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Review Article

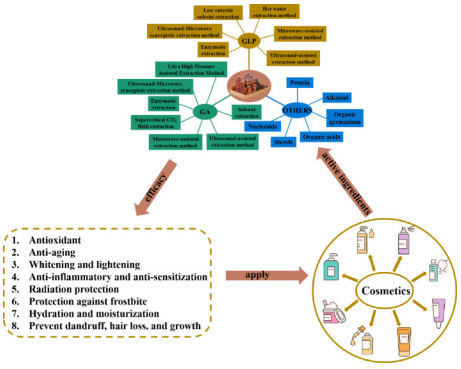
Bioactive components of *Ganoderma lucidum* and their efficacy and application in cosmetics

Gao-Peng Zhang, Yue-Min Pan, Song-Mei Ye, Yuan-Chao Lu, Xue-Jing Fan, and An-Qiang Zhang*

Food & Medicine Homology, **2025**, *2*, 9420044
https://doi.org/10.26599/FMH.2025.9420044

Highlights

(1) The active components and extraction methods of *G. lucidum* were summarised.
(2) The function of *G. lucidum* in cosmetics was discussed.
(3) An overview of commercially available *G. lucidum* cosmetics was given.
(4) Pointed out the current gap of *G. lucidum* in the cosmetic market.
(5) The potential of *G. lucidum* as a functional cosmetic ingredient was highlighted.



Beginning with the constituents of *Ganoderma lucidum*, we delineated the extraction methods of *G. lucidum* polysaccharides and total triterpenes. Additionally, we outlined the progress of research on other constituents. We briefly described the functional properties of *G. lucidum* constituents in cosmetics and the development of cosmetic products based on these properties. Finally, we summarized the types of *G. lucidum* cosmetic products available in the market.

Review Article

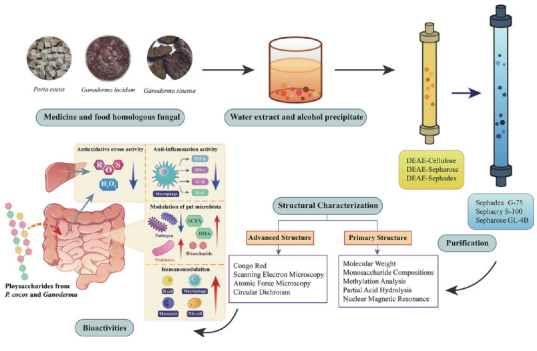
Research progress on structural characterization and bioactivities of *Poria cocos* and *Ganoderma* polysaccharides

Yi-Kun Xie, Xin-Yu Pan, Xin-Ran Liang, Ke-Feng Zhai*, and Qian Yu*

Food & Medicine Homology, **2025**, *2*, 9420040
https://doi.org/10.26599/FMH.2025.9420040

Highlights

(1) Polysaccharides are important active ingredients of medicine and food homologous fungal.
(2) Extraction and purification method of medicine and food homologous fungal polysaccharides were summarized.
(3) Structural characteristics of medicine and food homologous fungal polysaccharides were discussed.
(4) Diversified bioactivities and underlying mechanisms of medicine and food homologous fungal polysaccharides were outlined.



Poria cocos, *Ganoderma lucidum*, and *Ganoderma sinense*, as the well-known medicine and food homologous fungal, has been used as traditional Chinese medicine to improve health and to treat numerous diseases for a long history. Polysaccharide is the main effective ingredients of *P. cocos* and *Ganoderma* which possess a wide range of biological activities. Despite the research of polysaccharide from medicine and food homologous fungal still face challenges and difficulties, future study has become a research hotspot with a broad development prospect.

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Research Article

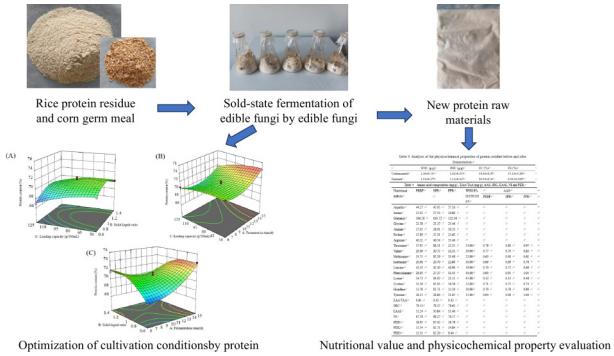
Optimization of solid-state fermentation for protein enrichment in rice protein residue and corn germ powder using edible mushroom mycelium

