



HEALTHY FOODS



**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

Prof. (Dr) Tanuja
Srivastava

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' 2023" 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.

Er. Suhail Ahmad Bhat
Assistant professor
Food Technology

Students Editor's

Simranjeet Kaur(FT7th)

Mahir Kumar (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.

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1. Pumpkin Seeds and its role as a Functional Food Ingredient:

Pumpkin is a fruit vegetable belonging Cucurbitaceae family grown in Asian countries. (Tindall,1983). It is the national vegetable of India. Its popularity is due to its use for decoration purposes in the Halloween season. Besides its aesthetic value, the fruit is compactly packed with functional nutrients.

The World Health Organization (WHO) strongly recommends increasing potassium intake to at least 3500 milligrams per day for adults. Consuming one-quarter cup of pumpkin seeds in addition to pumpkin squash provides an additional 8.5 grams of protein, 4.5 grams of heart-healthy monounsaturated fat, 155 milligrams of magnesium and B Complex vitamins except for vitamin B12, which only comes from animal products.

Pumpkins are a major source of nutrients, proteins, phytosterols, polyphenols, unsaturated fatty acids, tocopherols, cucurbitacin's and also other essential minerals. One cup of cooked pumpkin provides over 400% of the daily value for vitamin A and an average of 560 milligrams of potassium, seeds contain a high amount of potassium (K) and low in sodium (Na).



fat food stuffs. It also possesses good foaming properties and can act as thickening agent and therefore has huge potential in the Bakery Industry, (Due, 2016). To increase the shelf-life or in case of long- term storage after cultivation of *T. titanicus*, it can be treated by irradiation with Co-60(0.5 kGy), (Qiang et al, 2005).



Simranjeet kaur (FT7th)

2. How Termite Mushrooms can aid in addressing Challenges of Food Security in India.

India is a land of diversity in terms of culture, language, geography, weather conditions and food habits. Even after food diversification, the Global Hunger Index Score of India recorded in the year 2022 has been 29.1, which is regarded as “serious” (Global Hunger Index, 2022). India stands at 107th position on Global Hunger Index out of 121 countries and remains among the top 15 countries with high hunger indices. In

some countries including India, the rate may worsen in 2023. Most possible reasons may be conflict among countries, climate change, low economic growth rate post COVID-19, Russia-Ukraine war, all of which has led to increase in the prices of food, fuel and fertilizers, (Report on Hunger Index, 2022). The higher the hunger index, greater are the chances of malnutrition in children.



In view of the same, the focus has to shift towards food types that can fulfill the hunger needs and nutrition requirements of large families in a cost-effective manner. One such food type is a fungus – *Termitomyces titanica* (mushrooms). *Termitomyces titanica* is the world's largest edible mushroom as well as largest organism in the world having a cap diameter of around 1m (Ghorai et al, 2011) 3 feet wide in total (a report on *T. titanica*). The color of the cap is grayish with dark brown patches (Kumari et al, 2022).

The texture of mushroom is meaty with smoky and savory flavour. The amount of nutrients found in *T. titanica* is represented in Table below.

T. titanica, being the largest mushroom species can be a boon to the entire family, as using one mushroom could fill the stomach of at least 15-20 members, which helps in reducing hunger in a cost-effective manner, particularly for large families. It is rich in nutrients and contains medicinal properties that can not only reduce the problems of malnutrition, but also other diseases as mentioned above. *T. titanica* can be a good substitute for low fat food stuffs. It also possesses good foaming properties and can act as thickening agent and therefore has huge

3. Nutritional and Functional Properties of Millets:

Millets are a group of cereal grains that belong to the Poaceae family, commonly known as the grass family. They constitute an important source of food and fodder for millions and play a vital role in the Ecological and economic security of India. These millets are also referred to as 'coarse cereals', 'nutricereals', 'cereals of the poor', etc. Millets are highly adaptive to a wide range of environmental conditions such as floods, drought, etc. They have minimum requirements for water, fertilizers and pesticides.



Sorghum is the fifth most-produced cereal crop in the world. It is low in fat, but is rich in protein, B vitamins, fibre and micronutrients, all of which contribute to good health. This grain is a good source of plant based protein.

Pearl millet is also known as bajra and is grown in semi-arid regions, primarily in Africa and Asia. It is one of the eight main cereals in the world. It is well adapted to low rainfall, low soil fertility and high temperatures. This is one of the four most important cereals, which is rich in iron and zinc with high content of antioxidants.

Finger Millet is also known as ragi and is a type of small-sized millet that requires a large area for cultivation and comes under the taxonomic family Poaceae.

Because of its high nutritional content, it is considered as a special food supplement.

