INTERNATIONAL SOCIETY FOR MEDICINAL MUSHROOMS

国际药用菌学会

International Society for Medicinal Mushrooms （ISMM）was founded in Vancouver, Canada. As a global non-profit organization, ISMM promotes the development of research, education, production, transportation, marketing and cultivation of medicinal mushrooms to have people to work towards common aspirations and goals. The integration will increase the impact of the international medicinal mushroom industry and benefit the health of people in the world.

Honorable President: Prof. S.T.Chang, Prof.S.P. Wasser
President: Academician Li Yu
Executive President: Mr. Chen Hui
Secretary General: Mr. Liu Ziqiang

国际药用菌学会（International Society for Medicinal Mushrooms），简称ISMM，在加拿大温哥华注册成立，由从事药用菌产业的科研、教学、生产、流通、市场、文化及相关产业链的单位、团体和个人自愿组成的为实现共同意愿的非营利性国际组织。本学会致力于促进国际药用菌产业各个领域的融合与发展，以提升药用菌行业在全球的影响力，造福人类健康。

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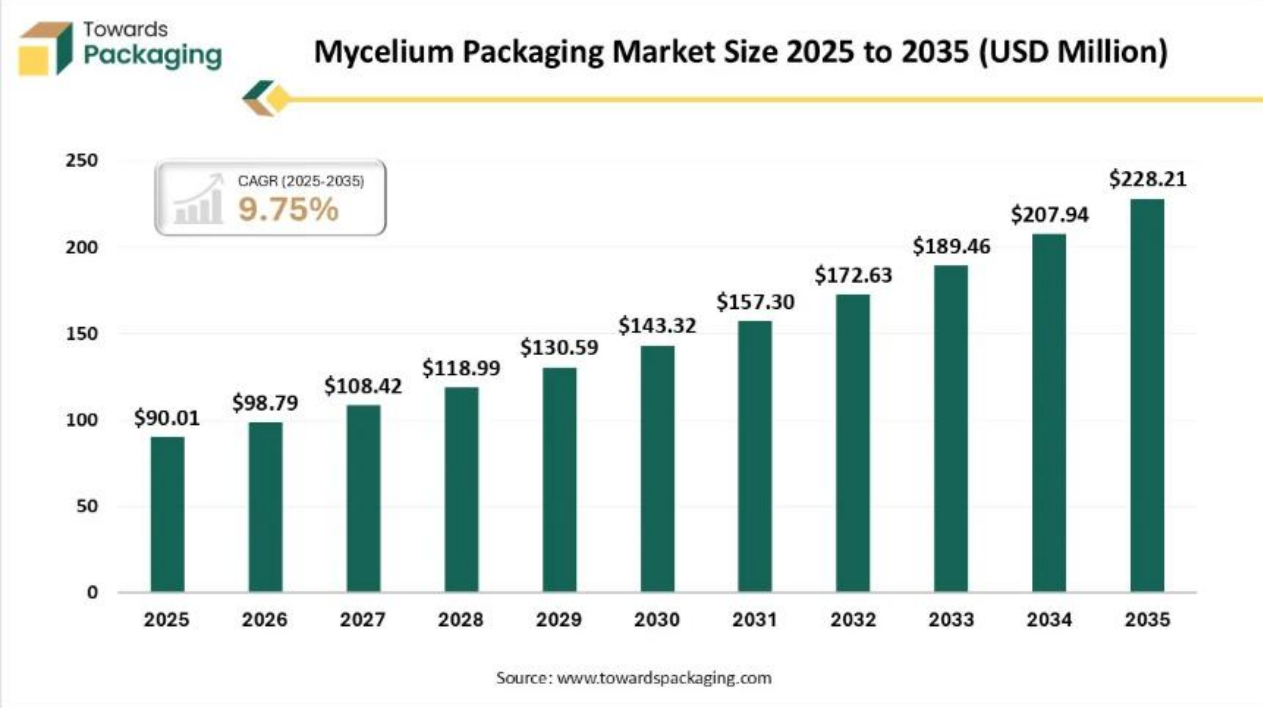
News Reports

Mycelium Packaging Market Size, Share, Production & Consumption Analysis, Sustainable Material Trends, Pricing Outlook, Eco-Friendly Packaging Demand, Competitive Landscape, and Global Forecast

The global mycelium packaging market, valued at USD 90.01 million in 2025, is anticipated to reach USD 228.21 million by 2035, growing at a CAGR of 9.75% over the next decade. In 2025, Asia Pacific led the market, with pure mycelium, cushioning, blocks, and consumer goods dominating, while from 2026–2035 North America, mycelium composites, bracing, sheets, and healthcare are set to grow fastest.

Mycelium Packaging Market Demand, Size and Growth Rate Forecast

The mycelium packaging market is forecasted to expand from USD 98.79 million in 2026 to USD 228.21 million by 2035, growing at a CAGR of 9.75% from 2026 to 2035. The growth of the market is predicted to develop quickly due to expanding factors such as a higher urge for biodegradable and sustainable alternatives to regular materials like leather, plastic, and traditional meat products.



Major Key Insights of the Mycelium Packaging Market

- In terms of revenue, the market is valued at USD 90.01 million in 2025.
- The market is projected to reach USD 228.21 million by 2035.
- Rapid growth at a CAGR of 9.75% will be observed in the period between 2026 and 2035.

- By region, Asia Pacific has dominated the global market by holding the highest market share in 2025.
- By region, North America is expected to grow at the fastest CAGR from 2026 to 2035.
- By product type, the pure mycelium packaging has dominated the market in 2025.
- By product type, the mycelium composite packaging will be developing at a main CAGR between 2026 and 2035.
- By function type, the cushioning segment dominated the market in 2025.
- By function type, the bracing segment will be growing at a significant CAGR between 2026 and 2035.
- By packaging format, the blocks segment dominated the market in 2025.
- By packaging format, the sheets segment expects the fastest growth in the market during the forecast period.
- By end use, the consumer goods segment dominated the segment in 2025.
- By end use, the healthcare segment will be developing at a main CAGR between 2026 and 2035.

What is Mycelium Packaging?

Mycelium is the latest sustainable packaging, which can substitute less environmentally friendly options, like polystyrene and plastic. It is an overall farm-developed and organic material created from the roots of a mushroom. The roots are grown around a mould to make a tailored design that carries products safely and proactively in transportation. As it is a completely natural product, mycelium decomposes any organic product, which leads to a toxic nature in the surrounding environment.

AI Use in Mycelium Packaging Industry

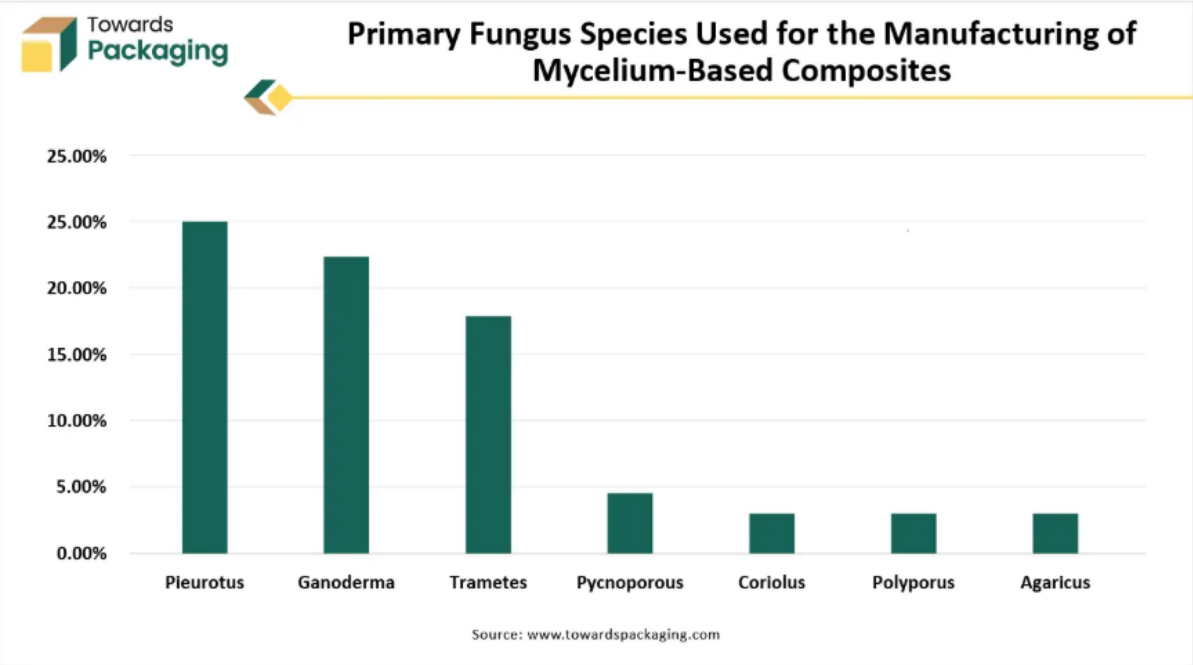
AI plays an important role in sustainable mycelium packaging, replacing plastic foams such as Styrofoam. The AI helps to refine the plastic foams' well-shaped design, as mycelium packaging highly contains agricultural waste with fungal roots. The AI suggest the apt material fusion and predicts environmental conditions for more growth in the industry.

Most of the mycelium packaging designers utilise generative AI to execute complicated shapes. Alongside, the experimental mycelium packaging adds AI-fuelled sensors to keep a check on product integrity and freshness to prevent spoilage.

Trends in Mycelium Packaging Market

- Polylactic Acid (PLA): It is one of the most prevalent compostable packaging materials, which is made out of fermented corn starch. It is clear, light, and is useful in usage as compostable food packaging containers and films.
- Cellulose: The materials that are made of cellulose are also very complicated in the industry. Such compostable packaging materials are created out of wood pulp and are hence biodegradable, moisture-resistant, and flexible; therefore, they are perfect for labelling and wrapping too.
- Food Packaging Trends: Plates, cutlery, and compostable stand-up pouches are increasingly being discovered in cafes, restaurants, and packaged food brands to display their commitment to the environment.
- Circular Economy: The transformation to the designs of the circular economy is one of the most encouraging aspects of compostable packaging dependency. Organizations are no longer matched with coverings that are to be thrown out, but instead are to be included back into the natural ecosystems.

Mycelium Composites



Technological Developments in the Mycelium Packaging Market

Mycelium -dependent materials are usually created from organic substrates, which are inexpensive, abundant, and frequently chosen as problematic waste. The studies have shown that development on cardboard, sawdust and paper waste, hay and coconut water, and agro-industrial residues like coffee chaff, coffee grubs, and cereal by-products, too.

Trade Analysis of Mycelium Packaging Market: Import & Export Statistics

- As per the global data, the globe has imported 6,132 shipments of mushroom packaging during the period June 2024 to May 2025.
- Such imports were being supplied by 767 exporters to a total of 903 worldwide buyers.
- During this period, in May 2025 alone, the globe imported 364 mushroom packaging shipments.
- The World has imported most of its mushroom packaging from Russia, China, and Vietnam.
- Worldwide, the leading three importers of the mushroom packaging are Vietnam, Russia, and Uzbekistan. Vietnam has topped the list with 6,820 shipments, followed by Russia with 3,906 shipments, and Uzbekistan, which has taken the third position with 1,226 shipments.

