DEPARTMENT OF FOOD TECHNOLOGY

MAGAZINE

2022 - 2023

EXCEL ENGINEERING COLLEGE (AUTONOMOUS)

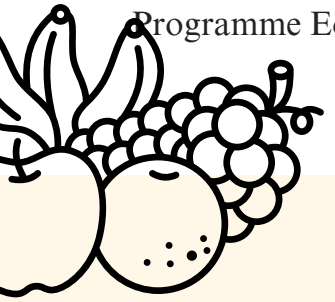
Approved by AICTE, New Delhi & Affiliated to Anna University, ChennaiAccredited by NBA (AERO, MECH, CSE & ECE), NAAC (A+Grade- 3.26) and Recognized by UGC (2f&12B)

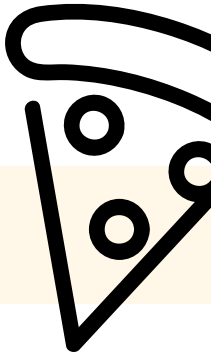
VISION

To develop technically sound food technocrats, to cater the needs of food processing industries, Research & Development organizations and society.

MISSION

- To produce competent Food Technologist with sound knowledge of hygienic food processing, preservation, food standards & regulation, packaging and storage in order to reduce the food losses.
- To Nurture research acumen and entrepreneurship skills among the students.
- To promote and practice high standards of professional ethics and social values for national importance.
- To provide solutions for the problems and leadership in the areas of food processing organization.
- To provide solutions for the problems and leadership in the areas of food processing organization Programme Educational Objectives





PROGRAM EDUCATIONAL OBJECTIVES

PEO 1: Graduates with sound knowledge in the field of food engineering and technology by integrating engineering & basic sciences.
PEO 2: Competent graduates who shall pursue careers in the field of food processing, quality control, product development and techno-marketing.
PEO 3: Graduates through innovative ideas and project management skills in order to make them as an entrepreneur.
PEO 4: Graduates who will apply the technical knowledge and interpret the problems related to food processing and preservation techniques for the benefit of society.

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NAAC A

TABLE OF STUFFINGS

- SPECIAL LECTURES
- STUDENTS ACHIEVEMENT
- STAFFS ACHIEVEMENT
- INDUSTRIAL VISITS
- EXTRA CURRICULAR ACTIVITIES
- ARTICLE CORNER

TOPPERS OF AY 2022-23

Jismi Babu

Dharani P

Saranya B

CHAIRMAN'S MESSAGE

"While we can't always prepare our children for the future, we can prepare them for the challenges that lie ahead. We sincerely hope that your time in the food technology department will provide you with the leadership and managerial skills you need. The news that your department is publishing this magazine makes me very happy, and I would like to congratulate you on the same. The fine qualities you will imbibe are the knowledge that you acquire from this magazine. We want you to experience the joy of achievement once, so that you will never stop for the rest of your life.

Prof. Dr. A. K. Natesan
Chairman
Excel Group of Institution

VICE-CHAIRMAN'S MESSAGE

"You don't have to be great to start, but you have to start to be great". 1 would like to congratulate the Department of food technology of Excel Engineering College for releasing the magazine "Ambrosia". The Article in this magazine will be a source of insight in the technical developments in the world of Science and Technology. This magazine is like a mirror reflecting the knowledge and creativity of the students of the food technology department.

Dr. N. Mathan Karthick
Vice Chairman
Excel Group of Institution

PRINCIPAL'S MESSAGE

Our college offers enough knowledge for students to acquire and use in order to standardize their research, academic performance, and professional skills. The goal of the institution is to give each Excel Engineering College student a better position with all of their skills. The Department of Food Technology's decision to publish a magazine is encouraging, and I want to urge each and every student to enhance their technical abilities and present their knowledge in the most effective manner. My sincere congrats go out to the food technology department staff and students.

Prof. Dr. K. Bommannaraja
Principal
Excel Engineering College

HOD'S MESSAGE

The field of food technology is one where innovation happens quickly. That the Department of Food Technology and Engineering has decided to start publishing the magazine "Ambrosia" makes me happy. It gives me great pleasure to congratulate all of my faculty members and students on the results of their diligence and interest, which they have demonstrated through a variety of articles. I urge all young people to get involved in the development process so they can contribute to its continued growth.

