

Department of Food Technology

Society of Food Technocrats
2024



Bhai Gurdas Institute of Engineering and Technology, Sangrur-
Punjab

Message



Dr. Guninderjit Singh Jawandha
Chairman
Bhai Gurdas Group Of Institutions

I am delighted to have the opportunity to release "Society of Food Technocrats", the annual college magazine. In this era of cut throat competition, apart study. One need to have the holistic development of personality & this is our prerogative to chisel our thinking & persona here. The magazine will act as a platform for your creativity & writing aptitude & I intently believe that you would have an all- round development of your personality during your sojourn in this temple of learning. I congratulate the Director, staff & students for publishing "Technomantra". I hope this issue would be meaningful, enjoyable & memorable in achieving its objectives.

Message



Prof. (Dr) Tanuja Srivastava Director Bhai
Gurdas Institute of Engineering and
Technology, Sangrur, Punjab

It is a matter of great pleasure for me to learn that Editorial Board is bringing out an issue of the College magazine "Society of Food Technocrats". I would like to appreciate those who have contributed articles for the college magazine as this shows the hard work, and the hidden potential of the students. I hereby congratulate those who contributed for the college magazine and welcome those who want to avail the Opportunity next.

(Prof) Dr. Tanuja Sarivastava
Director

Message



Dr. Ashok kumar
HOD Department of Food Technology

I am happy that department of Food technology is publishing yet another issue of "Society of Food Technocrats', 2024" This magazine is by the student & for the Students. It aims at providing a platform to the students to explore their latent Capabilities & talent, to express their creativity and to develop their technical skills as you scan through the pages of the magazine, it will enlighten you with the important milestone the department has achieved this year. Beside, our budding talents have expressed their thoughts, ideas, hopes, feelings, aspirations & Convictions in a creative way.

I congratulate the editorial board for unleashing the hidden potential of the students & appreciate them for their effort in bringing out their issue.

Dr. Ashok Kumar
Head of Department Food Technology

Message



It gives us great pleasure to bring you another issue of **"Society of Food Technocrats"**, the college magazine of Bhai Gurdas Institute of Engineering & Technology. The name and fame of an institute depends on the caliber and achievements of the students and teachers. The role of a teacher is to be a facilitator in nurturing the skills and talents of students. This magazine is a platform to exhibit the literary skills and innovative ideas teachers and students. **"Society of Food Technocrats"**, presents the achievements of students and contributions of teachers. We would like to place on record our gratitude and heartfelt thanks to all those who have contributed to make this effort a success. We profusely thank the management for giving support and encouragement and a free hand in this Endeavour. Last but not the least we are thankful to all the authors who have sent their articles. We truly hope that the pages that follow will make an interesting read.

Dr. Shafaq Javid
Assistant professor
Food Technology

Students Editor's

MehakJot Kaur (FT 7th)

Gurleen kaur (FT7th)

Vision of the Department

To achieve excellence in quality education, competent technologist, innovation and entrepreneurship that will benefit globally food processing sector and society.

Mission of the Department:

M1: To impart basic knowledge in the area of food science, food processing and safety.

M2: To inculcate in-depth knowledge of Food Engineering and Technology with an ability to analyze, evaluate, design, create and integrate existing and new knowledge.

M3: To equip and enable students with conceptual, technical and managerial skills to transform the organization and society.

M4: To serve people, society and nation with utmost professionalism, values and ethics to make development sustainable and quality of life.

PEO's of the Department:

PEO1: To provide students with the basic knowledge, skills and use of latest technologies in food science that help in lifelong learning and self education.

PEO2: To acquire theoretical, practical knowledge and Industrial exposure of Food Processing Sector to become a qualified Food Technologist.

PEO3: To provide students with overall competency by inculcate skills, technical writing and communication skills as professionals.