Mycelium Packaging Market - Value Chain Analysis

- Package Design and Prototyping: The packaging naturally has an organic, slightly designed, and off-white/beige look as the brands frequently develop to give importance to eco-friendly materials.
- Recycling and Waste Management: Mycelium products are naturally biodegradable, which lessens harmful substances in the environment without leaving behind anything toxic. Like plastics, which can take hundreds of years to decompose, mycelium packaging decomposes in a period of weeks, which shifts into nutrient-rich soil, which is advantageous to the earth.
- Logistics and Distribution: Like focused petrochemical plants, mycelium manufacturing is frequently decentralized. The facilities are being established near agricultural raw material sources, such as rice husks or hemp, to lower the carbon footprint of shipping heavy and low-value waste.

Segmental Insights

Product Type Insights

How Pure Mycelium Packaging Dominated the Mycelium Packaging Market in 2025?

Pure mycelium packaging has dominated the market in 2025, as it is the vegetative body of a filamentous fungi. It includes a dark three-dimensional link of microscopic tubes named a hyphae that fuse, branch, and weave with the help of organic substrates. As such, hyphae develop, they release enzymes like ligninases and cellulases, they broke down complicated biopolymers such as lignin and cellulose into simpler nutrients.

The mycelium composite packaging segment is predicted to witness the fastest CAGR during the forecast period. This packaging has been used for many eco-friendly advantages. It is a biodegradable solution and can be composted in a home setting, which avoids the demand for industrial composting design. The manufacturing procedure uses agricultural waste as a raw material, which is capable of lowering the amount of trash material and promoting circularity.

Function Type Insights

How Cushioning Segment Dominated the Mycelium Packaging Market in 2025?

The cushioning function has dominated the market in 2025, as eco-mushroom cushioning is the ideal sustainable alternative to regular packaging. It is made from renewable fungal mycelium and recycled materials, which are environmentally friendly materials, and are home compostable and eco-friendly too. They are durable and compatible, which protects the product surfaces from damage and scratches.

The bracing segment is predicted to witness the fastest CAGR during the forecast period. Mycelium packaging can conveniently be brought into various forms during the production procedure and hence can be used for transporting electronic devices as well as perfume bottles. The manufacturing is currently C02 -neutral at the time of shipping, as it provides maximum protection for the products. It is perfect, water-opposite at a shock absorption and even fire-opposite.

Packaging Formats Insights

How Blocks Segment Dominated the Mycelium Packaging Market in 2025?

The blocks segment has dominated the market in 2025 as organization that generates bio-blocks for construction applications use industrial presses in order to heat and compress their bricks, making them as rigid as concrete. Companies present around the globe are joining the mycelial movement, which develops the latest uses for fungi that point to synthetic leathers, biodegradable packaging materials, batteries, vegan bacon, and more.

The sheets segment is expected to witness the fastest CAGR during the forecast period. Myceen is a sustainable design and research object that concentrates on the growth of mushroom mycelium-based materials. Such compostable and carbon-negative materials are developed by integrating organic by-products and mycelium. Myco-material can capably substitute plastics, and it has issues with composites while updating other sectors left behind.

End-Use Insights

How the Consumer Goods Segment Dominated the Mycelium Packaging Market in 2025?

The consumer goods segment has dominated the market in 2025 as mycelium packaging startup goal is to substitute the highly polluting polystyrene and the recycling procedure is excessively costly and ineffective-those outcomes in the material which is being trashed in the landfills in which it is decomposed into an toxic microplastics. Additionally, they are sued to pack several consumer goods during logistics and in the sector.

The healthcare segment is expected to witness the fastest CAGR during the forecast period. Mushroom-dependent packaging materials are derived from mycelium networks that serve exceptional preventive elements for healthcare

shipping uses. Such materials serve as perfect cushioning elements while they decompose completely within a week of disposal. The cultivation procedure needs fewer resources and can use agricultural waste as a development medium, which provides additional environmental benefits.

Regional Insights

How Has Asia Pacific Dominated the Mycelium Packaging Market?

Asia Pacific has dominated the mycelium packaging market as it grows its huge agricultural industry, such as hemp, corn stalks, and rice husks, etc., as low-cost raw materials in order to develop mycelium packaging, which makes the business design highly revenue -smooth. In this region, there are strict bans on single -use plastics in countries such as India, China, and Japan, which are forcing a move towards biodegradable solutions.

India is using mycelium packaging market crucially, as growing government compulsions and bans on single-use plastics and non-biodegradable creations are forcing sectors to accept compostable alternatives. There is even high demand from millennial users and Gen Z users for environmentally friendly shipping, which is encouraging e-commerce giants to mix sustainable logistics.

North America expects the fastest growth in the market during the forecast period, because this region is witnessing a notable demand, which is driven by growing consumer awareness of health-conscious and sustainable products, expanded uses across different industries, and technological developments, too. Mycelium, which is the root-like structure of fungi, has gained importance as an evergreen biomaterial that has uses in construction, packaging, the food sector, and textiles. Besides, industry development is further fueled by assistive regulatory frameworks, by developing funding in terms of sustainable materials, and further acceptance of mycelium-based products among users and organizations.

The mycelium packaging market is growing in Canada, as this strong growth is associated with the developing focus on avoiding non-biodegradable packaging waste and aligns with government compulsion for sustainable alternative options. In Canada, mycelium packaging acceptance is gaining attention in e-commerce, consumer goods, and the food service industry. This classified potential of mycelium packaging in order to biodegrade naturally in weeks is a rigid differentiator as compared to plastics, which take centuries.

South America’s Advancement in the Mycelium Packaging Industry

South America’s advancement in this industry comes from the mixed involvement of Chile as an innovator, Argentina as a popular contributor, and Brazil, holding a massive amount of mycelium product sales. The agricultural unification via innovation expands agricultural engagement. The more agricultural integration more circularity there will be. The replacement for expanded polystyrene promotes the sustainable advancement of mycelium-related cushions. These cushions can be composted within weeks.

Europe’s Investment in the Mycelium Packaging Industry

Europe’s promising investments are tied to intelligent corporate alliances, EU programs and private venture capital initiatives. The investments focus on introducing biodegradable alternatives. The Horizon Europe program alone has secured billions to deliver financial help to circular bioeconomy projects. Alongside, the venture capital and private funding stimulate additional support for the industry. The giants like Myco, Biomyc and GROWN bio, with the help of regulatory intervention, introduced new innovations and technology to spur the industry growth.

Recent Developments

- In March 2026, the compostable bicycle seat with a wooden saddle is attracting more attention for its sustainability with the mycelium’s engagement expansion. With the use of computational tools, the wooden saddle spots the exact area of the mycelium that needs growth, ideal for the structure of the compostable bicycle seat.

- In March 2025, Mycelium producer Ecovative has raised USD 11M funding in its latest investment to complete the “explosive growth” of MyBacon, which is mycelium-dependent meat alternatives that are sold under its spinout brand named MyForest Foods.
- In October 2025, Saveggy, a Swedish food-tech company, developed an inventive solution to substitute plastic packaging for cucumbers. Such plant-based and edible prevention goals are to totally avoid plastic waste while storing manufactured fresh food for up to two weeks, which is the exact shelf life served by conventional plastic wraps.
- In March 2025, a Ukrainian startup company named S.Lab, which is being run by spouses Yuila Bialtska and Yevhen Tomilin, has made a biodegradable packaging created from industrial hemp stems and mushroom mycelium.
- In January 2025, Melati Foods revealed mycelium-based, sausage-style “breakfast patties” at a Sprouts Farmers Market in the United States.

Mycelium Packaging Market Supply Chain Analysis

Package Design and Prototyping

- Key Players – Grown.bio, Magical Mushroom Company and Ecovative Design.

Recycling and Waste Management

- Key Players – MycoWorks, Mogu and Dharaksha Ecosolutions.

Logistics and Distribution

- Key Players – Mushroom Packaging, Biohm and Fungi Solutions.

Top Companies in the Mycelium Packaging Market

- Ecovative Design LLC
- Mushroom Packaging LLC
- MycoWorks
- Grown.bio
- Magical Mushroom Company
- Paradise Packaging Company
- BioFab
- Mycotech Lab
- Loop Biotech
- Forager (Ecovative ecosystem)
- Reishi / MycoComposite
- Livin Farms
- Biohm
- Bolt Threads
- Mycelia BVBA
- MOGU (Italy)

- NoMy
- Libre Foods
- Atlast Food Co

Mycelium Packaging Market Segments Covered

By Product Type

- Pure Mycelium Packaging
- Mycelium Composite Packaging
- Mycelium Foam Packaging
- Others

By Function Type

- Cushioning
- Bracing
- Void Fill

By Packaging Formats

- Blocks
- Sheets
- Others

By End Use

- Food and Beverage
- Consumer Goods
- Healthcare
- Construction
- Others

By Region

- North America
  - U.S.
  - Canada
  - Mexico
  - Rest of North America
- South America
  - Brazil
  - Argentina

- Rest of South America
- Europe
  - Western Europe
  - Germany
  - Italy
  - France
  - Netherlands
  - Spain
  - Portugal
  - Belgium
  - Ireland
  - UK
  - Iceland
  - Switzerland
  - Poland
  - Rest of Western Europe
- Eastern Europe
  - Austria
  - Russia & Belarus
  - Türkiye
  - Albania
  - Rest of Eastern Europe
- Asia Pacific
  - China
  - Taiwan
  - India
  - Japan
  - Australia and New Zealand
  - ASEAN Countries (Singapore, Malaysia)
  - South Korea
  - Rest of APAC
- MEA

- GCC Countries
  - Saudi Arabia
  - United Arab Emirates (UAE)
  - Qatar
  - Kuwait
  - Oman
  - Bahrain
- South Africa
- Egypt
- Rest of MEA

Source: https://www.towardspackaging.com/

Up-coming Events

Dutch Mushroom Days

From 22–24 April 2026, the Brabanthallen in 's-Hertogenbosch will host the leading international trade fair for the mushroom industry. Meet key players, discover innovations and expand your global network.

Visitor Registration Now Open

Register on the website: https://champignondagen.nl/.

Why visit?

- Meet professionals from across the global mushroom industry
- Discover the latest market developments and technologies
- Exchange ideas, knowledge and experiences
- Strengthen your international network

Ambassador of the Mushroom Industry Award

In 2026, this special award will once again be presented to individuals who, through their exceptional dedication, have contributed to the positive development of the sector. You may nominate a candidate during the registration process.

Participate as exhibitor

The official exhibitor registration period has closed. If you are still interested in participating as an exhibitior, please contact us at info@champignondagen.nl We are happy to explore the possibilities with you to allocate the final remaining spaces.

Practical Information

- Parking information Brabanthallen
- Hotel accommodation

Source: https://champignondagen.nl/home-eng/

27th North American Mushroom Conference

The 27th edition of the North American Mushroom Conference will take place in Montreal, Canada, from June 4 to 6, 2026.

Start your engines! The 27th North American Mushroom Conference is racing to Montréal. This year's program is set to deliver two days of high-powered insights and connections. Join us as we explore the leading edge of mushroom cultivation, connecting with industry peers, and driving the future of our industry.

LOCATION

Immerse yourself in the vibrant culture of Montréal, a city renowned for its culinary scene and rich history. Our host venue, Le Centre Sheraton, is centrally located, offering easy access to all the conference activities and the city's attractions.

Le Centre Sheraton, 1201 René-Lévesque Blvd W, Montréal, Quebec H3B 2L7

WHY ATTEND?

Expert Insights: Learn from the best in the business. Our lineup of speakers includes industry leaders and experts sharing their knowledge on the latest trends and innovations.

