



Review Article

Research progress on active components, functional characteristics and applications of edible fungi

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Abstract: Edible fungi have the characteristics of “three more, two higher, and one less”, referring to multi-vitamins, multi-active components, high protein, high dietary fiber and low fat. Edible fungus is a kind of fungus with homology of medicine and food, which is rich in various active ingredients and physiological functions. It has been used as a source of healthy food and medicinal substances since ancient times. In this paper, two common fungi, *Hericium erinaceus* and *Agaricus blazei* Murill, are taken as examples, and the research progress of their active components, functional characteristics and processing and application are summarized, all of which provide theoretical basis and practical reference for the development and utilization of functional foods.

Keywords: edible fungi; *Hericium erinaceus*; *Agaricus blazei* Murill; active ingredients; functional characteristics; processing applications

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1 Introduction

Edible fungi are rich in active ingredients such as polysaccharides, phenols, terpenoids, sterols and brass. In addition, edible fungi have a unique flavor, which is composed of volatile aroma substances and non-volatile odor substances, and is deeply loved by consumers. Edible fungi are a kind of fungi with the homology of medicine and food, and have the reputation of “modern health food”^[1]. Edible fungi have the functional characteristics of anti-tumor, anti-virus and anti-oxidation, and are widely used in food, cosmetics, health care products, seasonings and other fields^[2]. *Hericium erinaceus*, also known as *Hericium erinaceus*, is named *Hericium erinaceus* because its shape is similar to *Hericium erinaceus*. *Hericium erinaceus*, like most edible fungi, also has extremely high edible and medicinal value. *Hericium erinaceus* is rich in nutrients such as polyphenols, polysaccharides, alkaloids and peptides, among which polysaccharide is one of the main active components, and has physiological functions such as lowering blood sugar, antioxidation, protecting intestines and immunomodulation. *Agaricus blazei* originated in Brazil, so it is also called *Agaricus blazei* murill, Komatsu Mushroom. It has always been regarded as the mystery of longevity by local people, and it is known as “God’s Mushroom”^[3]. It is an edible and medicinal rare fungus with delicious taste, strong smell and rich edible nutritional value. Besides, it also has excellent active ingredients, which can lower blood sugar, resist tumor and improve immunity, and has high medicinal value.

With the development of global economy and people’s concern

for healthy food, edible fungi are loved by consumers. This paper summarizes the active ingredients, functional characteristics and processing and application of *Hericium erinaceus* and *Agaricus blazei* Murill, so as to make people understand edible fungi scientifically and provide theoretical basis and reference value for the further development and application of edible fungi.

2 Research progress of active components of edible fungi

2.1 Polysaccharide

Hericium erinaceus has many active ingredients, besides some main nutritional active ingredients, polysaccharide and protein, there are other active ingredients, such as *Hericium erinaceus*, *Hericium erinaceus* ketone, steroids, diterpenes, phenols and volatile aromatic compounds^[4]. *Hericium erinaceus* polysaccharide is one of the main active ingredients that have been studied a lot, and it has many functional activities, mainly composed of glucose-based monosaccharides, which are composed of β -1,3 bonds connecting the main chain and β -1,6 bonds connecting the branched chain. In Tada H^[5] and others research, it is summarized that *Hericium erinaceus* polysaccharide has the functions of nourishing the stomach, resisting oxidation and aging, providing immunity and anti-tumor, and lowering blood sugar and blood lipid. Hao Yu^[6] and others used *Hericium erinaceus* polysaccharide as the modifier of nano-selenium, and carried out antioxidant experiments. The research showed that the *Hericium*

erinaceus polysaccharide-nano-selenium complex formed by *Heridium erinaceus* polysaccharide had stronger DPPH (1,1-diphenyl-2-picryl-hydrazyl radical) radical scavenging rate, superoxide anion scavenging rate and hydroxyl radical scavenging rate than nano-selenium, and had better biological activity. Xu Huanyi^[7] and others extracted *Heridium erinaceus* polysaccharide by ultrasonic wave, and carried out antioxidant experiments and lipase assay kit on nematodes. The results showed that *Heridium erinaceus* polysaccharide could improve its antioxidant enzyme activity and lipase activity *in vivo*, showing good antioxidant activity and reducing fat accumulation, which had obvious effects on improving fat metabolism.