CONTENS

Sr. No.	ARTICLES
1.	Modified Atmosphere Packaging (MAP) for Fresh Produce
2.	Take Control of Lactose Intolerance
3.	Vegan Banana Bread: A Delicious and Guilt-Free Treat
4.	Chocolate and banana pancakes recipe
5.	Enzyme-Based Processing: Unlocking New Frontiers in Food Texture and Flavor
6.	Revolutionizing Fermentation: Advances in Microbial Cultures
7.	Biodegradable Packaging Materials: PLA and PHA
8.	The Future of Food Preservation: Why Food Irradiation Matters

1. Modified Atmosphere Packaging (MAP) for Fresh Produce:

Modified Atmosphere Packaging (MAP) is a sophisticated preservation technique designed to extend the shelf life and maintain the quality of fresh produce. By altering the gas composition within the packaging—typically reducing oxygen and increasing carbon dioxide and nitrogen levels—MAP slows down the respiration and ripening processes while inhibiting microbial growth. This controlled atmosphere ensures the retention of nutritional and sensory qualities in fruits, vegetables, and herbs. Depending on the type of produce, MAP can be applied actively through gas flushing or passively using permeable films that allow gases to adjust naturally, with newer dynamic systems incorporating sensors for real-time monitoring and adjustments.



The applications of MAP are extensive, ranging from extending the freshness of delicate items like berries, leafy greens, and herbs to facilitating the transportation of exotic fruits over long distances. It is particularly beneficial for ready-to-eat products such as pre-cut fruits and salad kits, meeting the rising demand for convenience in the food industry. By slowing spoilage, MAP significantly reduces food waste, maintains product quality during transit, and supports global trade by ensuring produce reaches markets in optimal condition. This has made MAP a critical tool in meeting consumer expectations for fresh, high-quality food. Despite its advantages, MAP faces challenges such as high costs, reliance on plastic materials, and the need for stringent temperature and humidity control.

Conclusion

Modified Atmosphere Packaging (MAP) has transformed the way fresh produce is preserved and transported, enabling longer shelf life, reduced spoilage, and better quality retention. While challenges like cost and environmental concerns persist, advancements in sustainable and intelligent packaging technologies promise a brighter future for MAP. As the fresh produce industry continues to evolve, MAP will remain a cornerstone technology, meeting consumer demands for freshness and sustainability while reducing food waste globally.

2. Take Control of Lactose Intolerance:



The Nutritional Power of Dairy

Dairy products like milk, cheese, and yogurt are nutritional powerhouses, packed with essential nutrients such as protein, calcium, and vitamins A, D, and B-complex. These nutrients play a vital role in maintaining strong bones, healthy muscles, and robust teeth, while also supporting vision, skin, and nervous system health. For older adults, especially postmenopausal women, calcium and vitamin D are crucial for preventing osteoporosis and preserving bone density. However, for the estimated four million people in the UK who are lactose intolerant, the benefits of dairy may seem out of reach due to digestive discomforts triggered by lactose, the sugar found in dairy.

Lactose intolerance is not the same as a milk allergy. It occurs when the body cannot produce enough lactase, the enzyme needed to digest lactose. This deficiency leads to symptoms like bloating, cramps, wind, and diarrhea after consuming dairy.

Reclaim Dairy with Milkaid

Thanks to Milkaid, people with lactose intolerance can enjoy dairy again without discomfort. Milkaid's raspberry-flavored chewable tablets deliver lactase directly to the digestive system, allowing the body to process lactose effectively. These tablets are convenient for dining out or indulging in occasional treats like ice cream. For younger sufferers, Milkaid Junior offers a strawberry-flavored option tailored for children aged three and above. Additionally, Milkaid Drops can be added to milk to reduce lactose content by up to 99%, making it suitable for everyday use in tea, cereal, or cooking. Free from artificial flavors, gluten, and yeast, Milkaid ensures a safe and simple solution for the whole family.