Networking Powerhouse: Connect with colleagues, customers, and potential partners from across North America and beyond. This is your chance to build valuable relationships that will propel your business forward.

Innovation Showcase: Discover the latest technologies and advancements in mushroom cultivation in our EXPO hall.

THE 2026 EXPO WILL INCLUDE:

- 10' x 8' booth includes electrical service, pipe and drape, table, chairs, sign, and trash can
- Each EXPO space includes one (1) full Business Program Member Registration, valued at $1,100 USD
- EXPO Opening in conjunction with the Welcome Reception
- Breakfast and lunch buffets are served in the same ballroom as the EXPO
- Dedicated EXPO hours separate from the Business Program
- Light refreshments in the EXPO hall during EXPO hours

REGISTRATION

Registration Includes:

- Access to all business sessions and keynote presentations
- Admission to the trade show expo hall

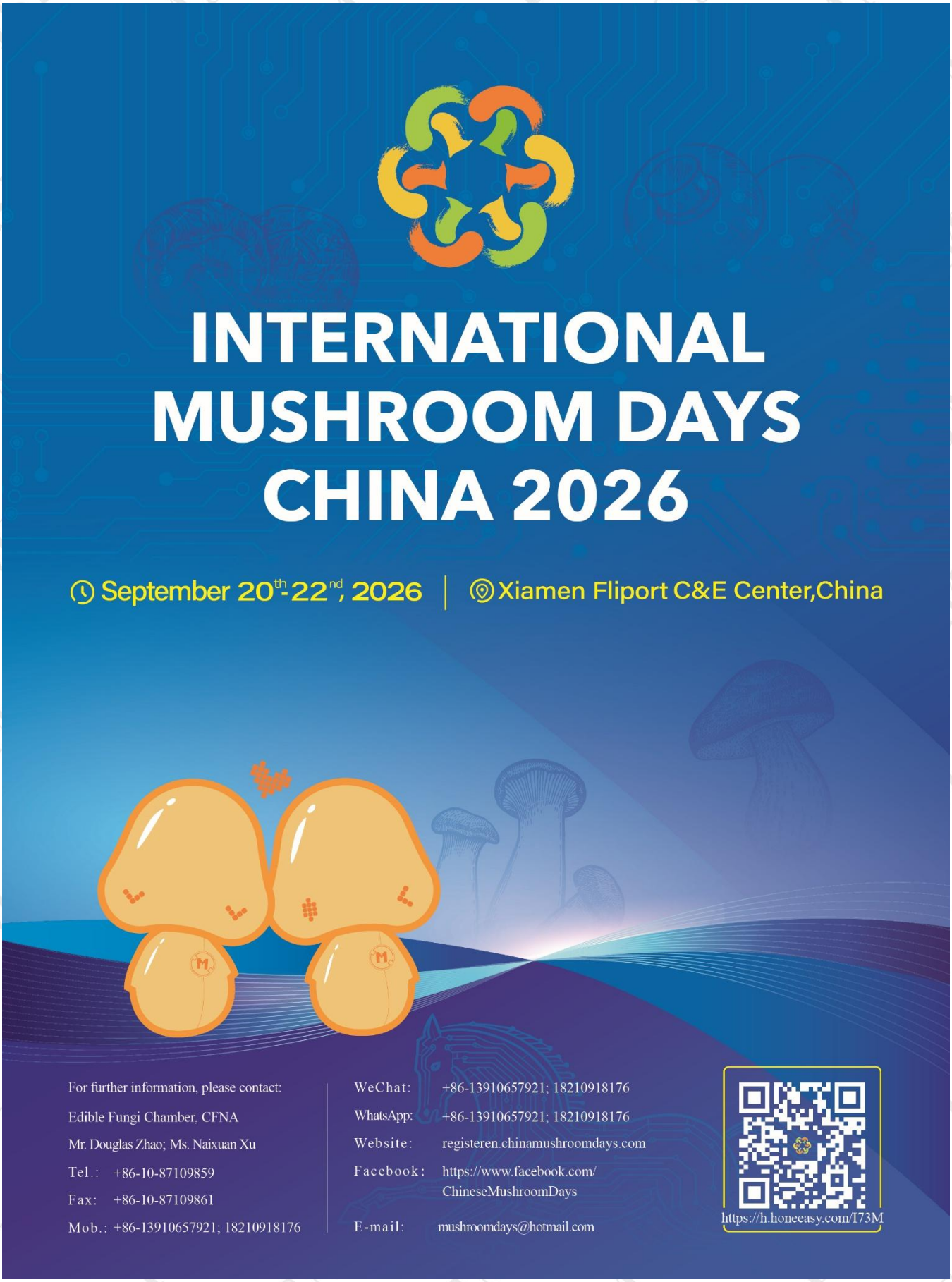
- Networking opportunities with industry professionals
- All scheduled meals
- Welcome reception and closing party

Registration fee:

- Member ($1,100.00)
- Non-Member ($1,600.00)
- Companion Member ($700.00)
- Companion Non-Member ($800.00)

Website: https://www.mushroomconference.org/

International Mushroom Days 2026



13th International Medicinal Mushroom Conference (IMMC13)

We are pleased to announce the upcoming 13th International Medicinal Mushrooms Conference (IMMC13), which will take place in the beautiful city of Bragança, Portugal, from 22 - 25 September 2026.

Under the theme *Medicinal Mushrooms for a Sustainable Future in Food & Health*, the conference will bring together researchers, representatives from the mushroom industry, and key stakeholders to share recent scientific advances and discuss current challenges and opportunities in unlocking the full potential of medicinal mushrooms for health, sustainability, and innovation.

ACCOMODATION

HOTEL SÃO LÁZARO

Avenida do Sabor, Lote 24. 5300-111 Bragança, Portugal. (+351) 273 310 070, reservas@exesaolazaro.com

HOTEL TULIPA

Rua Dr. Francisco Felgueiras nº 8-10. 5300-134 Bragança, Portugal. (+351) 273 331 675, reservas@hoteltulipa.com

For more, please visit conference website: 13th International Medicinal Mushroom Conference.

CONFERENCE TOPICS

- Sustainable Innovation in Mushroom
- Personalized Nutrition & Precision Medicine
- Therapeutic Potential of Psychedelic Mushrooms
- Microbiome-Mycotherapy Interactions
- AI & Omics in Medicinal Mushroom Research
- Climate Resilience via Ecosystem Services
- Cultural Heritage & Biocultural Conservation
- Public Health & Policy Applications
- Ethics, Safety & Regulatory Foresight
- Agro-food Systems & Circular Integration

REGISTRATION

Opening of registration: 1st January 2026

Early bird registration deadline: 15th May 2026

Closing date for registrations: 31st August 2026

*Individual registrations can ONLY be made by using the Official Platform.

Registration Platform: https://immc13.sci-meet.org/register/IMMC13

Registration Category	Early Bird Fee	Standard Rate Fee
Regular Attendees	600€	650€
PhD Students, Research Fellow*	300€	350€
Master Students and Research Fellow*	200€	250€
Accompanying Persons (with lunches)	350€	380€
Accompanying Persons (without lunches)	200€	250€
One-day Registration	200€	250€
Lower Income Countries	400€	400€

*Student registration forms must be accompanied by a signed letter from the Head of Department attesting to student status. The fees do not include accommodation costs.

ABSTRACT SUBMISSION

Abstracts are welcome in any of the following topics that are clustered by corresponding conference sub-themes.

Abstract Submission Deadline: 1st May 2026

Notification to authors of abstract acceptance (oral/poster): 31st June 2026

How to submit your abstract:

1. Register on the conference platform as participant using the following link.

2. Prepare your abstract using the official IMMC13 abstract template.

3. Please upload your abstract through the official Submission Platform by following these steps:

   a. Log in to the Conference Platform.

   b. In the *Participant Area*, select *My Publications*.

   c. Click on *New Submission*.

   d. A new window will open – please complete all required fields and attach your abstract file.

AWARDS

To recognize excellence and innovation, IMMC13 will include awards for the:

Best Poster Presentation

Best Oral Presentation

Best MushPitch

Detailed evaluation criteria for these awards will be announced shortly in the Awards Section of the conference website.

INVITATION TO SPONSORS

The Organizing Committee of the 13th International Medicinal Mushroom Conference (IMMC13) invites companies, institutions, and stakeholders to support this global event dedicated to scientific excellence, innovation, and sustainability in the medicinal mushroom field.

IMMC13 will gather leading researchers, industry experts, and professionals from around the world to share state-of-the-art advancements and strengthen collaboration between academia and industry.

Your participation as a sponsor will enhance your visibility, promote your brand, and reinforce your commitment to scientific progress and innovation.

CONTACTS

Conference Website: https://immc13.com/

Registration Platform: https://immc13.sci-meet.org/register/IMMC13

Participant Access Area: https://immc13.sci-meet.org/login

E-mail: info@immc13.com

Second Announcement of the 11th ICMBMP Oct. 13-17, 2026, Accra, Ghana

Second Announcement

The 11th International Conference on Mushroom Biology and Mushroom Products

Oct. 13-17, 2026

Accra, Ghana.

We are pleased to invite you to join us in Accra, Ghana, from October 13–17, 2026, for the 11th International Conference on Mushroom Biology and Mushroom Products (11th ICMBMP 2026). This milestone conference hosted for the first time on African soil will take place in Accra, Ghana under the theme ***"Fungal Frontiers: Mushrooms for Food Security, Health, and Sustainability."***

The 11th ICMBMP offers a unique opportunity for global experts to share the latest research and innovations in fungal biology, mushroom cultivation, functional food development, and sustainability. The conference will feature keynote lectures, scientific sessions, technical presentations, posters, exhibitions, and field visits, complemented by rich cultural programming.

The 11th ICMBMP meetings will foster vibrant scientific exchange and multi-sectoral collaboration among researchers, entrepreneurs, educators, policymakers, and development partners. This edition will showcase Africa's growing contributions to mushroom science and catalyze cross-continental partnerships for transformation.

Organizers of the 11th ICMBMP 2026

World Society for Mushroom Biology and Mushroom Products (WSMBMP)

CSIR-Food Research Institute (CSIR-FRI), Ghana

Accra Technical University (ATU), Ghana

Ho Technical University (HTU), Ghana

Co-organizers

Ministry of Environment Science and Technology (MEST), Ghana

Ministry of Food and Agriculture (MoFA), Ghana

University of Ghana, Institute for Environment and Sanitation Studies (IESS), Ghana

Institute of Edible Fungi, Shanghai Academy of Agricultural Sciences (SAAS), China

National Engineering Research Center of Edible Fungi, China

Mushroom Branch of the Chinese Agricultural Society (MBCAS), China

International Society for Mushroom Science (ISMS)

Organizing Committees of the 11th ICMBMP

WSMBMP Executive Committee

Qi Tan (China)

András Geösel (Hungary)

Manjit Singh (India)

Jingsong Zhang (China)

Johan Baars (Netherlands)

Yoichi Honda (Japan)

Mary Obodai (Ghana)

Hui Chen (China)

Local Organizing Committees:

Scientific Committee

Finance and Sponsorship Committee

Technical and Logistics Committee

Publicity and Marketing Committee

Social Committee

Secretariat

Language

Working languages for the conference are English, French and Chinese. Simultaneous translation will be provided for conference oral presentations.

Scientific Program

The 11th ICMBMP will incorporate the latest advances in mushroom biology and mushroom products through keynote lectures, oral presentations, poster displays, and technical workshops.