The main active ingredient of *Agaricus blazei* Murill is polysaccharide, and its structure is complex. The main active ingredient exists in the form of β -glucan, and its functional active ingredients are mainly β -D- glucan, β -(1,3)-D- glucan, β -(1,4)-D- glucan and β -(1,6)-D- glucan^[8]. Xu Yong^[9] extracted polysaccharide from *Agaricus blazei* Murill by alkaline solution extraction, and studied its molecular structure and biological activity.

2.2 Polyphenols

Polyphenols widely exist in edible fungi, and people can't synthesize polyphenols themselves, but can only get them from plants and edible fungi, which have anti-inflammatory, antiviral and antioxidant activities. Wei Qi^[10] extracted the polyphenols from *Agaricus blazei* Murill by ethanol extraction. Under the optimum extraction conditions, the total phenol content of *Agaricus blazei* Murill reached 2.92 mg/g. Compared with other active components, there are few studies on the polyphenols of *Heridium erinaceus*. Some scholars extracted the crude extract of *Heridium erinaceus* with the aid of ethanol extraction and ultrasonic wave, and then put the crude extract of *Heridium erinaceus* into the injection system of high performance liquid chromatography, and conducted three groups of experiments on mice, and obtained that the polyphenols extracted from *Heridium erinaceus* can provide auxiliary treatment for dyskinesia^[11]. Therefore, if it is used in health food for the elderly, it can prevent and treat dopamine neurons to some extent.

2.3 Polypeptide

Yihan Yu^[12] and others isolated and purified an active peptide with amino acid sequence from *Heridium erinaceus*. Through experiments, it was concluded that this active peptide has immunomodulatory effect and is beneficial to cancer treatment and improvement of human health. Tong Zhengquan^[13] prepared *Heridium erinaceus* polypeptide from *Heridium erinaceus* protein by ultrasonic-microwave assisted enzymatic method, and obtained three *Heridium erinaceus* polypeptide components after ultrafiltration, and evaluated their antioxidant and hypolipidemic activities *in vitro*.

Agaricus blazei polypeptide is an active substance extracted from the fruiting body of *Agaricus blazei*, which can not only prevent and treat diseases, but also be used for the development of health food. The research on the polypeptide has become the focus of modern science. Zou X G^[14] and others prepared four kinds of *Agaricus blazei* polypeptide components with different pore sizes by ultrasonic-assisted enzymatic extraction and ultrafiltration membrane technology, and then evaluated their antioxidant and immunomodulatory abilities. The results of antioxidant evaluation showed that, These four kinds of *Agaricus blazei* polypeptides can effectively scavenge DPPH, hydroxyl and ABTS free radicals. For

the second kind of *Agaricus blazei* polypeptide, the free radical scavenging rates are 79.31%, 63.60% and 96.08% respectively.

2.4 Ergosterol

Many studies have shown that ergosterol has the function of nourishing stomach, protecting gastric mucosa and treating gastritis to some extent. There are scholars determined *Heridium erinaceus* of 23 different germplasm by HPLC, and found that the ergosterol content of 3 was different among different germplasm, ranging from 2.23 0.02% to 4.39 0.02%. Ergosterol is a common active substance in edible and medicinal bacteria, which has good anti-inflammatory and antibacterial activities. Epidemiological studies have confirmed that the lack of vitamin D will lead to tumors, autoimmune diseases and cardiovascular diseases, and ergosterol can be transformed into vitamin D needed by human body by ultraviolet irradiation^[15]. Corr   R C G *et al.*^[16] extracted abundant ergosterol from the fruiting body of *Agaricus blazei* Murill by Soxhlet extraction method after five times. Studies have shown that ergosterol has remarkable antioxidant and antibacterial properties. Li W^[17] and others studied the methanol extract of *Heridium erinaceus* fruiting body, and separated 35 ergosterol, 14 aromatic compounds and 2 cerebrosides.

2.5 Lectins and Laccase

Some Japanese scholars extracted plant lectin from *Heridium erinaceus*, which proved that it had significant effect on sialic acid. In addition, foreign scholars have extracted plant lectin HEA from *Heridium erinaceus* fruiting body, and confirmed that it has anti-malignant cell proliferation and anti-HIV-1 activity, but it has no antibacterial activity. And a new laccase was isolated from the fruiting body of *Heridium erinaceus*, which proved that it had inhibitory effect on HIV-1 reverse transcriptase. In addition, the protein formation of *Heridium erinaceus* was analyzed^[18].

