



Oyster Mushroom: From Nutritional Richness to Functional Food for Health

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Oyster mushroom (*Pleurotus* spp.) is known to be an excellent source of many essential nutrients. In addition to being a rich source of protein, dietary fiber, vitamins, and minerals; oyster mushroom also contains various bio-active compounds such as beta-glucans, phenolic compounds, ergothioneine, and ergosterol. The abundance of both macro- and micro-nutrients, combined with the presence of multiple bioactive compounds, contributes to the growing interest in oyster mushroom as a functional food and as a potential source of health promoting components. Studies have demonstrated that regular consumption of oyster mushroom may have beneficial effects on metabolic processes, cardiovascular system, immune system, and gastrointestinal tract. Furthermore, due to its low fat content and valuable nutrient profile, oyster mushroom represents an ideal food for individuals who seek to incorporate healthier foods into their diet. Although limited human studies exist; there is emerging evidence suggesting that oyster mushroom may possess antidiabetic properties through improved postprandial glucose control and increased insulin sensitivity. Finally, oyster mushroom can be used to produce stable ingredients for a variety of culinary applications providing opportunities for value-added products and enhanced utilization.

Introduction

Oyster mushrooms (*Pleurotus* spp.) are among the most common types of edible mushrooms worldwide because they are both highly nutritious and can be cultivated sustainably using agricultural and other waste materials. By growing oyster mushrooms, it becomes possible to transform inexpensive biomass into valuable food sources and to make good use of agricultural waste products. Oyster mushrooms are not only a great source of protein, dietary fiber, carbohydrates, vitamins and minerals, but they are also very lean in terms of fat content. They contain many bioactive molecules that could possibly provide health benefits. Since fresh oyster mushrooms typically consist of about 90% water and spoil quickly at room temperature, it is important to process and/or preserve them. Processing and preservation techniques include drying, grinding into powders, etc., and can help extend the shelf life of oyster mushrooms when stored at room temperature. These processing and preservation methods can also lead to the creation of convenient food items made with oyster mushrooms. Moreover, processing and preservation techniques can help reduce the amount of spoilage and loss that occurs after harvesting. Therefore, oyster mushroom represents a novel food item that possesses multiple characteristics such as excellent nutritional value, functional properties, potential health promotion capabilities, and opportunities for adding value through processing and sustainable food production (Ritota & Manzi, 2023; Araujo et al., 2025).

Why are Oyster Mushrooms Important from a Nutritional Perspective?

Oyster mushrooms offer a wide range of nutritional benefits due to their diverse chemical composition. In addition to being rich in proteins, dietary fibers, vitamins and minerals, they also tend to be lower in fat content.



The nutritional value of oyster mushrooms may vary depending upon the species/strain of the mushroom, the growing substrate used, the developmental stage of the mushroom and/or the analytical method employed. Protein is essential for maintaining tissue structure and providing adequate dietary protein intake. Dietary fiber has been shown to improve digestive function and help regulate blood sugar levels and lipid levels. Additionally, B group vitamins are necessary for proper energy metabolism while many mineral elements such as potassium, phosphorus, iron and zinc serve multiple functions throughout the body. As well as these nutrients, oyster mushrooms provide additional functional properties through beta-glucans and other bioactive compounds (Lesa et al., 2022; Araujo et al., 2025). As such, the importance of oyster mushrooms as a food source does not rely on the presence of individual nutrients but rather on the synergistic effects of various macronutrients, micronutrients and bioactive compounds which make them an ideal candidate for inclusion in a healthy diet.

Table 1. Representative Nutritional Composition of *Pleurotus ostreatus*

Proximate component	Approximate content
Moisture	85–95%
Protein	17–42%
Carbohydrate	37–48%
Dietary fibre	24–31%
Fat	0.5–5%
Ash	5.7–10.9%

Note: Moisture is expressed on a fresh-weight basis, while other values are expressed on a dry-weight basis. Source: Lesa et al. (2022).

Oyster Mushroom as Functional Food

Functional foods are defined as those foods that provide additional health-promoting benefits beyond basic nutritional requirements. Oyster mushrooms (*Pleurotus* spp.) have been identified as functional foods because they contain a number of biologically active compounds and essential nutrients that may contribute to improved health. The functional attributes of oyster mushrooms include:

- **Nutritional Profile:** Oyster mushrooms are rich in proteins, dietary fibers, vitamins and minerals. In addition, they are generally low in fat.