Panel topics will include:

1) Biodiversity, Systematics, and Taxonomy;

2) Omics and Bioinformatics;

3) Genetics, Breeding and Engineering;

4) Physiology, Developmental Biology and Mushroom Cultivation;

5) Myco-Molecules: Nutritional and Therapeutic Potential;

6) Processing Technologies;

7) Pest and Disease Management;

8) Product Quality, Safety, and Regulation;

9) Mushroom Economics, Culture, and Policy

Registration

All registered participants will have access to the full scientific program, the mushroom innovation expo, field excursions, conference materials, and networking events. Registration includes the conference kit, program booklet (E copy), book of abstracts, and access to proceedings.

Online registration will be available at https://icmbmp11.foodresearchgh.org.

Registration rates are as follows:

Regular Participant: 500 USD before (including) July 31, 2026; 600 USD after July 31, 2026

Student*: 300 USD before (including) July 31, 2026; 400 USD after July 31, 2026

Accompanying Guest#: 400 USD

* Proof of student status is required upon registration

Accompanying Guest registration includes access to cultural events and the exhibition hall.

Refund Policy: Full refunds (less 50 USD administration fee, excluding bank charges) will be issued for cancellations received by Aug 15, 2026. A 50% refund applies for requests received by Sep 15, 2026. No refunds after that date.

Call for Abstracts and Papers

Participants are invited to submit abstracts for oral or poster presentations. Full papers may also be submitted for consideration in the conference proceedings.

Abstracts should include the title, authors, affiliations, and a 300–350 words summary of the research. Full manuscripts should follow standard scientific format.

Submission Timeline:

- 1st Call for Abstracts & Papers: November 1, 2025
- 2nd Call for Abstracts & Papers: February 1, 2026

- Abstract Submission Deadline: April 30, 2026
- Notification of Acceptance (Oral/Poster): May 31, 2026
- Full Paper Submission Deadline (for Proceedings): June 30, 2026
- Late-Breaking Abstracts (selected sessions only): August 15, 2026

Submissions should be made online via the Abstract Submission Portal.

For formatting guidelines, please refer to **"Directions for Abstract and Research Article"** at [https://icmbmp11.foodresearchgh.org].

Accommodation

Special conference rates will be available through the official registration portal at [https://icmbmp11.foodresearchgh.org]. Early booking is strongly encouraged due to limited availability.

Contact

Secretariat, 11th ICMBMP 2026

CSIR–Food Research Institute

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World Society for Mushroom Biology and Mushroom Products (WSMBMP)

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Research progress

Effect of ribavirin treatment on the nutritional quality and volatile compounds of shiitake mushrooms

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Abstract: This study examined the effect of ribavirin treatment on the nutritional quality and volatile compounds of shiitake mushrooms (*Lentinula edodes* 9608). Compared to the control (CK) group, the ribavirin-treated (TL) group had higher protein levels, calcium, magnesium, and manganese, but lower sodium-to-potassium ratio. Amino acid content was lower in the TL group. A total of 54 volatile compounds were identified, with alcohols, ketones, and aldehydes being the most common. Key flavor compounds, like 1-octen-3-ol and 3-octanol, were significantly higher in TL mushrooms. Spearman's correlation analysis revealed a negative correlation between certain nutrients and specific volatile compounds. Gene expression studies further revealed significant changes in genes related to mycelial growth, amino acid metabolism, fatty acid oxidation, and volatile compound production, offering valuable insights into the mechanisms of flavor formation and quality enhancement in shiitake mushrooms.

Food Control. Volume 183, May 2026, 111916

https://doi.org/10.1016/j.foodcont.2025.111916

Effects of *Ganoderma-lucidum*-fermented sugarcane bagasse–soybean residue substrate on the quality and starch digestibility of steamed bread

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Abstract: Sugarcane bagasse and soybean residue are underutilized agricultural byproduct rich in dietary fiber. This study evaluated how fermentation of a sugarcane bagasse–soybean residue substrate with *Ganoderma lucidum* (FMSB) affects the quality and in vitro digestibility of steamed bread. The results revealed significant enhancements in enzymatic activities within FMSB, with xylanase, carboxymethyl cellulase, filter paper cellulase, and laccase showing

increases of 117.9%, 96.3%, 140.3%, and 1566.9%, respectively. Degradation rates of the key structural components—cellulose, hemicellulose, and lignin—attained 27.5%, 42.2%, and 15.8%, respectively. Furthermore, substantial increases were observed in crude polysaccharide, flavonoidand and polyphenol contents, with increments of 272.27%, 43.02% and 28.81%, respectively. FMSB addition increased the storage modulus (G'), indicating improved dough rheological properties. When FMSB is incorporated into steamed bread, it promoted ordered molecular rearrangement of starch and the formation of a gel network encapsulating starch granules, thereby limiting starch swelling and modulating in vitro digestibility (at 6 % substitution, the predicted glycemic index (PGI) of steamed bread decreased by 7.06 % ($p < 0.05$)). Overall, this study provides a theoretical basis for the value-added utilization of sugarcane bagasse–soybean residue substrate(SB-SR) and developing nutritious staple foods.

Keywords: Sugarcane bagasse, Soybean residue, Lignocellulosic constituents, Steamed bread, In vitro starch digestibility

LWT. Volume 245, 1 April 2026, 119185

https://doi.org/10.1016/j.lwt.2026.119185

Valorization of spent mushroom substrate (SMS) combined with Bermuda grass for improved oyster mushroom (*Pleurotus florida*) yields

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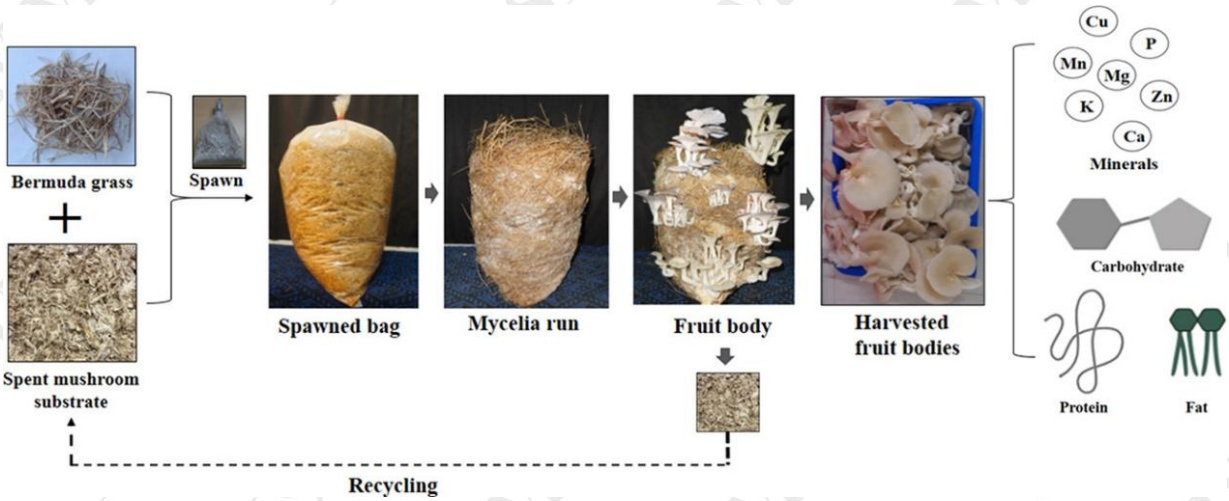
Abstract: Oyster mushroom requires a suitably rich combination of substrate and supplements to enhance the quality and nutrients of the fruiting bodies. The *Pleurotus florida* was grown on Bermuda grass (BG) and spent mushroom substrate (SMS) in distinct combinations: BG (100%), SMS (100%), BG + SMS (90% + 10%), BG + SMS (80% + 20%), BG + SMS (60% + 40%), and BG + SMS (50% + 50%). Complete mycelial run (CMR), pinhead initiation (PHI), first harvest (FH), flush-I, flush-II, flush-III, yield, biological efficiency (BE), and proximate composition of fruiting bodies were investigated. The BG + SMS (80% + 20%) substrate sets had the fastest CMR (16 d), PHI (19 d), and FH (23 d). Mushroom yield (1711 g) and BE (336.4%) were the highest with BG + SMS (80% + 20%) combos, which were respectively 762 g and 146.6% greater than control. The greatest values of both carbohydrate (48%) and protein (7.04%) were in the BG + SMS (90% + 10%), while the highest amount of fat (0.47%) was in the fruiting bodies of the BG + SMS (50% + 50%) combination. Fruiting bodies from the BG + SMS (50% + 50%) exhibited the highest K (1621), Cu (0.82), P (1196), Zn (20.5), Mg (138), Mn (8.5) and Ca (5.4) mg/100 g. The demonstrated findings of this study are recommended for significant and ecosystem-friendly valorization of SMS through valuable recycling by means of mushroom cultivation.

Graphical abstract



Bioresource Technology Reports. Volume 34, June 2026, 102674

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Mushrooms as Future Food: A Production-System and Recipe-Level Life Cycle Assessment for Sustainable Diets

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Abstract: Food systems must evolve to remain within planetary boundaries, and mushrooms offer a low-impact, circular alternative, yet evidence from real production systems remains scarce. Here, we present the first production-system life cycle assessment (LCA) of commercial Danish mushroom cultivation, combined with a recipe-level application LCA to evaluate downstream dietary implications. The production assessment quantifies environmental hotspots across production, packaging, and distribution, while the recipe-level analysis examines the potential of mushroom-based dishes to reduce meal-level impacts in an institutional kitchen. The findings show that mushroom production exhibits concentrated environmental hotspots, and that reuse of spent mushroom substrate (SMS) can reduce overall impacts by nearly 40%. Substituting meat with mushrooms lowers dish-level emissions, typically exceeding 40% reductions, with mushroom-only falling within planetary-boundary targets. Packaging, particularly moulded fibre-based formats, remains a significant contributor to overall impact. Overall, the study identifies mushrooms as a low-impact, circular food that can substantially reduce both production- and meal-level emissions, positioning them as a practical lever for climate-aligned institutional diets.

Keywords: Life Cycle Assessment (LCA), Mushroom production, Food packaging, Circular bioeconomy, Spent mushroom substrate (SMS), Planetary boundaries

Cleaner Food Systems. Available online 17 March 2026, 100024

https://doi.org/10.1016/j.clfs.2026.100024

Lion's Mane Medicinal Mushroom *Hericium erinaceus* (Agaricomycetes) Polysaccharides for Improved *In Vitro* Probiotic Growth, Adhesion, Antioxidant Activity, and Cryoprotective Properties

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Abstract: *Hericium erinaceus*, commonly known as lion's mane mushroom, is a rare edible and medicinal fungus that is highly valued in both the culinary and medical fields. Its primary bioactive component, polysaccharides, holds significant therapeutic potential, particularly in healthcare. This study investigates the prebiotic effects of crude polysaccharides extracted from *H. erinaceus* on various probiotic strains. Three distinct fractions of crude polysaccharides, HEP-30, HEP-50, and HEP-80 were obtained through fractional precipitation using 30%, 50%, and 80% (v/v) ethanol concentrations from hot water-soluble extracts. The effects of the polysaccharide extracts on probiotic growth, adhesion, antioxidant activity, and cryoprotective properties were evaluated *in vitro*. Of the HEP fractions, HEP-80 contains the highest amounts of protein, total sugars, and reducing sugars. Galactose is the predominant monosaccharide in all HEP fractions. The polysaccharide extract exhibited antioxidant activity by inhibiting DPPH free radicals across all three tested concentrations, with an average IC_{50} value of 10.189 mg/mL. HEP-80 significantly enhanced the growth of all three probiotic strains compared with an unsupplemented control group. HEP-80 at a concentration of 50 µg/mL increased the adhesion of *Lactiplantibacillus plantarum* strain L47-2 by up to 30%. Furthermore, HEP compounds demonstrated cryoprotective properties, resulting in over 70% survival of *L. plantarum* strain L47-2 after 90 days of storage at −20°C following freeze-drying. *H. erinaceus*-derived crude polysaccharides hold promise as both prebiotics and cryoprotectants, making them a potentially valuable functional ingredient for use in food products.

