

Society of Food Science & Technology

FOOD 'XTRA

Newsletter

Volume 2 | 2023

What's Special ?

■ **AI in Food
Research**

**Less Waste
More Sustainability** ■

■ **Modify Future
of Food**

**Space Food
Technology** ■

■ **Nano Food
Technology**



Society of
Food Science
& Technology

Wayamba University of Sri Lanka

Department of Food Science &
Technology | FLFN | WUSL

FOOD 'XTRA

Newsletter

Volume 02 | 2023

Society of Food Science & Technology
Department of Food Science & Technology
Faculty of Livestock, Fisheries & Nutrition
Wayamba University of Sri Lanka

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Wayamba University of Sri Lanka

Wayamba University of Sri Lanka (WUSL) is one of the latest and modern learning and research institutions in Sri Lanka. The degree programmes offered at Wayamba University are different from others as it offers students much more than a mere educational qualification. Curricular of the University aim at providing students a total holistic approach to one of a kind educational experience that enables them to achieve career goals along with creativity and innovativeness. The graduates are expected be employable individuals as well as valuable citizens who will be of benefit to the society.

The high practical content and opportunities for inplant/industrial training are characteristic features of our undergraduate study programmes which results in a good record of graduate employment. Wayamba University is located at two premises- Kuliypitya and Makandura with easy access from Colombo, Kurunegala, and Kandy. The two locations are situated in an ideal environment with food and agribusiness, and industrial and commercial activities.

The University has established links with national and regional industries, business establishments, research institutes and government and non-government organizations. The University has initiated several research activities with industry collaborations.



Faculty of Livestock, Fisheries & Nutrition

The Faculty has fully pledged strong research backdrop and community & outreach programmes that will contribute to producing capable and prolific graduates for the development of the aforementioned sectors in Sri Lanka.

The Faculty has a staff comprised of veteran and young academics who have the best educational and professional qualifications completed in well-reputed universities worldwide.

Our staff is comprised of internationally recognized researchers and academicians which is a key to our ever-growing student population and student academic success. The Faculty attempts to amalgamate real-life experiences, everyday scenarios and workplace requirements into the classroom to facilitate authentic and lifelong learning outcomes of the students while providing them with a competitive advantage to continue to exceed in their respective fields.



Department of Food Science & Technology

The Department of Food Science and Technology (DFST) has a mission to contribute to society through education in Food Science and Technology, disseminating knowledge, and conducting research and teaching at the highest level of excellence.

DFST's curriculum provides students with both theoretical knowledge and practical experience in food processing, product development, and quality control. The department has graduated skilled professionals to meet the demands of the food industry. In the final year, students specialize in specific topics, conduct research projects, or undergo intensive in-plant training. DFST places a strong emphasis on global food quality and safety.

Vision of the Department

“Inspiring minds to meet global food and health challenges”

Mission of the Department

“Contributing to the society through the pursuit of education in Food Science and Technology in learning, research, disseminating knowledge and meeting international standards at the highest level of excellence to meet global food challenges”

Society of Food Science & Technology



Society of
Food Science
& Technology

Wayamba University of Sri Lanka

The Department of Food Science and Technology works with the mission of contributing to the society through the pursuit of education in food science, food technology, food quality & safety and all allied sciences in learning, development of skills, synthesizing, application and dissemination of knowledge and meeting international standards in research and teaching at the highest levels of excellence.

The Society of Food Science & Technology (SFST), established in 2004 allows Food Science & Technology specializing undergraduates to explore the different aspects of the field in which they are to be professionals. The Society helps to develop the creativity of these undergraduates while harnessing their potential and getting the best out of each individual. Undergraduates are directed towards finding their strengths and opportunities in the industrial and academic fields of Food Science & Technology. In its essence, the Society helps to build up teamwork, good communication skills and a strong personality in the Food Science & Technology specializing students.

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“A simple action from one person can ultimately change the perspectives of others and lead to a better future.”

ECO – FRIENDLY PACKAGING

If an everyday item could affect the overall well-being of our lives and our future, wouldn't we be paying more attention to what it can do? Unfortunately, it isn't always the case.

Before delving deeper, what is eco-friendly packaging? Simply put, it is a technology for enclosing or protecting products for future processes, such as distribution, storage, sale, and use. Packaging divides into three types; primary packaging, which are materials that come into direct physical contact with the product, secondary packaging provides a second layer of protection for the items and can be used to unite several primary packages and tertiary packaging is mainly used to protect during transportation and storage. However, while on a mission to protect items, we are gradually vandalizing the environment without much concern.



So, what is the solution to this problem? From our side, what actions can we take to mitigate the destruction? “Eco-friendly packaging”, as the term suggests, is designed to have little or no damaging effect on the environment. If eco-friendly packaging were to be commercialized, its lifespan can be extended through reuse or recycling, reducing the need for new materials and further lowering the carbon footprint.

There are many eco-friendly packaging materials, such as natural fabrics like organic cotton and linen (made from plants), Tencel (made from sustainable wood pulp), corrugated cardboard and other forms of paper-based packaging, and biodegradable materials.

A simple action from one person can ultimately change the perspectives of others and lead to a better future. Switching to eco-friendly packaging has the potential to reduce water usage, solid waste, electricity consumption, and emissions and it is beneficial for both the environment and wildlife, while also lowering expenses associated with the packaging process. So, for the sake of ourselves and the betterment of the world, let's give it a try by switching to ecofriendly packaging.



which can provide valuable information about the composition and ingredients of food products. This can help food researchers and industry professionals make more informed decisions about food production and labeling, which can help to promote food safety and transparency.

Written by: S. Akshala



EDIBLE CUTLERY

Cutlery is a useful and simple device used worldwide for consuming food. Although the inventor is unknown, it is believed that spoons are one of the oldest eating tools used by humans, and they were typically made from natural materials such as wood, bones, and seashells. In the 18th century, forks and knives were also introduced. Silver was the preferred metal, but later stainless steel became more popular. Plastic was eventually introduced, lowering cutlery prices and making it more widely available in various sizes and designs, including cups, plates, spoons, knives, and forks.

However, the issue of high consumption and non-biodegradability remains. In the UK, 8.5 billion plastic utensils, including knives, forks, and spoons, are thrown away each year, made from non-biodegradable materials such as polystyrene and PVC that take hundreds of years to decompose. These plastic utensils also pose health risks as they contain harmful chemicals like BPA that can lead to cancer. To address these issues, the innovative and eco-friendly alternative of edible cutlery has gained popularity. They are made from edible materials such as rice, wheat, corn, and other grains, making them biodegradable and safe for human consumption.