Lectin is a protein or glycoprotein that can recognize specific sugars that are not covalently bound. It can promote the growth of lymphocytes and play an important role in the immune system. In addition, the agglutinin of *Agaricus blazei* Murill also has antibacterial effect. Kawagishi H^[19] and others separated and purified the agglutinin from *Agaricus blazei* Murill by column chromatography, and then extracted it effectively by gel column chromatography, and found that the agglutinin had obvious inhibitory effect on the growth of brown rot fungus through experiments. Hao J *et al.*^[20] isolated homogeneous monomer laccase (ASL) from *Agaricus blazei* Murill with molecular weight of 65 kDa by ion exchange chromatography and gel filtration chromatography, which showed the maximum activity at 50 °C and pH 5.0.

By summarizing the active ingredients of the above two kinds of edible fungi, it can be concluded that domestic and foreign scholars have extracted active ingredients such as polysaccharide, polypeptide, polyphenol, ergosterol, lectin and laccase by some methods, and proved the physiological functions of these active ingredients through experiments, which is of great significance to the development of functional foods for all age groups.

3 Research progress on functional characteristics of edible fungi

The main active components and their functional characteristics of two kinds of edible fungi are summarized in Table 1.

As can be seen from Table 1, the number of people suffering

Table 1 Main components and functions of edible fungus species

Edible mushrooms	Major constituent	Major function	References
	Extracellular polysaccharide	It has obvious protective effect on gastric mucosal injury.	[21]
	<i>Hericium erinaceus</i>	Promote nerve growth	[22, 23]
	Ethanol extract	The levels of total cholesterol, low-density lipoprotein cholesterol and triglyceride in rats fed with high-fat diet were decreased and the content of high-density lipoprotein cholesterol was increased.	[24]
<i>Hericium erinaceus</i>	<i>Hericium erinaceus</i> ketone and <i>Hericium erinaceus</i> element	Improve sleep and interfere with relieving anxiety	[25]
	Other	It has immunomodulatory, potential anticancer, anti-inflammatory and nerve regeneration effects.	[27]
		Relieve the pain of knee arthritis	[28]
<i>Agaricus blazei</i>	Polysaccharide	Improve dyslipidemia, reduce oxidative stress and inflammatory reaction caused by liver and lung injury, and prevent and treat tobacco mosaic virus.	[29, 30]
Murill	Polypeptide	Improve oxidative stress loss and play an anti-aging role.	[32]
	Polyphenol compound	Has anti-inflammatory, antioxidant, blood lipid lowering and blood sugar lowering effects.	[10, 33, 34]

from neurodegenerative diseases in the world is increasing, the social and medical pressure is increasing, the pathogenesis is complicated, and the general treatment methods can't effectively treat them. More and more scientific personnel tend to have natural substances for protecting nerves. A large number of studies have found that *Hericium erinaceus* has the functions of protecting nerves and promoting nerve growth, and the extracellular polysaccharide and ethanol extract of *Hericium erinaceus* can adjuvant treat and prevent neurodegenerative chronic diseases and effectively prevent Alzheimer's disease^[21]. Bizjak M Č^[22] and others mentioned that *Hericium erinaceus*, which is rich in *Hericium erinaceus*, has a growth factor to promote nerve growth and has a positive effect on brain and nerve health activities. Traumatic brain injury is an important factor of neurodegenerative diseases, which may lead to Parkinson's disease and seriously endanger people's health. D'Amico R^[23] and others made protein blot and immunohistochemical analysis on the brain of mice after the impact by simulating traumatic brain injury. It was found that the expressions of tyrosine hydroxylase and dopamine transporter decreased significantly after brain injury in mice, but *Hericium erinaceus* could recover after oral administration every day, indicating that *Hericium erinaceus* can effectively prevent the occurrence of neurodegenerative diseases such as Parkinson's disease. Choi W S^[24] et al. studied the ability of ethanol extract of *Hericium erinaceus* to reduce cholesterol level in rats fed with high-fat diet. The results showed that the ethanol extract of *Hericium erinaceus* could reduce the levels of total cholesterol, low-density lipoprotein cholesterol and triglyceride and increase the content of high-density lipoprotein cholesterol in rats fed with high-fat diet. *Hericium erinaceus* contains *Hericium erinaceus* ketone and *Hericium erinaceus* element, which can effectively relieve anxiety caused by persistent sleep disorder. And Li T J^[25] et al carried out a nine-day tail suspension test on mice to simulate the situation of sleep interruption. They were divided into two groups: taking *Hericium erinaceus* orally 20 minutes before the tail suspension test and not taking *Hericium erinaceus*. EEG and EMG were used to record the sleep situation and conduct behavioral activities of mice. The results show that the anxiety of mice taking *Hericium erinaceus* is not obvious, so it is concluded that *Hericium erinaceus* can improve sleep and interfere with anxiety. Hou C^[26] evaluated the protective effect of *Hericium erinaceus* polysaccharide on ethanol-induced gastric mucosal injury in rats, and found that *Hericium erinaceus* polysaccharide had obvious protective effect on gastric mucosal injury. The *in vivo* and *in vitro* studies of mouse and human cell

