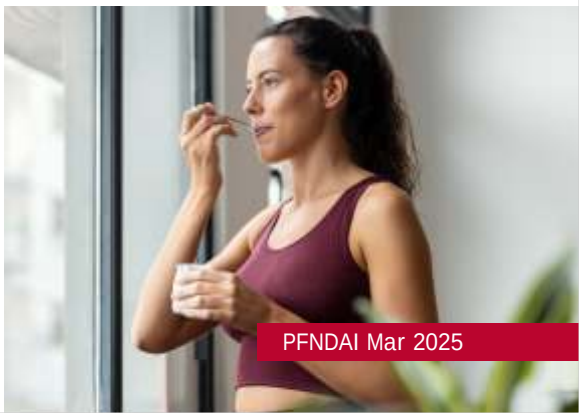
- Focus your awareness on the snacking experience and pay attention to each bite or sip.
- Reduce distractions such as your phone or the TV

- Slow down the pace of eating and check to see if you are full and satisfied

- Be kind and encourage yourself as you evaluate your choice
- Reflect on what transformed your snacking to mindful snacking

By practicing these mindful eating tips, you can enhance your snacking experience, improve your awareness of hunger and satisfaction, and make more mindful food choices overall.

Mindful snacking plays a crucial role in modern, fast-paced lifestyles, transforming it from an unconscious habit into a purposeful and enjoyable experience. By fostering awareness of eating habits, it encourages healthier choices, better portion control, and a deeper appreciation of food. Paying attention to hunger cues, savoring flavors, and making intentional choices can help individuals balance enjoyment with nutrition. As dietary patterns continue to evolve, integrating mindfulness into snacking supports overall well-being, making it a valuable approach for those seeking a more conscious and nourishing way to eat amid their busy routines.



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THE FUTURE OF BREAKFAST: HOW EVOLVING LIFESTYLES ARE REDEFINING NUTRITIOUS MORNINGS

AUTHORS

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In today's fast-paced world, breakfast is often sacrificed in the rush of daily life. With demanding work schedules, long commutes, and the constant juggle of responsibilities, many people either skip breakfast entirely or settle for quick but nutritionally inadequate options. However, as awareness of health and wellness grows, Indian consumers are becoming more conscious of their food choices, seeking convenient yet wholesome breakfast solutions that deliver both nutrition and taste while staying true to their cultural roots.

The Evolving Breakfast Culture in India

Traditionally, Indian breakfasts have been diverse and nutritionally balanced, with meals like idli, dosa, poha, parathas, and upma providing a rich mix of carbohydrates, proteins, and fibre. These home-cooked staples have long been a source of sustained energy, supporting active lifestyles. However, with the shift towards modern, urban living, breakfast habits are changing.

Today, professionals, students, and young families are looking for quick, hassle-free, and nutritionally fulfilling options that align with their busy schedules and evolving health goals. This shift has paved the way for smart, make-ahead, or ready-to-eat breakfasts that offer the best of both worlds—convenience and nutrition.

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Key Trends Shaping the Future of Breakfast in India

1. Mindful Eating & Portion Control – As people become more conscious of weight management and metabolic health, portion control and balanced nutrient intake are taking centre stage. Breakfast choices are now shifting towards light yet sustaining options rich in fibre, protein, and essential vitamins to keep energy levels stable and reduce unhealthy snacking.

2. The Comeback of Traditional Superfoods – Indian superfoods like millets (ragi, bajra, jowar), pulses, and seeds are regaining popularity due to their rich fibre, protein, and micronutrient content. These slow-digesting grains provide sustained energy release, making them a perfect fit for modern health-conscious consumers.

3. Rise of Functional & Fortified Foods – With growing demand for balanced nutrition, consumers are gravitating towards breakfast options enriched with fibre, protein, iron, and essential vitamins. This includes nutrient-dense whole grains, iron-rich plant-based sources, and functional ingredients that support immunity, digestion, and overall wellness.

4. Plant-Based & High-Fiber Choices – As plant-based and dairy-free lifestyles gain traction, high-fibre and protein-rich breakfast options are emerging. Alternatives like nut-based beverages, whole-grain blends, and seeds provide light, digestible, and nutrient-rich breakfast choices that support gut health and overall well-being.

5. On-the-Go & Smart Nutrition Solutions – With time being a key constraint, consumers are looking for quick, portable breakfast options that don't compromise on nutrition. Whether it's ready-to-eat wholesome blends, fortified cereals, or easy-to-make grain-based choices, the demand for nutrient-packed convenience foods is steadily growing.

Easy & Nutritious Breakfast Ideas for the Modern Indian

Understanding the need for quick, nutritious, and culturally rooted breakfast options, here are some easy-to-make recipes that balance taste and health:

1. Overnight Oats with an Indian Twist

Overnight oats are a global breakfast trend, but adding an Indian touch makes them even more exciting. Soak rolled oats in milk or yogurt and flavour them with elaichi (cardamom), saffron, and a handful of chopped dates and almonds for a wholesome start to the day.

2. Sprouted Moong & Paneer Chilla Wraps

For those looking for a high-protein breakfast, sprouted moong chillas stuffed with paneer make an excellent choice. Simply blend sprouted moong dal into a batter, cook it like a dosa, and fill it with spiced paneer for a filling yet nutritious meal.

3. Ragi Banana Smoothie

Blend ragi flour with bananas, dates, peanut butter, and milk to create a delicious smoothie packed with iron and energy. This drink is great for those looking for a power-packed breakfast in a hurry.

4. Nut & Seed Laddoos

A traditional yet modernized grab-and-go breakfast option, these laddoos combine flaxseeds, sesame seeds, almonds, dates, and honey for a fibre-rich, nutrient-dense snack that can keep you energized throughout the morning.

A Balanced Breakfast for a Healthier Tomorrow

As Indian consumers become more mindful of their food choices, the future of breakfast is evolving towards convenience without compromising on health and nutrition. By embracing traditional wisdom while incorporating modern dietary needs, we can create breakfasts that are both satisfying and nutritionally sound.

Whether it's a quick smoothie or a protein-packed chilla, Breakfast is more than just the first meal of the day—it's an opportunity to fuel your body with the right nutrition and set the tone for a productive, energetic day. While busy lifestyles often make it tempting to skip breakfast or opt for quick fixes, choosing the right breakfast can make all the difference.

Traditional Indian ingredients like millets, oats, and multigrains offer a rich source of fibre, protein, and essential vitamins and minerals—exactly what your body needs to stay active and healthy. Pairing them with iron-rich foods and fortified options ensures you get a well-balanced start to your day.

For those looking for convenience without compromising on nutrition, breakfast solutions that are enriched with fibre, iron, B vitamins, and essential nutrients can help bridge the gap. Whether it's a wholesome bowl of fortified multigrain cereal, fibre-rich oats, or nutrient-packed muesli, making a smart choice in the morning can keep you fuller for longer and support your overall well-being.

So, the next time you're planning your morning meal, go for something that's not just filling but nutritionally balanced—because a good morning leads to a great day!

NOVEL SOURCES OF PROTEINS

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As consumer awareness of the environmental impact of food production grows, so does the demand for sustainable and nutritious alternatives. Scientific and technological advancements are essential in tackling food safety, health, and environmental challenges.

Rapid urbanization and industrialization have led to resource scarcity, while global hunger and malnutrition persist, highlighting the critical role of proteins in nutrition and food security. The agri-food industry faces mounting pressures to mitigate climate change, reduce pollution, preserve biodiversity, and ensure a safe, sustainable food supply (1).

To address these challenges, transformative approaches in agriculture and food production are necessary. Among the promising solutions is the development of novel protein sources, foods derived from innovative technologies, alternative ingredients, or new production methods.

These novel proteins have the potential to reshape the future of food by offering more sustainable and efficient alternatives to traditional protein sources.

Categories- Innovative solutions are emerging from various fields to introduce alternative sources of proteins. A few are described below.

Edible fungus proteins:

Food security and environmental sustainability are increasingly being addressed through edible fungi too, particularly mycoproteins and other fungal proteins, which are emerging as viable sources of nutrition. The mycelial proteins found in large, edible mushrooms provide a balanced amino acid profile, excellent digestibility, and reduced dependence on climatic conditions. Some species, such as Aspergillus and Neurospora, are traditionally used in fermentation processes like tempeh production, which enhances their digestibility.

Recent advancements in fermentation and enzymatic extraction have improved the yield and nutritional value of these proteins,

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making them suitable for use as meat substitutes, food additives, and protein supplements. Edible fungi, including mycelium and mushrooms, feature prominently in some plant-based meat substitutes, offering alternatives that closely resemble real meat in flavour, texture, and nutritional content. To maximize yield and quality in mycelial protein production, two important technologies used are Solid-State Fermentation (SSF) and Submerged Fermentation (SMF) (2).

Yeast extracts are also commonly used as plant-based flavour enhancers due to their umami flavour. For instance, nutritional yeast is often utilized as a protein supplement, cheese substitute, or seasoning, while baker's yeast is the most prevalent type used for leavening bread. The benefits of consuming these edible fungi are numerous, including their antioxidant properties, cholesterol-lowering effects, and immune modulation capabilities (3).

Algae proteins:

Global demand for macroalgal and microalgal foods is rising as algae are consumed for functional benefits. These foods, marketed as "functional foods" or "nutraceuticals," vary widely in protein content. Spirulina and red algae are examples of blue-green algae (cyanobacteria), which are attracting interest as new protein sources because of their high nutritional value, sustainability, and practical uses. Spirulina is the most widespread microalga used in the food industry for the production of proteins. Porphyra (Nori) is a red-algae that is high in protein, EPA, etc. It contains bioactive substances with antioxidative, anticancer, antihyperlipidemic, and immunomodulatory properties. These are sustainable due to their rapid growth and minimal environmental impact compared to traditional protein sources, as they require less land and a reduced amount of water for cultivation.

Spirulina and Chlorella, for example, can contain up to 70% protein by dry weight and provide all essential amino acids. Both Spirulina and Chlorella are produced on a large scale and are added to various foods, such as salad dressings, beverages, and baked goods, or sold as protein supplements.

There is strong evidence supporting different types of algae as a nutritious and functional food source, but challenges remain in quantifying these benefits and potential adverse effects. Key issues include the limited understanding of nutritional composition across different algal species, geographical regions, and seasons, which can affect dietary value (4). Additionally, it's important to identify which fractions of algal foods are bioavailable to humans and how harvesting, storage, and processing can influence their nutritional value. While algae and insect proteins have potential, their adoption is limited by seasonal availability, geographical location, and consumer preferences, especially for Indian consumers. The path from algal research to the development of new food products or dietary supplements is also shaped by industrial, regulatory, and nutritional factors. This emerging field offers opportunities for phycologists, necessitating innovative experimental and collaborative approaches.

Cell culture:

Cultured meat is revolutionizing food production by eliminating the need for traditional agriculture. Technology for cell growth outside of an organism's body is known as cell culture technology. These do not require land, animals or weather conditions. The animal, plant, and microbial cells are cultivated in a bioreactor using a nutrient-rich medium, and then separation, purification and formulation take place to yield cultured meat, phytochemicals for food supplements, and mycoprotein, respectively. Microbial proteins from cell culture can replace animal proteins in diets, positively affecting blood cholesterol and glycaemic response. Additionally, vegetable and fruit plant cell cultures (VFPCs) offer high protein, energy, and fibre content and can be cultivated in controlled environments regardless of external conditions(5).

Cultured meat is produced from animal cells and was popularized by Willem van Eelen, known as the "Godfather of cultured meat.". This lab-grown meat aims to offer nutritional value similar to traditional meat while allowing for modifications based on dietary preferences. Benefits include a lower risk of infectious diseases and foodborne pathogens and reduced exposure to harmful substances like antibiotics and hormones. Cultured meat is developed in countries like Singapore. Many companies produce animal-free dairy proteins using precision fermentation to replicate the flavour and texture of animal products like cheese and milk without using animals by engineering yeast, fungi, etc to generate real egg proteins, milk and dairy proteins (such as whey and casein) or meat proteins (like haemoglobin). Cell-based collagen serves as a sustainable alternative to animal-derived collagen, being safe and bio-identical. It can be applied in various areas, including the food and beverage sector, nutraceuticals, and medicinal products like creams and topical treatments (6).

To successfully replace traditional meat, cell-based meat must taste as good as or better than conventional meat. There are several reasons why meat grown from animal cell cultures may differ from typical meat. First, its texture, specifically tenderness and water-holding capacity and flavour development, will be affected since it doesn't undergo the same biochemical processes as post-mortem transformation. Additionally, the sensory qualities of traditional meats can vary based on the complexity of the cell types used (6). While different muscle types influence colour and texture, including hardness and juiciness, the current technology for cell-cultured muscle types is still under development.

This technology has the potential to produce products that are ethical, eco-friendly, and free from pathogens. However, various unresolved techno-social, cultural, economic, and other issues are crucial for the sustainability and feasibility of cell-based meat.

Genetically Modified foods:

Genetically modified (GM) foods have the potential to be feasible as a novel protein source, especially given their ability to enhance nutritional profiles, increase yields, and improve resilience to climate change.

Through genetic engineering, scientists can modify crops to increase their nutritional value, improve bioavailability, and introduce essential vitamins and minerals. These can produce enhanced protein and amino acid content, e.g. GM crops like soybeans, rice, and maize have been engineered to have higher protein levels or improved amino acid profiles. Alternative protein sources like GM yeast and microalgae can produce proteins similar to those found in meat and dairy (e.g., precision fermentation of casein and whey).

In the United States, genetically modified soybeans play a significant role in agriculture as animal feed, in food production (such as soybean oil and soy protein), and in various industrial applications (7).

However, safety and acceptability remain key challenges. Different countries have varying regulations, and consumer perception remains a barrier to the adoption of GM foods. In India, there is caution around the adoption of GM foods due to regulatory, environmental, and socio-economic concerns (8). However, GM crops have made an impact on Indian agriculture, particularly with Bt cotton, while other GM food crops remain under strict regulation and are yet to be approved. The Genetic Engineering Appraisal Committee (GEAC) is the primary body that assesses and approves GM crops, while the Food Safety and Standards Authority of India (FSSAI) regulates GM food imports and ensures compliance with food safety standards.