Edible cutleries come in various shapes and sizes and can be used for a range of purposes, such as stirring drinks, eating salads, and other foods. Some are available in different flavours, including sweet, savoury, and plain, making them a tasty and appealing addition to any meal. Edible cutlery is strong and durable, can be used multiple times, and is easy to store and transport, making it ideal for use at home, work, school, and while travelling.



Edible bowl made by students from Kirori Mal College that started Project Patradya to fight plastic pollution in India

Typically, edible cutlery has a lifespan of up to 18 months. Once they reach their expiration date, they can be decomposed simply by pouring water on them and they will degrade within three days. Additionally, edible cutlery offers health benefits such as iron, protein, fibre, and calcium. Sorghum, in particular, is said to be rich in micronutrients and can be used to boost energy, providing around 34.86 calories per utensil.

Edible cutlery is also hygienic and safe for human consumption, as they do not contain harmful chemicals that can leach into food and cause health problems. They are also safe for people with food allergies, being gluten-free, dairy-free, and nut-free. However, there are some limitations to edible cutlery, such as the lack of sharp edges on edible knives and the clumsiness of edible forks compared to regular ones. Edible spoons are designed for scooping, pushing, pulling, and holding food, but cutting can be difficult with an edible knife.

In conclusion, edible cutlery is a convenient and innovative solution to the problem of plastic waste. They are environmentally friendly, safe, hygienic, and delicious, and as the world moves towards more sustainable and ecofriendly products, edible cutlery is poised to become a popular alternative to traditional cutlery in the future.



Edible spoons made by Narayana Peesapaty, a 50-year-old Hyderabad-based researcher

Written by: Yashodara Fernando

FOOD WASTE AND GLOBAL WARMING



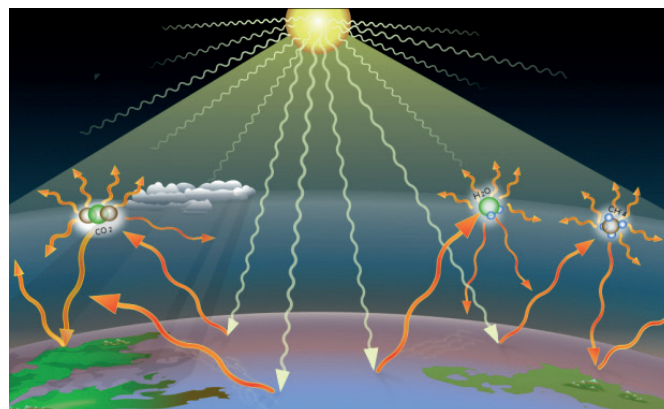
Food waste is a major issue that not only contributes to economic losses but also significantly impacts the environment. Approximately one-third of all food produced globally is lost or wasted, releasing methane and other greenhouse gases as it decomposes in landfills. This exacerbates global warming, which has farreaching consequences for our planet and all its inhabitants. In this article, we will examine the connection between the food system and climate change, and explore what can be done to reduce the amount of food that goes to waste. By working together to address this issue, we can help to slow the effects of global warming and create a more sustainable future for generations to come.

Throwing your burger or bun uneaten to the trash bin is primarily an act of wasting but it accounts for wasting energy, water, and, fertilizers, and fuels that are involved with the production of the burger or bun.

Hence, food wastage results in the inefficient use of resources and energy. Food wastage is more widespread than you think. Food wastage occurs along the entire supply chain from the farm to consumers. Food wastage can be categorized according to where it occurs as,

- **Food loss** – occurs before the food reaches the consumers as a result of issues in the production, storage, processing, and legal frameworks regarding marketing and distribution phases.
- **Food waste** - food that is fit for consumption but consciously discarded at the retail or consumption phases.

Global food production is quite enough to nourish every human being in the world. Although one in nine people still does not have enough food to eat and 793 million people are undernourished.



This food wastage is costing USD 940 Million to the global economy annually. If one-quarter of the food currently lost could be saved, that will be adequate to feed 870 million hungry people. Food wastage is a major threat to the global economy and the growing hunger of the world.

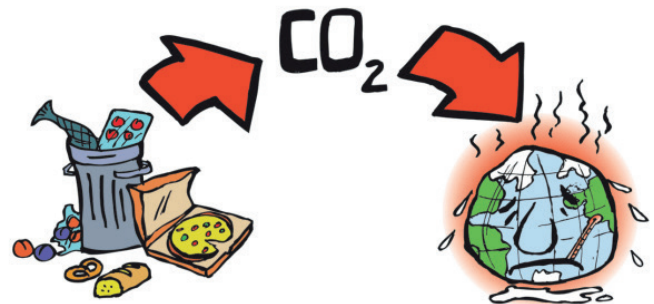
Have you ever thought of the relationship between food waste and climatic changes on the earth? With the rapid increment of the population, global food wastage is accelerated to a certain extent which causes 10 % of greenhouse gas emissions. Greenhouse gases such as CO₂ and methane trap the heat of the sun and increase the temperature of the atmosphere which leads to an increase in the average temperature of the earth's climate system. When food is decomposed, greenhouse gas emissions occur. Food waste rotting in landfills emits methane which is a 28 times stronger greenhouse gas than CO₂. Wasting food is worse than plastic production, oil extraction, and aviation because the proportion of greenhouse gases emitted by those industries is lower than the amount emitted through food wastage. If food waste is a country it would be the largest greenhouse gas emitter after USA and China. As per the above information, food wastage should be minimized as soon to avoid global consequences coming.

There are several ways food waste occurs, normally in industrialized countries food waste occurs in the kitchen due to uneaten food. But in developing countries, both food waste and food loss occur considerably. Mainly food losses in developing countries occur due to a deficiency of advanced postharvest technologies and economic shocks. In developing countries, economic shocks are very frequent and they directly affect the food chains.



Food is produced, processed, distributed, prepared, eaten, and occasionally disposed of. Each of these processes produces greenhouse gases, which trap the heat of the sun and cause climate change. Food is linked to about one-third of all greenhouse gas emissions that are caused by humans.

Therefore minimizing food wastage is become one of the top priorities of the United Nations By 2030. All the steps involved in food production is involved greenhouse gas emissions, especially CO₂. The most appropriate way to reduce greenhouse gas emissions is by reducing food wastage.



While initiating all the possible approaches to minimize food wastage, current food production and consumer behaviour need to be modified to a certain extent to form a sustainable food chain globally. For this instance identifying which foods cause emitting a higher proportion of greenhouse gases is required. The emissions intensity is expressed in kilograms of “carbon dioxide equivalents” – which includes not only CO₂ but all greenhouse gases – per kilogram of food, per gram of protein, or per calorie. Animal-based foods especially red meat, dairy, and farmed shrimp, are generally associated with the highest greenhouse gas emissions.