Yang Li, Sai-Qin Guo, Zhou-Zhou Cheng, Hao-Qi Chu, Hong-Juan Zhang, Jin-Yu Chen, Ming Chai, Hong Gu, Jian Wang*, and Pei-Long Sun*

Food & Medicine Homology, **2025**, *2*, 9420047
https://doi.org/10.26599/FMH.2025.9420047

Highlights

(1) The protein content of grain protein residue fermented by edible fungi had increased.
(2) The nutritional value of fermented grain protein residue was enhanced.
(3) The emulsifying capacity of fermented grain protein residue had improved.
(4) Fermented grain protein residue could be used as high-protein food ingredients.



This study utilized edible fungi to ferment rice protein residue and corn germ meal. Then, the fermentation process conditions of grain protein residue were optimized through single factor experiments and response surface methodology to obtain a new type of protein raw material. Finally, evaluate the physicochemical and nutritional indicators of the protein raw materials.

Review Article

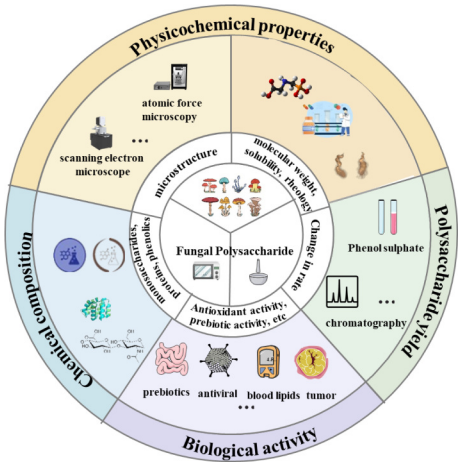
Effect of different drying and grinding techniques on the physicochemical properties and biological activities of fungal polysaccharides

Hui-Nan Zhang, Yuan Liu, Hui-Ling Zhang, Qing-Zhao Wan, and Ya-Qi Wang*

Food & Medicine Homology, **2025**, *2*, 9420045
https://doi.org/10.26599/FMH.2025.9420045

Highlights

(1) Fungal polysaccharides are natural compounds with diverse biological activities, used in medicine, food, and cosmetics.
(2) The properties and activities of fungi are significantly affected by drying methods such as hot air drying, freeze drying (FD), and spray drying (SD), as well as by grinding methods



Fungal polysaccharides, as bioactive compounds derived from fungi, play a pivotal role in health-related applications, including immune modulation, anti-cancer properties, and antioxidant activities. Drying and grinding are equally critical steps in polysaccharide processing, alongside extraction and

including mechanical grinding, superfine grinding, and cryogenic grinding.
(3) Selecting appropriate drying and grinding methods is crucial for improving extraction efficiency and functional properties, enhancing their roles in pharmaceuticals, food, and health products.
(4) Ongoing research and technological advancements are essential for refining the preparation and processing of fungal polysaccharides, driving progress in related industries.

purification, and warrant close consideration. This review provides an overview of how various drying and grinding techniques affect the physicochemical properties and biological activities of fungal polysaccharides. It underscores the necessity of selecting optimal methods to preserve polysaccharide structural integrity and enhance their functional properties, thereby advancing their potential in disease prevention and therapeutic applications.

Review Article

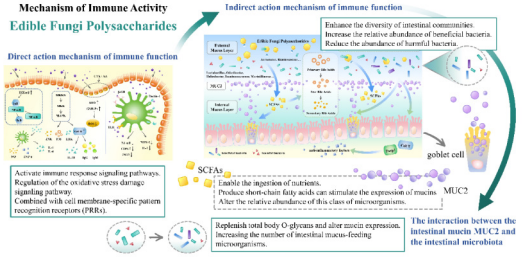
Research progress on the mechanism of functional activity of edible fungi polysaccharides—focusing intestinal mucus as a key and entry point

Yun-Yan Yu, Ya-Ning Duan, Sai Ma, Qiu-Hui Hu, and Gao-Xing Ma*

Food & Medicine Homology, **2025**, *2*, 9420042
https://doi.org/10.26599/FMH.2025.9420042

Highlights

(1) The direct and indirect mechanism of immune function of edible fungi polysaccharides.
(2) The function of the intestinal mucus barrier in intestinal immunity.
(3) Mucins and edible fungi polysaccharides engage in electrostatic interactions.
(4) Interaction of polysaccharides with mucins is mediated by intestinal microorganisms.