These foods have to be tested for their safety. Each GM food must be tested for unintended allergenic or toxic effects. Long-term impacts must be studied. This will help for better consumer perception, regulatory approval and other concerns. Hence while GM foods are scientifically promising as protein sources, large-scale adoption depends on continuous safety research, regulatory frameworks, and consumer education. Advances in biotechnology, may help create next-gen GM foods with improved public acceptance.

Insects:

Edible insects are known for their high nutritional quality, particularly their protein content. Numerous studies have shown the benefits of using insects either partially or completely in various products, such as meat analogues, sausages, and bread. One of the benefits is a high essential amino acid index. However, it is important to note that substituting meat with increased amounts of insect flour can lead to a decrease in the textural properties of the final products (9).

Entomophagy, the practice of eating insects, is common among various tribal communities in India. In Nagaland, people consume grasshoppers, crickets, red ants, and mulberry silkworm larvae. In the Midnapur district of West Bengal and Odisha, red ant eggs and larvae are also eaten. A similar practice is observed in Karnataka, Tamil Nadu, Kerala, and Arunachal Pradesh, among other regions. These communities believe that these insects help prevent diseases and are part of their culture (10).

Some studies have already explored the use of insect proteins or insect flours to partially replace conventional ingredients in food formulations,

particularly in baked goods and meat analogues, yielding promising results. However, certain antinutrients, such as oxalates, tannins, etc, have been found in small amounts in some insects, and further investigation is needed to promote insect flours as usable food ingredients. To validate edible insects as ingredients in food products for Indians, several challenges must be addressed, including the implementation of new regulations, increasing consumer acceptance due to cultural resistance, gaining a better understanding of allergenic risks and toxicity, and developing effective unit operations to scale up production at an industrial level. The approval of regulations allowing the use of insects as a food ingredient or as human food is another issue to be addressed, especially in India, as FSSAI has no clear guidelines for edible insect products.

Conclusion:

The growing demand for sustainable and nutrient-rich foods has led to the exploration of novel protein sources, including algae, edible fungi, cell-cultured proteins, genetically modified foods, and insects. These alternatives not only offer viable solutions to global food security and environmental concerns but also provide diverse nutritional benefits. However, their use in the mainstream is dependent upon overcoming challenges related to consumer acceptance, regulatory approval, and large-scale production feasibility.

As research continues to understand the full potential of these alternative protein sources, collaboration among scientists, food technologists, nutritionists, policymakers, and the food industry will be crucial in ensuring their safety, accessibility, and integration into mainstream diets. In order to meet the demands of an expanding world population while reducing ecological effect, we can build an efficient food system by adopting innovation and improving regulatory frameworks.

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WEBINAR ON 'HEALTHY OILS FOR HEALTHY LIVES'

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Protein Foods & Nutrition Development Association of India (PFNDAI) organized a Webinar on 'Healthy Oils for Healthy Lives' on 21st February 2025. The event was sponsored by Marico Limited, Mother Dairy Fruit and Vegetable Private Limited, and Frigorifico Allana Private Limited.

The welcome address of the webinar was given by Dr. Shashank Bhalkar, Executive Director at PFNDAI. He thanked the sponsors of the event.He stated that oils are essential for flavour, richness, and texture in food products and contribute to our diet and nutrition. They provide about 30% of our daily energy intake and are responsible for various physiological functions. Different cooking oils are used in India, with different regions having different culinary practices.

Understanding the science behind these oils helps select the right cooking oil. He further expressed that the webinar would feature expert presentations, panel discussions, and industry experts discussing issues and challenges in the oil industry, which would enhance the understanding of various aspects of the oil industry for everyone attending the webinar.

Ms. Samreen Shaikh, Jr. food technologist at PFNDAI introduced the speakers for the session, providing a brief about their background, qualifications, and expertise.

Ms Meenu Yadav, Principal Manager, Technical Regulatory Affairs, Marico Ltd., discussed about 'Essential fatty acids and associated regulations for fortification'. She started the talk by discussing the NIN guidelines and the importance of essential fatty acids in a diet. A study on school-going Indian children showed that their diet is deficient in essential fatty acids, particularly omega-3 fatty acids, crucial for cognitive and behavioural development. She further stated that the recommended ratio of omega-3 to omega-6 in the Indian diet is not met, which leads to various lifestyle diseases.

There is potential for fortification in food products like dairy, meat, bakery products, and infant formula. She highlighted challenges such as oxidation, rancidity, consumer acceptance, regulatory issues, and the need for awareness programs. She also elaborated the global regulatory scenario with the US, EU, Australia and New Zealand promoting omega-3 fortification. The Food and Drug Administration permits it but requires specific criteria. In India, the regulatory approach is evolving and recognizing the need for omega-3 fortification. She expressed that there is a potential for India to make representation-based science and add other sources of omega-3 fatty acids to comply with stricter ratios. She concluded by stating that omega-3 fortification is essential for addressing modern dietary imbalances, requiring sustainable sources, innovative technologies, and public health awareness.

Ms Mani Misra, Deputy Manager (Scientific regulatory affairs and nutrition) at Mother Dairy Fruit and Vegetable Private Limited, presented on 'The science and art of healthy oils'. She highlighted the importance of selecting healthy oils. It is important to understand the properties of oils, as fats are essential for physiological and metabolic functions in the body. She also discussed the use of cold-pressed and refined oils, such as Kachchighani mustard oil, used in pickles and other products. She highlighted the importance of understanding the type of oil used and the amount of oil used, as well as the phytosterols and antioxidants present in these oils. Fortification, which has been operationalized by the Government of India, is crucial for combating micronutrient malnutrition and preventing hidden hunger. She suggested various oils for purposes like baking, salad dressing, and frying. Ms Mani also mentioned campaigns like 'Aaj se thoda kam' and 'Zara sa badlav' that raise awareness about reducing oil consumption. She also stressed the importance of using a combination of oils when cooking dishes and avoiding reheating.

The new labelling and display regulations have simplified the process of choosing the right oil for daily consumption, hence she encouraged individuals to read labels when selecting oil.

Mr. Akshay Salgarkar, DGM - R&D Frigorifico Allana Private Limited to talk on 'Perfect cooking oil for every need'. He stated that oils and fats are essential for overall well-being, providing the body with necessary fatty acids. They also add flavour and texture to food. He listed various types of oils, such as sunflower, soybean, rice bran, and groundnut oils, each with its own fatty acid composition. These oils can provide health benefits such as vitamin absorption, heart health, and energy. However, there are risks associated with certain fatty acids, such as saturated fat, trans fat, and acrylamide formation when heated to high temperatures. Some parameters are essential while choosing the right oil, like the ratio of essential fatty acids and the presence of natural antioxidants. Multi-source cooking oils, which are blends of various

oils, are beneficial for heart health, have anti-inflammatory properties, and have a neutral taste. He advised that oil should be stored in an airtight container in a cool, dry, dark, and moisture-free environment. Used cooking oil should be consumed within a day or two, and rotation of oil is recommended to achieve the recommended balance. Consuming oil in moderation is crucial for maintaining a healthy diet.

A panel discussion followed the presentations. Dr. Himanish Das, Vice President – QA, R&D and Compliance department at Emami Agrotech Limited, was the panel moderator and Dr. Subhadra Mandalika, Academic and Research Advisor, Lifeness Science

Institute, Senior Vice president- Association of Sports, Nutrition and Fitness Sciences; Ms. Shilpa Telang, Head Research and Development, Bunge India Pvt Ltd.; and Ms. Meenu Yadav, were the panellists.

The discussion began with Dr. Subhadra emphasizing the importance of balancing omega-3 and omega-6 fatty acids. Omega-3 is cardioprotective, while omega-6 can lead to inflammation if consumed in excess. Combining oils is necessary for achieving the right balance. She also listed omega-3-rich oils available in India.

Ms. Shilpa outlined challenges in the oil and fat sector, highlighting the spread of misinformation by social media influencers.

She listed various challenges, like the impact of climate change, price fluctuations, and regulatory concerns, while noting trends toward cold-pressed and organic oils. Ms. Meenu addressed the regulatory landscape, mentioning that the FSSAI allows specific health claims for oil.

Challenges with loose oil sales and misleading labelling were also discussed. Stricter regulations are in progress to combat these issues. Dr. Himanish concluded the discussion by thanking the panel for their insights.

At the end of the session, Ms Simran Vichare, Nutritionist at PFNDAI, gave a vote of thanks to the webinar sponsor, speakers, and panellists, along with her PFNDAI team members for making the webinar a success.

The entire webinar recording is available on the following link: https://fb.watch/xXJD-buxUJ/

REGULATORY ROUND UP

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

Revised list of FSSAI notified laboratories for testing of fortificants in Fortified Rice (FR), Fortified Rice Kernel (FRK) and Vitamin-Mineral Premix for Fortified Rice Kernel : The approved list of laboratories for testing fortificants (Iron Vitamin B9 and B12) in FR and FRK is given in Annexure 1 and Annexure 2 respectively. A list of laboratories for testing these fortificants in Vitamin-Mineral Premix for FRK is given in Annexure 3. FBOs should check the latest validity of accreditation of these notified laboratories before sending samples. This order supersedes the earlier order dated 10.12.2024.

Validity Order of FSSAI notified Food Testing laboratories dated 06.02.2025 : A list of FSSAI approved laboratories with validity of their accreditation as of 06.02.2025 and contact details is given. These can be used to carry out analysis of samples taken under FSSA Act 2006, and regulations.

Draft Food Safety and Standards (Laboratory and Sample Analysis) Amendment Regulations : This draft notification is for amendments in FSS (Laboratory and Sample Analysis) regulations. Various amendments are suggested. This includes the form for issuing a certificate of analysis, the quantity of samples of unspecified products, the method of analysis to be used in case no method is available in the manual of methods of analysis published by authorities, the timeline for regulatory and import samples analysis etc. Any suggestions or objections should be sent to the CEO, FSSAI within sixty days from 17.02.2025 in the prescribed format.

Draft Notification of Food Safety and Standards (Labelling and Display) Amendment Regulations, 2025 : This draft notification proposes to amend FSS (Labelling and Display) Regulation, 2020. The proposed amendment includes the following

In the Nutrition Fact Table, the declarations relating to the percentage RDA per serving of Added Sugars, Saturated Fat and Sodium are to be made bold and in a font size bigger than the others.

Size and Colour scheme of Milk Logo, to be declared on the label of milk and milk products as defined in 2.1 of FSS (Food Products Standards and Food Additives) Regulation, 2011, is specified

Declarations related to Coffee – Chicory mix products to be made in capital letters on the Front of the Panel and within a box.

Any suggestions or objections should be sent to the CEO, FSSAI within sixty days from the date of publication in the prescribed format.

RESEARCH IN HEALTH & NUTRITION

Gut microbes may mediate the link between drinking sugary beverages and diabetes risk

January 31, 2025

It is well known that consuming sugary drinks increases the risk of diabetes, but the mechanism behind this relationship is unclear.

Now, in a paper publishing January 31 in the Cell Press journal Cell Metabolism, researchers show that metabolites produced by gut microbes might play a role. In a long-term cohort of US Hispanic/Latino adults, the researchers identified differences in the gut microbiota and blood metabolites of individuals with a high intake of sugar-sweetened beverages. The altered metabolite profile seen in sugary beverage drinkers was associated with a higher risk of developing diabetes in the subsequent 10 years. Since some of these metabolites are produced by gut microbes, this suggests that the microbiome might mediate the association between sugary beverages and diabetes.

The findings of this study offer valuable insights into the potential mechanisms underlying the relationship between sugary beverage consumption, changes in the gut microbiome, and increased diabetes risk. By identifying specific bacterial species and metabolites associated with high sugar intake, researchers have shed light on how these factors may contribute to metabolic disturbances and higher diabetes susceptibility. This research not only expands our understanding of the complex interplay between diet, gut health, and disease risk but also highlights the importance of considering microbial influences in developing targeted interventions for diabetes prevention and management.

Moving forward, further investigations are needed to validate these findings in diverse populations and explore the broader impact of microbial metabolites on other chronic health conditions. By leveraging this knowledge, researchers and healthcare professionals may be able to develop more personalized and effective strategies for mitigating the detrimental effects of sugary beverage consumption on metabolic health. Ultimately, this study paves the way for future research aimed at harnessing the potential of the gut microbiome to address the growing burden of diabetes and related metabolic disorders in populations worldwide.

Danish researchers discover gently heating lactic acid bacteria produces vitamin B2

17 Dec 2024 | By Benjamin Ferrer

Danish researchers discover gently heating lactic acid bacteria produces vitamin B2

Scientists at the Technical University of Denmark have discovered a natural and simple method for producing vitamin B2 (riboflavin) by gently heating lactic acid bacteria. This method is cost-effective and climate-friendly, making it a potential game-changer in developing countries where vitamin B2 deficiency is common. The method allows for easy fortification of food with vitamin B2 during production processes like making yogurt or sourdough.

By gently heating lactic acid bacteria, researchers were able to produce significant quantities of vitamin B2. This method is natural and does not require complex purification processes. The team used Lactococcus lactis bacteria, commonly found in cheese and cultured milk, and subjected them to oxidative stress by heating them to 38-39°C. This stress caused the bacteria to produce more riboflavin. By adding various nutrients, researchers optimized the production process, achieving 65 mg of vitamin B2 per litre of fermented substrate—nearly 60 times the daily human requirement. The new method can be integrated into existing food fermentation processes. Specially selected lactic acid bacteria can be packaged as a starter culture for foods like milk,

maize, or cassava. This method could potentially be expanded to produce other essential vitamins and nutrients, such as folic acid (B9) and vitamin B12. It could be applied to various foods, including sauerkraut. The method is natural, without genetic modification, and consumes less energy and fewer chemicals compared to traditional synthetic vitamin production. It only requires basic fermentation tools common in many households.

Food fortification remains a key focus, particularly in developing nations. Fortification adds essential micronutrients (vitamins and minerals) to commonly consumed food to improve nutritional quality.Notable efforts include the Millers for Nutrition coalition, supporting millers in countries like Bangladesh, Ethiopia, India, Indonesia, Kenya, Nigeria, Pakistan, and Tanzania in fortifying staple foods.Recent innovations in food fortification include the Japanese debut of Vision R by Rohto Pharmaceuticals and dsm-firmenich, as well as a new stable dry form of vitamin A for baby formula.
The method developed by the Danish researchers offers a promising approach to improving vitamin B2 availability and enhancing food fortification efforts, particularly in developing regions.