This is due to animal-based production being intensively engaged with animal farming which requires huge grasslands and natural resources. Additionally, farm animals generally emit methane as they digest grass and plants. Therefore the carbon footprint of animal-based products is high. The livestock industry generates 14% of carbon emissions which equals the amount generated by all transportation together. And the most influential issue is the occupation of ice-free land by farm animals. Nearly one-third of ice-free lands are occupied by the livestock industry on other hand consumed roughly one-third of fresh water on earth. Current food wastage and food manufacturing practices including farm-to-intensive production plants that lead the entire globe toward a climatic crisis gradually. According to NOAA's 2021 Annual Climate Report, the combined temperature of land and the ocean has increased at an average rate of 0.14 Fahrenheit per decade since 1880.



However, since 1981 the average rate has increased more than twice. This causes severe climatic changes within a couple of decades to come.

Appropriate actions are required to reduce current conditions. But it is important to choose initiatives that can suppress global warming while assuring the economic stability of the world and the well-being of the human population. This is where food science and technology play a vital role to produce sustainable solutions for global food waste and loss.

Not only that, the livestock industry which includes unsustainable farming methods, needs to be reformed and restructured to reduce carbon emissions for further generations of the planet earth. For the advancement of the food system of the world, alternatives should be developed and deployed.

Food waste and food losses can be reduced by transforming operations in the supply chain into more feasible and traceable operations. In developing countries, the post-harvest losses which occur at all points of the supply chain from production in the field to the food being placed on a plate for consumption are comparatively high due to a lack of capital for production, poor storage facilities, economic shocks, inefficient transportation etc. Rather than suppressing global warming, minimizing food loss and wastage helps to develop an efficient economic environment which benefits all the stakeholders of the food chain and supports to fight against poverty of the people. The transformation of the global food system should be directed with the food science findings.

Close inspection systems and traceability evaluations of the supply chain need to be rapidly developed to attain the sustainability goal of the United Nations within the next decade. Proper data handling systems, sustainable packaging methods, genetic alterations of some crops for sustainability, and smart framing are major components of a sustainable food chain.

Household food wastage is also considered when coming to industrialized countries. A European or North American consumer wastes almost 100 kilograms of food annually, which is more than their weight. In industrialized countries, food availability is high which causes high accessibility and affordability because of their high per capita income. One European or North American wastes 15 times more food than Saharan African consumers annually. Domestic food waste can be limited by practising simple manners such as donating surplus foods, sharing foods with others, shopping smartly, and consuming food wisely.

These all issues are strictly attached to the consumer behaviour of the people because they build the demand for particular foods which increases the overall footprint of world agriculture. Modifications should be applied gradually by creating demand for alternatives that can produce some favourable effects on slowing down the rate of global warming. Impossible Foods which produce the impossible foods company based on plant sources have become a fine answer to a certain extent when it comes to minimizing greenhouse gas emission and over-exploitation of ice-free lands and drinking water. They produce foods that look, taste, and cook like meat but are made entirely from plants. Many kinds of research are going on plant-based proteins and their functions to alter animal-based products.

A plant-based burger patty uses 96% less land, and 87% less water, and generates 89% less emission than a beef patty. To enhance the characteristics of these plant-based meat alternatives understanding the functional properties of plant-based protein is massively important. United Nations Environment program has been conducting various awareness campaigns to deliver and strongly convince the idea of transforming the diet of the people into a plant-based approach and reducing food wastage.



As per the key points of the **Paris Agreement** the goal of limiting global warming to well below 2°C, and pursuing efforts to limit it to 1.5°C. to achieve this goal collaboratively steps need to be initiated such as minimizing food loss and food waste by improving technology and awareness, replacing animal-based products with plant-based alternatives, promoting smart farming models and enhancing food quality control and quality assurance.

In conclusion, driving this world to a sustainable food system has become a very complicated task that is interlinked with every sector of the world. There are more than 1 billion people who engage in agricultural operations as their livelihood., More than half of the population of the world has taken part in agriculture.

Their entire life routing based on this agricultural economic system hence when initiating innovative and sustainable food and agriculture models, adequate evaluation and inspection must be strongly followed to direct the world economy and household economy of the people toward where recovery stage of global warming and climatic change. When comparing all the possible actions against global warming, the elimination of food wastage is more applicable and feasible.

“Anyone can save food”, this idea needs to be normalized and built up as a trend of people around the world. If the world could achieve the zero food wastage goal, the entire population can be fed and under nutrition would have vanished from this world and a net reduction of greenhouse gas emissions would be 10% which cause to turn back the clock on global warming.

Just save your piece of food today and that will be credited to you and your future generation by creating a sustainable plane of the earth for every living being.

Written by: Anushka Yasas

National Industry Exhibition 2023

The “Industry 2023” exhibition, organized by the Ministry of Industries and the Industrial Development Board, aimed to promote and showcase the innovations and capabilities of local industries and businesses across various sectors. These exhibitions provided platforms for businesses to showcase their products, services, technologies, and projects to a diverse audience, including potential investors, customers, and partners.

The event took place from June 22nd to 25th, 2023, at the BMICH. The exhibition featured a wide range of products, including processed food, spices, essential oils, packaging, advanced manufacturing, digital technology, tea, value-added tea, beverages, coir and coir products, milk and milk products, rubber and plastic products, textile, and apparel.

The Society of Food Science and Technology represented our university under our department’s name at the exhibition. Our stall received positive feedback, with enthusiasts expressing favorable comments about the food products and services we offered. We were able to inspire and recognize potential investors and enthusiasts, encouraging them to actively participate in the advancement of food products, contribut-

Written by: V.Saika



PROFOOD PROPACK 2022



Innovation and advancement are at the core of the food industry, constantly driving the development of new technologies and solutions.

The Pro Food Pro pack and Ag-biz, which is Sri Lanka's most comprehensive agriculture-based packaging exhibition, was introduced in 2022 with a new theme called From Farm to Fork. It opened doors to the general public and trade visitors on the 18th, 19th and 20th of November 2022 for the 19th consecutive year at the BMICH Exhibition Centre.

The exhibition brought together professionals, experts and industry leaders to showcase cutting-edge technologies, discuss emerging trends and explore the future of agriculture and food packaging.

It was an immersive experience. The event contained different zones, including exhibition halls, demonstration areas and networking lounges. It showcased an impressive array of innovative technologies designed to enhance food packaging, preservation and sustainability. Various food companies and upcoming traders have platforms for participants to interact with the latest advancements in their products and witness live demonstrations of new technology.

There were 5 main categories under which the products would be assessed and awarded. They were the most innovative product, most innovative process, commercially viable product, best green innovation and best innovation that promotes food safety.