Conclusion

Lactose intolerance doesn't have to mean giving up dairy. With Milkaid's innovative range of products, you can regain the joy of enjoying milk, cheese, yogurt, and even ice cream. Packed with nutrients vital for overall health, dairy can once again be part of your diet, providing essential benefits while keeping digestive discomfort at bay. Take control of lactose intolerance with Milkaid and savor the goodness of dairy worry-free.

3. Vegan Banana Bread: A Delicious and Guilt-Free Treat:



Vegan banana bread is a delightful, plant-based twist on a classic favorite. Made without eggs or dairy, it relies on natural ingredients to achieve the same moist, flavorful result. Ripe bananas not only provide natural sweetness but also act as a binding agent, eliminating the need for eggs. Pair them with nutrient-rich alternatives like almond milk, coconut oil, or flaxseed to boost the bread's health benefits. Vegan banana bread is also customizable—add nuts, dark chocolate chips, or spices like cinnamon to elevate its taste and texture.

Why Choose Vegan Banana Bread?

Aside from its rich flavor, vegan banana bread aligns with sustainable and ethical eating practices. By avoiding animal-derived ingredients, it reduces environmental impact and supports cruelty-free food choices. It's also a healthier option for those managing dietary concerns such as lactose intolerance or cholesterol. Vegan banana bread offers all the indulgence of traditional recipes without compromising on your values or wellness goals.

Easy and Satisfying to Make

Vegan banana bread is surprisingly simple to prepare, even for novice bakers. With just a few staple ingredients, you can whip up a batch in under an hour. All you need are ripe bananas, plant-based milk, a good quality flour, and your choice of sweetener. The lack of eggs and dairy makes cleanup easier, too! Perfect for breakfast, a midday snack, or dessert, this versatile treat is a crowd-pleaser that even non-vegans will enjoy.

Conclusion

Vegan banana bread proves that plant-based baking can be as delicious as it is mindful. Whether you're a dedicated vegan or simply exploring healthier alternatives, this recipe delivers on flavor, texture, and nutrition. So, grab those overripe bananas and get baking—because indulgence can be both ethical and delicious!

Gurleen Kaur (FT-7TH Semester)

4. Chocolate and banana pancakes recipe:



There's nothing quite like waking up to the heavenly aroma of chocolate and bananas mingling together. These Chocolate and Banana Pancakes are the perfect balance of indulgence and comfort, blending rich cocoa with the natural sweetness of ripe bananas. Whether you're looking for a decadent breakfast, a delightful brunch, or a quick dessert, this recipe will have you flipping for joy. Best of all, it's simple to make and easy to customize, ensuring a treat the whole family will love.

Mixing the Batter

Chocolate and banana pancakes are a delightful treat that combines the richness of chocolate with the natural sweetness of bananas. To prepare these pancakes, start by whisking together the dry ingredients: all-purpose flour, cocoa powder, sugar, baking powder, baking soda, and a pinch of salt. In a separate bowl, mix mashed ripe bananas with milk, an egg (or applesauce for an egg-free version), vanilla extract, and melted butter. Gently fold the wet ingredients into the dry mixture until just combined, ensuring a slightly lumpy batter for fluffy pancakes.

Cooking the Pancakes

Heat a non-stick skillet or griddle over medium heat and lightly grease it with butter or oil. Pour about 1/4 cup of batter onto the skillet for each pancake and spread it lightly. Cook until bubbles form on the surface and the edges look set, then flip to cook the other side until golden brown. Repeat the process for the remaining batter. These pancakes are quick to prepare, making them perfect for a comforting breakfast or dessert.

Serving Suggestions

Serve the chocolate and banana pancakes warm, stacking them on a plate and topping them with banana slices, chocolate chips, melted chocolate, and a drizzle of maple syrup or honey. For an indulgent finish, add whipped cream. The combination of flavors is irresistible, and the pancakes provide a satisfying balance of sweetness and richness. Whether enjoyed as a family breakfast or a special treat, these pancakes are sure to please.