Research reveals metabolic link between coffee consumption and gut microbiome

13 Dec 2024 | By Venya Patel

The study emphasizes the impact that a single daily food item, like coffee, can have on the human gut microbiome and highlights the need for further research to explore these effects at the biochemical level.

The study identified over 115 species of gut bacteria that have a positive association with coffee consumption. Lawsonibacter asaccharolyticus had the strongest association and was found to grow better when supplemented with coffee. Quinic acid has antibacterial, antioxidant, anti-inflammatory, and antiviral activities.Trigonelline is linked to neuroprotective, hypoglycemic, memory-enhancing, antibacterial, antiviral, and antitumor benefits.

The top ten coffee-associated species of gut bacteria remained correlated with decaffeinated coffee consumption, indicating that their biochemistry is likely caffeine-independent.The prevalence of L. asaccharolyticus was higher in populations that consume more coffee, particularly in Western countries.The bacterium was found to be much less common in rural populations with non-Western lifestyles.

The study suggests that coffee may play a significant role in shaping the gut microbiome at both individual and population levels.Researchers recommend further investigation into the underlying mechanisms of coffee stimulation in vitro.The next step involves uncovering the microbial mechanisms underlying the metabolism of coffee to better understand the role of specific foods on the gut microbiome.

The discovery of the metabolic link between coffee consumption and gut microbiome is a significant breakthrough in understanding how simple dietary choices can impact overall health. The identification of L. asaccharolyticus as a key bacterium that responds positively to coffee intake opens the door to further research on the health benefits associated with this relationship. With over 115 species of gut bacteria showing a positive association with coffee consumption, it is clear that what we eat and drink can have a profound impact on the composition of our gut microbiome.

ISSN updates position on HMB for muscle health based on new research findings

07 Jan 2025 | By Jolanda van Hal

ISSN updates position on HMB for muscle health based on new research findings

The International Society of Sports Nutrition (ISSN) has updated its Position Stand on HMB (β-Hydroxy-β-Methylbutyrate) to recognize the growing body of scientific research on this muscle health ingredient.
Since the last Position Stand in 2013, the volume of research on HMB has increased significantly, focusing on its benefits for older adults and aging athletes, muscle loss mitigation, and muscle function and strength improvement.

The research covers two forms of HMB: Calcium HMB (HMB-Ca) and a free acid form of HMB (HMB-FA). HMB-FA appears to lead to increased HMB levels in the bloodstream compared to HMB-Ca. Both forms of HMB are safe for oral supplementation in humans for up to one year and may improve glucose metabolism in younger adults. HMB enhances muscle protein synthesis and suppresses muscle protein breakdown.

HMB may help reduce muscle damage, promote muscle recovery, growth, and repair, and may have anti-inflammatory effects. HMB may improve muscle protein synthesis, attenuate inflammatory responses when consumed close to exercise, and have beneficial physiological effects in both acute and chronic consumption. Daily HMB supplementation, combined with exercise training, may improve body composition by increasing lean mass and/or decreasing fat mass. HMB may improve strength and power in untrained individuals and positively impact aerobic performance in trained athletes. HMB can improve muscle strength, functionality, and quality in non-exercising, sedentary, and aging populations. It may benefit the treatment of age-associated sarcopenia and counter muscle disuse atrophy during periods of inactivity.

HMB's versatility is demonstrated through its synergies with other ingredients like creatine, vitamin D, protein, and certain amino acids, addressing muscle loss and improving overall muscle health. Ongoing clinical studies in older adults in the US and other countries are assessing HMB's potential in healthy aging and its ability to counter muscle atrophy due to disuse.The updated Position Stand reviewed over 750 scientific references and serves as a comprehensive resource for consumers, sports nutritionists, and dietitians.

Innovating nutrition: Consumer engagement with AI technology

08 Jan 2025 | By William Nichols

Innovating nutrition: Roquette boosts consumer engagement with AI technology

Roquette is leveraging AI-driven persona technology to enhance consumer engagement and product development in the nutrition industry. By creating personalized food concepts that align with the unique preferences of diverse consumer profiles, it aims to make the consumer experience more engaging and relevant.

The AI-driven persona technology helps craft food concepts that resonate with different consumer profiles. This platform showcases market trends, ingredient panels, and nutritional profiles of proposed formulations, immersing visitors in curated food experiences. The blend of human expertise and AI-driven creativity ensures that concepts are relevant, engaging, and aligned with consumer needs.

Plans are to continue exploring AI technologies to drive innovation and efficiency across various business areas, including predictive maintenance, supply chain optimization, and food safety monitoring.The goal is to stay at the forefront of technological advancement and ensure their offerings meet evolving consumer needs.

The AI-driven video platform offered is a key component in immersing consumers in curated food experiences and showcasing the unique value of their plant-based ingredients. Through compelling consumer stories and realistic visualizations, the platform tailors the content to individual consumer profiles, providing a personalized and interactive approach that inspires consumers to deliver an enhanced food experience. By harnessing the power of AI to generate targeted consumer profiles and impactful concept mock-ups, it is able to streamline the formulation process and drive innovation within their offerings.

As the company continues to explore AI technologies in various business areas, such as predictive maintenance and supply chain optimization, they are committed to staying at the forefront of technological advancement to meet the evolving needs of consumers and improve their operations and offerings.

New Research on Omega-3 beyond established health benefits

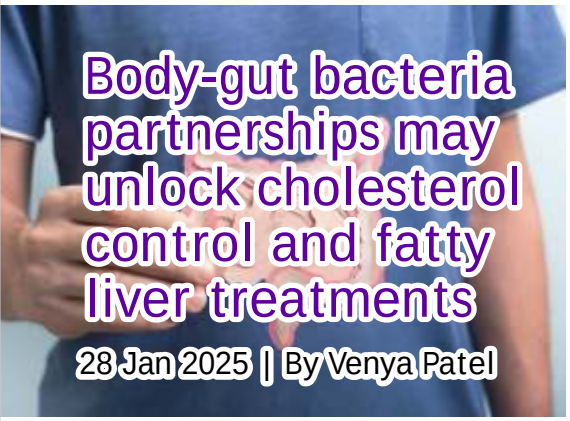
Webinar preview: dsm-firmenich features new omega-3 research beyond established health benefits

The heart, brain, and eye health benefits of omega-3 fatty acids are well-supported by research, but highlights additional benefits of these nutrients, including sleep, mood, and muscle health, which consumers may be less aware of.

Emerging research shows that docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) may benefit sleep, mood, and muscle health. Consumers are increasingly seeking ways to improve their well-being, and omega-3s can play a beneficial role. Global intake of DHA and EPA is generally insufficient, and offers plant-based omega-3 options like life's Omega and life's DHA to bridge this gap.

DHA and EPA may improve sleep quality and have mood-boosting potential, supporting emotional well-being and maternal mental health. Plant-based omega-3 sources, such as algal oils, are sustainable and appeal to environmentally conscious consumers and those on plant-based diets.dsm-firmenich emphasizes the importance of innovative technologies to make omega-3 benefits more accessible while complying with sustainability goals.

The shift towards plant-based omega-3 sources, particularly algal oils, reflects a growing consumer demand for sustainable and environmentally friendly options. As fish populations face increasing pressure and marine resources become more strained, the need for alternative sources of DHA and EPA is more pressing than ever before. Algal-derived omega-3s offer a promising solution, catering to the needs of environmentally conscious consumers, vegans, and vegetarians who are seeking to incorporate these essential fatty acids into their diets without contributing to the depletion of marine ecosystems.



Body-gut bacteria partnerships may unlock cholesterol control and fatty liver treatments

28 Jan 2025 | By Venya Patel

Body-gut bacteria partnerships may unlock cholesterol control and fatty liver treatments

The article discusses new research on the role of body-gut bacteria partnerships in managing cholesterol levels and fatty liver disease.

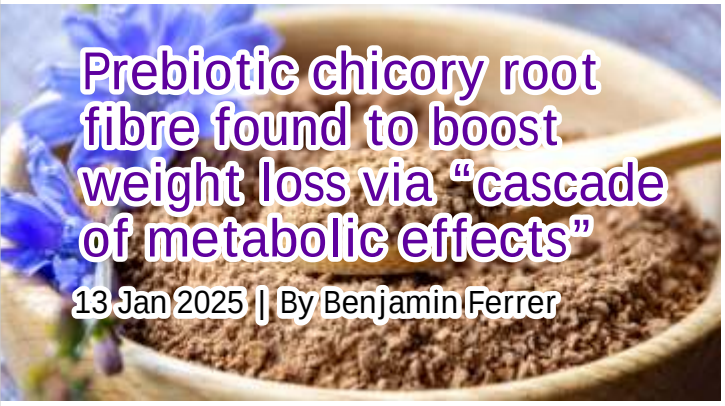
Gut bacteria produce bile acids that activate the farnesoid X receptor (FXR), a key regulator of cholesterol metabolism and fat storage.Excessive free bile acids produced by the microbiota can negatively impact cholesterol and fat metabolism, potentially leading to non-alcoholic fatty liver disease.

The body counters the effects of bile acids by producing bile acid-methylcysteamines (BA-MCYs), which help maintain metabolic balance.BA-MCYs act as signalling molecules to regulate fat and cholesterol levels.A high-fibre diet positively impacts BA-MCY production, although the specific foods that boost production are not yet known.Dietary changes, such as increasing fibre intake, could enhance BA-MCY production and offer new avenues for managing health issues.

BA-MCYs are difficult to detect due to their mass spectroscopic properties and their production in the host's intestine, not the liver.Further research is needed to understand how BA-MCYs work in mice and their potential for therapeutic applications in humans.Investigating whether BA-MCY supplementation can decrease overall cholesterol levels and provide long-term benefits for liver health.Understanding how different diets and lifestyle factors affect BA-MCY production in humans.

Initial studies in mice show significant metabolic benefits, such as reduced liver fat levels and improved cholesterol metabolism.Future research aims to determine the dietary regimens that boost BA-MCY production, with the goal of human validation.Since BA-MCYs occur naturally in the human body, the timeline for developing these compounds as drugs may be shorter compared to synthetic compounds. Health benefits of fibre-fortified products are being explored by various professionals and companies.

Ingredients like acacia fibre support gut health, while rice and carob proteins help preserve muscle mass.The research highlights the potential of body-gut bacteria partnerships in managing cholesterol levels and fatty liver disease through dietary changes and new therapeutic approaches.



Prebiotic chicory root fibre found to boost weight loss via “cascade of metabolic effects”

13 Jan 2025 | By Benjamin Ferrer

Prebiotic chicory root fiber found to boost weight loss via “cascade of metabolic effects” in literature review

A systematic literature review published in The American Journal of Clinical Nutrition examined the effects of chicory root fibre on weight loss and metabolic health.

The review included 32 randomized controlled trials with nearly 1,200 participants. Chicory root fibre intake resulted in a statistically significant and clinically meaningful 2% reduction in body weight compared to the placebo. The effectiveness of chicory root fibre in weight loss became more pronounced over time and was consistent regardless of participants' health status.

The fibre supported reductions in body mass index (BMI), fat mass, and waist circumference. When supplementation lasted for at least eight weeks, a reduction in body fat percentage was noted. Chicory root fibres, such as inulin and oligofructose, are proven prebiotics that support gut health by promoting the growth of beneficial microorganisms like Bifidobacteria. These prebiotics trigger a cascade of metabolic effects, leading to increased satiety and reduced food intake. Prebiotic fibres (Inulin and Oligofructose) are natural, non-GMO, and clean label, derived from chicory root via a gentle hot water extraction method.

Obesity remains a global priority, with one in eight people living with obesity and 2.5 billion adults overweight. Supplement innovation, including GLP-1 weight loss drugs and nutritional support systems, continues to evolve in response to the obesity epidemic.

How dairy can help tackle the triple burden of malnutrition among South East Asian children

By Audrey Yow 27-Nov-2024

https://www.foodnavigator-asia.com/Article/2024/11/27/dairy-can-help-tackle-the-triple-burden-of-malnutrition-among-south-east-asian-children/

The article discusses the triple burden of malnutrition faced by South East Asian children and explores how dairy can help address these issues.

South East Asian children face undernutrition, overnutrition, and micronutrient deficiencies (hidden hunger). SEANUTS II data revealed that more than 70% of children in South East Asia lack calcium, and more than 80% lack vitamin D. Additionally, 24–40% of children younger than four years old were found to be anaemic.

Partnerships with governments, NGOs, and private sectors. School programmes that provide nutritious dairy products and disseminate nutritional information. Products fortified with appropriate nutrients tailored to meet dietary needs. Varied pack sizes to cater to different needs and ensure affordability. Grassroots education campaigns to explain the benefits of milk consumption. Initiatives to help scale up milk production and improve food security.

Initiatives and Success Stories: Indonesia: Pilot partner in school milk and meal programmes, providing free lunch with milk. Malaysia: School programmes benefiting 78,000 children with 21 million cartons of milk a year. Thailand: One Million Smiles campaign donating one million cartons of omega-fortified dairy products. Vietnam: Promoting access to dairy through the Dutch Lady brand and improving labelling clarity.

Philippines: Nutrient-dense solutions through the Alaska brand, including small milk packs for low-income families.

Overweight issues are more prevalent in urban areas, while stunting is more common in rural regions. Micronutrient deficiency affects children across both rural and urban areas. The goal is to build on SEANUTS II insights and fine-tune formulations for specific countries to address their unique nutritional needs.

Collaboration, accessibility, and education are key to tackling the triple burden of malnutrition and improving the nutritional profile of South East Asian children.

Does new study pave the way for cocoa's future as a functional food?