Additionally, an award was granted for the best stall among the lot



It was an exhilarating experience for all of us. We were fortunate to meet several influential persons in the food industry and get a chance to introduce the skills and potential of our students. Finally, after hours we were allowed to present our products to the judging panel and were immediately praised and acknowledged for our hard work.

This was confirmed when our university won two gold places in 2 categories which were the most Innovative Product for our infamous kohila sausage and first place for best stall. It was an incredible achievement as it was the first time our university had won two awards. Among the other student awards, some notable products were the most innovative process won by the University of Vocational Technology for their “nonpaddy rice”, the most commercially viable product won by the University of Sri Jayawardanapura for “mung meatballs” and best green innovations won by University of Sabaragamuwa for “bio pico corn husk

The ProFood ProPack 2022 experience was an exceptional event that revolutionized the food industry. It was an incredible opportunity for students, traders and stakeholders alike. From showcasing the latest advancements in technology to highlighting the trends in the industry towards more sustainable methods, this sets the stage for a successful future. As the industry continues to evolve, events like ProFood ProPack will remain vital for driving progress and fostering collaborations in the industry.

PROFOOD PROPACK 2023



For the second time running, the committee 2020/21 received the chance to attend the International processed food packaging exhibition- ProFood ProPack 2023 which was held from August 4th to 6th. This event showcases the latest technology, products, and businesses within the food and packaging sectors. A dedicated space was provided for the university students and it was well utilised, as a variety of food products, packaging and technology were showcased.

The Wayamba University stall was well decorated and displayed the products that were produced throughout the academic semester. While the Third-year students primarily worked towards this, the Second-year Juniors played a massive role in assisting. Through cumulative hard work, inspiration and constructive criticism from the academic staff, the University represented a wide range of unique and functional food products like “Sauce Slices”, “Jackfruit Sausages” and “eco-friendly packaging materials”.

While the product exhibition went on, the Inter-University Food Science Quiz Competition was held. Under the individual performance section, one of our very own batchmates brought victory and pride to our University. Overall this experience was a chance to explore cutting-edge innovations in food processing and packaging, network with industry professionals, and discover new market trends.



Written by: H.U. Jayathilake

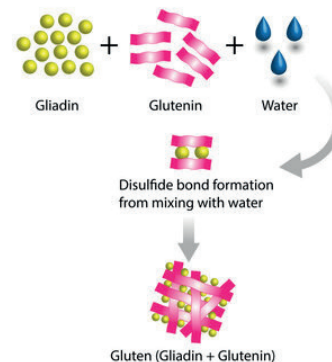
THE SCIENCE BEHIND MAKING GLUTEN-FREE CAKE



Most of us love to eat cake, but if you experience discomfort after eating cakes due to digestive issues, have you ever considered the reason? It could be due to an immune response to gluten (a wheat protein) known as Coeliac disease. This condition occurs when your immune system attacks your tissues after consuming gluten, causing damage to your small intestine and hindering nutrient absorption. The Coeliac disease typically leads to chronic diarrhoea, steatorrhea, and poor absorption.

It's important to note that cake recipes typically contain wheat flour, sugar, margarine, and eggs. The endosperm of certain grains such as wheat, barley, and rye contains a pair of proteins called glutenin and gliadin, which make up gluten. Flours that contain glutenin and gliadin are considered glutenous, while those that do not, such as rice flour, corn flour, and buckwheat flour, are labelled gluten-free. To avoid Coeliac disease and other similar disorders, it is essential to replace gluten. The most common species of wheat is common wheat (*Triticum aestivum* L), and soft wheat flour is used to make cakes. Wheat flour is made up of starch (70% to 75%), water (14%), proteins (8% to 11%), lipids (2% to 3%), and non-starch polysaccharides (2% to 3%). The proteins in wheat flour consist of about 15% to 20% non-gluten proteins (albumin and globulin) and about 80% to 85% gluten proteins (gliadin and glutenin).

Glutenin is a large, high molecular-weight protein made up of different subunits linked by disulfide bonds and containing free sulfhydryl groups.



The formation of gluten is complex, but it can be summed up as **“flour + water + mixing = gluten.”** A great cake requires a structure that holds those gas bubbles and this is where wheat flour reigns supreme. Wheat flour has gluten and gluten is PROTEIN bond that results in a tight dough or batter structure, these protein bonds hold the bubbles in the batter and the cake rises high.

For gluten-free cakes, gluten-free flours typically require stabilizers and thickeners such as xanthan gum and guar gum to achieve a similar texture. Without gluten, gluten-free baked goods tend to be dry and crumbly and do not hold their shape well. Xanthan gum is often used in gluten-free products because it provides some of the texture that gluten gives to baked goods. Like gluten, xanthan gum helps bind ingredients together, creating baked goods with better structure and helps retain gas for structure development. It provides some of the stickiness that gluten-free goods lack, replacing some of the elasticity. Xanthan gum sticks to flour and moisture, creating moist goods that maintain their shape after baking.



Cakes can be classified into two types: batter-type and foam-type. Batter-type cakes, such as cream cakes and pound cakes, contain a significant amount of fat, and their batters can be considered emulsions.

Foam-type cakes, such as angel food and sponge cakes, contain only a small amount of fat and their batters can be described as foams.

In the multistage method of cake making, margarine and sugar are first creamed together to form a light foam with air bubbles incorporated in the solid fat or oil phase. Then, liquid eggs are added, the water component of which dissolves the sugar.

The batter changes from a water-in-oil emulsion to an oil-in-water emulsion, while the air remains contained in the margarine fragments or fat phase. The oil-water interface is stabilized by the lipoproteins of the egg yolk.

Now you have caught up with the science behind the gluten-free cake. Gluten formation and its components provide proper texture to cakes. The addition of gums mimics the function of gluten. Finally, the cake is made by mixing fat and sugar while incorporating air and gluten-free flour, eggs and gums are mixed to provide optimum texture. Significant changes in batter viscosity are shown in the early and later baking phases. Now you all can enjoy the cake the way you like.

Written by: V.Saika

MODIFYING THE FUTURE OF FOOD: UNDERSTANDING GMO FOODS

Foods made from organisms whose genetic material (DNA) has been altered in a way that does not occur naturally are referred to as genetically modified (GM) foods. This is done by the introduction of a gene from a different organism. Modern biotechnology, gene technology, recombinant DNA technology, and genetic engineering are other terms used to describe this technology. The majority of GM foods currently on the market come from plants, but in the future, likely, foods that are made from GM microorganisms or GM animals will also be sold.



This technology has been used for various motives such as increasing yield, reducing costs for food production, reducing the need for pesticides, enhancing nutrient composition, and food quality and greater food security.