Dr. M. Karuppaiya
Head of the Department
Department of food technology

STUDENT'S ACHIEVEMENTS

Total 6 students from II B. Tech Food Technology have undergone internship program in "Panda Foods Pvt.Ltd., Coimbatore" during the period of 10th January 2023 to 25th January 2023.

Total 5 students from II B. Tech Food Technology have undergone internship program in "Sunraja oil industries Pvt. Ltd., Erode." during the period of 09.06.23 - 25.06.23.

STUDENT'S ACHIEVEMENTS

Total students from II B. Tech Food Technology have undergone internship program in "DARMONA TEA INDUSTRY, Ooty" during the period of 04.06.23 - 22.06.23.

Total students from II B. Tech Food Technology have undergone internship program in "AAVIN COOPERATIVE MILK PRODUCERS, Villupuram, Salem" during the period of 02.01.23 - 16.01.23.

STUDENT'S ACHIEVEMENTS

- **Total 3 students from II B. Tech Food Technology have undergone internship program in "AMMAN SAGO FACTORY, Salem" during the period of 15th January 2023 to 19th January 2023.**

- **One students from II B. Tech Food Technology have undergone internship program in "MALABAR MEAT FACTORY, KERALA" during the period of 10.01.23 - 25.01.23.**

- **One students from II B.Tech Food Technology have undergone internship program in "M R Krishnamoorthi cooperative sugar mills Ltd, Sethiathope., Salem" during the period of 07.01.23 - 22.01.23.**

- **One students from II B.Tech Food Technology have undergone internship program in "TASTEE MASALA INDUSTRY, Erode" during the period of 05.01.23 - 20.01.23.**

FACULTY ACHIEVEMENTS

CI&CEQ

MURUGESAN M. PALANISAMY[1]
KANNAN KANDASAMY[2]
VENKATA R. MYNENI[3]

[1] Department of Food Technology, Excel Engineering College, TN India
[2] Department of Chemical Engineering, Kongu Engineering College, TN, India
[3] Department of Chemical Engineering, Mettu University, Ethiopia

SCIENTIFIC PAPER

TWO-PHASE LEACHING FOR METAL RECOVERY FROM WASTE PRINTED CIRCUIT BOARDS: STATISTICAL OPTIMIZATION

Article Highlights

Abstract

Dr. M. P. Murugesan (Associate Professor) Published Paper titled "Two phase leaching for metal recovery from waste Printed circuit boards: Statistical optimization" on June 2021.

Hindawi

Research Article

Treatment of Municipal Wastewater in a Fixed Aerated Bed: Use of Natural Fibrous Materials

Dr. M. P. Murugesan (Associate Professor) Published Paper titled "Treatment of Municipal Wastewater in a Fixed Aerated Bed: Use of Natural Fibrous Materials" on July 2022.

FACULTY ACHIEVEMENTS

- **Dr. M. P. Murugesan (Associate Professor)** Published Paper titled "Methylene Blue Adsorption BY UV-Treated Graphene Oxide Nanoparticles (UV/n-GO): Modeling and Optimization Using Response Surface Methodology and Artificial Neural Networks" on July 2022.

- **Mr. M. Raja (Assistant Professor)**Published Paper titled "Physiochemical Analysis of Drinking Water and Treatment with a Homemade Filter: A Case Study of Illu Abba Bor Zone, Ethiopia" on Aug 2022.

- **Ms. U. Rammiya(Assistant Professor)** Published Paper titled "Utilization of mango Processing industrial waste into value added products" on Sep 2022.

- **Ms. U. Rammiya (Assistant Professor)** Published Paper titled "Standardization of functional foods from mango seed kernels" on Sep 2022.