By Liza Laws 02-Dec-2024

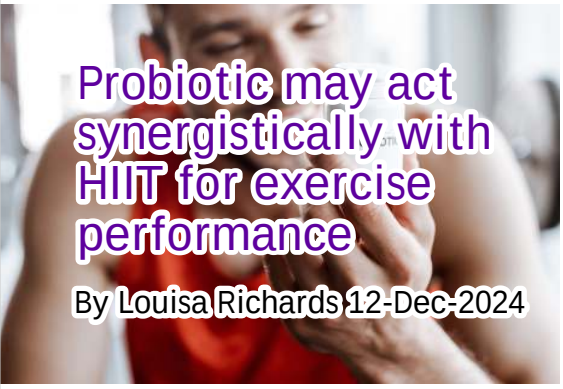
https://www.foodnavigator-usa.com/Article/2024/12/02/cocoa-flavanols-protect-heart-health/

A recent study published in the Food and Function Journal by researchers at Birmingham University has found that cocoa flavanols can counteract the adverse effects of high-fat meals and stress.

The study aimed to show that fat consumption can impair the recovery of endothelial function (how well the thin layer of cells lining blood vessels helps regulate blood flow, vascular tone, and overall cardiovascular health) following mental stress, while flavanols consumed with fat can mitigate the negative impact.

Stress can temporarily affect how well blood-vessels function, which may help explain its link to heart problems. Stress-related heart issues often show reduced ability for blood vessels to widen and higher resistance in blood flow during stressful situations. Participants who consumed high-flavanol cocoa with a high-fat meal showed improved endothelial function compared to those who consumed low-flavanol cocoa. Mood ratings and cardiovascular metrics were tracked, revealing a noticeable impact of flavanols post-stress.

The study highlights the potential benefits of cocoa flavanols in managing cardiovascular and stress-related responses, suggesting that flavonoid-rich foods can temporarily protect endothelial function from the adverse effects of high-fat meals and stress in young, healthy adults.With rising consumer interest in functional foods, cocoa-based products enriched with flavanols could see increased demand, aligning with market trends emphasizing natural solutions for health and wellness.



Probiotic may act synergistically with HIIT for exercise performance

By Louisa Richards 12-Dec-2024

https://www.nutraingredients.com/Article/2024/12/12/twk10-probiotic-may-act-synergistically-with-hiit-for-exercise-performance/

The article highlights a fascinating study about the potential synergistic effects of the probiotic strain L. plantarum TWK10 when combined with high-intensity interval training (HIIT).

According to the research, daily supplementation with TWK10 could not only boost exercise performance but also help address certain negative impacts of HIIT, such as increased waist circumference.

Key findings include: Participants who took TWK10 alongside HIIT exhibited a greater increase in time to exhaustion (TTE) compared to control groups. TWK10 supplementation helped reduce hip circumference, counteracting negative changes in waist size that HIIT alone might cause.The probiotic might offset some unexpected outcomes, such as increased fasting blood glucose levels, although the exact mechanism remains unclear.

The study focused on middle-aged obese women (ages 35–55) and emphasized the importance of probiotics in mitigating winter-related weight challenges. Researchers acknowledged limitations, including the study's duration and seasonal factors, and called for further investigation.

Omega-3 shows potential for improved insulin sensitivity

By Olivia Haslam 07-Nov-2024
NutraIngredients Europe

Recent research published in the journal Nutrients suggests that omega-3 fish oil may benefit gut health and lipid metabolism in people with type 2 diabetes mellitus (T2DM).

A randomized, double-blind, placebo-controlled study conducted by researchers in Nanjing, China, assessed the effects of omega-3 fish oil supplementation in T2DM patients and found that omega-3 polyunsaturated fatty acids (PUFAs) can influence gut bacteria structure and function, which may have significant implications for gut health and systemic inflammation.

Type 2 diabetes affects over 90% of people with diabetes worldwide, with a projected prevalence of 12.2% (783.2 million people) by 2045. Omega-3 PUFAs—including α-linolenic acid, EPA, and DHA—are known to benefit various health areas. Studies have shown that omega-3 PUFAs can help prevent T2DM by improving insulin signalling, reducing inflammation, and influencing glucose metabolism. Omega-3 PUFAs also positively impact gut microbiota, restoring a balanced microbiome and increasing anti-inflammatory compounds like short-chain fatty acids.

Imbalances in the gut microbiome are linked to T2DM risk due to disrupted biochemical processes that lead to insulin resistance. Therefore, a healthy gut microbiome can support metabolic and immune function, improving insulin sensitivity and blood glucose regulation.

The study administered daily fish oil capsules or a placebo to two groups of 55 T2DM patients over three months. Blood and fecal samples were collected at the beginning and end of the study to analyse serum lipids, glycemic parameters, gut microbiota diversity, and lipidomics. Findings indicated that omega-3 PUFAs from fish oil did not significantly reduce fasting plasma glucose levels compared to baseline. However, the fish oil group experienced significant reductions in serum fasting blood glucose, glycosylated hemoglobin, HOMA-IR, total cholesterol, triglycerides, LDL cholesterol, and non-HDL levels compared to the placebo group after three months.

The intervention also altered glycerophospholipid metabolism and gut microbiota composition. Specifically, the fish oil group showed a significantly lower abundance of Desulfobacterota and reduced levels of Colidextribacter, Ralstonia, and Klebsiella compared to the placebo group, while levels of Limosilactobacillus, Lactobacillus, and Haemophilus significantly increased.

Relevant glycolipid metabolism indicators showed significant correlations with changes in serum lipid metabolites and intestinal bacterial and fungal profiles.

The researchers concluded that fish oil supplementation may benefit patients with type 2 diabetes and highlighted the need for additional validation through large-scale population trials.

https://www.nutraingredients.com/Article/2024/11/07/omega-3-shows-potential-for-improved-insulin-sensitivity/

FOOD SCIENCE & INDUSTRY NEWS

Formulating with fibre: Research touts vast gut health and functional benefits

23 Jan 2025 | By Jolanda van Hal

Formulating with fibre: Research touts vast gut health and functional benefits

The article highlights the increasing interest in fibre-fortified nutrition as consumer awareness grows regarding the need to increase fibre intake.

Consumers are more aware of the need to increase their fibre intake, driving demand for fibre-fortified products. Research advances highlight the benefits of fibres and prebiotics beyond gut health. Some products contain too much or too little fibre to meet claimed benefits, leading to increased market scrutiny. Experts emphasize the importance of science-backed claims and validation certificates.

Eszter Heijnen from Sensus mentions significant advancements in product development and consumer awareness. Innovations like chicory inulin and oligofructose are paving the way for versatile and palatable fibre-enriched products. Fibers support immunity and mental well-being beyond digestive health. Hannah Ackermann from COMET highlights that clinically proven prebiotic fibres can provide a natural and sustainable alternative to popular GLP-1 drugs. Prebiotic fibre shakes improved metabolic health, digestion, and health-related quality-of-life scores.

Abigail Storms from Tate & Lyle notes potential for fibre-fortified products to support gut health, immunity, weight management, mental health, heart health, and diabetes. Research links fibre intake to reduced heart muscle damage caused by diet-induced cardiac disease. Fortification could prevent or delay type 2 diabetes cases and deaths due to cardiovascular episodes. Chicory root inulin and oligofructose represent significant opportunities for fibre fortification due to their versatility, tolerance, and neutral taste. Consumer awareness of the fibre gap and prebiotics' benefits drives demand for fibre-enriched products.

Dr. Isabelle Jaouen from Alland & Robert emphasizes making fibres easier to use and more environmentally sustainable. The company's acacia fibre range, Beyond Acacia, is energy-saving, easier to use, and has a minimal carbon footprint.

Vanessa Bailey from Ingredion mentions fibres can replace sugar and improve texture in addition to health benefits. New products combine fibre with vegan, plant-based, and sugar-related claims. Fiber is now appearing in new categories such as beverages and confectionery, including gummies, chocolate, and ice cream.

GoodMills Innovation unveils plant protein blend for baked goods

24 Jan 2025 | By Gaynor Selby

GoodMills Innovation unveils plant protein blend for baked goods

GoodMills Innovation has introduced GoWell Tasty Protein, a new balanced protein blend made from environmentally-friendly ingredients such as fava beans, yellow peas, sunflower seeds, and wheat.

This blend is specifically designed for the baked goods sector, allowing manufacturers to easily produce protein-rich baked goods like burger buns,

sandwich rolls, soft breads, bagels, baguettes, pretzels, and pancakes.

GoWell Tasty Protein contains 60% protein and offers a well-rounded amino acid profile, ensuring that the taste and sensory quality of the final product are not compromised. The blend can be used to create baked goods that can be marketed as "high protein" and "vegan," depending on the dosage and recipe formulations.

The new protein blend is praised for its optimal sensory characteristics, delivering a delicate bite and harmonious mouthfeel in the final product. It has a neutral to slightly nutty flavour and preserves the original character of the baked goods. The ingredients used in GoWell Tasty Protein are environmentally friendly in cultivation and processing.

GoodMills Innovation aims to provide a comprehensive solution with excellent taste, sensory properties, ease of processing, and sustainability credentials. This new protein blend supports the creation of products that meet the current market demand for protein-rich, plant-based foods.

This launch follows GoodMills Innovation's recent showcase of its fibre and protein concepts at Fi Europe in Frankfurt, where the company demonstrated how plant-based ingredients can help manufacturers achieve advanced textures and nutritional values.

Sugar reduction without taste trade-offs: New industry efforts to replicate and replace sweetness globally

22 Jan 2025 | By Sade Laja

Sugar reduction without taste trade-offs: New industry efforts to replicate and replace sweetness globally

Reducing sugar in food products is a complex process that involves considering various factors, as merely replacing sweetness without addressing functionality can lead to issues.

This challenge is heightened by the fact that the taste of ingredients, such as strawberries, can vary based on where they are grown, affecting their sugar profiles.

Companies use a "Replace Rebalance Rebuild" approach to tackle sugar reduction. This involves:Replacing sweetness with alternative sweeteners.Rebalancing flavour to maintain the overall taste profile.Rebuilding functionality to ensure the product's texture and mouthfeel are not compromised.

Innovation and partnerships are crucial in the sugar reduction sector. Key developments include:Tate & Lyle: Formed The Natural Sweetener Alliance with Manus to commercialize stevia Reb M.Collaborated with BioHarvest to synthesize botanical sweeteners, enhancing sustainability and cost-effectiveness.Roquette and Bonumose: Teamed up to scale the use of tagatose, a low-calorie sweetener with health benefits.

Increasing health concerns, such as diabetes, obesity, and heart disease, drive the demand for sugar reduction. Consumers are becoming more informed and mindful of their nutritional choices, leading to a preference for natural or low-calorie sweeteners.

Tate & Lyle offers a broad portfolio of sweeteners and fibres to support sugar reduction efforts. Their products, such as TastevaStevia Sweeteners, Dolcia Prima Allulose, and Purefruit Monk Fruit Extract, help create healthier options with better taste profiles. Countries are implementing regulations around added sugar, such as taxes and front-of-pack labelling requirements. Companies aim to stay ahead of these changes by developing innovative sugar reduction solutions.

Although sugar-free products will remain, there is a push for innovations in reduced-calorie options. Specialty sugars, such as honey and agave, may gain interest as alternatives. Governments worldwide are expected to accelerate efforts to reduce sugar intake through taxes and labelling, with voluntary reduction schemes also playing a role. A one-size-fits-all approach won't work, and ingredient suppliers and manufacturers must adapt to local policies and consumer expectations. Emphasis is on the complexity of sugar reduction, the importance of

innovation and partnerships, and the need to balance taste and health benefits while adapting to changing consumer behaviour and regulations.

https://www.foodnavigator.com/Article/2024/11/25/upf-how-can-industry-improve-consumer-perceptions/

The article by Donna Eastlake discusses the negative perception of ultra-processed foods (UPF) and explores ways in which the food and beverage industry can improve consumer perceptions of these products.

Ultra-processed foods have garnered a lot of bad press and are perceived as unhealthy and harmful to the environment. Studies have linked UPFs to chronic diseases such as type 2 diabetes, heart disease, and even early death. Reports from the World Health Organization have compared the consumption of UPFs to smoking and drinking alcohol. There is a lack of clear understanding about the true health impacts of UPFs, even among scientists.

Potential Solutions: On-Pack Advertising: Highlight the nutritional benefits and quality ingredients in UPFs. Promote the positive aspects of certain processing methods, such as reducing sugar content. Clear Communication: Provide understandable explanations of the benefits of ultra-processing. Focus communication efforts on older generations who are less familiar with UPFs. Addressing Misinformation: Acknowledge that not all UPFs have negative health impacts; some can contribute to better health outcomes. Advocate for more research to provide clearer, consensus-based data on the health impacts of UPFs.

Generational Divide: Younger Consumers: More accepting of UPFs. Older Consumers: Less accepting and more sceptical due to lack of familiarity. The industry needs to balance the narrative by emphasizing the positives and ensuring that consumers have accurate, comprehensible information about UPFs.

https://www.foodnavigator.com/Article/2024/12/02/major-npd-opportunities-in-intermittent-fasting/

This highlights the growing popularity of intermittent fasting and explores new product development (NPD) opportunities for the food and beverage industry.

Intermittent fasting is the most popular diet globally, driven by its strong links to weight loss and endorsements from celebrities and health experts. The intermittent fasting market is predicted to grow at a compound annual growth rate (CAGR) of 15.7% over the next decade, outpacing the overall weight management market.

Popular Types of Intermittent Fasting: Time-Restricted Eating: Fasting every day for 12 hours or longer and eating in the remaining hours (e.g., 16:8 method). The 5:2 Diet: Eating normally for 5 days and restricting calorie intake to 500–600 on the remaining 2 days. Eat Stop Eat: 24-hour fast once or twice a week. Alternate-Day Fasting: Fasting every other day. The Warrior Diet: Eating small amounts of raw fruits and vegetables during the day and one large meal at night.

NPD Opportunities for Brands: Meal Plans: Creating meal plans for intermittent fasting adopters, particularly those on the 5:2 diet. New Products: Developing products that provide the essential nutrients required by adopters to maintain a balanced diet. High-Quality Ingredients: Emphasizing high-quality sources of fibre and protein to help consumers feel fuller for longer.

Brand Success Stories: ProLon: Launched a range of foods and drinks to support fasting diets, including snack bars, soups, shakes, and spreads. SlimFast: Pivoted to offer products that cater to intermittent fasting, providing solutions for consumers before, during, and after their fast.