Keywords: *Hericium erinaceus, H. erinaceus* polysaccharides (HEPs), prebiotics, lactic acid bacteria, medicinal mushrooms

International Journal of Medicinal Mushrooms, Volume 28, Issue 2, 2026, pp. 47-61

DOI: 10.1615/IntJMedMushrooms.2025061287

Evaluation of F_0-based sterilization for microbial safety and mycelial growth of enoki mushroom (*Flammulina velutipes*) substrate

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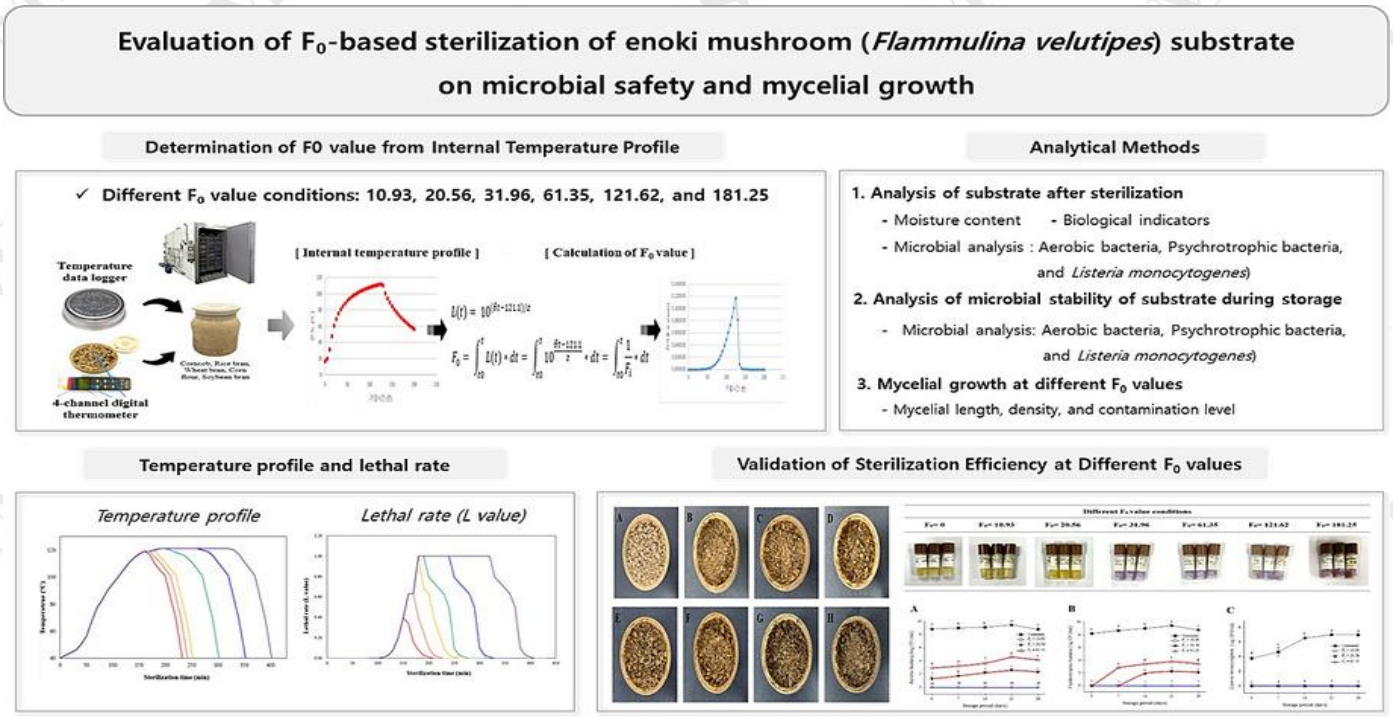
Abstract: Sterilization of enoki mushroom (*Flammulina velutipes*) substrate is a critical step to ensure both microbial

safety and optimal mycelial growth for mushroom production. In this study, the substrates were heat treated with various F_o values ranging from 10.93 to 181.25 and evaluated for physicochemical properties such as moisture content, mycelial growth, and microbial safety. The optimal sterilization range for ensuring microbial safety and mycelial growth was F_o values of 31.98–121.62. F_o values lower than 31.98 allow bacteria to re-grow during mycelial cultivation, increasing the risk of contamination and inhibiting mycelial growth. In contrast, excessive sterilization at F_o = 181.25 caused moisture loss and substrate charring, inhibiting mycelial growth. These findings indicate the importance of optimizing sterilization parameters to balance microbial inactivation and efficient mycelial growth in mushroom cultivation, providing practical guidance for optimizing sterilization conditions in commercial mushroom cultivation. Moreover, this approach may also help minimize the risk of microbial contamination and ensure the high quality and microbial safety of the mushroom product.

Graphical abstract



Food Research International. Volume 233, Part 1, 1 June 2026, 118932

https://doi.org/10.1016/j.foodres.2026.118932

Immunomodulatory Effects of Medicinal Mushroom Extracts in the Sensitized Human Keratinocyte Cell Line NCTC2544

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Abstract: Contact dermatitis (CD) is a common skin condition characterized by inflammation caused by exposure to allergens. In Malaysia, it accounts for a significant portion of skin diseases, with irritant contact dermatitis being the most prevalent type. *Lignosus rhinocerus* and *Ophiocordyceps sinensis* are medicinal mushrooms known for their immunomodulatory properties and therapeutic potential in autoimmune diseases. This study aimed to investigate the immunomodulatory effects of cold-water extracts from *O. sinensis* cultivar OCS02® (xOs™) and *L. rhinocerus* TM02® cultivar (xLr®) on p-phenylenediamine (PPD)-sensitized NCTC 2544 keratinocytes, a well-established, non-tumorigenic keratinocyte model commonly used for allergenicity and irritation testing. Cytotoxicity, cytokine expression, reactive oxygen species (ROS) levels, and lipid peroxidation were assessed following extract treatment. The results showed that xLr® at 1 mg/mL exhibited no observed adverse effect level (NOAEL), while xOs™ had a half-maximal inhibitory concentration (IC_{50}) of 650 µg/mL in NCTC 2544 keratinocytes. Conversely, PPD, a known sensitizing agent, inhibited NCTC 2544 cell growth, with an IC_{50} of 17.7 µg/mL. Both xLr® and xOs™ (at 250 µg/mL) significantly downregulated ROS levels, membrane lipid peroxidation, and the expression of interleukin (IL)-18 and IL-6 in PPD-sensitized keratinocytes ($P < 0.05$). This study highlights the anti-inflammatory and cytoprotective properties of xLr® and xOs™, suggesting their potential application in managing inflammatory conditions in PPD-sensitized keratinocytes. Furthermore, their immunomodulatory effects on cytokine production indicate a promising role in alleviating diseases associated with chronic inflammation and immune dysfunction. In conclusion, xLr® and xOs™ may have therapeutic potential as immunomodulatory agents for treating CD.

Keywords: *Ophiocordyceps sinensis* OCS02®, cultivar, *Lignosus rhinocerus* TM02®, cultivar, contact dermatitis, IL-6, IL-18, medicinal mushrooms

International Journal of Medicinal Mushrooms, Volume 28, Issue 3, 2026, pp. 1-10

DOI: 10.1615/IntJMedMushrooms.2025061740

Mushroom-based high-efficiency solar evaporator for water harvesting

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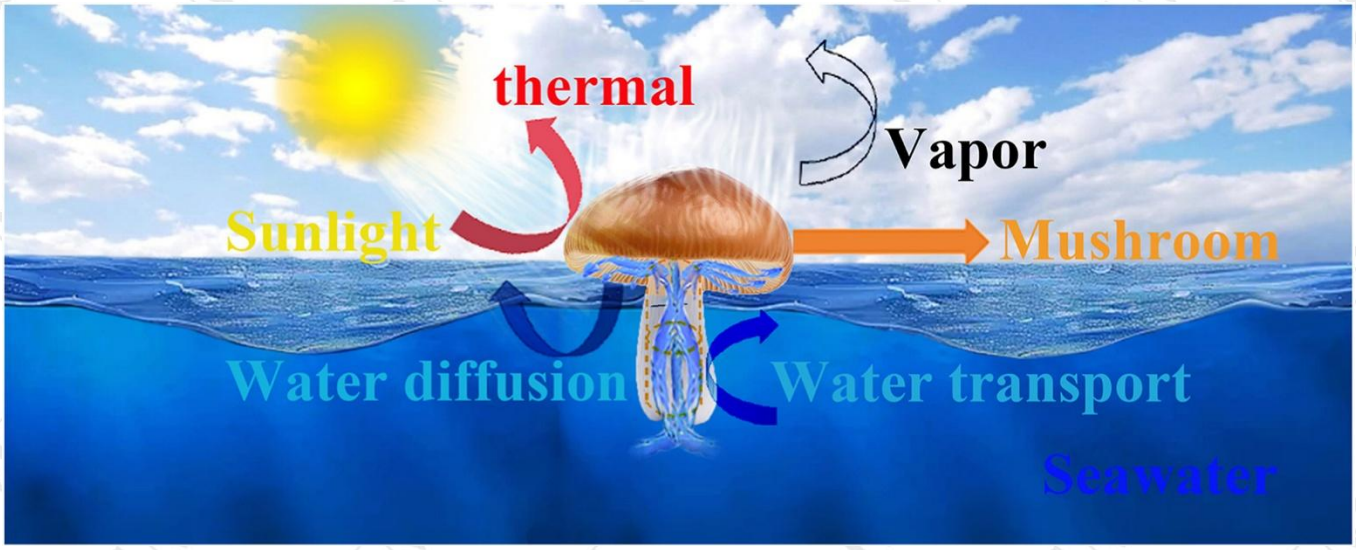
Abstract: Solar-driven interfacial evaporation represents an innovative and highly promising strategy to address global freshwater scarcity and enhance water purification technologies. The distinctive structure of natural mushrooms, comprising a pileus and stipe, offers a feasible pathway for designing efficient and low-cost solar evaporators. In this

work, natural mushrooms were employed as solar evaporators to evaluate their performance in evaporating seawater and sewage. Under 3.9 suns illumination, evaporation rates of 4.89, 4.57, and 3.73 $kg \cdot m^{-2} \cdot h^{-1}$ were achieved for sewage, deionized water, and seawater, respectively. Under natural sunlight conditions (0.5 sun), the mushroom evaporator attained rates of 2.62 and 2.13 $kg \cdot m^{-2} \cdot h^{-1}$ for sewage and seawater, respectively. The mushroom-based evaporator demonstrates not only exceptional photothermal conversion performance but also remarkable cycling stability and durability.