There is a scientific agreement that the currently available food made from GM crops does not pose a significant risk to human health as opposed to conventional food but, every GM food needs to be tested individually before being released. The issue lies in the fact that the general population is less likely to believe the claim that GM foods are safe. The legal and regulatory status of genetically modified foods varies from country, with some prohibiting or limiting them while others allow them with varying levels of regulation. GMOs are tested for safety for human, plant, and animal health by the U.S. Food and Drug Administration (FDA), U.S. Environmental Protection Agency (EPA), and U.S. Department of Agriculture (USDA).

Genetically modified foods are currently subjected to Sri Lanka's Food Act and National Policy on Biosafety. The Biosafety Policy covers both GM food and GM seeds, while the Food Act primarily focuses on GM food. The National Biosafety Act, which is currently being written by the Ministry of the Environment, will give GMOs more validation. According to the Biosafety Policy, the Ministry of the Environment must receive a request before an importer can bring in a product that might contain GMOs.

The Ministry will then send the data to appropriate institutions (Ministry of Health, Ministry of Agriculture, Ministry of Fisheries and Aquatic Resources, etc.) for a risk assessment after taking into account the item's type and nature. The Biosafety Expert Consultation Committee, a committee authorized by the Cabinet and comprised of all relevant parties, receive the Risk Assessment report next (health, agriculture, customs, legal, and environment, etc.).



Once the committee gives its approval, the importer may proceed to bring the item into the country with the required labelling. The importation of GM food and/or seed is not prohibited by current law. The ExtraOrdinary Gazette to the Food Act No. 26 of 1980 (passed in 2006) mandates that all importers declare whether their consignment contains genetically modified organisms (GMOs). The product must be labelled as such if it does contain GM components. As a result, it is now up to the consumer to decide whether or not to purchase products that could contain GMOs. However, no food production with the GMO label has proceeded in the country yet. (Galappattige, 2018).



However, GM foods are an important trend. Despite challenges from climate change and shifting weather patterns, a growing lack of land and water, and productivity losses, advances in technology can be made.

Indeed, it can be argued that these technologies are essential for raising production. Every time new crop technologies are implemented, the productivity gain causes the crop's supply curve to move forward, which improves producer and consumer surplus. Therefore, GM crops most definitely have a big impact on agricultural development and food security.

Written by: M.K.Sandareka

CRACKING THE CODE HIDDEN SUGARS UNVEILED



Do you avoid eating sweets, cakes, and ice cream to reduce your sugar intake? Then this article is perfect for you. You might be consuming more sugar than you think, even if you try to avoid sugar intake as many foods have hidden sugars.

There are two types of sugars present in foods: added sugars and total sugars. According to FDA definitions, added sugars are sugars that are added during processing and packaging, including free mono- and disaccharides, sugars from syrups and honey, and sugars from concentrated fruit or vegetable juices that exceed what would be expected from the same volume of 100 per cent fruit or vegetable juice of the same type. However, the definition does not include fruit or vegetable juice concentrated from 100 per cent fruit juice that is sold to consumers, or the fruit component of fruit spreads. Added sugars consist of different types of sugars, such as agave syrup, corn syrup, brown sugar, highfructose corn syrup, fructose, dextrose, glucose, and honey that can occur naturally in foods or be added during processing.



Some added/natural sugars do not directly appear to customers as “sugar” on the label but instead under the guise of less wellknown names like dextrose, lactose, corn syrup etc. But they also account for the total sugar content of food and influence the total calorie intake of the consumers. Such sugars are called “**Hidden Sugars**” Non-calorie sweeteners, such as aspartame, acesulfame potassium, and saccharin, are not considered added sugars, even though they are added during food processing, because they are low-calorie ingredients.

Total sugar is the total amount of sugars in a food or product, including natural sugars present in foods and added sugars. Earlier, this was indicated as ‘sugars’ on the nutritional label. However, regulations have changed to indicate sugars separately as “Total sugars” and “Added sugars”. The “Added sugars” is included in the amount of “Total sugars”. To make this information easier to interpret correctly, the FDA also added the word “Includes” to the “Added sugars” line. This new line represents the amount of sugar that has been added to a food or beverage during manufacturing. Added sugars information is presented not only in grams but also as per cent Daily Value (%DV).



Although both types of sugars have the same chemical formulas, it is recommended to **consume less than 10% of total calories DV from added sugars**.

This is because high added sugar content may result in a reduced intake of nutritious foods, as it exceeds the recommended daily allowance (RDA) of calorie intake. High-calorie intake may lead to high blood glucose levels, diabetes, and obesity, but not the type of sugar consumed. So, most people.

Nutrition Facts	
50 servings per container	
Serving size	2 tsp (8g)
Amount per serving	
Calories	30
	% Daily Value*
Total Fat 0g	0%
Sodium 0mg	0%
Total Carbohydrate 8g	3%
Total Sugars 8g	
Includes 8g Added Sugars	16%
Protein 0g	
Not a significant source of saturated fat, trans fat, cholesterol, dietary fiber, vitamin D, calcium, iron and potassium.	
*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.	

think that sugar is the only risk factor in foods for most chronic diseases, but that is not true. Total sugar content including natural sugars added sugars and hidden sugars all affect chronic diseases as they increase the calorie content of food. Some people avoid high-glycemic index (GI) foods, thinking that those foods may cause diabetes.

However, studies have shown that an increase in the GI alone does not mean an increased risk of diabetes, as other factors also affect it. Therefore, foods should not be judged by their GI alone, and other factors, such as nutrient density and fat content, need to be considered. Balancing calorie intake with physical activity can be greatly beneficial in maintaining body weight and preventing chronic diseases.

However, dental cavities are associated with sugars but do not have a direct impact. When sugars remain between teeth, bacteria feed on them and cause dental cavities. This depends on how often foods are consumed and the amount of time these foods remain on the teeth.

As discussed above, overconsumption of sugar may lead to chronic diseases through increased calorie intake. Therefore, food choices should be made more carefully. One should read the nutritional label and ingredient list more carefully and avoid foods that have added sugars of more than 10% of total calorie DV and be careful of hidden sugars on the label. Some foods that people think are safe such as breakfast cereals, flavoured yoghurt, condiments like ketchup and beverages may have hidden sugar. Hence, it is important to read nutritional labels and ingredient lists carefully to avoid falling into the trap of being ignorant about the hidden sugars present in your food.