Adopting streamlined approach to scale cultivated protein for APAC market

By Audrey Yow 02-Dec-2024

https://www.foodnavigator-asia.com/Article/2024/12/02/vital-meat-adopts-streamlined-approach-to-scale-cultivated-protein-for-apac-market/

Vital Meat focuses on collaborating with food industry players, restaurants, and food service providers to incorporate its cultivated chicken into various products (e.g., stuffed pasta, soups, broth, nuggets) rather than targeting consumers directly.

By concentrating on cultivated chicken, Vital Meat can efficiently scale production and drive prices down. Chicken is widely consumed in the region, providing a familiar entry point for consumers.

Affordability: Making cultivated meat economically viable for the wider population remains a significant challenge.Consumer Acceptance: Transparent communication and consumer education about the benefits of cultivated meat (e.g., sustainability, ethics, health) are crucial for fostering long-term acceptance.

Consumer Awareness: Vital Meat and its partners actively promote consumer awareness through tastings and collaborations with eateries, integrating cultivated meat into traditional and modern recipes.Regulatory Support: The proactive regulatory stance in Singapore, including the “30-by-30” vision to produce 30% of its food locally by 2030, supports the growth of cultivated meat.

The APAC market is characterized by increasing consumer interest and acceptance, driven by a growing awareness of food sovereignty and openness to new food technologies.

Orange-fleshed sweet potato powder could improve vermicelli’s nutritional value

By CM Tay 02-Dec-2024

https://www.foodnavigator-asia.com/Article/2024/12/02/orange-fleshed-sweet-potato-powder-could-improve-vermicelli-nutrition/

Traditionally made from rice flour and water, vermicelli is mostly carbohydrates and lacks essential nutrients, minerals, protein, and fibre.

OFSP (orange fleshed sweet potato powder) is rich in carotenoids, polyphenols, and fibre, making it a strong candidate to improve vermicelli's nutritional quality and sensory appeal.

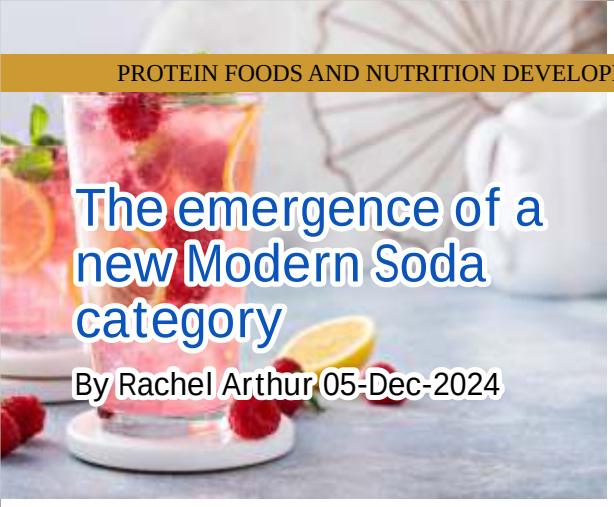
Enhanced Nutritional Value: High Beta-Carotene: Supports eye health and immune function. Fiber Content: Aligns with consumer demand for heart-healthy foods. Colour and Texture: OFSP's natural orange hue adds visual appeal, while its fibre improves noodle firmness and resilience.

Using locally sourced OFSP, especially from regions like Vietnam’s Mekong Delta, can provide economic benefits and support sustainability goals. Local sourcing reduces carbon emissions associated with long-distance ingredient transport.

Researchers developed a standout formula, F3, with 20% OFSP powder and 80% rice flour. This formula showed improved cooking qualities and significant health advantages: Beta-Carotene Levels: 9.29 µg/g, supporting vitamin A production. Glycaemic Index (GI): Lower estimated GI of 51.24, making it suitable for diabetics and pre-diabetics. Negative PRAL Score: -1.45, suggesting it helps balance the body’s acid levels.

The research presents an opportunity for food manufacturers to scale up the production of OFSP-enriched vermicelli. OFSP-enriched vermicelli can help address public health concerns like vitamin A deficiency.

The addition of OFSP powder to vermicelli offers a convenient, economical, and environmentally friendly strategy to improve the quality of rice noodles and community nutrition.



The emergence of a new Modern Soda category

By Rachel Arthur 05-Dec-2024

https://www.foodnavigator-usa.com/Article/2024/12/05/walmarts-modern-soda-shelf-the-start-of-the-functional-beverage-revolution/

Walmart has launched a new "Modern Soda" category featuring healthier beverages like OLIPOP, Poppi, and Zevia. This category includes low or no sugar, clean label, and functional sodas.

Walmart's support gives significant recognition to this emerging category, which aims to offer better-for-you alternatives to traditional sugary sodas.

Walmart's Modern Soda category includes gut health-focused brands OLIPOP and Poppi, as well as stevia-sweetened Zevia. These beverages have been around for years, but Walmart's involvement highlights their potential. The new shelf is a triple win: better options for consumers, affordable healthy choices for Walmart, and redefined soda perceptions for brands.

Traditional sodas are high in sugar and "empty calories," making them a target for healthier reformulation. Modern Soda targets a broad consumer base, from health-conscious Gen Z to Millennials and Gen X seeking zero-sugar alternatives.

Ben Goodwin, founder of OLIPOP, aims to create a healthier soda supporting digestive health. The brand combines nostalgic comfort with functional benefits, making it popular across demographics. Although traditional sugary sodas dominate the market, better-for-you brands are riding consumer trends like sugar reduction and clean labels. Mintel projects the carbonated soft drink category will grow by 30% in the next three years, with the better-for-you soda subset expected to grow 75%.Walmart's Modern Soda shelves could significantly impact public health by offering healthier alternatives and reducing sugar consumption. It's clear that there's a growing demand for healthier beverages.

A new biodegradable material to replace certain microplastics

https://www.eurekalert.org/news-releases/1066944

MIT chemical engineers designed an environmentally friendly alternative to the microbeads used in some health and beauty products

MIT researchers have developed a biodegradable material that can replace the plastic microbeads used in health and beauty products. These polymers break down into harmless sugars and amino acids, offering an environmentally friendly alternative to traditional microplastics.

The new material, made from poly (beta-amino esters), is biodegradable and can dissolve in acidic environments like the stomach. It can encapsulate nutrients such as vitamins A, D, E, C, zinc, and iron, protecting them from degradation and remaining intact even after boiling or long-term storage.

Fortifying foods with these particles could help address nutrient deficiencies, benefiting millions of people worldwide. The particles can replace microbeads in cleansers, effectively removing substances like permanent marker and waterproof eyeliner while absorbing potentially toxic elements like heavy metals.

The material was tested on cultured human intestinal cells, showing no damage at doses used for food fortification.

The researchers are working on further testing and safety data collection to obtain GRAS (generally regarded as safe) classification from the U.S. Food and Drug Administration.

This innovation represents a significant step forward in addressing the environmental issues caused by microplastics and offers a promising solution for both health and beauty applications.

What's hot in natural and clean confectionery?

By Natasha Spencer-Jolliffe
20-Nov-2024

https://www.foodnavigator-usa.com/Article/2024/11/20/latest-launches-in-natural-and-clean-confectionery/

AThe natural and clean confectionery market focuses on trends and innovative product launches in 2024 and what lies ahead for 2025.

Seasonal Sales and Healthier Alternatives

• Unreal: Released a Halloween variety pack of low-sugar chocolates at Target, catering to seasonal demands.
• Skinnydipped: Expanded its range with peanut butter cups, chocolate squares, and salty nuts, alongside launching a large-scale ad campaign.
• SmartSweets: Reformulated its low-sugar gummy candies, enhancing flavours and textures. New limited-edition Easter products, Berry Bunnies and Tropical Easter Eggs, contain only 3 grams of sugar per bag, using stevia as a natural sweetener.

Protein-Packed and Fat-Free Candies

• Protein Candy: Introduced the world's first "super candy" with up to 14 grams of protein per serving, low sugar, and prebiotic fibre.
• Barebells: Created a Birthday Cake snack bar with 20 grams of protein and no added sugar, targeted at post-workout refuelling.
• Pandy: Launched its Tropic Trio gummies in mango, pineapple, and passionfruit flavours with zero fat, minimal sugar, and added protein.

Peanut Butter's Dominance

• Hershey & ONE Brands: Released low-sugar protein bars in Reese's Peanut Butter Lovers and Hershey's Cookies 'n' Creme flavours, with 18 grams of protein and 3 grams of sugar.
• Justin's: Unveiled organic nut-based chocolate candy pieces, using fruit and vegetable dyes instead of synthetic ones, catering to organic candy consumers.
• Krack'd Snacks: Developed a keto-friendly dark chocolate peanut butter caramel crunch bar with less than a gram of sugar, low carbs, and vegan-friendly credentials.

Innovations and Investments for 2025

• Alice Mushrooms: Secured investment to expand its functional chocolate product line.
• Wild Thingz Candy: Set to debut a vegan-friendly, low-sugar candy collection targeting health-conscious consumers in 2025. Products include Zesty Pests, Fruity Flyers, and Gummy Grubs.

These trends highlight the shift towards better-for-you products that provide permissible indulgence, align with health-conscious lifestyles, and leverage seasonal opportunities.

Can beverages be made less sweet?

By Rachel Arthur 05-Dec-2024

https://www.foodnavigator-usa.com/Article/2024/12/05/can-beverages-be-made-less-sweet/

This investigates whether beverages can be made less sweet while still meeting consumer expectations.

While reducing sugar in beverages is straightforward, achieving consumer acceptance with less sweetness is harder. People's innate love for sweetness is evolutionary, but individual preferences are influenced by age, culture, and genetics.

PepsiCo and Biofortis Research conducted studies to test if sweetness preferences can be altered by reducing sugar content gradually or immediately in soft drinks. Results showed: American sugar-soda drinkers adapted to less sweet beverages. Mexican consumers and low-calorie soda drinkers showed less preference change.

Market Initiatives: PLEZiFiZZ: Aimed at older kids and teens, this drink contains 70% less sugar and uses stevia, with added nutrients like fibre, potassium, and vitamin C. It aims to reshape kids' palates for less sweet beverages long-term. Growing consumer interest in sour, savoury, herbal, or complex profiles is driving innovations in less-sweet beverages (e.g., kombucha, kefir, chili-infused drinks).

Sugar contributes to texture and mouthfeel, challenging reformulations. Solutions like gelling agents (pectin, xanthan, guar) are helping address these challenges.

Digital Innovation Optimizes Food Product Formulations

INNOCUOUSNESS
12 December 2024

https://www.foodnewslatam.com/inocuidad/53-control-calidad/15789-la-innovaci%C3%B3n-digital-optimiza-las-formulaciones-de-productos-alimentarios.html

This article discusses the development of a digital innovation tool under the EU-funded OptiSignFood project to optimize food product formulations.

Modern consumers demand healthier and more sustainable food products but often resist price increases. Food manufacturers face significant challenges balancing these consumer demands with affordability while complying with regulatory and nutritional standards. Developing a new food product typically takes up to two years and costs millions, with many projects failing due to disjointed communication between manufacturers, brand owners, and retailers.

OptiSignFood Project Goals: The project, a collaboration of scientists, industry experts, and high-tech developers, aimed to simplify food product development by addressing nutritional, environmental, and economic variables simultaneously. The team sought to create software that predicts and optimizes food formulas with key factors such as: Nutritional value, Environmental impact (e.g., ingredient carbon footprints), Food safety and quality parameters

A database was developed to link nutritional information with environmental impact data. AI and machine learning algorithms were employed to identify optimal ingredient combinations, reducing the need for expensive, time-consuming tests. This approach accelerates product development while maintaining a focus on health, safety, and sustainability.

Benefits of the Digital Tool: Efficiency: Manufacturers can reduce formulation development time by up to 80%. Comprehensive Assessments: The platform integrates lifecycle assessments of food and agricultural systems. Consumer Engagement: Products developed with the software prioritize transparency in nutritional and environmental benefits.

The software is now being commercialized, with a focus on key food categories such as plant-based milks and snacks. The growing database aims to extend its impact to more food categories, leveraging continuous improvements in artificial intelligence. The project aspires to improve the nutrition and sustainability of food products across various categories on a large scale. By aligning environmental and health impacts with consumer habits, the developers hope to foster healthier dietary changes.

How brands can balance health, indulgence & convenience in the morning

By Deniz Ataman 16-Dec-2024

https://www.foodnavigator-usa.com/Article/2024/12/16/balancing-health-indulgence-and-convenience-in-morning-eats/

While consumers “can’t beat the convenience” of a bowl of cereal, “we are seeing needs and wants shift in the morning towards more warm and satiating types of products,” Darren Seifer, consumer goods and foodservice insights, Circana, told FoodNavigator-USA. Convenience wakes up the morning routine for consumers, with 90% of morning meals prepared in under 15 minutes, according to Circana.

From quick morning routines to social media-driven trends, the evolving demands of mornings are reshaping the food and beverage landscape, pushing brands to innovate with both convenience and indulgence. While consumers “can’t beat the convenience” of a bowl of cereal, “we are seeing needs and wants shift in the morning towards more warm and satiating types of products,” Darren Seifer, consumer goods and foodservice insights, Circana, told FoodNavigator-USA.

While cereal won’t be “dethroned” from the top convenience spot, other categories like sausages, frozen pancake, waffles and French toast “that you could quickly

heat and eat" plays a critical role in the morning meal, he added. Older consumers will typically choose these frozen formats while younger consumers prefer potatoes and breakfast sandwiches, according to Circana's Future of Morning report. This article discusses how consumer demands for health, indulgence, and convenience are influencing the breakfast food and beverage market. Below is a brief summary:

Consumer Preferences: Convenience is crucial, with 90% of morning meals prepared in under 15 minutes. While cereal remains popular, there's increasing demand for warm, satisfying options like frozen pancakes, waffles, and breakfast sandwiches.

Gen Z shows a strong reliance on food service for morning meals due to a lack of cooking experience, while older generations lean toward frozen breakfast items.

Wellness Trends: Consumers prioritize wellness in the morning, often seeking protein-rich and nutrient-dense products. There's a growing preference for "healthy indulgences," which balance health and enjoyment.