Graphical abstract



Keywords: Solar-driven interfacial evaporation, Mushroom, High efficiency, Sewage, Seawater

Green Energy and Resources. Volume 4, Issue 1, March 2026, 100162

https://doi.org/10.1016/j.gerr.2025.100162

Nutritional content assessment of selected wild edible mushroom species and its comparison to cultivated mushroom species in Tanzania

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Abstract: Wild mushrooms are recognised for their nutritional and economic importance; however, their potential in Tanzania remains undocumented and underutilised. The present study assessed the nutritional composition of wild and cultivated mushroom species, the impacts of drying on nutrient retention, and the integration of indigenous species into local food systems. We studied seven (7) mushroom species, i.e., five wild edible species (*Cantharellus symoensii, Cantharellus afrocibarius, Amanita loosei, Lactarius kabansus,* and *Lactarius xerampelinus*) and two cultivated varieties

(*Pleurotus ostreatus* and HKP Uyole). Samples were collected from Mlele Forest in the Katavi Region and the Mbeya Region. Proximate analyses were conducted on fresh and dried samples to determine moisture, protein, fat, fibre, ash, and carbohydrate contents. Wild mushrooms exhibited higher nutritional value, with protein content reaching up to 38.6%, crude fibre up to 17.6%, and total ash up to 14.1% compared to cultivated varieties. Higher moisture content (90–92%) in wild mushrooms led to rapid spoilage and shorter shelf life (from hours to 4 days). Drying significantly extended shelf life of mushrooms and retains most nutrients, although some reduction in protein content was observed. This study uniquely integrates nutritional profiling, processing effects, shelf-life analysis and taxonomic documentation to highlight species-specific differences between wild and cultivated edible mushrooms in Tanzania and contributes evidence to inform food security and nutrition strategies.

Keywords: Proximate composition, Food preservation, Indigenous knowledge, Dietary diversification, Tanzania

Food Chemistry Advances. Volume 11, June 2026, 101274

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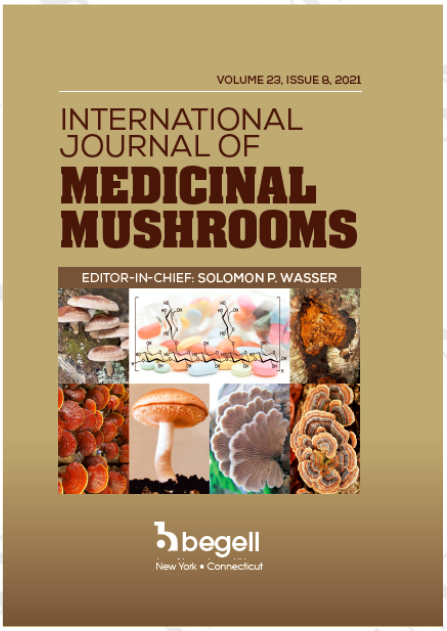
International Journal of Medicinal Mushrooms Call for Papers



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International Journal of
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2026, Vol. 28, Issue no.4

Points and Reviews

The Role of Medicinal Mushrooms in Cancer Treatment: Bioactive Compounds and Therapeutic Potential (Part II)

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Orgainal Published on International Journal of Medicinal Mushrooms, 2025, Vol. 27, Issue no.12

ABSTRACT: In recent years, research on the therapeutic potential of mushroom species has notably expanded, and the effects of these organisms on cancer treatment have come to the forefront. The present review examines the anticancer and antitumor effects of various edible and medicinal mushroom species on different human cancer cell lines and summarizes the biological mechanisms underlying these effects. The reviewed studies show that polysaccharides (particularly β-glucans), triterpenoids, phenolic compounds, protein-polysaccharide complexes and other bioactive components contained in mushrooms are effective on apoptosis induction, cell cycle arrest, activation of the immune system, reduction of oxidative stress, inhibition of metastasis and angiogenesis. *In vitro* and *in vivo* studies, especially on species such as *Ganoderma lucidum*, *Cordyceps militaris*, *Lentinula edodes*, *Hericium erinaceus*, and *Grifola frondosa*, have shown that these mushrooms exhibit significant cytotoxic, antiproliferative, and immunomodulatory effects against various types of cancer (including breast, colon, lung, liver, prostate, cervical, etc.). These findings indicate that mushroom-derived natural products should be evaluated not only as adjunctive therapies, but also as potential pharmaceutical agents. However, most of the available data are at the preclinical level, and more comprehensive toxicological and pharmacokinetic studies are needed to ensure clinical applicability.

KEY WORDS: medicinal mushrooms, bioactive compounds, anticancer activity, immunomodulation, apoptosis, cancer cell lines

ABBREVIATIONS: ACP, *Agrocybe cylindracea* fucoglucogalactan; **AR**, androgen receptor; **A549, H-1299**, lung carcinoma; **BEAS-2B**, human bronchial epithelial cells; **BEP**, purified acidic polysaccharide; **BRMs**, biological response modifiers; **Caco-2, HCT 116**, colon carcinoma; **CCD 841 CoTr**, colon epithelial cells; **CH72**, murine skin carcinoma; **CMPs**, *C. militaris* polysaccharides; **CTSD**, cathepsin D; **DHT**, dihydrotestosterone; **EAC**, Ehrlich ascites carcinoma; **EPS**, extracellular polysaccharide; **ET**, Ehrlich tumor; **GR**, glucocorticoid receptor; **GSSG/GSH**, total glutathione; **G6PD**, glucose-6-phosphate dehydrogenase; **HCC**, hepatocellular carcinoma; **HeLa, SiHa, CaSki**, cervical carcinoma; **HepG2**, human liver hepatoblastoma; **Hep3B, HUH-7**, human hepatoma; **HEP-2**, larynx carcinoma; **HL-60, T-4**, leukemia; **HPAF-II, PL45**, human pancreatic adenocarcinoma; **HT-29, LS180, SW948**, human colorectal cancer; **IL-2**, interleukin-2; **IMR-32**, human neuroblastoma; **IPS**, intracellular polysaccharide; **iNOS**, inducible nitric oxidesynthase; **Jurkat**, human acute T-cell leukemia; **KB**, oral cavity cancer; **MCF-7, MDA-MB231, MDA-MB468, BT-20, KAIMRC1**, breast adenocarcinoma; **MDR**, multidrug resistance; **MDSCs**, myeloid-derived suppressor cells; **MHH-ES1, S-180**, sarcoma; **MMPs**, matrix metalloproteinases; **MT-1, 4T1, ZR-75-30**, breast cancer; **NCI-H187**, small lung cancer; **NK**, natural killer; **NO**, nitric oxide; **PC-3, DU-145, LNCaP**, human prostate cancer; **PD-L1**, programmed death-ligand 1; **P-gb**, P-glycoprotein; **PRDX1**, peroxiredoxin 1; **PSK**, polysaccharide-K; **PSP**, polysaccharide peptide; **RNA**, ribonucleic acid; **ROS**, reactive oxygen species; **SOD**, superoxide dismutase; **SPR**, surface plasmon resonance; **SPS**, sulfated polysaccharides; **SW-480, LS174, HCT-15, COLO-205**, colon cancer; **TFPS**, high-molecular-weight polysaccharides; **TNF—α**, tumor necrosis factor-α; **U87, SF-295**, glioblastoma; **U937**, monocytic cell line

Continued from previous issue

M. *Fomitopsis pinicola* (Sw.) P. Karst.

Fomitopsis pinicola (Family: Fomitopsidaceae) is a medicinal mushroom traditionally used for the treatment of ailments such as headache, nausea, and liver disorders. Recent scientific investigations have revealed its significant anticancer and antitumor potential, driven by various bioactive compounds, including polysaccharides, triterpenoids, and sterols. A 2021 study identified that ethyl acetate extracts rich in11-α-acetoxykhivorin displayed strong anticancer activity by inducing G1 phase cell cycle arrest, apoptosis, and inhibition of angiogenesis, leading to the suppression of tumor growth in cancer models.[57] Earlier, extracellular (EPS) and intracellular polysaccharides (IPS) extracted from *F. pinicola* were foundto exhibit potent antioxidant activities, capable of reducing cellular damage caused by free radicals, suggesting a protective role against oxidative stress-mediated carcinogenesis.[58] *In vivo* experiments in S-180 sarcoma-bearing mice demonstrated that ethanol extracts of *F. pinicola* inhibited tumor growth by 54% and prolonged survival. These effects were associated with apoptosis induction in cancer cells.[59] Furthermore, ergosterol, a sterol compound isolated from *F. pinicola*, showed a pro-apoptotic activity and effectively inhibited cell migration in SW-480 human colorectal cancer cells, indicating its role in both tumor suppression and metastasis inhibition.[60] Collectively, extracts and compounds from *F. pinicola* exert anticancer effects through multiple mechanisms, including cell cycle arrest, apoptosis induction, anti-migratory activity, and antioxidant defense enhancement, highlighting its potential as a multifunctional naturaltherapeutic agent.

N. *Fomitopsis officinalis* (Vill.) Bondartsev & Singer (Old Name: *Fomes officinalis* (Vill.) Bres.)

Fomitopsis officinalis (Family: Fomitopsidaceae), commonly referred to as "agarikon," is a medicinal mushroom historically used in traditional remedies for a variety of ailments. In recent years, its anticancer and antitumor properties have been extensively studied, particularly concerning its polysaccharides and bioactive metabolites, which influence tumor progression through multiple biological pathways. A 2024 study investigated FOBP90-1, a homogeneous heteropolysaccharide isolated from *F. officinalis*, with a molecular weight of 28.7 kDa. In zebrafish tumor models, FOBP90-1 significantly inhibited tumor growth by promoting immune system activation and angiogenesis suppression. Mechanistically, its antitumor effects were linked to interactions with immune and tumor-associated receptors, including TLR-2, TLR-4, PD-L1, and VEGFR-2, suggesting a multi-target engagement.[61] In another study, a structurally distinct polysaccharide, FOP80-1, with a molecular weight of 4.5 kDa, was isolated and tested in HepG2 cells and zebrafish models. FOP80-1 was shown to inhibit proliferation, invasion, and metastasis, while inducing ROS accumulation, G0/G1 cell cycle arrest, and apoptosis. It also exhibited anti-angiogenic activity, with surface plasmon resonance (SPR) assays confirming high-affinity binding to VEGF, highlighting its potential role in targeting tumor vascularization.[62] Additionally, a study assessing six different solvent fractions of *F. officinalis* identified the chloroform extract (Fo3) as the most potent. Fo3 selectively promoted apoptosis in HepG2 and LO2 hepatocellular carcinoma cells, induced G2/M cell cycle arrest, and activated NF-KB signaling pathways, suggesting both pro-apoptotic and immune-regulatory mechanisms.[63] Overall, *F. officinalis* exerts robust antitumor effects through a range of mechanisms, including immune system activation, angiogenesis inhibition, cell cycle regulation, and induction of apoptosis, supporting its potential as a multifaceted agent in cancer therapeutics.