INDUSTRIAL VISIT

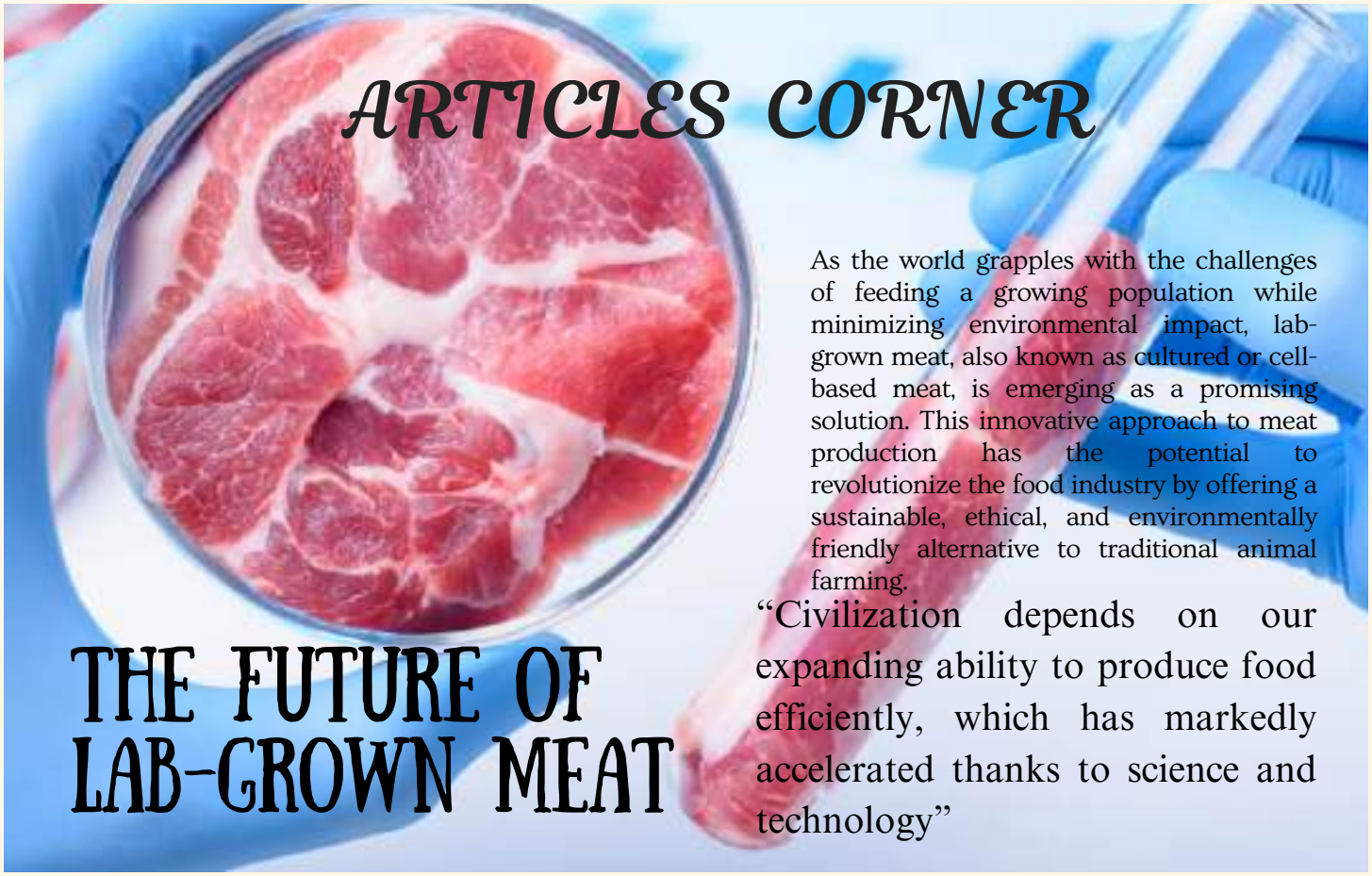
Industrial visit was arranged to "**Sakthi sugars, Aappakoodal" on 26.09.2022**

Industrial visit was arranged to "**Sri Vetrivelan Sago Factory, Thamampatty" on 04.02.2023**

INDUSTRIAL VISIT

Industrial visit was arranged to "**Benchmark Tea Industries and Nilgiris fresh produce co., Ooty"** on **14.04.2023**

Industrial visit was arranged to "**Milky mist,Perudurai" on 01.11.2022**



ARTICLES CORNER

As the world grapples with the challenges of feeding a growing population while minimizing environmental impact, lab-grown meat, also known as cultured or cell-based meat, is emerging as a promising solution. This innovative approach to meat production has the potential to revolutionize the food industry by offering a sustainable, ethical, and environmentally friendly alternative to traditional animal farming.