Brand Strategies: Effective packaging with clear messaging, such as "great source of protein" or "ready in minutes," is essential to resonate with time-strapped consumers. Leveraging social media for creative food preparation ideas (e.g., viral cottage cheese recipes) can boost category sales.

Technology Integration: Appliances like air fryers, which have gained popularity, are reshaping breakfast habits by offering healthier, crispier meal options.AI presents opportunities to enhance cooking precision and consistency for consumers.

Molecular farming start-up begins field cultivation of egg protein-producing potatoes

18 Dec 2024 | By Sade Laja

Biotech start-up PoLoPo has begun planting its genetically modified potatoes in fields, moving beyond greenhouse scale.

The company uses molecular farming techniques to produce proteins in plants, enabling them to express target molecules like animal proteins found in dairy or eggs.

PoLoPo aims to disrupt the traditional egg production market, which is resource-intensive and heavily reliant on animal-based products. Their first target protein is Ovalbumin (egg protein), offering a cost-effective alternative amidst rising egg prices, supply chain instability, and avian flu outbreaks.

Maya Sapir-Mir, PoLoPo CEO, expressed excitement about moving from lab to greenhouse and now to field-growing, marking a significant step for the company and the field of molecular farming. The increased yield from field trials will be directed to commercial samples for partners to begin working with the product in food applications.PoLoPo will also supply Patatin, the native protein in potatoes, which is an allergy-friendly, high-quality protein.

The current potato crop is expected to yield around three tons when harvested in spring 2025, marking a significant increase from the previous greenhouse-scale capacity of tens of kilograms. PoLoPo uses proprietary metabolic engineering techniques to turn potato plants into micro-biofactories. The plants manufacture and store target proteins in tubers, which are harvested, and the proteins are extracted and dried into functional protein powder for use in food processing lines and formulations. According to the Good Food Institute, molecular farming offers benefits such as a range of tissues for protein expression and wide applicability to crop improvement.

https://www.foodingredientsfirst.com/news/molecular-farming-start-up-begins-field-cultivation-of-egg-protein-producing-potatoes.html

Faster and cost-effective plant-based launches amid supply chain volatility

21 Nov 2024 | By Elizabeth Green

Beneo's focus on streamlining hybrid and plant-based development processes is evident in their collaborations with companies like Meatless and their use of faba bean protein concentrate to create a variety of product samples.

By covering multiple aspects of the value chain, Beneo is helping producers simplify their development processes and offer scalable solutions that meet consumer demands for quality and affordability. As consumer interest in plant-based diets continues to grow, Beneo is positioning themselves to prioritize the end-consumer experience by focusing on ingredients that foster closer relationships with consumers. With a strong emphasis on taste, texture, cleaner labels, and price, Beneo is demonstrating at Fi Europe the potential of their solutions to meet the needs of consumers seeking plant-based options.

Beneo has developed innovative plant-based egg replacers using faba bean protein concentrate to address the challenges seen in the F&B supply chains with eggs. This egg-free meringue made with faba protein delivers a stable foam and well-aerated texture after baking, offering a rich, creamy, and tasty alternative to traditional meringues. The use of plant proteins not only provides a stable pricing in end products but also offers functional benefits such as emulsifying properties and improved Nutri-Score. With the increasing interest in hybrid concepts and flexitarian diets, Beneo is exploring the development of hybrid consumer products, such as pies, rolls, and tacos, that incorporate Meatless Textured Flakes to partially or fully replace meat in toppings and fillings. This innovation opens up new possibilities for the use of plant proteins in various applications like bakery, meat replacements, and sports nutrition, with the upcoming faba bean concentrate facility in Germany set to enhance production capabilities and drive further advancements in plant-based solutions.

https://www.foodingredientsfirst.com/news/fie-2024-live-beneo-eyes-faster-and-cost-effective-plant-based-launches-amid-supply-chain-volatility.html

Saudi Arabia launches date-based cola alternative amid Israel boycotts

09 Dec 2024 | By Insha Naureen

Saudi Arabian company Turath Al-Madina has launched Milaf Cola, the world's first soft drink formulated using dates, a staple in Middle Eastern beverages such as sharbat.

This drink aims to compete with mainstream cola giants as consumers boycott brands with ties to Israel. In the UAE market, substitutes like Gaza Cola, Freeway Cola, and V7's Super Soda Cola have emerged as alternatives to mainstream products like Coca-Cola, in response to the Israeli occupation and invasion of Gaza.

Milaf Cola has no added sugar and is a healthier alternative to carbonated beverages, owing to the fibre, antioxidants, magnesium, and potassium present in dates. The product meets international food standards and promotes sustainable production practices. It supports local agriculture and aims to boost global markets for Saudi Arabia's date farmers. The dates used are sourced locally to ensure environmental sustainability. This product launch aligns with Saudi Arabia's Vision 2030 program, which focuses on sustainable, locally sourced products and aims to increase economic, social, and cultural diversification.

Consumers have responded positively to Milaf Cola's flavour. The company plans to introduce the date-based drink to regional and international markets, aiming to redefine global perceptions of dates. Turath Al-Madina plans to revolutionize the consumption of dates with a range of innovative products, including date-based energy drinks, date syrups for cooking, and infused beverages for specific health needs.

Since the invasion of Gaza, sales of international brands like Coca-Cola and Pepsi have declined in neighbouring countries like Egypt. Local brands, such as SinaCola and Primo's Pizza, have stepped in

to replace these international brands. Pepsi's marketing campaign slogan "Stay Thirsty" caused controversy among Egyptians amid the widespread boycott movement and conflict in Gaza, where nearly 91% of the population is acutely food insecure, according to a recent UN report.

Local brands altered their marketing strategies to cater to consumer demands and sensitivities. Trobi, an Egyptian soft drinks company, reported an 80% sales increase after the war began, using slogans like "Encourage Your Country's Product" as a marketing tool. The Federation of Egyptian Chambers of Commerce warned that such boycott campaigns could potentially harm the state's economy, affecting local investors, staff, and workers, as well as the taxes paid by these companies. The Western parent firms receive no more than 5% of the Egyptian units' revenues.

Turath Al-Madina's launch of Milaf Cola represents a significant step towards promoting healthier and sustainable beverage options, while also addressing market demands and supporting local agriculture. The positive consumer response and plans for future innovations highlight the potential for date-based products to gain popularity in regional and international markets.

https://www.foodingredientsfirst.com/news/milaf-cola-saudi-arabia-launches-date-based-cola-alternative-amid-israel-boycotts.html

Blood sugar control spikes interest across all health markets

By Nikki Hancocks 14-Mar-2024

https://www.nutraingredients.com/Article/2024/03/14/blood-sugar-control-spikes-interest-across-all-health-markets/

This highlights the rising interest in controlling blood sugar across various health markets, often termed as part of a "glucose revolution."

Blood sugar control is no longer seen as a concern for diabetics alone, with consumers recognizing the impact of blood sugar spikes on energy, mood, and long-term health risks like cardiovascular disease and nerve damage.

Innovative Solutions: Reducose: A white mulberry leaf extract shown to reduce post-meal blood sugar by up to 40%, helps prevent Advanced Glycation End products (AGEs), linked to collagen damage. Fibersol: A digestion-resistant maltodextrin, developed into an anti-spike gummy to improve satiety and reduce glucose spikes.

Healthy Aging: Emphasis on how blood sugar control can preserve collagen and reduce aging signs. Women's Health: Focus on insulin resistance and its connection to menopause symptoms and PCOS. Sports Nutrition: Developing low-glycemic, crash-free products for athletes.

Trends Driving the Movement: Increased use of Continuous Glucose Monitors (CGMs) and health-tracking devices. Social media influencers educating consumers about blood sugar stability. Consumer demand for sweet but low-GI products in categories like protein bars. Growing appeal of solutions that balance energy levels and improve mental focus. This trend signifies a shift toward integrating blood sugar control in daily nutrition for various demographics.

Industry innovations offer new solutions for targeted nutrition and wellness

05 Dec 2024 | By William Nichols

World of biotics: Industry innovations offer new solutions for targeted nutrition and wellness

The nutrition landscape is seeing rapid advancements in probiotics, with industry leaders developing targeted health solutions to address specific health concerns.

These tailored nutritional supports aim to enhance efficacy and provide personalized wellness options. Companies have developed broad portfolios of biotic ingredients supporting various health benefits, including gastrointestinal, mental, women's, infant and children's, immune, oral, and cardiometabolic health.

Data from Innova Market Insights shows a 6% annual increase in biotic ingredient launches from October 2022 to September 2024, with the US and Canada leading these launches. The fastest-growing categories include digestive, liver, kidney, and bladder health. Products, such as Lacticaseibacillusrhamnosus (LGG) and Urex (a combination of Lactobacillus rhamnosus GR-1 and Lactobacillus reuteri RC-14), provide targeted solutions for urogenital and mental wellness.

The world of biotics is rapidly expanding, with industry innovations offering new solutions for targeted nutrition and wellness. Companies are leading the charge in developing probiotic ingredients tailored to address specific health concerns, such as gastrointestinal health, mental health, women's health, and immune support. These advancements promise enhanced efficacy and personalized wellness options for consumers looking to optimize their health.

As the industry continues to grow, there is a focus on compelling innovations that emphasize effectiveness and necessity to consumers. From probiotics tailored to individual needs through microbiome analysis to innovative formulations that combine probiotics with other beneficial ingredients like prebiotics and vitamins, the market is evolving to meet the demands of health-conscious consumers.

Moving forward, companies are committed to staying close to customers and partners, addressing evolving market demands, and educating consumers on the benefits of biotic health solutions for overall well-being.

Industry leaders explore the latest supplement absorption and bioavailability trends

19 Dec 2024 | By Milana Nikolova

Industry leaders explore the latest supplement absorption and bioavailability trends

Consumers are increasingly valuing supplements with high bioavailability and bioidentical characteristics.

Sustainable manufacturing processes and clear labelling are also becoming more important.64% of consumers actively seek clear sustainability communications on packaging (Innova Market Insights).

New, convenient dosage formats are emerging in the market.Brands must ensure ingredients in these formats maintain bioavailability and stability.Focus is on maximizing ingredient efficacy through advanced bioavailability technologiesand formulations in the dietary supplement industry are key to ensuring that these products are effectively absorbed by the human body. Experts are working on innovative solutions to enhance the absorption and stability of key ingredients. By focusing on bioavailability, clean labelling, and sustainable manufacturing practices, companies are meeting consumer demands for effective and transparent supplement products. Through technologies like chelation processes, microencapsulation, and patented delivery systems, the industry is working towards maximizing the efficacy and benefits of dietary supplements for consumers. With a strong emphasis on science-backed approaches, these companies are dedicated to improving the bioavailability of key nutrients such as vitamin K2, magnesium, iron, and curcumin to ensure optimal absorption and health benefits for consumers.

Ubiquinol supplements provide the body with the same form that naturally makes up more than 96% of CoQ10 in human blood plasma, eliminating the need for conversion. Studies have shown that Ubiquinol has superior absorption compared to conventional CoQ10, making it a game-changer in supplementation. As people age, their natural levels of Ubiquinol decline, making supplementation even more crucial. Kaneka's Ubiquinol is available in various forms, all retaining their efficacy as a cofactor in cellular energy production and antioxidant defence. On the other hand, Lubrizol Life Science products focus on overcoming absorption and bioavailability issues with their branded ingredients, addressing stability, bioavailability, and organoleptic properties.

One of their technologies, iron microcapsules, utilizes micronisation to increase bioavailability, while NewCaff product line features sustained release technology for caffeine absorption without negative side effects.

In summary, the bioavailability and absorption of omega-3s are crucial factors in determining the effectiveness of supplements. By delivering omega-3s in a monoacylglyceride form, like Solutex'sMaGOmega, the body can more efficiently absorb these essential fatty acids without relying on digestive enzymes. This unique form not only ensures faster absorption but also acts as an emulsifier to facilitate micelle formation, enhancing bioavailability. Studies have shown that MaGOmega technology can enhance omega-3 absorption over three times better than traditional fish oil supplements, making it a more effective and efficient option for those with compromised enzymatic systems or malabsorption conditions.

Can plant-based overcome UPF links to avoid future trust issues?

By Donna Eastlake
31-Oct-2024 Food Navigator

The article addresses the challenges faced by the plant-based industry due to associations with ultra-processed foods (UPF) and low-quality ingredients, which have shaken consumer trust.

The plant-based sector faced a backlash when many of its products were revealed to be ultra-processed and made with low-quality ingredients. This has negatively impacted consumer trust. To regain consumer trust, the industry is shifting towards using fewer, more natural ingredients and moving away from ultra-processing methods. Brands are focusing on simplifying ingredients and creating minimally processed products.

Ultra-processing remains a significant challenge for the industry. However, there is an opportunity to improve by using more natural ingredients and transparent communication with consumers about product ingredients and manufacturing processes. Companies should prioritize educating consumers about the health benefits of plant-based alternatives, emphasizing whole-food ingredients and minimizing unnecessary additives.

Collaborating with nutritionists and health professionals to back claims with science-based evidence is crucial for rebuilding trust. Plant-based brands can highlight the environmental benefits of adopting a plant-based diet, such as reduced carbon emissions and land usage. This can encourage some consumers to switch to a more plant-focused flexitarian diet.

Despite efforts, plant-based products are still struggling to reach price parity with animal-based products. The cost-of-living crisis has exacerbated this issue, but the industry is working to address it. Government support is needed to help make plant-based proteins more affordable compared to animal proteins. Despite the challenges, interest in adopting a plant-based diet remains high. The number of Europeans identifying as vegan is significant, and there is a growing market for plant-based ingredients, such as legumes and vegetables.

The plant-based industry needs to focus on transparency, simplification of ingredients, and educating consumers about the health and environmental benefits to restore trust and boost sales.

https://www.foodnavigator.com/Article/2024/10/31/Plant-based-food-UPF-links-damaging-but-can-be-U-turned/

EFSA health panel dismisses claims linking creatine and improved cognitive function

16 Dec 2024 | By Venya Patel

EFSA health panel dismisses claims linking creatine and improved cognitive function

EFSA's dismissal of the claims linking creatine and improved cognitive function highlights the importance of scientific evidence in the realm of health and nutrition.