Edible fungi polysaccharide is a kind of natural active substance, which plays an important role in immune regulation. The research on the mechanism of polysaccharide activity in the early stage mainly focused on the direct action mechanism between polysaccharide and cell, and the indirect action mechanism between polysaccharide and microbe and cell. It mainly focused on the enhancement of immune cells and the regulation of immune active factors, as well as the regulation of intestinal microenvironment homeostasis. Due to the complexity of the intestinal environment, polysaccharides need to interact with the mucous layer of the intestinal tract before entering the intestinal tract to play the function of immune activity. This interaction will change the structure, viscosity and dispersion of polysaccharides, thus affecting the activity of polysaccharides in the body. Therefore, the interaction between polysaccharide and mucus layer is also extremely important. Edible fungi polysaccharides can supplement mucinoglycan to change the glycosylation level of mucin, and also affect the abundance of mucin symbiotic flora, thus changing the secretion of mucin. As prebiotics, the short-chain fatty acids produced by polysaccharides can not only directly act on intestinal epithelial cells, but also maintain energy generation. It can also stimulate goblet cells and maintain mucus barrier homeostasis. The effect of the interaction between polysaccharide and intestinal mucus on intestinal immune activity can be a new direction to study the mechanism of polysaccharide activity.

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Review Article

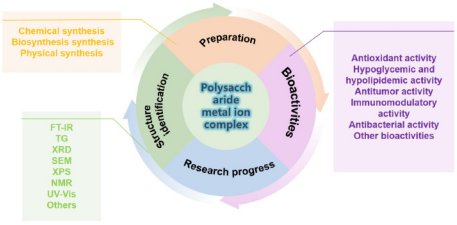
Preparation and biological activity of polysaccharide metal ion complex and feasibility analysis of *Tremella fuciformis* polysaccharide with metal ions

Juan Bai, Ya-Shu Wei, Yan He, Hua Zhang, and Xia Ma*

Food & Medicine Homology, **2025**, *2*, 9420031
https://doi.org/10.26599/FMH.2025.9420031

Highlights

(1) The chemical, physical and biological synthesis methods of metal ion complexes of polysaccharides were compared, and summarizes the advantages and disadvantages of the complexation methods.
(2) The characterization methods commonly used in the study were summarized to determine whether polysaccharide and metal ions were successfully complexed under certain conditions.
(3) Polysaccharide metal ion complexes usually have better biological activities than metal ions or polysaccharides alone.
(4) Researchers have successfully combined *Tremella* polysaccharides with iron ions.



This paper presents a comprehensive review of the synthesis, biological activity, structural characterization, and research advancements related to metal ion complexes of polysaccharides. Initially, we conduct a comparative analysis of the advantages and disadvantages associated with chemical synthesis, physical synthesis, and biosynthesis. Subsequently, we compare the biological activities of polysaccharide-metal ion complexes before and after coordination. The results indicate that these complexes generally exhibit enhanced biological activities compared to their individual components—metal ions or polysaccharides—including antioxidant, hypoglycemic, hypolipidemic, immunomodulatory, anti-tumor, anti-inflammatory, and antibacterial properties. Furthermore, structural characterization techniques were employed to confirm successful complexation of polysaccharide-metal ion complexes as well as any structural modifications occurring pre- and post-complexation. Finally, future directions for research on metal ion complexes derived from Tremella polysaccharides are proposed in order to provide insights for the development of novel therapeutic agents and adjuvants.

Review Araicle

Hypoglycemic effects of edible fungus polysaccharides: A mini review

Yan-Long Cui and Bo Li*

Food & Medicine Homology, **2025**, *2*, 9420046
https://doi.org/10.26599/FMH.2025.9420046

Highlights

(1) We summarize the hypoglycemic mechanisms of edible fungus polysaccharides (EFP).
(2) The structure-hypoglycemic activity relationship of EFP was fully discussed.
(3) We point out the probable future research directions and trends of EFP involved hypoglycemic effects.