lines by Winder M^[27] showed that some substances contained in *Hericium erinaceus* extract had immunomodulatory, potential anticancer, anti-inflammatory and nerve regeneration effects. Yang S Y^[28] et al found that *Hericium erinaceus* can relieve the pain of knee arthritis caused by anterior cruciate ligament transection in rats, and reduce the degeneration of articular cartilage and the increase of bone erosion. A large number of studies show that *Hericium erinaceus* is expected to become a functional food for the treatment of osteoarthritis. To sum up, the intake of *Hericium erinaceus* can reduce gastric mucosal damage, reduce the levels of total cholesterol, low-density lipoprotein cholesterol and triglyceride, increase the content of high-density lipoprotein cholesterol, promote nerve growth, improve sleep and relieve anxiety, and effectively protect health.

With the deepening of people's understanding of *Agaricus blazei* Murill, more and more attention has been paid to the application of its active components in anti-tumor, hypoglycemic, hypolipidemic, anti-aging and antioxidant. Li Y^[29] compared with ABP group, *Agaricus blazei* polysaccharide can improve dyslipidemia by regulating intestinal flora in rats. At the same time, Wang W^[30] et al conducted intrathecal injection experiments on mice, which showed that polysaccharide could effectively alleviate the oxidative stress and inflammatory reaction of liver and lung injury. In the research of Hu Die^[31], the control effect of crude polysaccharide from *Agaricus blazei* Murill on tobacco mosaic virus was determined by half-leaf method, point injection test and systemic host infection activity evaluation. The results showed that the control effect of crude polysaccharide from *Agaricus blazei* Murill was over 60%, the inhibition rate was 38.18% and the control effect was as high as 76.81%. Feng Qingxia^[32] preliminarily extracted the polypeptide from *Agaricus blazei* Murill by ammonium sulfate precipitation and enzymatic hydrolysis, and obtained three kinds of polypeptide monomers by purification. By using comparative experiments, behavioral experiments were carried out on mice. The results showed that the polypeptide improved the oxidative stress loss in mice and played an anti-aging role. People can only get polyphenols from food, and polyphenols mainly exist in edible fungi and plants, which have anti-inflammatory and antioxidant activities. Wei Qi^[10] comprehensively evaluated the hypoglycemic effect of *Agaricus blazei* polyphenols by establishing a diabetic rat model and regularly detecting the weight, fasting blood glucose level and glucose tolerance of rats. The results showed that *Agaricus blazei* Polyphenols could reduce fasting blood glucose and glucose tolerance, and had hypoglycemic effect. In addition, the

antioxidant and hypolipidemic effects of *Agaricus blazei* Murill polyphenols on rats were also explored. Chen Zhuojuan^[33] *et al.* used the fruiting body of *Agaricus blazei* as raw material to prepare the enzymatic hydrolysate of *Agaricus blazei* through enzymatic hydrolysis, and measured the antioxidant activity of the enzymatic hydrolysate of *Agaricus blazei* with DPPH radical scavenging rate as the experimental index. The results showed that the DPPH radical scavenging rate of the enzymatic hydrolysate of *Agaricus blazei* was 69.13%. Ishii P L^[34] and others evaluated the anti-tumor and immunomodulatory effects of daily feeding *Agaricus blazei* Murrill food, and found that the growth of sarcoma in mice was inhibited and the immune system also changed significantly. To sum up, through animal experiments, it can be concluded that the active ingredients contained in *Agaricus blazei* Murill include polysaccharides, peptides and polyphenols, which have significant effects in reducing blood fat, antioxidation and blood sugar. Diseases have brought people endless problems such as atherosclerosis, hypertension and hyperlipidemia, and the development of these edible fungi with active ingredients into food will greatly help prevent people's health problems.