While creatine has been touted for its potential benefits in various areas, including sports performance and muscle building, the panel's analysis of ten human intervention studies reveals a lack of consistent effect on cognitive function. This finding challenges the notion that creatine supplementation can directly enhance memory, attention, and other cognitive domains.

The decision by EFSA was prompted by a health claim made by Alzchem Trostberg, asserting that creatine supplementation positively impacts specific cognitive domains. However, the panel's evaluation of the evidence suggests that such claims may lack sufficient scientific backing. Despite the speculation that creatine supplementation can increase brain creatine concentration and improve energy supply to neurons, the panel's findings emphasize the need for further research to establish a clearer link between creatine intake and cognitive function. As the demand for health and wellness products continues to grow, the industry faces the challenge of providing scientifically supported claims to consumers seeking effective solutions for cognitive enhancement and overall well-being.

FDA proposes mandatory front-of-package labels for better health outcomes

10 Dec 2024 | By Venya Patel

FDA proposes mandatory front-of-package labels for better health outcomes

The US FDA is ramping up efforts to tackle the obesity and diabetes crises by focusing on front-of-package (FOP) nutrition labelling, sodium reduction, and updated "healthy" food claims.

The agency is urging the food industry to provide healthier options and believes that FOP nutrition labelling can increase consumer awareness about ultra-processed foods (UPFs) that contribute to poor nutrition.

Chronic diseases like heart disease, cancer, and diabetes are responsible for the majority of disability and death in the US, driving $4.5 trillion in healthcare costs annually. Rural residents, racial and ethnic minorities, and those with lower socioeconomic status have higher rates of diet-related chronic diseases.

FOP nutrition labelling aims to educate consumers about specific nutrients in foods, such as saturated fat, sodium, and added sugars. The FDA envisions FOP nutrition labels becoming as iconic as the Nutrition Facts label.

The FDA has issued voluntary sodium reduction targets, with encouraging results showing 40% of targets achieved in 2022.New targets aim to reduce average sodium intake by 20% from previous levels.

The FDA is finalizing the definition of "healthy" nutrient content claims to match current nutrition science. A "healthy" symbol is being developed to help consumers identify foods that are the foundation of a healthy dietary pattern.

The FDA is addressing concerns about additives in UPFs by establishing an office dedicated to post-market assessments and developing processes to reassess chemicals previously approved for food use. The FDA is convening a workshop with the National Institutes of Health to identify key priorities and critical next steps for research on UPFs. The agency is prepared to take the lead in enhancing nutrition in the US, with a focus on improving public health outcomes through better nutrition.

By increasing consumer awareness through easily accessible information on food packaging, individuals can make more informed decisions about their dietary choices. With chronic diseases like heart disease, cancer, and diabetes on the rise, it is imperative for the food industry to offer healthier options to combat these health issues.

US FDA's new healthy definition encouraging nutritious diets to take effect next month

06 Jan 2025 | By Venya Patel

US FDA's new healthy definition encouraging nutritious diets to take effect next month

The FDA's new definition of "healthy," set to take effect next month, aims to align with current nutrition science and encourage nutritious diets.

Here are some key points: Criteria Based on Food Groups: New criteria focus on food groups and nutrient-to-limit thresholds, including saturated fat, sodium, and added sugars. Limits for Added Sugars: Specific limits for added sugars are introduced for the first time. Qualifying Core Food Group: Foods labelled "healthy" must include a qualifying amount from at least one core food group (e.g., vegetables, fruits, dairy, grains, protein, or oils) and meet specific nutrient limits. Compliance Deadline: Manufacturers must comply by February 25, 2028.

The update addresses chronic diseases, aiming to improve access to nutrition information and support healthy consumer shopping. The FDA is also developing a "healthy" symbol for product labels. Additionally, the agency is working on voluntary sodium reduction targets and front-of-package nutrition labelling to improve overall nutrition and reduce diet-related chronic diseases.

This significant update by the FDA reflects a growing awareness of the importance of nutrition in overall health and wellness. By redefining 'healthy' in a way that aligns with current scientific understanding, the agency aims to empower consumers to make more informed choices about the foods they eat.

Additionally, the new criteria may encourage manufacturers to prioritize the nutritional quality of their products, ultimately contributing to improved public health outcomes. As the FDA continues to prioritize transparency and nutrition education, it is clear that these efforts are crucial in addressing the ongoing issues of obesity and chronic diseases in the United States.

Tea brands win big as FDA endorses "healthy" label claim for unsweetened varieties

08 Jan 2025 | By Benjamin Ferrer

Tea brands win big as FDA endorses "healthy" label claim for unsweetened varieties

The FDA's new rule allows certain tea products to display the "healthy" claim on packaging if they contain less than 5 calories per 12 fluid ounce serving.

Unsweetened tea is officially recognized as a healthy choice. Tea is highlighted for its health benefits, including high concentrations of flavan-3-ols, which can reduce the risk of heart disease and diabetes, and improve blood pressure, cholesterol, and blood sugar levels. Label claims help consumers make informed purchasing choices and encourage healthier dietary patterns. Scientific evidence supports tea's potential to reduce the risk of heart disease and diabetes, and improve overall dietary patterns.

Tea is the most widely consumed beverage in the world after water.Tea drinkers tend to consume fewer high-calorie, sugar-sweetened beverages and have healthier

overall dietary patterns.Both caffeinated and decaffeinated tea contribute to hydration.

The FDA's endorsement of the "healthy" label claim for unsweetened tea varieties is a significant win for tea brands looking to promote the health benefits of their products. With tea being a widely consumed beverage around the world, the recognition of its nutritional value can help consumers make informed choices when it comes to their drink selections. The high concentration of flavan-3-ols in true teas like black, green, oolong, white, and dark teas makes them a powerhouse of bioactive compounds that can support heart health, blood pressure, cholesterol levels, and blood sugar management.

Ayana Bio enhances ultra-processed foods with cultivated plant cells for health claims

27 Jan 2025 | By Venya Patel

Ayana Bio enhances ultra-processed foods with cultivated plant cells for health claims

The article discusses how plant cell culture technology can address the nutritional shortcomings of ultra-processed foods (UPFs).

Cultivated plant cells can be engineered to deliver bioactive compounds like polyphenols, flavonoids, antioxidants, and carotenoids directly into UPFs. These bioactives can support cognition, cardiovascular health, and antioxidant claims, making UPFs healthier without compromising taste or accessibility.

Plant cell culture can produce the full spectrum of bioactives found in plants, offering a controlled and sustainable way to enhance nutrient density. For example, anthocyanins from blueberries can be cultivated using plant cell culture and added to UPFs to promote brain health, cardiovascular support, and anti-inflammatory benefits while preserving taste and shelf stability.

Plant cell culture technology is increasingly cost-competitive due to advancements in bioprocess optimization and scalability. It eliminates the need for land, pesticides, and lengthy growing cycles, reducing the time and costs associated with traditional agriculture. The technology has the potential to make fortified UPFs affordable for institutions like schools and low-income communities.

Scaling plant cell culture technology for mass production and adoption by major food manufacturers requires collaboration and innovation. Partnerships with contract manufacturing organizations (CMOs) and food manufacturers are necessary to integrate plant cell-derived bioactives into supply chains.

To address concerns that adding nutrients to UPFs might not compensate for their health risks (e.g., high sugar and fat content), a two-pronged approach is necessary. Reducing unhealthy ingredients like fats, sugars, empty calories, artificial colours, and synthetic preservatives. Fortifying with nutrient-dense ingredients to bring health benefits back to these foods.

Governments play a key role in defining and implementing restrictions on what should or should not be included in processed foods. Offering grants or tax incentives to companies developing technologies to improve nutrient density can foster the adoption of plant cell culture technology. Plant cell-derived ingredients have already been approved in the EU, and efforts are underway to obtain approvals from the US FDA.

The goal is to transform UPFs into vehicles for essential nutrition, not just sources of empty calories. Clinical evidence demonstrating the health benefits of bioactives will build trust and educate consumers.

Veggie victory: French court rules plant-based manufacturers can still use terms like “steak” and “sausage”

30 Jan 2025 | By Gaynor Selby

Veggie victory: French court rules plant-based manufacturers can still use terms like “steak” and “sausage”

A French court has ruled against a ban on using traditional meat-related terms like "steak" and "sausage" for plant-based alternatives, which had been proposed by the French government.

This ruling follows the European Court of Justice's reasoning that such a ban would violate EU law.

The case was brought to the Conseil d'Etat by the European Vegetarian Union (EVU), the French Vegetarian Association (AVF), Proteines France, and Beyond Meat.
The ruling is seen as a significant win for the plant-based movement, as it allows plant-based products to continue using traditional meat-related terms. This victory follows the Advocate-General's recommendation that the French court reject the ban.

The French government is now required to pay legal fees to the plant-based organizations involved in the case. The opposition, primarily from the meat industry, argued that using such terms confuses consumers. However, plant-based advocates, including Rafael Pinto, senior policy manager at EVU, argue that this pushback is an attempt to hinder the progress of plant-based alternatives.

Pinto emphasizes that the ruling should be seen as a positive signal for farmers and producers investing in plant-based alternatives, as well as for consumers. He argues that a level playing field would involve equal public subsidies and VAT (consumer tax) rates for both meat and plant-based products.

Despite this victory, the French government could propose a new ban that adheres to the legal requirements set by the European Court of Justice, such as only applying the ban to products produced within France. This could create significant issues for the F&B industry due to varying regulations across countries.

Pinto hopes the ruling will shift the French government's focus to more critical issues, such as supporting sustainable farming, increasing competitiveness, and protecting consumers. He points out that similar attempts to ban meaty denominations have occurred in other EU countries but were ultimately retracted.

Front-of-pack labelling 'must be mandatory' urges sector head

By Nicholas Robinson 29-Nov-2024

https://www.foodnavigator.com/Article/2024/11/29/front-of-pack-labelling-must-be-mandatory-urges-sector-head/

The article explores the need for mandatory front-of-pack labelling to help reduce sugar consumption and improve public health.

Obesity, especially among children, is increasing across Europe. One in three children aged between six and nine are overweight or obese, according to the World Health Organization. The food and beverage sector, particularly the soft drinks industry, has made significant strides in reducing sugar content. For example, soft drinks have reduced sugars by nearly 34% since 2000.

Front-of-pack labelling (e.g., traffic light or Nutri-Score systems) educates consumers about sugar content and encourages manufacturers to reduce sugar. Many countries still treat front-of-pack labelling as optional, but it needs to be mandatory to push manufacturers to do better. Countries like Mexico and Chile have mandated front-of-pack labelling, resulting in families buying less food and drinks with high sugar and salt content. Canada is considering similar regulations, combined with government awareness campaigns, to make a significant difference.

A large portion of sugar in products is unnecessary, as up to 80% is not efficiently used by the body. Better consumer education about sugar and exploring alternative reduction options beyond sweeteners are crucial. Industry needs to innovate further in sugar reduction technology.

FDA mulls standard date labels to reduce food waste

By Elizabeth Crawford 04-Dec-2024

https://www.foodnavigator-usa.com/Article/2024/12/04/fda-could-standardize-expiration-date-labels/

The FDA and USDA are considering standardizing date labels on food products to reduce consumer confusion and food waste.

Confusion about "sell by," "use by," and "best by" dates leads to an estimated 20% of food waste in homes.

Both agencies have recommended using the "Best if Used By" label, which notes the date after which quality may decline but the product is still safe to consume.

The agencies believe the "Best if Used By" label is most frequently perceived by consumers as communicating quality. Leading industry trade groups have supported this standardization, and stakeholders have reiterated their support in response to the Biden-Harris Administration's goal to reduce food loss and waste in the US by 50% by 2030.

Despite broad support, food manufacturers continue to use various phrases, causing consumer confusion and premature disposal of safe food. The FDA and USDA are seeking additional information on industry practices, barriers, consumer perceptions, and the impact of date labelling on food waste.

A national education campaign about standardized date labels could help consumers manage their food budgets more effectively. In 2019, the average US family of four wasted at least $1,500 worth of food, equating to about 66 million tons of wasted food.

https://www.foodnavigator-usa.com/Article/2024/12/05/ai-transparency-is-a-concern-among-consumers/

Consumer Packaged Goods (CPG) companies need to expand their transparency efforts to include emerging technologies like AI.

A survey showed that a significant majority of consumers believe companies should declare if a food or beverage is designed or manufactured with AI. 83% of surveyed consumers want companies to disclose the use of AI in food and beverage production.

Additionally, 64% believe AI-made products should not be considered "natural," and 78% think the government should regulate AI use in the industry. Nearly half of the consumers (44%) perceive AI-made products as less safe, and 29% would be less likely to purchase them, compared to 26% who are more likely to buy AI-created products.

Acceptance of AI in the food industry varies by age, with younger generations (Gen Z and Millennials) being more positive about AI than older generations (Gen X and Boomers).

Companies using generative AI have seen increased revenues, with over half experiencing a 6-10% increase. To address consumer concerns and potential misinformation, CPG companies are urged to develop transparency initiatives and communication plans to showcase the benefits of AI.It's clear that transparency and education around the use of AI in the food and beverage industry are essential to gain consumer trust and avoid potential public backlash.

https://www.foodnavigator-usa.com/Article/2024/12/09/how-should-brands-prepare-for-mandatory-front-of-pack-nutrition-labeling/

The FDA is considering implementing mandatory front-of-pack (FOP) nutrition labelling for packaged foods to help consumers make healthier choices.

This initiative aims to highlight key nutritional information, such as saturated fat, sugar, and sodium levels, on the front of food packages, making it easier for consumers to understand the health impact of the products they purchase.

The proposed FOP labelling could take the form of a "repeated system," which simply repeats key information from the back of the package, or a "warning system," which highlights high levels of certain nutrients. Both systems have their pros and cons, with the warning system being more impactful but potentially harder to approve.

For food and beverage manufacturers, this mandate could have significant implications for product

innovation, renovation, and marketing. Brands may need to reformulate products, innovate better-for-you options, or adjust serving sizes to avoid triggering a warning on the front of the pack. Additionally, there will be opportunities for brands to provide feedback on the proposed rule and time to comply with the final rule once it is passed.