Conclusion

Chocolate and banana pancakes are a versatile and crowd-pleasing dish that pairs well with a variety of toppings. The ease of preparation and the blend of flavors make them an excellent choice for a quick treat or a special occasion. With their rich, chocolatey taste and the sweetness of bananas, these pancakes are guaranteed to delight everyone at the table.

5. Enzyme-Based Processing: Unlocking New Frontiers in Food Texture and Flavor:



Enzyme technology is reshaping the food industry by enhancing the texture, flavor, and nutritional profiles of a wide range of products. Enzymes such as amylases, proteases, and lipases, derived from natural sources like plants and microorganisms, enable precise modifications in food structure. These biological catalysts are essential for improving the elasticity of dough in baked goods, the creaminess of dairy products, and the fibrous texture of plant-based meats. As consumer demand for healthier and more sustainable food options grows, enzyme-based processing is emerging as a vital tool for creating high-quality, innovative products.

Enzymes also play a critical role in developing unique and complex flavor profiles. In fermentation processes, enzymes unlock the umami in soy sauce, enhance the aroma of fruit juices, and improve flavor complexity in beverages like wine and beer. By breaking down proteins, starches, and fats into flavor-precursor compounds, enzyme technology allows manufacturers to produce food and beverages with enhanced sensory appeal, meeting the evolving tastes of consumers.

The future of enzyme-based processing is driven by advances in biotechnology and sustainable practices. Innovations in enzyme engineering are leading to the development of more efficient and stable enzymes, reducing energy consumption and food waste. Despite challenges like high production costs, process optimization, and consumer skepticism, enzyme-based technologies hold immense potential to revolutionize food production.

Conclusion

Enzyme-based processing is unlocking new frontiers in food texture and flavor, offering innovative solutions for producing sustainable, nutritious, and sensory-rich foods. By leveraging ongoing advancements and addressing current challenges, the food industry is poised to meet evolving consumer demands and shape a more efficient and sustainable future.

6. Revolutionizing Fermentation: Advances in Microbial Cultures:



This article delves into the latest developments in microbial cultures and their profound impact on the fermentation process, detailing their roles, benefits, and implications for the future.

Understanding Fermentation and the Role of Microbial Cultures

Fermentation, a metabolic process driven by microorganisms like bacteria, fungi, and yeast, converts organic compounds such as sugars into simpler substances like alcohol, gases, or acids. This process not only preserves food and extends shelf life but also enhances its flavor, nutritional value, and digestibility. Traditionally reliant on wild microorganisms, modern fermentation now utilizes specific microbial strains optimized for consistent, high-quality results. Recent breakthroughs in microbial culture technology are revolutionizing the fermentation industry. Genomic sequencing and genetic engineering, including CRISPR technology, allow scientists to design microbial strains with enhanced efficiency and stability. Multi-strain and synbiotic cultures combine different microorganisms to achieve complementary effects, such as improved flavor complexity and gut health benefits.

Applications and Challenges of Advanced Fermentation

The food and beverage industry has been a major beneficiary of advanced microbial cultures, producing dairy alternatives, probiotic-rich functional foods, and precision-crafted alcoholic beverages. In pharmaceuticals, microbial fermentation is essential for producing antibiotics, vaccines, and biologics. Agriculture benefits from biofertilizers and biopesticides, while sustainable biofuel production leverages microbial fermentation to convert biomass into energy. However, challenges such as strain stability, regulatory hurdles, high costs, and ethical concerns surrounding genetically modified organisms (GMOs) must be addressed for widespread adoption of these technologies.

Conclusion

Advances in microbial cultures are transforming fermentation into a modern scientific frontier, offering solutions to enhance food quality, promote sustainability, and drive medical innovations. By integrating traditional techniques with cutting-edge technology, fermentation holds the potential to address global challenges in food security, health, and environmental sustainability, paving the way for a future where microbial cultures play a pivotal role in shaping industries and improving lives.