- **Beta-Glucans:** Beta-glucans are complex carbohydrates (polysaccharides) found in the cell walls of fungi. Researchers have evaluated beta-glucans for their potential immunomodulatory and metabolic activities.
- **Antioxidants:** Phenolic compounds present in oyster mushrooms exhibit antioxidant activity and may help protect cells from damage caused by free radicals generated during normal physiological processes.
- **Ergothioneine:** Ergothioneine is an antioxidant that is synthesized naturally by fungi including oyster mushrooms. Because ergothioneine has been demonstrated to have the potential to prevent cellular damage and promote healthy aging, there has been increasing interest among researchers regarding this compound.
- **Ergosterol and Vitamin D2:** Ergosterol is a type of sterol that exists only in fungi such as oyster mushrooms. When exposed to ultraviolet radiation, ergosterol is converted to vitamin D2. Therefore, ergosterol provides a means for increasing the nutritional value of mushrooms.

Health-Promoting Properties of Oyster Mushroom

The oyster mushroom has numerous nutrient-rich and bioactive properties that have demonstrated advantages for many areas of an individual's overall health including: 1. Antioxidant defense. 2. Metabolic health. 3. Cardiovascular function. 4. Gut health. 5. Immune health.

- **Antioxidant Defense-** oyster mushroom has phenolic compounds and ergothioneine, both of which are related to its antioxidant effects and may help prevent oxidative damage to cells.
- **Anti-Diabetic and Metabolic Health-** dietary fiber and beta-glucans can influence how well the body digests, absorbs, and metabolizes glucose. While there is limited evidence that *Pleurotus* mushrooms may improve glucose and lipid metabolism, more human-based research is required.
- **Cardiovascular Health-** with its relatively low fat content, high levels of dietary fiber, and presence of bioactive compounds, oyster mushroom can be included in diets designed to promote cardiovascular health. Researchers have investigated whether oyster mushroom can positively impact cholesterol, triglycerides, and other cardiometabolic indicators.
- **Gut Health-** dietary fiber and polysaccharide components found in mushrooms may interact with the microorganisms living in the intestines (gut microbiota) and thus support intestinal and metabolic health. Investigating the ability of *Pleurotus* to modify the composition and/or activity of the gut microbiota represents a growing area of study.
- **Immune Health-** the immunomodulatory effects of beta-glucans have been examined. Results from animal studies are encouraging; however, human-based studies examining the immunomodulatory effects of beta-glucans are limited.
- **Healthy Aging-** oyster mushroom contains protein, fiber, micronutrients, ergothioneine, and beta-glucans. Given the presence of these components, oyster mushroom may represent a potential candidate for studies focusing on promoting healthy aging and protecting cells from environmental stressors.

Value Addition and Product Development

Oyster mushrooms is an important aspect of the food industry. Oyster mushrooms are a very perishable product due to their high moisture content. Therefore, it is necessary to develop methods to preserve them and increase their shelf life. Drying, dehydration and powdering are some methods that may be used to extend the shelf life of oyster mushrooms. Once the oyster mushrooms have been processed in this manner they can then be used as a food ingredient. Oyster mushroom powder can be added to many types of value-added foods including biscuits, bread, pasta, soup, snacks, laddu, pickle and other ready-to-eat (RTE) and ready-to-cook (RTC) products. These types of products will not only provide increased nutritional value but also provide convenience and ease of consumption of oyster mushrooms. The newly developed

products can be assessed based on sensory acceptability, nutritional composition, microbiological quality and storage stability.

Conclusion

The oyster mushroom represents a new "superfood" from a nutritional standpoint as it contains protein, dietary fiber, micronutrients, low levels of total fat, and has an extensive variety of bioactive components. In addition to being consumed fresh, this mushroom can be dried, powdered, and incorporated into products to provide a practical functional ingredient for today's ready-to-eat (RTE) and ready-to-cook (RTC) foods. There is currently substantial evidence supporting several promising functional attributes of oyster mushrooms; however, additional clinical trials using humans are needed to support specific therapeutic claims. The most significant opportunity for oyster mushrooms is to integrate nutrition, food science, value-added processing, and sustainable production to produce evidence-based mushroom-based foods that contribute to healthier eating patterns.

References

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