THE FUTURE OF LAB-GROWN MEAT

"Civilization depends on our expanding ability to produce food efficiently, which has markedly accelerated thanks to science and technology"

Lab-grown meat is produced by cultivating animal cells in a controlled environment, eliminating the need to raise and slaughter animals. The process begins by harvesting a small sample of muscle cells from a living animal. These cells are then placed in a nutrient-rich medium that mimics the conditions inside an animal's body, allowing them to grow and multiply. Over time, the cells develop into muscle tissue, which is then harvested and processed into meat products.

The traditional meat industry is a major contributor to environmental degradation, responsible for significant greenhouse gas emissions, deforestation, and water usage. Additionally, concerns about animal welfare and the ethical implications of factory farming have led many to seek alternatives to conventional meat. Lab-grown meat addresses these concerns by offering a method of production that requires fewer resources and causes less harm to animals and the environment.

Environmental Benefits

One of the most compelling arguments in favor of lab-grown meat is its potential to reduce the environmental impact of meat production. Studies suggest that lab-grown meat could reduce greenhouse gas emissions by up to 96% and use 99% less land compared to conventional beef production. Furthermore, it requires significantly less water, a critical factor in regions facing water scarcity.

Ethical Considerations

Lab-grown meat offers a more humane alternative to traditional meat production. Since the process involves only a small sample of cells from a living animal, it eliminates the need for slaughter, addressing the ethical concerns associated with factory farming. For consumers who are concerned about animal welfare but still wish to consume meat, lab-grown products provide a viable solution.

THE ROLE OF AI IN MODERN AGRICULTURE

Artificial Intelligence (AI) is revolutionizing agriculture, transforming it into a more efficient, sustainable, and productive industry. Key advancements include:

Precision Farming: AI-driven systems analyze data from various sources to optimize water use, fertilizer application, and pesticide distribution, resulting in improved crop yields and reduced environmental impact.

Crop Monitoring and Disease Detection: AI tools, such as drones and sensors, monitor crops in real-time, identifying early signs of stress, disease, or pests, allowing for timely interventions that prevent significant crop loss.

Automation and Robotics: AI-powered robots are automating labor-intensive tasks like planting, harvesting, and weeding, increasing efficiency and addressing labor shortages while promoting sustainable practices.

AI in Livestock Management: AI technologies monitor animal health, optimize feeding strategies, and enhance breeding practices, leading to healthier livestock and more efficient resource use.
Sustainable Agriculture: AI helps farmers adopt environmentally friendly practices by optimizing inputs and reducing the overuse of chemicals, thereby minimizing pollution and promoting sustainability.

3D PRINTING IN THE FOOD INDUSTRY

"Food is art, and food is love. And we should show love and appreciation for those who cook it by eating it with relish." - Mark Bittman

3D printing is revolutionizing the food industry by introducing new opportunities for customization, sustainability, and efficiency in food production. This technology involves using edible materials, or "food inks," to create food items layer by layer from digital models, allowing for intricate designs and personalized nutrition.

- Customization and Personalization: 3D printing enables the creation of visually striking and personalized food items, such as unique chocolates, intricate cake decorations, and custom meals tailored to individual dietary needs.
- Sustainability and Food Waste Reduction: The technology can help reduce food waste by using ingredients more efficiently and transforming by-products into new, edible items. It also supports the use of alternative protein sources like insect flour and lab-grown meat, which have a lower environmental impact.
- Innovative Culinary Creations: Chefs and food designers are using 3D printing to explore new culinary possibilities, creating edible sculptures, multi-layered desserts, and novel textures that push the boundaries of traditional cooking methods.
- Mass Production and Efficiency: In the future, 3D printing could enhance mass food production by providing greater consistency and reducing labor costs, as well as by streamlining the supply chain by producing food closer to the point of consumption.

BLOCKCHAIN FOR FOOD TRACEABILITY

"Food technologies like hydroponically grown vegetables and in vitro clone meats could ultimately be subject to the law of accelerating returns."

Blockchain is a distributed ledger technology that records transactions across multiple computers in a way that ensures the data cannot be altered retroactively. Each transaction, or "block," is linked to the previous one, forming a "chain" of data. This chain is visible to all participants in the network, but it is secure and cannot be changed once recorded.

In the context of food traceability, blockchain can be used to record every step of the food supply chain—from farm to table. This includes information about where and how crops are grown, how food is processed and transported, and when it reaches the consumer. Each participant in the supply chain, such as farmers, processors, distributors, and retailers, enters data into the blockchain. This data is then available in real-time to all stakeholders, ensuring transparency and accountability at every stage.