7. Biodegradable Packaging Materials: PLA and PHA:



PLA (Polylactic Acid): A Cost-Effective Solution

PLA, a biodegradable plastic derived from renewable resources like corn starch and sugarcane, is widely used in food packaging due to its cost-effectiveness and versatility. It is produced through the fermentation of plant sugars, resulting in a transparent, compostable, and non-toxic material suitable for various applications. PLA is commonly used in beverage containers, fresh produce packaging, and ready-to-eat meal trays. However, its limitations include sensitivity to high.

PHA (Polyhydroxyalkanoates): A High-Performance Alternative

PHA is a biodegradable polymer produced by bacteria through the fermentation of organic materials, such as plant oils or agricultural waste. Known for its superior water resistance and flexibility, PHA is ideal for moist food packaging like snack wrappers, single-serve containers, and fresh produce packaging. Unlike PLA, PHA can degrade in both aerobic and anaerobic conditions, including marine environments, making it highly effective in reducing ocean plastic pollution. Despite its advantages, PHA's high production cost remains a challenge, limiting its widespread adoption.

Comparison and Future Prospects

When comparing PLA and PHA, both offer significant environmental benefits, but their applications vary based on cost, water resistance, and biodegradability. PLA is more affordable and suitable for dry food packaging, while PHA excels in moisture-resistant applications and marine biodegradability. As advancements in production technology and demand for sustainable solutions increase, the cost of PHA is expected to decrease, making it more accessible for the food industry. Future innovations will likely enhance the performance and affordability of both materials, contributing to a more sustainable packaging landscape.

Conclusion

PLA and PHA represent a critical shift toward eco-friendly packaging solutions in the food industry. While PLA offers a cost-effective option for dry goods, PHA's superior water resistance and biodegradability position it as a high-performance alternative. Together, these biodegradable materials are poised to play a vital role in reducing plastic waste and supporting a sustainable, circular economy in food packaging.

8. The Future of Food Preservation: Why Food Irradiation Matters:



Food irradiation is a cutting-edge preservation technology that uses ionizing radiation to eliminate pathogens, pests, and spoilage microorganisms without compromising the food's taste, texture, or nutritional value. This process is especially valuable for perishable foods like fruits, vegetables, and meats, as it extends shelf life and maintains product quality without the need for chemical additives. In India, regulatory bodies such as the Food Safety and Standards Authority of India (FSSAI) and the Board of Radiation and Isotope Technology (BRIT) oversee the use of irradiation for items like spices, grains, and export-bound fruits.

The primary sources of irradiation—gamma rays, electron beams, and X-rays—offer flexibility in treating various food types. Gamma rays, derived from isotopes like Cobalt-60, penetrate deeply, making them ideal for bulk foods. Electron beams, on the other hand, are better suited for surface-level treatment, while X-rays provide a balance of penetration and safety. This versatility enables food irradiation to address multiple challenges, from pathogen control and pest elimination to spoilage reduction, ensuring safer and longer-lasting food products.

Despite its benefits, public perception remains a challenge due to misconceptions about the safety of irradiated foods. Contrary to popular belief, irradiated food does not become radioactive and poses no health risks. Regulatory bodies like the World Health Organization (WHO) and the Food and Agriculture Organization (FAO) endorse irradiation as a safe and effective preservation method. Consumer acceptance can be improved through transparent labeling, education, and awareness campaigns that highlight the safety, efficacy, and environmental benefits of this technology.

Conclusion

In conclusion, food irradiation offers a sustainable, chemical-free solution to enhance food safety, reduce waste, and extend shelf life. As technology advances and awareness grows, it has the potential to play a pivotal role in global food security, ensuring safe and fresh food for consumers while addressing environmental and logistical challenges in the food supply chain.