4 Research progress in processing and application of edible fungi

The main raw materials and functional characteristics of the two kinds of edible fungi are summarized in Table 2.

As can be seen from Table 2, *Hericium erinaceus* has a unique flavor, delicious taste, various active ingredients and various functional characteristics, and is widely used in food, medicine and health food. Some scholars study, when the amount of *Hericium erinaceus* powder is 8%, the water absorption rate of the semi-dried surface of *Hericium erinaceus* powder is 140.5%, and the light transmittance is 89.74%. In Ma Qiang^[35] and others article, it is summarized that *Hericium erinaceus* polysaccharide can be made into *Hericium erinaceus* tablets and *Hericium erinaceus* Jianwei capsules, which can improve gastrointestinal diseases to some extent, and *Hericium erinaceus* gastrointestinal health oral liquid and *Hericium erinaceus* essence capsules can be made into health food. In addition to its own processing and application, *Hericium erinaceus* can be compounded with other

foods to give full play to its edible value. There are scholars made *Hericium erinaceus* brewing powder with 7.4% *Hericium erinaceus* and soft sugar, 38.9% red dates and 46.3% milk powder, and analyzed its brewing properties. The results showed that the solubility of *Hericium erinaceus* brewing powder was 91.44%, and its brewing properties were good. Although *Hericium erinaceus* has many biological activities, it is not easy to preserve, so it is often dried after picking and rehydrated after drying, but it often produces bitterness, which limits deep processing. Added bananas and *Hericium erinaceus* powder to milk, and then fermented it to make *Hericium erinaceus* powder banana yogurt, which not only had delicate texture and refreshing taste, but also neutralized the bitter taste of *Hericium erinaceus* powder. Therefore, in order to remove its bitter taste, it can be fermented with other foods, which can not only utilize *Hericium erinaceus* resources, but also promote the development of fermented products. *Hericium erinaceus* is also often used in condiments. Geng Ji^[36] processes *Hericium erinaceus* and beef, and makes *Hericium erinaceus* beef sauce with bright color and mellow taste. Huang Hesheng^[37] fermented glutinous rice and *Hericium erinaceus* to form *Hericium erinaceus* cooking wine. Compared with ordinary cooking wine, *Hericium erinaceus* cooking wine has antioxidant activity. In addition to the processing and application of *Hericium erinaceus*, it is also used in bread, beverage, porridge, cake and sausage.

The processed products of *Agaricus blazei* Murill mostly exist in fresh and dried products, and are rarely used in deep processing products. Huang Xiao^[38] and others hydrolyzed *Agaricus blazei* Murill by enzymatic hydrolysis, and a variety of active components in it were dissolved out to make enzymatic hydrolysate. The original nutritional value of the prepared *Agaricus blazei* Murill beverage was preserved, and its unique flavor was maintained, with almond aroma and smooth taste. Wang Xin^[39] and others used *Ganoderma lucidum* and *Agaricus blazei* as raw materials, and developed a compound yogurt of *Ganoderma lucidum* and *Agaricus blazei* through process optimization. The protein content of the yogurt was higher than that of ordinary yogurt, and it was delicate in appearance and mellow in taste. Fang Xue^[40] have also developed yogurt with nutritional and health care functions, which is in a good state in