O. *Grifola frondosa* (Dicks.) Gray

Grifola frondosa (Family: Grifolaceae), commonly known as maitake, is a widely recognized medicinal mushroom used in traditional medicine for its immunomodulatory and antitumor properties. Recent scientific research has focused on the polysaccharide fractions of this species, which exhibit both direct cytotoxic effects on tumor cells and indirect immune-mediated antitumor activity. A 2024 study demonstrated that a purified polysaccharide known as GFI significantly inhibited tumor growth in a breast cancer mouse model. GFI treatment reduced the levels of myeloid-derived suppressor cells (MDSCs) in blood and tumor tissues and enhanced the activity of CD8+ T cells, indicating improved antitumor immunity through suppression of immunosuppressive cell populations.[64] In earlier research, *G. frondosa* polysaccharides (GFPs) induced mitochondria-dependent apoptosis in MCF-7 and MDA-MB-231 breast cancer cells by upregulating Bax, caspase-3, and caspase-8, while downregulating Bcl-2 and Bcl-xL. Additionally, GFPs inhibited AKT/ GSK-3B and ERK phosphorylation, disrupting cell survival signaling pathways.[65] Another polysaccharide, GP11, exhibited cytotoxic activity against HepG2 liver cancer cells and inhibited tumor growth *in vivo* by stimulating macrophage activation and increasing levels of TNF-α and IL-2.[66] Similarly, MZF, a 23 kDa polysaccharide isolated in 2009, suppressed colon cancer progression in mice by promoting splenocyte and macrophage proliferation, and upregulating IL-12p40, IL-2, and IFN-γ expression, indicating enhanced cellular immunity.[67] Collectively, these findings confirm that polysaccharides derived from *G. frondosa* exert anticancer activity via a dual mechanism: direct induction of apoptosis in tumor cells and modulation of the host immune system, including suppression of MDSCs, enhancement of T-cell responses, and macrophage activation.

P. *Laetiporus sulphureus* (Bull.) Murrill

Laetiporus sulphureus (Family: Laetiporaceae), commonly referred to as sulfur shelf or sulfur mushroom, has been

traditionally used in the treatment of cancer and gastrointestinal ailments. Recent scientific studies have highlighted its antitumor and immunomodulatory activities, primarily associated with sulfated polysaccharides (SPS) and protein-polysaccharide complexes derived from its fruiting bodies. A 2024 study demonstrated that SPS isolated from *L. sulphureus* exhibited strong anti-proliferative effects on MDA-MB-231 triple-negative breast cancer cells. The treatment induced G0/G1 cell cycle arrest, significantly inhibited cell migration, and triggered apoptosis. Mechanistically, SPS treatment led to the downregulation of CDK4 and Cyclin D1, and the upregulation of the cyclin-dependent kinase inhibitor p21, suggesting a shift toward cell cycle inhibition.[68] Another study evaluated three SPS fractions (F1, F2, and F3) and identified F2, a medium molecular weight component, as the most potent inhibitor of cell proliferation. Its high sulfate and protein content, along with specific monosaccharide composition, were believed to contribute to its enhanced activity. F2 induced G0/G1 arrest and modulated the TGF-B signaling pathway, highlighting its role in both cell cycle regulation and tumor microenvironment modulation.[69] Earlier research demonstrated that a protein-polysaccharide complex extracted from the fruiting bodies of *L. sulphureus* inhibited sarcoma 180 tumor growth in A-strain mice. This fraction enhanced immune function by increasing the number of hemolytic plaque-forming cells, suggesting that its antitumor effect was mediated in part by immune system activation.[70] Summing up, these findings indicate that *L. sulphureus* exerts anticancer effects through a multifaceted mechanism involving cell cycle arrest, apoptosis induction, inhibition of cell migration, TGF-B pathway modulation, and immune stimulation, particularly effective in aggressive cancer phenotypes such as triple-negative breast cancer.

Q. *Amauroderma rude* (Berk.) Torrend (Current Name: *Sanguinoderma rude* (Berk.) Y.F. Sun, D.H. Costa & B.K. Cui)

Amauroderma rude (Family: Polyporaceae) is a medicinal mushroom that has demonstrated potent anticancer effects in both *in vitro* and *in vivo* models. In a comprehensive 2013 study, extracts of *A. rude* were evaluated against a broad panel of human and murine cancer cell lines, including breast carcinoma (MDA-MB-231, MCF-7, MT-1, MDA-MB-4 8), mouse breast cancer (4T1), lung adenocarcinoma (A549), glioblastoma (U87), hepatocellular carcinoma (HepG2), prostate carcinoma (DU145), cervical cancer (HeLa), and leukemia (Jurkat), as well as human lung epithelial cells (BEAS-2B).[71] Among the tested fungi, *A. rude* exhibited the most pronounced cytotoxic activity, significantly reducing cell viability and colony formation across multiple cancer cell lines. It robustly induced apoptosis and showed selective toxicity toward cancer cells while sparing non-cancerous lung epithelial cells (BEAS-2B). *In vivo* experiments conducted on mice bearing breast tumor further confirmed its antitumor activity, demonstrating a marked reduction in tumor growth and an increase in apoptotic cell populations following extract administration. Although the exact bioactive components responsible for these effects were not characterized, the displayed anticancer activity is hypothesized to stem from a combination of fungal polysaccharides and putative triterpenoids. Mechanistically, *A. rude* extracts were found to suppress c-myc expression, a key regulator of cell proliferation and tumor progression, contributing to tumor growth inhibition and enhanced programmed cell death. These findings position *A. rude* as a promising candidate for natural product-based cancer therapy, with strong apoptosis-inducing capabilities and broad-spectrum antitumoractivity.

R. *Coriolus versicolor* (L.) Quél. (Current Name: *Trametes versicolor* (L.) Lloyd)

Coriolus versicolor (Family: Polyporaceae), also known as “turkey tail,” is a widely researched medicinalmushroom traditionally used in Asian medicine. It has gained significant attention for its application in cancertreatment, largely due to two major bioactive compounds - polysaccharide-K (PSK) and polysaccharide peptide(PSP). PSK, also known as krestin, was

developed in Japan and has been approved for use as an immunotherapeutic adjuvant in cancer treatment. It has been shown to enhance immune function, reduce tumor-associatedsymptoms, and potentially prolong survival in cancer patients, particularly in lung and gastrointestinal malignancies. A 2015 systematic review concluded that PSK improves quality of life and immune competence, whilecontributing to reduced tumor progression.[72] PSP, isolated in China in 1989, exhibits similar immunomodulatory activity and has demonstrated direct cytotoxic effects *in vitro*. PSP was shown to inhibit cell proliferation in gastric, lung, and leukemia cell lines, and to stimulate immune system components, such as Tlymphocytes, macrophages, and natural killer (NK) cells, suggesting a dual mechanism of action - tumor suppression andimmune enhancement.[73] Both PSK and PSP function as biological response modifiers (BRMs), enhancing host defense mechanisms, while also exerting direct anticancer activity. Their ability to inhibit metastasis andmodulate the tumor microenvironment has made them valuable additions to integrative oncology protocols.In summary, *C. versicolor* exhibits anticancer properties primarily via immune system modulation and tumorgrowth inhibition, with PSK and PSP being clinically relevant agents in supportive and adjuvant cancercare.

S. *Funalia trogii* (Berk.) Bondartsev & Singer (Current Name: *Trametes trogii* Berk.)

Funalia trogii (Family: Polyporaceae) is a ligninolytic mushroom species known for its enzymatic diversity and bioactive metabolites. Recent studies have revealed its antitumor and cytotoxic potential, particularly through its enzyme-rich extracts and mycelial components that act on various cancer cell lines. A 2015 study identified laccase – a phenol-oxidizing enzyme with a molecular weight of 5 kDa – as one of the biologically active constituents of *F. trogii* extract. While the contribution of peroxidase to cytotoxicity remained inconclusive, laccase was suggested to be a key agent in the observed anticancer activity.[74] An earlier study investigated the cytotoxic effects of aqueous extracts from *F. trogii* mycelium against multiple human tumor cell lines, including HT-29 (colon), LNCaP and PC3 (prostate), MCF-7 and MDA-MB-231 (breast cancer). Treatment with 0.5-5.0 mg/mL for 4 hours led to significant dose-dependent cytotoxicity, with IC_{50} values ranging between 0.4-0.72 mg/mL. Notably, the extract did not affect normal fibroblast cells, but did induce death in proliferating endothelial cells, suggesting tumor selectivity. *In vivo* injections into immuno- compromised mice delayed tumor growth by 9 days, further supporting the antitumor potential of *F. trogii* extracts.[75] In an earlier cytotoxicity assay, standardized water extracts of *F. trogii* caused 71.5% growth inhibition in HeLa cervical cancer cells, while also affecting fibroblast cells to a lesser degree (51.3% inhibition), indicating preferential cytotoxicity toward cancer cells.[76] Collectively, findings indicate that *F. trogii* exhibits antitumor activity primarily through inhibition of cell proliferation and induction of apoptosis, with laccase emerging as a potentially active biomolecule warranting further mechanistic exploration.

T. *Ganoderma lucidum* (Curtis) P. Karst.

Ganoderma lucidum (Family: Polyporaceae), also known as “reishi" or “lingzhi," is one of the most widely recognized medicinal mushrooms, traditionally used in East Asian medicine for promoting longevity and vitality. In modern pharmacological research, *G. lucidum* has demonstrated extensive anticancer and antitumor activities, attributed to its rich content of triterpenes and polysaccharides. A novel triterpene compound isolated from *G. lucidum* exhibited significant cytotoxic activity against A549 (lung) and HepG2 (liver) cancer cells by inducing apoptosis through the p53/caspase-3 signaling axis.[77] Similarly, *G. lucidum* triterpenes (GLT) have been shown to suppress viability and metastatic potential in DU-145 prostate cancer cells, with dose- and time-dependent reductions in migration and invasion. These effects were linked to the downregulation of matrix metalloproteinases (MMPs).[78] In colon cancer

models, GLT induced cell cycle arrest at the G0/G1 phase and promoted apoptosis in HT-29 cells via inhibition of B-catenin and NF-KB signaling, suggesting disruption of tumor-promoting transcription pathways.[79] Additionally, triterpene-rich extracts inhibited hepatoma cell growth through the suppression of protein kinase C, activation of MAPK cascades, and G2 phase arrest, further highlighting their multi-targeted effects.[80] Beyond triterpenes, polysaccharides isolated from *G. lucidum* also play a critical role in enhancing immune responses, promoting natural killer (NK) cell activity, and modulating cytokine production. In summary, *G. lucidum* exhibits broad-spectrum anticancer activity through a variety of mechanisms, including apoptosis induction, cell cycle regulation, immune enhancement, and inhibition of metastasis and angiogenesis, making it one of the most promising fungi in oncological research.

U. *Ganoderma sinense* J.D. Zhao, L.W. Hsu & X.Q. Zhang

Ganoderma sinense (Family: Polyporaceae) is a medicinal mushroom species that has been used in traditional Chinese medicine for over two millennia and is officially classified as a form of "lingzhi" alongside *G. lucidum*. Recent studies have explored its anticancer and immunomodulatory effects, primarily attributed to its bioactive polysaccharide fractions (GSPs). A 2021 study demonstrated that polysaccharides derived from fermented products of *G. sinense* and rice bran (GS-DRB-11) exhibited significant antitumor activity against the H1299 non-small cell lung cancer cell line, both *in vitro* and *in vivo*. The GS-DRB-11 fraction displayed the strongest cytotoxicity, with an IC_{50} value of 40.2 μg/mL, and achieved a tumor inhibition rate of 8.81% in murine xenograft models.[81] Comparative analyses conducted in 2018 confirmed that polysaccharides from *G. sinense* and *G. lucidum* share similar structural features and biological activities, including antitumor and immunoregulatory effects, further validating their joint classification as lingzhi species in pharmacopoeias.[82] In 2017, the Chinese regulatory authority approved GSPs as an adjuvant therapeutic agent for treating leukopenia and hematopoietic damage during chemotherapy and radiotherapy. These polysaccharides also possess antioxidant, anticytopenic, and mushroom toxin-detoxifying properties, which distinguish them from other *Ganoderma*-derived polysaccharides.[83] Collectively, *G. sinense* exhibits significant anticancer activity by suppressing tumor cell proliferation, enhancing immune responses, and protecting hematopoietic function, as demonstrated by robust *in vitro* and *in vivo* studies, thereby positioning it as a valuable candidate in integrative cancer therapy.