Edible fungus are an important resource of food and medicine. Edible fungus Polysaccharides are one of the bioactive substances and own multiple biological activities, such as immunomodulatory, antioxidant, anti-inflammatory and hypoglycemic effect etc. The possible hypoglycemic mechanisms of edible fungus (EFP) were fully summarized.

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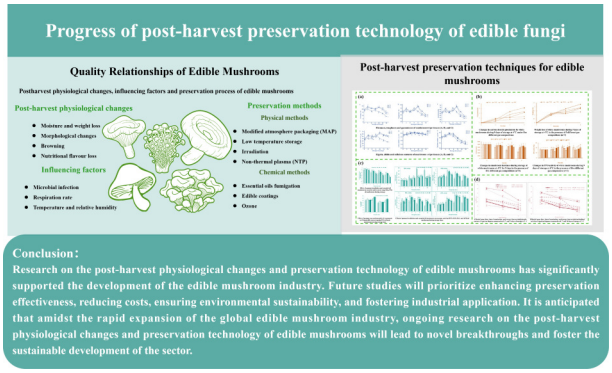
Review Article

Progress of post-harvest preservation technology of edible mushroom

Nan Zheng, Yao-Mei Ma, Hong-Yu Lei, Xin-Yu Zhen, Yue Wang, Yu Zhang, Dong-Xia Gou, and Tong Liu*

Food & Medicine Homology, **2025**, *2*, 9420028
https://doi.org/10.26599/FMH.2025.9420028



Physiological changes occurring in edible mushrooms after harvesting and common techniques for post-harvest preservation of edible mushrooms are outlined, and examples of their application are presented.

Highlights

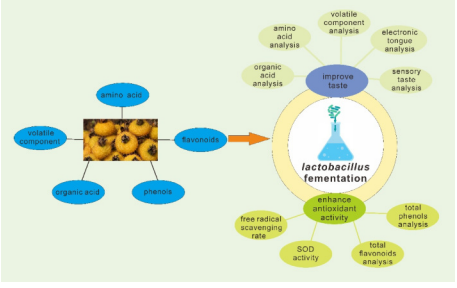
(1) Overview of physiological changes in edible mushrooms after harvest.
(2) Factors affecting postharvest physiological changes in edible mushrooms are summarised.
(3) Summarises post-harvest preservation techniques for edible mushrooms.

Research Article

Effects of lactic acid bacteria fermentation on antioxidant activity and sensory quality of *Rosa sterilis* S D Shi

Qin-Yi Hu, Xin-Xin Tang, Zhu Li*, Long-Feng Wei, Xue-Ping Wu, and Hao Zhao

Food & Medicine Homology, **2025**, *2*, 9420026
https://doi.org/10.26599/FMH.2025.9420026



Rosa sterilis S D Shi is a special agricultural product of Guizhou province, which is rich in high nutritional value and biological activity, and has great development potential. However, because it contains high tannin, its taste is bitter. In this study, *Lactobacillus plant* BJ-1 and *Lactobacillus brevis* BJ-31 were used to ferment *Rosa sterilis* S D Shi juice respectively, which can significantly improve the taste while ensuring its antioxidant activity. The amino acids, volatile organic acids, antioxidant activity, and taste of *R. sterilis* S D Shi juice before and after fermentation were tested. The results showed that lactic acid bacteria fermentation of *R. sterilis* can improve the taste and enhance the antioxidant activity, which can provide a reference for the development of Guizhou province's characteristic agricultural product.

Highlights

(1) BJ-1 and BJ-31 fermentation can make *Rosa. sterilis* S D Shi juice taste significantly improved.
(2) BJ-1 and BJ-31 fermentation increased the free radical clearance rate of *R. sterilis* S D Shi juice DPPH by 43.11% and 40.70%, respectively.
(3) Fermentation of BJ-1 and BJ-31 made the free radical clearance rate of *R. sterilis* S D Shi juice ABTS exceed 95%.
(4) The fermentation of BJ-1 and BJ-31 increased the SOD of *R. sterilis* S D Shi juice by 2.47% and 5.03%, respectively.