Enhancing Food Safety

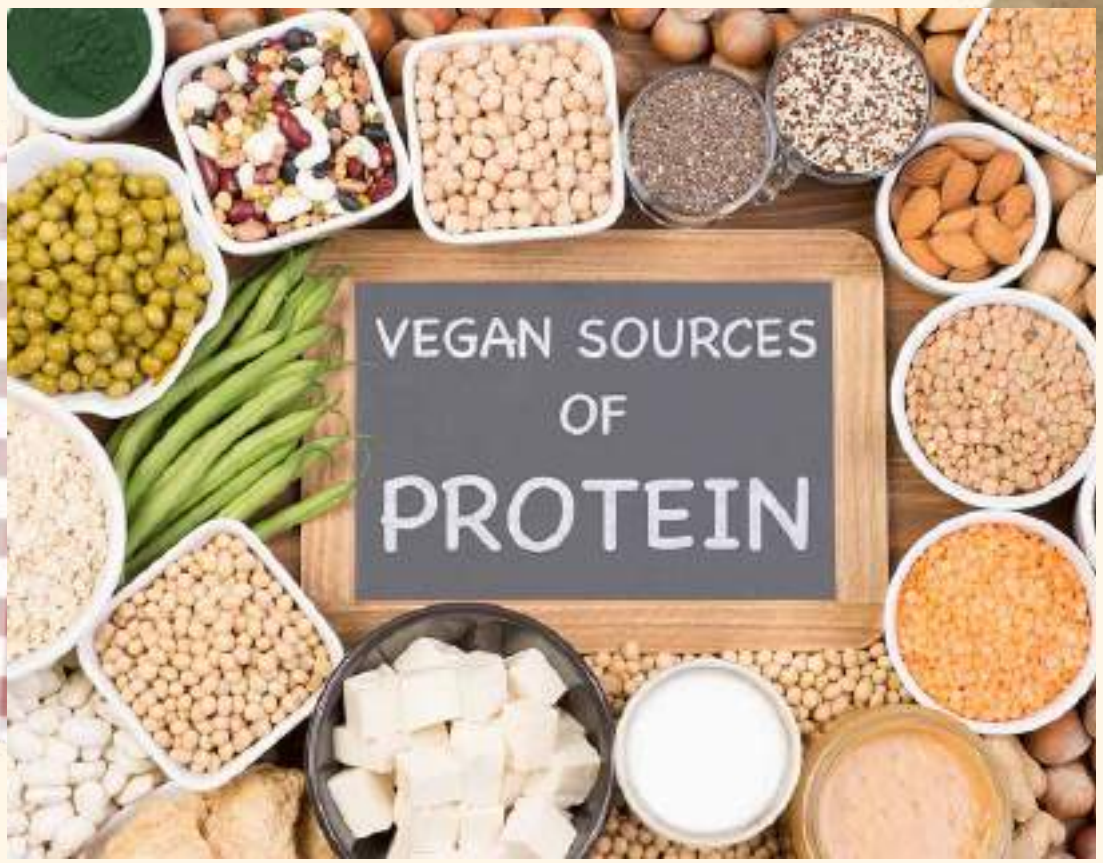
Food safety is a major concern, especially when it comes to preventing foodborne illnesses and ensuring that food products are free from contamination. Blockchain can play a crucial role in enhancing food safety by providing a reliable and traceable record of the journey each food item takes from its source to the consumer.

Combatting Food Fraud

Food fraud, such as mislabeling or adulteration, is a growing problem in the global food industry. Blockchain technology can help combat food fraud by providing a transparent and tamper-proof record of the entire supply chain. This makes it difficult for dishonest actors to manipulate data or misrepresent the origin or quality of food products.

Improving Supply Chain Efficiency

Blockchain can also enhance the efficiency of food supply chains by streamlining processes and reducing the need for intermediaries. With all data stored on a single, transparent ledger, stakeholders can quickly and easily access the information they need, reducing delays and administrative costs.



Plant-based proteins are derived from various plant sources such as legumes, grains, nuts, seeds, and vegetables. These proteins can be consumed in their natural form, like beans or lentils, or processed into plant-based meat alternatives, protein powders, and other products. Popular plant-based protein sources include soy, pea, chickpeas, hemp, quinoa, and more recently, innovative options like algae and mycoprotein.