Written by: Kalpa Sathsara

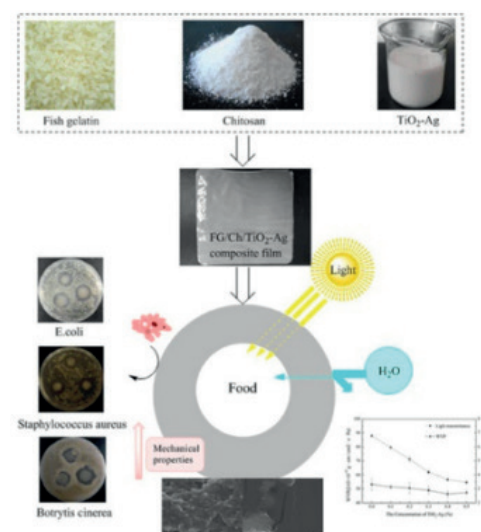
NANOFOOD

A BITE-SIZED REVOLUTION IN FOOD SCIENCE

Nanofood describes food that is linked with nanotechnology. Nanotechnology techniques and related tools, nanomaterials are used to cultivate, produce, process and package nanofood. This nanofood concept is not very new to us. Many food structures naturally exist at the nanoscale. The main purpose of linking nanotechnology to food is to enhance the overall quality of food such as improving shelf life, nutritious value, and flavour profile while reducing the cost.



There are countless applications for nanofood. Edible coatings are used to preserve the quality of fresh foods during extended storage. For example, gelatin-based edible coatings contain cellulose nanocrystals and chitosan film with nano SiO₂.



Derong Lin a 1 et al. (2020) Preparation and characterization of Tio2-AG loaded fish gelatin-chitosan antibacterial composite film for food packaging, *International Journal of Biological Macromolecules*. Elsevier

For example, Fish gelatin and chitosan are integrated into edible nanocomposite films for perishable fruits, and TiO₂-Ag loaded fish gelatin-chitosan antibacterial composite film for food packaging. The main function of these types of gelatin films is to preserve food by enhancing antimicrobial ability, and UV barrier capability and by avoiding absorbing the moisture to food from outside.

Protein hydrogels can be easily placed into capsules to protect drugs from extreme environmental conditions. Nano additives

and nutraceuticals may be used to improve the nutritional value of food. Nano anticaking agents are widely used to improve consistency and prevent lump formation. Nano-based food packaging industry has come up with a lot of innovation at present. Improved packaging is using of nanoparticles to improve the physical performance of food. Furthermore, nanoparticles are established in active packaging as antimicrobial agents. Smart packaging includes nano biosensors for pathogen detection.



Bioactive food components often degrade and become inactivated in functional food ingredients due to adverse environmental conditions. Nanoencapsulation of these bioactive compounds can be used to extend the shelf-life of such food.

However, it is well-known that nanoparticles that have unique chemical and physical characteristics compared to larger particles of the same composition can lead to unforeseen toxicity when they interact with living systems.

In conclusion, nanofood represents a promising new area of innovation in the food industry. By using nanotechnology to improve the overall quality of food, increase its nutritional value, and extend its shelf life, it has the potential to revolutionize the way we think about food and food production. However, as with any new technology, it's important to approach nanofood with caution and to carefully consider the potential risks and benefits before fully embracing it.

Written by: Shehara Dassanayaka

SPACE FOOD TECHNOLOGY



From the ages of tube food squeezed into mouths by Mercury, Gemini and Apollo crews, space food has come a long and incredible way. Astronauts today have the luxury of choosing their food from a variety of flavours and textures from hundreds of miles away from Earth. The advancements in food preservation, packaging and technology have paved the way to bring about dozens of licensed space food products that are specifically modified to meet the nutritional needs of space explorers while also satisfying the pleasures of consuming food and boosting the morale, even away from earth. These products are even commercialised to the general public known as a “spin-off” and they are utilized by many as camper’s food, emergency rations and even shelf-stable food for home-bound seniors.

Diving deep into the specific technologies used in this production, it is noted the most utilized process is “freeze-drying”. This is coupled with innovative packaging methods which tackle problems like moisture, oxygen and practical issues like refrigeration,



(U.S. Space Food [MRE Kits])

Origins of space food

During the era of Mercury and Gemini, the first space food was ingested in the form of bite-sized cubes, pastes from tubes and rehydrating beverage powders. Food was freeze-dried for both conveniences in storage as well as transport. The shuttle orbiter fuel cells produce electricity by combining hydrogen and oxygen which results in a usable amount of water. The bite-sized food was coated in gelatine to prevent crumbling and freeze-dried food was in plastic containers.

Apollo and Skylab food

The origin of Skylab Food, Inc. introduced 5 different varieties of food. It was more elaborate, as it included a freezer, refrigerator and pressurized storage for perishables and aluminium cans. Plastic containers held hot water for rehydration and foil was used to cover beverages to extend shelf life.



During the Mercury program, astronauts' food often came in tubes or bite-sized cubes. Credits: NASA

Space Shuttle and International Space Station food

However, refrigerators and freezers would take up more space and it was necessary to produce food that could be maintained at ambient temperature. Both the Shuttle and the ISS started using freeze-dried, thermostabilized, irradiated, immediate moisture and natural food in their expeditions. Food like nuts, granular bars, and even fruit were important additions to natural food. There were 200 different food types to choose from and condiments were appreciated due to taste loss in space.

Dehydrated food was emphasized again because the water was produced as a byproduct by fuel cells. It combines hydrogen and oxygen to produce electricity so the water was available at no cost. ISS missions were comparatively pretty long so it was important to manage packaging and storage waste. Each of the food was sorted into categories and put in separate boxes so the astronauts could choose what to eat each day. At this point variety of soups, casseroles, meat products and rice were available as dehydrated food.

Heating in space was done by flexible pouches and used methods like air impingement technology. It used jets of hot air at the top and bottom of the oven and heats the food directly. To solve the earlier issue of breadcrumbs fresh flour tortillas were used and other natural forms of food were stored in clear flexible pouches that can be cut open with scissors.



Fresh Produce Delivery to the ISS. Fresh fruits and vegetables are a delicious and much anticipated treat on the ISS. This delivery arrived on March 3, 2013

Future in Space Food Technology

The main source of food, for now, continues to be freeze-dried, thermo-stabilized and some reduced moisture food. This provides the bulk of food until food production in space is introduced. Some methods suggested for producing food in space are **Food Crops, Chemical synthesis and 3D printing**. To produce crops a chamber requiring a large mass, power source and equipment would need to be launched into space. Growing crops needs more mass than the mass required to store oxygen and water recycling systems for astronauts. This is still extensively being researched by NASA. Some food suggested for this is wheat, lettuce, potato, soybean and tomato. Synthetic food production can prove to be effective to create food ingredients like glycerol, sugars and even functional proteins from waste material. 3D printing and extrusion technology can present reliable, efficient and unique varieties of food with new flavour aromas and designs. But there is still research that needs to be undergone before any of this is expected.