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Research Article

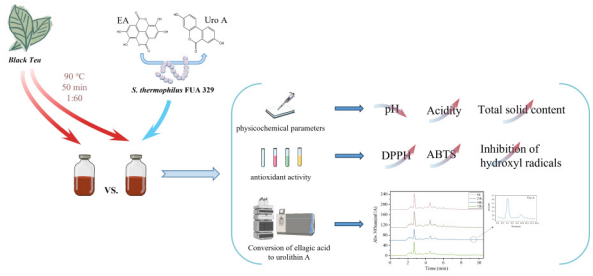
Effects of urolithin A-producing *Streptococcus thermophilus* FUA329 fermentation on the composition and antioxidant bioactivities of black tea

Ya-Ling Zhao, Rui Tang, Shu Liu, Shu-Ting Han, Juan Feng, Ke-Xin Chi, Guang Yang, Xiao-Yue Hou, and Yao-Wei Fang*

Food & Medicine Homology, **2025**, *2*, 9420041
https://doi.org/10.26599/FMH.2025.9420041

Highlights

(1) *S. thermophilus* FUA329 can be capable of producing the bioactive metabolite urolithin A from ellagic acid.
(2) *S. thermophilus* FUA329-fermented black tea shows higher antioxidant activity than that of the control.
(3) the black tea fermented with *S. thermophilus* FUA329 displayed better texture than that of the control.



Streptococcus thermophilus FUA329 metabolized ellagic acid (EA) in black tea into urolithin A (Uro A), which has multiple bioactivities. This study investigated the effects of *S. thermophilus* FUA329 fermentation on black tea's composition and antioxidant activity. Results showed a significant decrease in tea polyphenol (TP) content within 48 hours, while Uro A was detected at 0.6799 μM and remained stable at 72 hours. The antioxidant activity of FUA329-fermented black tea was higher than that of CGMCC 1.8748-fermented tea. The fermentation also increased the presence of various polyphenols. This strain shows potential as a probiotic for EA biotransformation to Uro A.

Aims and Scope

Aims

Food & Medicine Homology is a peer-reviewed, cross-disciplinary, open access journal dedicated to cutting-edge research integrating findings in food science and medicine. The journal publishes papers dealing with plants, animals and microorganisms, reporting the food resources and base materials with nutritional and medicinal values and health-promoting effects that are discovered and confirmed using modern scientific theories and technologies, and providing insights into their health-promoting functions, underlying molecular mechanisms of action and regulatory modes.

Food & Medicine Homology focuses on the scientific evidence and practical application guidance of the composition-efficacy-mechanism relationship in food resources with medicinal and therapeutic values, and provides theoretical basis for the development of products with nutritional, health-promoting, therapeutical and medicinal functions. The content reported in the articles must be scientifically innovative, impactful and excellent.

Scope

- **Research on functional components:**
  Including isolation, structural characterization and activity evaluation of polysaccharides, proteins and secondary metabolites.

- **Efficacy studies:**
  In vivo and *in vitro* efficacy studies of extracts, effective fractions/parts and secondary metabolites.

- **Health effects:**
  In vitro and *in vivo* research on the mechanisms of action of functional ingredients, including clinical studies such as human oral administration trials.

- **Interdisciplinary research:**
  Including but not limited to:

- Screening and discovering new food resources based on traditional Chinese medicine framework and folk medicine practices, include toxicity evaluation;
- Research on the applications of new functions of clinical formulas/preparations based on the homology of medicine and food exploration of new food raw materials and ingredients;
- Food nutrition and safety evaluation systems for the digestive tract;
- New analytical technologies for the identification and activity screening of functional components. Bioavailability, targeted delivery, and microecological regulation of functional components.

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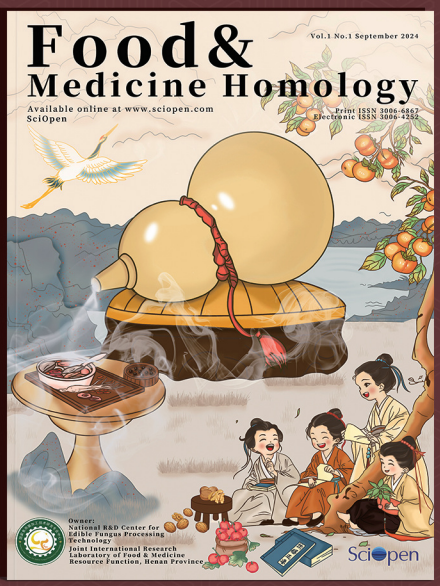

- 聚焦具有药用和康养价值的食物资源中成分-功效-机理之间关系的科学证据，为开发兼具营养、保健、康养、医疗功能的健康产品提供理论基础
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