These plant-based options are often praised for being more sustainable and environmentally friendly than traditional animal-based proteins, as they generally require fewer resources such as water and land, and produce fewer greenhouse gas emissions.

"The future of food is not just about taste; it's about technology, sustainability, and ethics."
— Chef José Andrés

Health and Wellness

One of the primary drivers of the plant-based protein movement is the growing awareness of the health benefits associated with plant-based diets. Research suggests that diets rich in plant proteins can help reduce the risk of chronic diseases such as heart disease, type 2 diabetes, and certain cancers. Additionally, plant-based proteins are often lower in saturated fats and cholesterol compared to animal proteins, making them a heart-healthy choice.

Environmental Sustainability The environmental impact of meat production is another significant factor driving the shift towards plant-based proteins. Livestock farming is a major contributor to greenhouse gas emissions, deforestation, and water usage. As concerns about climate change and resource depletion grow, many consumers are choosing plant-based proteins as a more sustainable option.

Fermentation Technology and the New Wave of Foods

Fermentation is an ancient technique that has been used for thousands of years to preserve and enhance the flavors of food. From bread and yogurt to beer and cheese, fermentation has been a cornerstone of culinary traditions worldwide. Today, this age-old process is experiencing a renaissance, driven by advancements in fermentation technology and a growing interest in sustainable, health-conscious eating. The new wave of fermented foods is not only revitalizing traditional practices but also paving the way for innovative products that promise to revolutionize the food industry.

Understanding Fermentation Technology

Fermentation is a natural process where microorganisms, such as bacteria, yeast, or fungi, break down sugars and other compounds in food, producing alcohol, acids, gases, and other byproducts. This process not only preserves food but also enhances its flavor, texture, and nutritional value.

The technology behind fermentation has evolved significantly, allowing for more controlled and precise outcomes. Modern fermentation techniques enable the creation of new flavors, textures, and functional properties in food, while also enhancing safety and shelf life.

Fermentation can be categorized into several types:

1. Lactic Acid Fermentation: Used in products like yogurt, sauerkraut, and kimchi, where lactic acid bacteria convert sugars into lactic acid, giving the food its characteristic tangy flavor.
2. Ethanol Fermentation: Utilized in the production of alcoholic beverages like beer, wine, and spirits, where yeast converts sugars into ethanol and carbon dioxide.
3. Acetic Acid Fermentation: Used to produce vinegar, where ethanol is converted into acetic acid by acetic acid bacteria.
4. Alkaline Fermentation: Found in foods like natto and some traditional African and Asian foods, where bacteria produce ammonia, leading to a rise in pH and the creation of distinct flavors.

Nanotechnology is revolutionizing food preservation by offering innovative solutions that extend shelf life, improve safety, and reduce waste. By manipulating materials at the nanoscale, nanotechnology enhances packaging, develops nanosensors for monitoring food safety, creates nanoemulsions for more effective preservatives, and introduces antimicrobial nanoparticles to prevent spoilage. Key applications include:

- Nanomaterials in Packaging: These improve barrier properties, create active packaging that interacts with food, and enable smart packaging that monitors food conditions.
- Nanosensors: Used for freshness indicators and contaminant detection, helping ensure food safety throughout the supply chain.
- Nanoemulsions and Nanocarriers: These enhance the stability and effectiveness of preservatives, allowing for controlled release over time.
- Antimicrobial Nanoparticles: Incorporated into packaging or applied directly to food, these nanoparticles inhibit the growth of spoilage-causing microorganisms.

Despite the potential, challenges remain, including safety concerns, consumer acceptance, and regulatory hurdles. However, with ongoing research and development, nanotechnology is poised to play a significant role in reducing food waste, improving food security, and ensuring that consumers have access to safer, fresher food.

Nanotechnology is making a significant impact on food preservation, offering new solutions for extending shelf life, improving safety, and enhancing the quality of food products. From advanced packaging materials to nanosensors and antimicrobial nanoparticles, the applications of nanotechnology are transforming the way we preserve and protect our food. However, as this technology continues to evolve, it is essential to address safety concerns, gain consumer acceptance, and navigate the regulatory landscape to fully realize the benefits of nanotechnology in food preservation.

Edited by

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