This is an annual grass plant belonging to the tribe Paniceae of the Poaceae family. It is also known as Italian or German millet and is categorized under small millet due to its small size. It is grown as a staple food in China, India, Myanmar, Russia and Eastern Europe. rich, alcohol-soluble proteins called

Mahir (FT7th)

4. Nutritional Significance of Banana Pseudostem and its Food

Applications:

Banana (*Musa paradisiaca*), the evergreen fruit crop belonging to the family Musaceae, is also known as sweet banana and kluay nam wa (Gupta et al., 2022; Ali et al., 2022). The yield of bananas is highly prolific and attains a superior rank globally. The production of bananas was reported to be 116 million tons in 2017-2019 and 121 million in 2021, contributing to around 16% of the production of the total fruit including grapes, citrus fruits and apples. (Singh et al., 2016; Ramirez-Bolanos et al., 2021; Gupta et al., 2022; Zou et al., 2022) Pseudostem has a rich nutritional profile encompassing a range of nutritional components such as minerals, amino acids, dietary fibre, lipids, antioxidants and polyphenols that demonstrate various health- enhancing qualities. As per the previous research studies, it has been revealed that pseudostem is a good source of macronutrients including potassium, calcium and magnesium. The presence of dietary fibre in pseudostem helps in detoxifying the body by eliminating waste products.



To conclude, pseudostem which is considered agricultural waste can be utilized in food industries for the formation of economically feasible products. The fortification of pseudostem is considered an optimal technique to improve the nutritional profile of food, due to the comprehensive nutritional profile which makes the food more valuable. Moreover, including banana pseudostem in the diet can prevent the occurrence of many diseases like diabetes, cardiovascular disease, cancer, obesity and renal stone, since it is a rich source of dietary fibre, antioxidants, minerals and an adequate number of amino acids waste product.

5.Utilization Coffee Grounds of Spent– “A Profitable Coffee Waste”

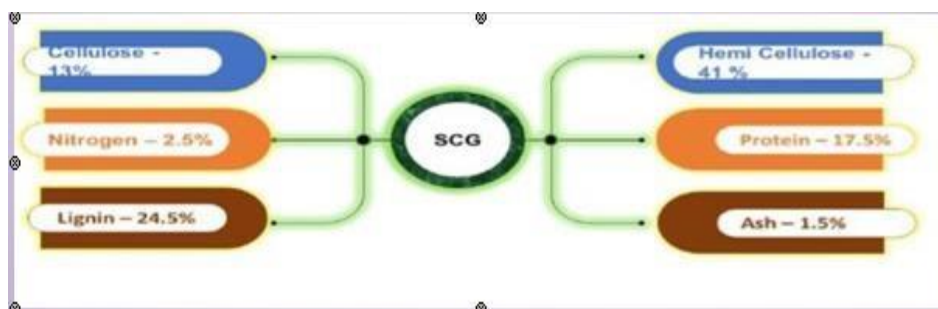
Coffee bean is currently the second highest commodity that is being traded globally, apart from being the most widely consumed beverage. At the same time, the brewing of coffee beans results in a small number of specified compounds and generates a huge amount of leftovers in the form of coffee grounds (SCG), which are the meshes left after extracting the desirable composites in the brewing process.

Composition of Spent Coffee Grounds (SCG):

Polysaccharides, particularly cellulose and hemicellulose are the most abundant component of SCG, accounting for roughly half of its dry mass. The vital components of hemicellulose sugars are mannose, galactose and arabinose, while glucose is the important component of cellulose. Lignin and protein are the next most abundant compounds, accounting for roughly 20% of total dry mass.

SCG in the Food Industry:

The large quantity of organic compounds found in used coffee grounds, (SCG) makes it appropriate for use. An earlier innovation investigated extracting specific ingredients, like terpenes, oil, flavour and alcohol to extracting specific ingredients, like terpenes, oil, flavour and alcohol to create products with high value



Application of SCG Compounds in the Food Industry:

Caffeine:

Coffee also referred to as 1,3,7-trimethylxanthine, is the most well-known substance in coffee and coffee-related products and ingredients.

Carbohydrates:

Carbohydrates in the form of polysaccharides- galactomannans and arabinogalactans-have excellent usage in emulsion stabilizers and stabilizers in milk and dairy products, fruit-based water gels, powdered goods and as a good formulation for baby milk, seasonings, soups and sauces.

6. Probiotic Microorganisms in your Food! What's really changed

Today? Why Probiotics?