Astronaut Shane Kimbrough holds lettuce in front of the Veggie chamber on the International Space Station in November 2016. Photo courtesy of NASA

Written by: H.U. Jayathilake

FOOD AS MEDICINE

Can food be medicine? “Food as medicine” is one of the trending concepts in the Western world. The diet can be a major impact factor on an individual’s health. The core of a healthy diet is built on adequate intakes of a variety of nutrient-dense foods, including fruits, vegetables, lean protein, healthy lipids, whole grains, etc. However, the universal truth is that people who have enough healthy foods are more likely to have strong immune systems and live longer. But we have to be careful with our diet. Most research evidence suggests that a diet rich in added sugar, trans fats, and excess salt can cause several diseases like cardiovascular diseases, high blood pressure, and type 2 diabetes. Nutrition specialists recommend that the diet supports good health through its ability to reduce the risk factors of diseases like cardiovascular diseases, high blood pressure, and type 2 diabetes.



As an example, antioxidants naturally found in some fruits and vegetables can prevent the transformation of cholesterol into plaques in artery walls that can cause the blockage of blood flow. Actually, food is more complex than any pill. It is not a pill. Food varies dramatically in nutrient content depending on the season, farming method, processing method, storing method, and seed. For example, even sunflower oil, which may be good for health, can cause harm if used for deep frying. Sunflower oil contains polyunsaturated fatty acids, which can react with oxygen and create toxic compounds when exposed to high heat. Therefore, every person should take into account some factors like cooking method when preparing meals. If everyone can eat whole foods as nature made, we can consider food as medicine.

Research findings have shown that certain diet plans are scientifically supported to help prevent many chronic diseases. For example, the heart-healthy DASH diet, which is rich in fruits, vegetables, and whole grains, has been shown to lower blood pressure and LDL cholesterol, which can increase the risk of heart

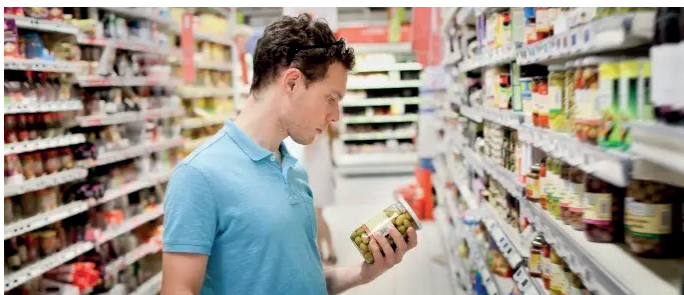


Food is a crucial part of life. People are highly attached to food, not only to fulfill hunger but also for mental satisfaction. Most families share their emotions, thoughts, and what they have done with family members while they are eating. Therefore, food can affect not only physical health but also mental health. Some people eat a lot of high-calorie foods to forget their problems, which can be a major reason for the prevalence of obesity. With the correct practices of eating, let food be your medicine and medicine be your food.

Written by: Ms. JMYV Jayasinghe

FOOD LABELLING

FAO promotes Food Labelling as an effective tool to protect consumer health in terms of food safety and nutrition. Food labels convey information about the product's identity and contents, and on how to handle, prepare and consume it safely.



A food label, which contains information presented on the food product, is one of the most important and direct means of communicating information to the consumer. The internationally accepted definition of a food label is any tag, brand, mark, pictorial or other descriptive matter, written, printed, stencilled, marked, embossed or impressed on, or attached to, a container of food or food product. This information, which includes items such as ingredients, quality and nutritional value, can accompany the food or be displayed near the food to promote its sale.

With the increase in global trade and a shift away from the traditional face-to-face food producer and buyer relationship, there is a greater need to create food labels that are clear and can be trusted.

The Food Advisory Committee is responsible for assuring that foods sold in the Sri Lanka are safe, wholesome and properly labelled. This applies to foods produced domestically, as well as foods from foreign countries. The Food Act No.26 of 1980 contain all regulations followed.

Nutrition labelling

One of the main drivers for nutrition labelling is the increased prevalence of diet-related non-communicable diseases. These labels can be effective instruments in helping consumers to make healthy food choices.



The 5 required types of information on a food label

To maximise the potential of nutrition labels and health claims to improve public health, awareness campaigns and education programmes should be provided on an ongoing basis to help consumers to understand and use labels appropriately.

Food Labelling To Reduce Food Waste

Food manufacturers use date marking to advise subsequent food chain operators on the appropriate shelf-life of food. The Codex Alimentarius guides two key date marks "Best before date" or "Best quality before date" and "Use-by-Date" or "Expiration date". In countries where the food legislation allows, such foods can be "redistributed" for human consumption because there are no safety implications even if consumed after that date.

Food fraud

One of the main aims of a labelling policy is to prevent food sellers from deliberately misleading consumers through false representations on a package.



Nutrition Facts		Nutrition Facts	
2 servings per container		2 servings per container	
Serving size 1 cup (237mL)		Serving size 1 cup (237mL)	
Amount per serving		Amount per serving	
Calories 160		Calories 160	
Total Fat 4g	8%	Total Fat 4g	8%
Saturated Fat 0.5g	1%	Saturated Fat 0.5g	1%
Trans Fat 0g	0%	Trans Fat 0g	0%
Cholesterol 0mg	0%	Cholesterol 0mg	0%
Sodium 680mg	28%	Sodium 340mg	14%
Total Carbohydrate 24g	8%	Total Carbohydrate 24g	8%
Dietary Fiber 8g	32%	Dietary Fiber 8g	32%
Total Sugars 5g	10%	Total Sugars 5g	10%
Includes 0g Added Sugars	0%	Includes 0g Added Sugars	0%
Protein 7g	14%	Protein 7g	14%
Vitamin C 0mg	0%	Vitamin C 0mg	0%
Calcium 20mg	4%	Calcium 20mg	4%
Iron 1mg	4%	Iron 1mg	4%
Potassium 521mg	11%	Potassium 521mg	11%

Comparison of Nutrition Facts for a regular vegetable soup, and reduced sodium vegetable soup.

Actions On The Ground - Impact Of Food Packaging

This is being done through the implementation of regional projects that aim to provide support to food chain actors, governments and private-sector entities on appropriate food packaging and labelling systems.

Origin Labelling Of Food

These labels are given to products with specific attributes, qualities or reputations stemming from their geographical origin. Through the preservation of food culture and the promotion of healthy diets, linking food products to their origin through labels supports the achievement of the Sustainable Development Goals.

Written by: K.M.H. Fernando

“Saaraboomi” National Youth Exhibition

The “Saaraboomi” exhibition, organized by the National Youth Service Council, aims to inspire youth to participate in agro-businesses by sharing knowledge and expertise, promoting the adoption of advanced technology, and fostering conversions.