Table 2 Main raw materials of edible fungi and their applied products

Edible mushrooms	Main raw materials	Application product	References
<i>Hericium erinaceus</i>	<i>Hericium erinaceus</i> powder	<i>Hericium erinaceus</i> powder semi-dry noodles	-
	<i>Hericium erinaceus</i> polysaccharide	<i>Hericium erinaceus</i> tablets, <i>Hericium erinaceus</i> Jianwei capsules, <i>Hericium erinaceus</i> gastrointestinal health oral liquid and <i>Hericium erinaceus</i> essence capsules.	[35]
	<i>Hericium erinaceus</i> , soft sugar, red dates, milk powder	<i>Hericium erinaceus</i> powder	-
	Milk, bananas and <i>Hericium erinaceus</i> powder	<i>Hericium erinaceus</i> powder banana yogurt	-
	<i>Hericium erinaceus</i> , beef and winter vegetables	<i>Hericium erinaceus</i> beef sauce and <i>Hericium erinaceus</i> winter vegetable chilli sauce	[36]
	Glutinous rice and <i>Hericium erinaceus</i>	<i>Hericium erinaceus</i> cooking wine	[37]
	other	Bread, drinks, porridge, cakes and sausages	-
	Enzymatic hydrolysate of <i>Agaricus blazei</i> Murill	<i>Agaricus blazei</i> drink	[38]
	<i>Ganoderma lucidum</i> and <i>Agaricus blazei</i> Murill	<i>Ganoderma lucidum</i> and <i>Agaricus blazei</i> compound yogurt	[39, 40]
	<i>Agaricus blazei</i> , pork	<i>Agaricus blazei</i> recombinant pork breast	[41]
<i>Agaricus blazei</i> Murill	<i>Agaricus blazei</i> and wheat flour	<i>Agaricus blazei</i> noodle	[42]
	<i>Agaricus blazei</i> , bovine bone meal	<i>Agaricus blazei</i> Bovine Bone Powder Crispy Biscuit	-
	<i>Agaricus blazei</i> , tea	<i>Agaricus blazei</i> health tea	[43]
	Fermentation broth of <i>Agaricus blazei</i> mycelium and yeast fermentation broth	<i>Agaricus blazei</i> health wine	[44]

color and taste. Fan Jinshan^[41] and others developed the recombinant pork jerky rich in *Agaricus blazei* Murill, which is rich in nutritional components and functional active components, meets the requirements of modern people for healthy food and has broad market prospects. Zhen Jiamei^[42] and others used *Agaricus blazei* Murill and wheat flour as raw materials to produce *Agaricus blazei* Murill noodles. The results showed that the addition of *Agaricus blazei* Murill increased the total dietary fiber and protein content of noodles, and improved the nutritional value of noodles. And optimized the formula of crisp biscuits made of *Agaricus blazei* Murill beef bone powder by orthogonal test. When the addition of *Agaricus blazei* Murill powder was 6%, the biscuits produced were unique in flavor, crisp in mouth and high in nutritional value. The active ingredients of *Agaricus blazei* are very beneficial to human health, so they are often developed into health food. Bao Xiangping^[43] used a new formula of *Agaricus blazei* cultivation medium to develop *Agaricus blazei* health tea with tea, and measured the contents of total nitrogen, amino acids, trace elements and polysaccharides in *Agaricus blazei* health tea by Kjeldahl method, high performance liquid chromatography and phenol-sulfuric acid method respectively. The results showed that protein, amino acids and trace elements of *Agaricus blazei* health tea were not greatly lost, and the extraction rate of polysaccharide was 445 mg/g when brewed in 500 mL boiling water. At the same time, Li Ying^[44] used the fermentation broth of *Agaricus blazei* mycelium and yeast fermentation broth for submerged fermentation to prepare *Agaricus blazei* health wine. The wine was golden and bright in color, smooth in taste and rich in nutrition, which not only met people's demand for wine, but also provided rich nutritional value.

5 Conclusion and prospect

People are more and more familiar with the research and utilization of edible fungi, among which *Hericium erinaceus* and *Agaricus blazei* Murill are widely used, and their active components and functional characteristics have made great contributions to human health. Among them, the active components such as polysaccharides, peptides, polyphenols and ergosterol contained in *Hericium erinaceus* and *Agaricus blazei* Murill play important roles in reducing blood fat, antioxidation, lowering blood sugar and protecting gastric mucosa. However, while studying its active components at home and abroad, there is little research on the structural composition of the active components, and there are many studies on the active components and functional characteristics of polysaccharides. *Hericium erinaceus* is widely used in medicine and food, which can not only exert medicinal value, but also increase its function on food, so as to develop more functional food. The products of *Agaricus blazei* Murill are relatively few, especially the deep-processed products, which mostly exist as fresh or dried products. The possible reason is that the active ingredients of *Agaricus blazei* Murill will be lost or destroyed during the deep-processing process, while the fresh or dried products are only preserved by physical methods, which has little influence on their active ingredients. Therefore, with the rise of fast-food culture and the development of fast-paced life, deep-processed products with easy preservation and long validity period can meet people's needs more easily, but food safety problems inevitably arise due to the addition of chemical reagents. Therefore, the preparation technology of edible mushroom functional food is not only satisfying nutrition and taste, but also safe and harmless to human body.

Conflicts of interest

The authors declare that there are no conflicts of interest in this work.

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