Probiotics are “live microorganisms that offer a health benefit on the host when administered in suitable numbers” (FAO/WHO 2001). They're frequently found in fermented milk, yoghurt and cheese. Functional foods such as probiotics and prebiotics make up the largest segment of the Functional Foods Market in Europe, Japan and Australia. These can be ingested as either fermented or unfermented foods or as dietary supplements (products in powder, capsule or tablet forms). Currently the most prevalent method is to consume probiotic organisms through food products. The majority of probiotic food products are classified as functional foods and they make up a large portion of that category. The purpose of this article is to provide an Overview of Probiotic Foods and the factors responsible for survival of Probiotic Microorganisms and Recent Technological Advances which are helping maintain their viability during processing, packaging and storage.

Traditional Probiotic Foods:

Traditional fermented/preserved foods and beverages are known to be related to some ethnic practices and civilizations. They are seen as playing an important role in ancient cultures that is widely recognized across countries and continents. Previously, traditional foods were made without taking into account the science of the microbe's application and role.

Table 1: Some Traditional Probiotic Foods of Different Countries

Product	Probiotic	Food Product	Country
Adai	LAB	Cereal, legume	Thailand
Agbelima	<i>Lb. plantarum</i> , <i>Lb. brevis</i> , <i>Lb. fermentum</i> <i>Leuc. mesenteroides</i>	Cassava	south east Asians
Atole	LAB	Maize	
Ben-saalga	LAB	Pearl millet	Kenya, Philippines
Probiotic ice cream	<i>L. acidophilus</i> , <i>Bifidobacterium animalis</i>	Sheep milk	India
Yoghurt	<i>Lactobacillus delbrueckii</i> , <i>Streptococcus thermophilus</i>	Cow milk, Yak	India

Several studies have concluded that the use of probiotics in dairy-based foods and beverages is preferable. As a result, the dairy industry is expanding practically in every country and continent. Non- dairy probiotics, which include fermented cereals, soy meat, fruits and vegetables are known for their flavour and refreshing nature. They are also high in minerals, vitamins and antioxidants.

Breej Mohan (FT7th)

7. Nutraceutical Gummies: A Novel Formulation to Dispense

Functional Nutrition:

Nutraceuticals are based on foods or components of foods that have a major role in altering and sustaining optimal physiological function in the human body. The distinction between food and medicine is being bridged by nutraceuticals. They possess the potential for enhancing nutrition, safety, and therapeutic outcomes. Nutraceuticals have attracted a lot of attention in recent years. Recently, processed foods with high functional nutrition value have become the prime focus of consumers concerning their healthy eating habits. The consumer trend has changed to favour food products that are providing HDL cholesterol, vitamins, dietary fibre, phytopigments, and minerals and are also facilitating by reducing the intake of calories and triglycerides. Nutraceutical gummies are agar-agar or gelatinous sugar-based formulations possessing Phyto-components having functional immunity, detox, sleep, digestion, lifestyle supplements and children's calcium requirements have all benefitted greatly from gummies.



Gummy nutrient supplements or Nutraceutical Gummies are more desirable among a class of population, owing to their aesthetic acceptance and delivery convenience. Gummies with nutritional supplements facilitate the dispensing of vital essential micronutrients to the generation of the 21st century that wants to maintain a healthy lifestyle with ease. A variety of lifestyle amendments viz. digestive health issues, general cardiac problems, micronutrient deficiencies and gut-microbiome issues can be supported with such formulations. In addition to vitamins and minerals, macronutrients like proteins, omega-3 fatty acids and DHA diets can also be supplemented. To increase the gummies' appeal to customers, a variety of active substances and plant-based or microorganism-based food additives can be added.

Dharminder (FT7th)

8. How Termite Mushrooms can aid in addressing Challenges of Food Security in India.



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In view of the same, the focus has to shift towards food types that can fulfill the hunger needs and nutrition requirements of large families in a cost-effective manner. One such food type is a fungus – *Termitomyces titanicus* (mushrooms). It is a gilled mushroom that belongs to genus *Termitomyces*, (Kamat, 2016). The mushrooms of this genus grow in symbiotic relationship with termites- *Odontotermes obesus*, *O. feae*, *O. brunneus*, etc., (Aanen et al, 2002).

Climatic conditions for *Termitomyces titanicus*:

Termitomyces titanicus requires cold temperature and high rainfall for its cultivation. It mainly grows in winter season with soil rich in carbon, nitrogen, magnesium and calcium. (*T. titanicus* report, 2023)

Nutritional Value and Health Benefits of *T. titanicus*

T. titanicus, being the largest mushroom species can be a boon to the entire family, as using one mushroom could fill the stomach of at least 15-20 members, which helps in reducing hunger in a cost-effective manner, particularly for large families. It is rich in nutrients and contains medicinal properties that can not only reduce the problems of malnutrition, but also properties that can not only reduce the problems of malnutrition, but also other diseases as mentioned above. *T. titanicus* can be a good substitute for low fat food stuffs



Harkomaljot Singh (FT7th)