It was held from September 1st to 3rd, running from 9 a.m. to 9 p.m. The exhibition featured innovative food products, agri-technologies, agri-businesses, post-harvest technology awareness, youth agro-companies, value-added products, NYSC farm products, school innovations, and more.

The Society of Food Science and Technology, in collaboration with three other departments, represented our university under our faculty's name at the exhibition. Our stall received positive feedbacks from both local and foreign visitors regarding the food products and services we offered. We were able to inspire and educate entrepreneurs and young individuals to become more involved in food product development, contributing to a brighter future for our country.

Written by: B.K.K. Sathsara



The Inspiring Origin Story of Nestlé: From Infant Formula to Global Food Giant



Nestlé Good food, Good life

Nestlé is the largest food company in the world, boasting over 400 manufacturing facilities on five continents. It sells a wide range of products, including coffee, juices, chocolate, malted beverages, confectionery, culinary and refrigerated products, dairy products, baby food, frozen foods, pet foods, and pharmaceuticals. But have you ever wondered about its origin?

Henri Nestlé (born on August 10, 1814 and died on July 7, 1890) was a German-Swiss confectioner and the founder of Nestlé. In the 1860s, one in five infants under the age of one in Switzerland died due to malnutrition or other diseases. At the time, infant mortality rates were high and there were no reliable, safe alternatives to breast milk. Henri Nestlé began experimenting with infant food in his laboratory to tackle this pressing issue.



From Pharmacist's Assistant to Founder of the World's Leading Nutrition, Health and Wellness Company

Initially, he came up with a biscuit-like easily digestible product. He and his friend, Jean Balthasar Schnetzer, a nutrition scientist, removed the acid and starch from wheat flour as they were difficult for babies to digest. The flour was then crushed, mixed with milk and sugar, and turned into a paste. Later, he developed a milk and flour powder that combined cow's milk, wheat flour, and sugar.

He launched his product, "Farine lactée" (flour with milk), for infants who could not be breastfed. He was asked to test his infant cereal on a 15-day-old infant who was not taking any milk or other food, and he was able to save the life of this premature baby, Little Wanner. Since then demand for the product skyrocketed, and soon "Farine Lactée Henri

Nestlé" (Henri Nestlé's Milk Flour) was being sold throughout much of Europe. Physicians also began to recommend the product, which had gained a reputation for its quality, paving the way for modern infant formula.



The iconic Nestlé logo was trademarked in 1868. "Nestlé" means "small bird's nest" in the Swabian dialect. Henri Nestlé's original trademark was based on his family's coat of arms, which featured a single bird on a nest. Over time, Nestlé added three young birds being fed by a mother to create a link with the three brothers from whom the Nestlé family tree originated.



The company reached the size that Henri Nestlé could not run it alone in his advancing age. In 1875, he sold his company and factory in Vevey to three local entrepreneurs. They employed chemists and skilled workers to help expand production and sales. Henri Nestlé sold not only the company and factory, but also its brand name and trademark. Hence, his name and the iconic nest still appear on Nestlé brands worldwide.

Written by: S. Kayooriha



THE USE OF AI TECHNOLOGIES IN FOOD RESEARCH **CHATGPT**

One of the primary ways that ChatGPT is being used in food research is by analyzing large amounts of unstructured data, such as social media posts, reviews, and online forums. With its advanced machine learning algorithms, ChatGPT can quickly identify patterns and trends related to consumer preferences, behaviors, and opinions about food. This information can then be used to inform the development of new food products that better meet the needs and desires of consumers. For example, by analyzing social media posts and online forums, ChatGPT can identify the most popular food trends and preferences, such as a desire for more plant-based and organic food options. This information can then be used to guide the development of new food products that better align with these trends and preferences.

Another way that ChatGPT is being used in food research is by providing a platform for virtual assistants and chatbots that can interact with consumers and provide personalized information and recommendations about food. For example, a consumer may ask a chatbot about the nutritional content of a specific food, and the chatbot can quickly access and provide the relevant information. This not only saves time and effort for the consumer, but it also helps to ensure that accurate and up-to-date information is being shared.

Additionally, chatbots can provide customized recommendations based on the individual's food preferences, dietary restrictions, and other personal factors. This can help consumers make more informed and healthy food choices, which can have a positive impact on their overall health and wellbeing.

ChatGPT is also being used to support the development of new and innovative food technologies. For example, it can be used to analyze and interpret data from sensors and other monitoring devices that are used to monitor food quality, safety, and freshness. This information can then be used to make real-time decisions about food processing and preservation, which can help to minimize waste and improve the overall quality of the food that is produced. Additionally, ChatGPT can be used to analyze data from food labeling and packaging, which can provide valuable information about the composition and ingredients of food products. This can help food researchers and industry professionals make more informed decisions about food production and labeling, which can help to promote food safety and transparency.



In conclusion, the use of ChatGPT in food research is providing food scientists and researchers with new and powerful tools for understanding the complexities of the food industry.

With its advanced natural language processing capabilities, machine learning algorithms, and support for virtual assistants and chatbots, ChatGPT is playing a critical role in advancing food research and shaping the future of the food industry. As food research continues to evolve, it is likely that the use of ChatGPT and other advanced artificial intelligence technologies will become even more widespread and impactful, helping to ensure that the food we eat is safe, nutritious, and delicious.

Generated using ChatGPT





Acknowledgement

We are honored to present the second issue of the newsletter “**FOOD’XTRA**”, by the Society of Food Science and Technology (2023) of the Department of Food Science and Technology.

We are sincerely grateful to our Dean of the Faculty, Snr. Prof. (Mrs.) C.V.L. Jayasinghe for her valuable ideas, support, and guidance from the beginning to the end. We are really fortunate that we had the kind association and supervision of Mr. Umesh Rajapakse, Senior Treasurer of the Society of Food Science and Technology. His exemplary guidance and consistent encouragement were so great, even our profound gratitude is not enough. We were lucky enough to be able to do this under his guidance.

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We sincerely thank all our lecturers in the Department of Food Science and Technology for all their encouragement. Your valuable suggestions and guidance have been helpful in various phases of the completion of this task. We are deeply indebted to all the lecturers without whose constructive feedback this event would not have been a success. So, we convey our sincere gratitude for your proper guidance for the completion of this task successfully.

We also take this opportunity to express our deep sense of gratitude to all the writers who supported us by giving us articles. They all spent a lot of their precious time and effort on us. Last but not least, we would like to appreciate the efforts of all members of the Society of Food Science and Technology for their hard work to make this a success. This achievement required a lot of effort from each individual involved in this task, and we would like to thank them all again.

Newsletter Designers:

Ravihansa Subasinghe | Madara Weerawardhane

END



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