FDA issues guidance to strengthen US infant formula supply chain

By Teodora Lyubomirova
04-Dec-2024

https://www.foodnavigator-usa.com/Article/2024/12/04/fda-issues-manufacturer-guidance-for-infant-formula-supply-disruptions/

The FDA has issued new guidance aimed at strengthening the US infant formula supply chain to prevent shortages like those experienced in 2022.

This draft guidance outlines how manufacturers should notify the FDA about potential supply disruptions and discontinuations to improve supply chain resiliency.

Manufacturers must notify the FDA as soon as practicable, but no later than five business days after discontinuing a product or experiencing interruptions likely to lead to meaningful supply disruption. Voluntary notifications at least six months before permanently discontinuing a product are encouraged. Notifications should include the manufacturer's name, impacted product names, the nature of the issue, and the reason for the disruption. Additional voluntary details, such as UPC codes, alternative products, shelf life, product volume, and geographical distribution, can help the FDA better assess the situation.

Notifications should be submitted via email with specific subject lines indicating whether the notification is for permanent discontinuance or interruption in manufacturing. Separate notifications are required for permanent discontinuances and interruptions in manufacturing.The FDA emphasizes that timely and detailed notifications from manufacturers can significantly reduce the incidence, impact, and duration of supply disruptions and product shortages.

South Korea launches 19 government-backed reduced-sodium and sugar products

By Pearly Neo 09-Dec-2024

https://www.foodnavigator-asia.com/Article/2024/12/09/south-korea-launches-19-government-backed-reduced-sodium-and-sugar-products/

South Korea has launched 19 new reduced-sodium and reduced-sugar food and beverage products as part of its national Comprehensive Plan for Reducing Sodium and Sugar.

This initiative is a collaboration between the government and industry to meet national health targets. Some notable products include: Packaged sandwiches: Up to 45% reduced sodium, Packaged hamburger: 30% reduced sodium, Strawberry ice cream: Up to 50% reduced sugar, Other products: Castella cakes, packaged soups, tteokbokki soup, Korean sausage, and iced teas

These products will carry labels indicating "less salt" or "reduced sugar" for easy identification by consumers. According to the local Sodium and Sugar Reduction Labelling Standards, lower-sodium or lower-sugar products must have at least 10% less salt or sugar content than the average value of distributed products or 25% less than similar products produced by the manufacturer.

Various reformulation methods were employed to achieve these reductions, such as:Using low sodium ingredients; Increasing vegetable content in sandwiches and burgers; Adjusting high-sodium ingredients and salt substitutes ratios in soups; Controlling sugar content and using sweeteners like allulose and monkfruit in ice creams and iced teas

This initiative aims to expand the available choices for consumers looking for healthier food options and to address concerns about high sodium and sugar intake, particularly among single-person households and young girls.

FDA evaluates labelling for plant-based milks, cell-cultured foods

By Elizabeth Crawford 10-Dec-2024

https://www.foodnavigator-usa.com/Article/2024/12/10/are-tighter-labeling-requirements-on-horizon-for-plant-cell-based-products/

The FDA is considering strengthening labelling requirements for plant- and cell-based products to ensure consumers understand their nutrition and production compared to animal-based counterparts.

However, the agency is unlikely to prohibit the use of the term 'milk' for plant-based products when adequately qualified1. This decision could also influence labelling issues for cell-cultured products.

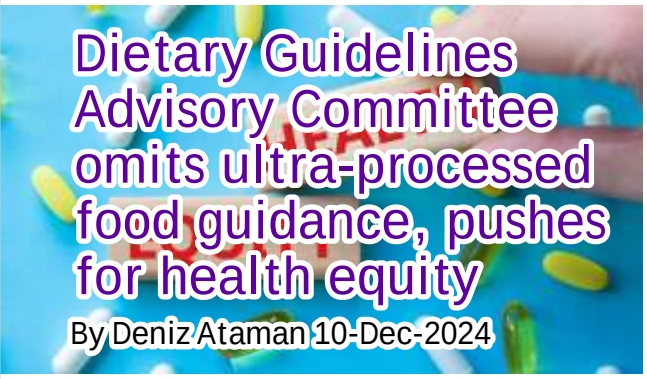
Senators Tammy Baldwin and Lisa Murkowski criticized the FDA for enabling what they see as misleading labelling of plant-based and genetically-engineered products. Outgoing FDA Commissioner Robert Califf and FDA Deputy Commissioner for Human Foods Jim Jones acknowledged the need for accurate and transparent labels but defended recent controversial labelling decisions.

The draft guidance on labelling plant-based milk alternatives has been a flashpoint, with Baldwin arguing it violates the agency's standards of identity. The guidance recommends that plant-based beverages using the term 'milk' voluntarily compare their nutritional value to dairy milk. Baldwin criticized this approach, arguing that consumers mistakenly believe plant-based alternatives are nutritionally equivalent or superior to dairy products.

Jones explained that the agency's research shows consumers are not misled by terms like soy milk or oat milk and that they seek such products because they are not milk. He added that plant-based beverages must qualify the term milk by specifying what they are derived from, such as soy, almond, or oat.

Baldwin also raised concerns about cell-based, lab-grown products using dairy terms in stores. Califf agreed that labels must accurately reflect what the product is but noted that the USDA regulates the labels of these products. He defended cell-cultivation as a way to reinforce food security and address climate change.

Murkowski suggested the FDA does not have a strong track record of explaining new production methods to consumers in an understandable way. Califf countered that the scientific language used in labels is accurate and necessary.



Dietary Guidelines Advisory Committee omits ultra-processed food guidance, pushes for health equity

By Deniz Ataman 10-Dec-2024

https://www.foodnavigator-usa.com/Article/2024/12/10/dietary-guidelines-submits-final-recommendations/

The Dietary Guidelines Advisory Committee (DGAC) submitted its scientific report to the Department of Health and Human Services and the Department of Agriculture on Dec. 10.

The report's findings and recommendations, which address nutrition and health from pregnancy and childhood through adulthood, will form the foundation for the 2025-2030 Dietary Guidelines for Americans. Stakeholders have 60 days to submit comments, with a virtual public meeting scheduled for Jan. 16 hosted by USDA and HHS.

The DGAC did not provide clear guidance on ultra-processed foods due to the lack of a unified definition. The committee expects research on the health impacts of UPFs to expand in the next five years. Some nutrition experts argue there is enough evidence showing the adverse health impacts of consuming UPFs to justify guidance.

DGAC introduced a health equity framework for the first time, considering disparities across socioeconomic groups, race, ethnicity, and culture. The framework recommends increased consumption of plant-based whole foods like vegetables, fruits, legumes, and proteins like seafood and fish. A dietary pattern for American Indian and Alaska Native groups was created, recognizing their integral foods.

DGAC recommended decreasing consumption of red and processed meats, saturated fats, added salt, and sugar due to their links to increased risk of diet-related illness. Individuals are encouraged to replace or substitute these foods with plant-based options, including legumes, grains, vegetables, and unsaturated or polyunsaturated fats.

DGAC did not provide specific recommendations on healthy portion sizes due to a lack of evidence. They suggested choosing smaller portions away from home and planning pre-portioned meals at home.

DGAC emphasized the importance of flexible, personalized, and inclusive healthy eating patterns. The Eat Healthy Your Way pattern encourages flexibility, personalization, and inclusivity in healthy eating while aligning with overarching nutrition recommendations. The DGAC's Health Equity Working Group Subcommittee created dietary intake patterns for American Indian and Alaska Native populations, with potential for developing similar protocols for other diverse groups. Despite increased awareness of the Dietary Guidelines, very few Americans follow them. The DGAC called for making it easier for Americans to implement the guidelines.

The report has sparked various reactions from health advocates and industry experts. Some praised the health equity framework, while others criticized the lack of guidance on ultra-processed foods and portion sizes. If you need any more specific details or want to discuss a particular section, feel free to ask!

Campaigners welcome UK legislation mandating folic acid flour fortification

Kirstin Knight, Interim Head of Publishing December 2, 2024

Campaigners welcome UK legislation mandating folic acid flour fortification

The UK government's decision to mandate folic acid fortification in non-wholemeal wheat flour by the end of 2026 aims to address neural tube defects such as spina bifida.

All non-wholemeal wheat flour must include folic acid. Full implementation is expected by late 2026. This measure is estimated to prevent 200 cases of neural tube defects annually and improve maternal health.

A synthetic form of vitamin B9, essential for the healthy development of the baby's brain, skull, and spinal cord during early pregnancy. Pregnant women or those trying to conceive are advised to take 400 micrograms (µg) of folic acid daily for at least three months before and 12 weeks into pregnancy. With half of pregnancies in the UK being unplanned, boosting folic acid intake across the population can help indirectly protect unborn babies.

Fortification is expected to prevent numerous health issues linked to folate deficiency and reduce healthcare costs over time. UK flour is already fortified with calcium, niacin, thiamine, and iron for public health improvement. Critics point out that focusing solely on non-wholemeal wheat flour excludes groups relying on gluten-free or wholemeal products, potentially widening health disparities. Small-scale millers producing less than 500 metric tonnes annually are not required to comply with the new law.

This decision aligns the UK with countries like the US and Canada, where similar measures have been in place for decades, showing positive public health outcomes.

Fruit snack advertising wars: When must manufacturers verify third-party reviews?

By Elizabeth Crawford 11-Dec-2024

https://www.foodnavigator-usa.com/Article/2024/12/11/pim-brands-general-mills-clash-over-fruit-snack-marketing/

The article delves into a legal dispute between PIM Brands (maker of Welch's Fruit Snacks) and General Mills (maker of Mott's Fruit Flavored Snacks) over advertising practices.

The key issue revolves around when manufacturers are responsible for verifying claims made in third-party reviews that they repost or promote. PIM Brands accused General

Mills of reposting incentivized third-party reviews that claimed Mott's snacks were healthy, wholesome, and nutritious due to their fruit and vegetable juice content. The National Advertising Division (NAD) determined that such reviews significantly influence consumer decisions and must be substantiated to avoid misleading claims.

General Mills argued that its snacks contain fruit and vegetable juice as ingredients, complementing a healthy diet rather than replacing fruits and vegetables. NAD found no evidence that the fruit juice concentrate in Mott's snacks provided nutritional benefits equivalent to whole fruits or 100% fruit juice. NAD recommended that General Mills discontinue reposting certain reviews and influencer posts that could mislead consumers. General Mills agreed to comply with the recommendations.

This case highlights the importance of transparency and accuracy in advertising, especially when leveraging third-party reviews.

Illinois researchers develop model to evaluate food safety control strategies for produce industry

December 12, 2024 Marianne Stein

https://aces.illinois.edu/news/illinois-researchers-develop-model-evaluate-food-safety-control-strategies-produce-industry

This article provides an overview of a study conducted by researchers at the University of Illinois Urbana-Champaign, focusing on a new model to evaluate food safety control strategies in the produce industry.

Below is a detailed summary: Leafy greens, such as lettuce and spinach, are common sources of foodborne illness due to contamination with pathogens like E. coli.Despite existing safety measures, contaminated products can still reach consumers, leading to recalls and public health risks.The study's goal was to develop a flexible model to estimate microbial risks in the produce supply chain and help growers and processors make better safety-related decisions.

The developed model includes five stages of the supply chain: Primary production, Harvesting, Processing, Retail & Consumer handling. At any stage, users can: Assess contamination risk, Increase or reduce contamination risk levels, Implement product testing. The model's output measures the likelihood of microbial contamination in products reaching consumers.

Test Case: Leafy Greens:

Researchers chose leafy greens for the study as they are frequently associated with contamination incidents. Comparing interventions, improved process controls (e.g., washing with food-safe acids) reduced contamination risk more effectively than end-of-process product testing. Provided an overall greater reduction in contamination risk at retail (proxy for recall risk). Reduced risk of recalls and public health incidents but led to higher rejection rates of lower-risk lots.The study showed that high-level contamination events, which drive recalls and health risks, are rare.

The model enables comparisons between different safety strategies, helping stakeholders allocate resources effectively. The researchers created SCRM-Lite, an interactive platform where users can explore test case scenarios and interventions. The model is not specific to leafy greens; it can be applied across various produce categories.

Researchers emphasize that a zero-contamination food system is unlikely due to open production environments. Instead, a "menu of options" for contamination prevention and reduction is critical. This innovative approach underscores the importance of computational tools in improving risk assessment and management for the produce industry.

Scanning the Horizon Hear Global firm that helps F&B companies navigate the ever-shifting currents of regulatory change

By Tingmin Koe 26-Nov-2024

Scanning the Horizon - IFT.org

Whether it's maintaining food traceability records, meeting requirements for short-form labelling, or removing synthetic chemicals from packaging, food and beverage companies must constantly track and comply with new and changing regulations.

Yet as government organizations work to ensure that foods and beverages are safe and adequately labelled, it can be overwhelming for companies to keep up with the constantly changing landscape. "To stay compliant, food companies must be proactive, not reactive," says Mark Moss, head of regulatory and scientific affairs – Europe at Leatherhead Food Research, a UK-based global company serving food and beverage manufacturers in more than 150 countries.

Companies must manage requirements like food traceability records, short-form labelling, and synthetic chemical removal from packaging. Constant regulatory changes create complexities, particularly in areas like environmental sustainability and packaging requirements, making compliance an ongoing challenge. Staying reactive to these changes is often resource-intensive and risks falling out of compliance.

A proactive business tool

designed to give companies early visibility into upcoming regulatory changes. Enables businesses to plan adjustments to formulas, labels, and systems in a resource-efficient way. Covers both short-term and long-term regulatory changes based on business needs.

Visibility and Preparedness:

Early insights into proposed regulations allow companies to adapt and advocate. Early identification enables businesses to voice their concerns about proposed regulations, potentially securing modifications (e.g., extended transitional periods). Focuses efforts on impactful regulations, ensuring businesses allocate resources effectively.

Leatherhead Food Research Services

works with global food businesses and offers tailored services designed to filter out irrelevant developments, providing a high signal-to-noise ratio for regulatory updates. Features a team of experts fluent in local languages to closely monitor developments across major markets. By adopting tools like regulatory horizon scanning, companies can future-proof their portfolios, streamline compliance strategies, and stay ahead in a competitive market. Let me know if you'd like to learn more about specific regulations or tools like these!