V. *Polyporus melanopus* (Pers.) Fr. (Current Name: *Picipes melanopus* (Pers.) Zmitr. & Kovalenko)

Polyporus melanopus (Family: Polyporaceae) is a medicinal mushroom species from the Polyporaceae family with limited but emerging interest in its anticancer and antitumor potential. Although comprehensive data on its bioactive components remain scarce, preliminary studies suggest that it may exert anti-proliferative effects against various human cancer cell lines. A 2014 study evaluated the *in vitro* cytotoxicity of both water and ethanol extracts of *P. melanopus* against HepG2 (liver), S-180 (sarcoma), HCT-116 (colorectal), and MDA-MB-231 (triple-negative breast cancer) cell lines. The results demonstrated that ethanol extracts were more effective than aqueous extracts in inhibiting cancer cell proliferation, indicating the presence of ethanol-soluble bioactive constituents with antitumor activity. However, the specific compounds responsible for these effects were not identified.[59] Due to the limited number of studies, the exact mechanisms of action and active compounds of *P. melanopus* remain unclear. Nonetheless, comparative data from related species, such as *Polyporus umbellatus*, suggest that members of the genus may contain immunomodulatory and cytotoxic compounds, including polysaccharides and terpenoids, that warrant further exploration in *P.melanopus*. In summary, while early evidence indicates antiproliferative effects of *P. melanopus* extracts in cancer models, comprehensive phytochemical and mechanistic studies are necessary to validate its therapeutic potential and to isolate

its active compounds.

W. *Taiwanofungus camphoratus* (M. Zang & C.H. Su) Sheng H. Wu, Z.H. Yu, Y.C. Dai & C.H. Su

Taiwanofungus camphoratus (incertae sedis), also known as *Antrodia camphorata*, is a medicinal mushroom endemic to Taiwan, traditionally used for treating liver disorders, hypertension, and inflammation. In recent years, it has emerged as a promising source of anticancer agents, with various triterpenoids and extracts demonstrating potent activity against multiple cancer cell types. A 2019 study revealed that zhankuic acids A, B, and C, isolated from *T. camphoratus*, act as P-glycoprotein (P-gp) inhibitors in human cervical cancer cells, thereby reversing multidrug resistance (MDR). Notably, zhankuic acid A enhanced the efficacy of chemotherapeutic agents such as doxorubicin, paclitaxel, and vincristine, supporting its use in chemosensitization strategies.[84] In an earlier study, the HS7 fraction, obtained from the n-hexane extract of *T.camphoratus*, suppressed proliferation in CL1-0 human lung cancer cells by downregulating AKT-mTOR, ERK, and STAT3 signaling pathways. This effect led to G0/G1 cell cycle arrest and apoptosis induction through the upregulation of CDK inhibitors.[85] Another investigation demonstrated that the ethanol extract (TCEE) of *T. camphoratus* induced apoptosis and cell cycle arrest in Hep3B and HepJ5 hepatocellular carcinoma cells by increasing the expression of P21 and P27, and activating caspase-3. Moreover, TCEE enhanced the tumor-suppressive effects of cisplatin and doxorubicin when used in combination, highlighting its potential in synergistic cancer therapy.[86] A foundational 2010 study identified ten novel triterpenoid compounds (camphoratin A-J) from the fruiting bodies of *T. camphoratus*, which displayed cytotoxic effects against KB and KB-VIN cancer cell lines and inhibited nitric oxide production, indicating both anti- tumor and anti-inflammatory activities.[87] In conclusion, compounds isolated from *T. camphoratus* exhibit multifaceted anticancer activities, which include cell cycle arrest, apoptosis induction, chemosensitization, and MDR reversal, supporting their development as promising natural adjuncts in cancer therapeutics.

X. *Hericium erinaceus* (Bull.) Pers.

Hericium erinaceus (Family: Hericiaceae), commonly referred to as lion's mane mushroom, has long been utilized in traditional medicine for gastrointestinal health and is increasingly recognized for its anticancer and immunomodulatory potential. Recent studies have focused on the effects of its polysaccharide fractions, derived from both fruiting bodies and mycelium, on various cancer cell lines and tumor models. In a 2020 study, *H. erinaceus* fruiting body polysaccharides (HEFPs) were shown to significantly inhibit the proliferation of HCT-116 and DLD1 colorectal cancer cells and to induce mitochondrial-dependent apoptosis. Mechanistically, HEFPs increased reactive oxygen species (ROS) levels, disrupted mitochondrial membrane potential, upregulated Bax, and activated caspase-9 and caspase-3, while downregulating Bcl-2, indicating the activation of the intrinsic apoptotic pathway.[88] In another study, a mycelial polysaccharide known as EP-1 selectively induced apoptosis and cell cycle arrest at the G0/G1 phase in a precancerous human gastric cell line (MC), but had no cytotoxic effect on normal gastric epithelial cells (GES-1). This effect was linked to the modulation of Bax, Bcl-2, and caspase-3 expression.[89] *In vivo* studies further support these findings. In a 2011 experiment, hot water and microwave extracts from freeze-dried fruiting bodies of *H. erinaceus* reduced tumor weight by 38-41% in a CT-2 colon cancer model. These effects were accompanied by increased splenic NK cell activity, enhanced macrophage phagocytosis and NO production, elevated levels of pro-inflammatory cytokines (TNF-α, IL-1B, and IL-6), and reduced expression of angiogenesis-related markers, such as VEGF, COX-2, and 5-LOX.[90] Earlier research comparing *H. erinaceus* and *H. laciniatum* polysaccharides reported that *H. erinaceus*-derived compounds more

effectively suppressed lung metastases and promoted T cell and macrophage proliferation in tumor-bearing mice.[91] In summary, polysaccharides from *H. erinaceus* exert anticancer effects via ROS-mediated mitochondrial apoptosis, cell cycle regulation, and immune system enhancement, offering strong therapeutic potential for both prevention and treatment of cancer.

Y. *Sarcodon imbricatus* (L.) P. Karst.

Sarcodon imbricatus (Family: Bankeraceae) is an edible mushroom widely consumed in China and other East Asian regions, known for its nutritional richness and emerging medicinal potential. Recent research has focused on its antitumor and immunomodulatory properties, particularly in the context of breast cancer. In a 2020 study, water extracts of *S. imbricatus* (SIE) were tested in both *in vitro* and *in vivo* models of breast cancer. SIE significantly inhibited proliferation, migration, and invasion of breast cancer cells *in vitro*, while also suppressing tumor growth in 4T1 tumor-bearing mice. The treatment resulted in increased serum levels of interleukin-2 (IL-2), IL-6, and tumor necrosis factor-α (TNF-α). Furthermore, SIE enhanced natural killer (NK) cell activity, promoted splenocyte viability, and downregulated the expression of programmed death-ligand 1 (PD-L1) in tumor tissues.[92] These findings indicate that *S. imbricatus* exerts its antitumor effects via immunostimulatory pathways, involving cytokine release, NK cell activation, and immune checkpoint regulation. Notably, the inhibition of PD-L1 expression suggests a role in reversing tumor immune evasion - a critical mechanism in modern cancer immunotherapy. In summary, *S. imbricatus* displays promising immunomodulatory and antitumor activities, making it a potential candidate for functional food development and complementary cancer treatment strategies.

Z. *Tremella fuciformis* Berk.

Tremella fuciformis (Family: Tremellaceae), an edible mushroom long used in traditional Chinese medicine, has gained increasing scientific attention due to its diverse biological properties, particularly its anticancer and immunomodulatory potential. The key bioactive components of this species are high-molecular-weight polysaccharides (TFPs), primarily composed of mannose and glucose. In a recent study, TFPs were found to induce apoptosis in B1 melanoma cells by promoting the M1 polarization of macrophages, suggesting an indirect immune-mediated antitumor mechanism.[93] The ability of TFPs to shiftmacrophages toward a pro-inflammatory phenotype supports their role in enhancing antitumor immune responses. Another investigation assessed the effects of both hot and cold water extracts of *T. fuciformis* on PC-3 prostate cancer cells. The cold water extracts demonstrated stronger cytotoxicity, significantly reducing cell viability and inducing apoptosis. These effects were linked to an increased caspase-3 activation, elevated Bax/Bcl-2 ratio, and suppression of MMP-9 expression, indicating the involvement of intrinsic apoptotic signaling.[94] Furthermore, TFPs have been reported to modulate inflammatory responsesby regulating cytokine levels and oxidative stress, which may further contribute to their anticancer properties.[95] Overall, *T. fuciformis* exhibits anticancer activity through a combination of immune activation,apoptosis induction, and anti-inflammatory modulation, making it a promising candidate for integrative cancer therapy research.

IV. . CONCLUSIONS AND FUTURE PERSPECTIVES

This review has highlighted the promising anticancer properties of various medicinal mushrooms, with a focus on bioactive compounds such as polysaccharides, terpenoids, and lectins isolated from species like *Ganoderma lucidum*,

Cordyceps militaris, *Lentinula edodes*, and others. These fungi exhibit a broad spectrum of mechanisms, including apoptosis induction, cell cycle arrest, immune modulation, and metastasis inhibition, which collectively position them as potential natural chemotherapeutic agents. The extracts from these mushrooms have demonstrated significant efficacy against a wide range of cancer cell lines, including those of breast, liver, lung, and colon cancers. Notably, mushroom-derived compounds have shown enhanced anticancer effects when administered in combination with conventional chemotherapeutic agents, suggesting their potential role in synergistic therapies. Despite the encouraging findings from both *in vitro* and *in vivo* studies, further research is essential to translate these results into practical clinical applications. Clinical trials are necessary to evaluate the safety, efficacy, pharmacodynamics, and optimal dosages of these bioactive compounds. Moreover, deeper exploration into the molecular mechanisms of action, particularly how polysaccharides and terpenoids influence key signaling pathways such as NF-KB, MAPK, and PI3K/Akt, is required to fully understand their anticancer potential. Future studies should also explore the synergistic and protective effects of mushroom extracts when used as adjuncts to established chemotherapeutic regimens, aiming to maximize efficacy while minimizing side effects. Furthermore, isolating and characterizing new bioactive compounds from less-studied mushroom species could uncover novel anti- cancer properties that remain unexplored. Understanding the pharmacokinetics and bioavailability ofthese compounds will also be crucial in optimizing their therapeutic use. In conclusion, while significant progress has been made in understanding the anticancer potential of medicinal mushrooms, additional research is required to overcome existing challenges and enable their full clinical application in cancer therapy.

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Call for Papers

Aiming to build the relationship between the members and the Society, the publication of the newsletters was proposed before the launching of the Society. The newsletters represent one of the key official publications from the Society. Contents of the newsletters will include notifications of the decisions made by the committee board, reviews or comments contributed by ISMM committee members, conferences or activities to be organized, and the status updated in research, industrialization, and marketing for medicinal mushrooms. The newsletters will be released quarterly, by the first Monday of every January, April, July, and October, with possible supplementary issues as well. The Newsletter is open to organizations or professionals to submit news, comments, or scientific papers relating to medicinal mushroom research, marketing, or industry.

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