Determination of the Quality and Nutrition of Seven Edible Fungi

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Abstract: In this study, Lentinus amygdalin (Pleurotus ostreatus) and Lentinus edodes (Pleurotus ostreatus), which were main grown in Sichuan Province, were selected as the research objects, and analytical instruments, such as UV VIS spectrophotometer and electronic analytical balance, were used to determine the nutritional quality and analyze them, aiming to determine the quality and nutritional composition of more common edible mushrooms, to provide a theoretical basis and technical guidance for the development and use of local food bacteria resources and industrial research. The test results showed that the measured edible mushrooms were rich in proteins, sugars and vitamin C, and they were edible and medicinal resources with umami taste, comprehensive nutrition, reasonable ratio and great development value.

1 INTRODUCTION

Broad edible mushroom mainly include all kinds of edible fungi; narrow edible mushroom refer to all large fungi that can form the bacterial nucleus, and large fungi that can form large frame solid meat or gum, edible fungi (Jing, 2019); (Wang, Zhang, 2017). At present, China is still the first country to cultivate and use edible fungi. The widely cultivated edible fungi in China mainly include lentinus edodes, grass mushroom, flat mushroom, oyster mushroom, slippery mushroom, black fungus, tremella. While fully mastering the excellent variety breeding technology, improving seed production and cultivation methods, the survival rate and scale of edible fungi are also growing rapidly. China's edible fungus industry has risen all over the country, and the quality requirements of edible fungi are becoming more and more strict.

From the domestic market prospect, China's edible fungus production and consumption potential is huge (Chen, 2011). More than 60 varieties of edible fungi are cultivated artificially every year (Song, Ke, 2021). Artificial cultured mycelium accelerates the breeding rate of edible fungi and the possibility of achieving high yield, and some countries have established mushroom sheds and mushroom factories with an annual output of more than 1,000 tons. Planting of edible fungus has become an important part of China's agriculture, and has played an important role in the adjustment of agricultural industrial structure and helping farmers to increase their income (Zheng, 2008).

The vitamin content in edible fungi is generally higher than in plant food, among which the vitamin C content is higher. Regular consumption of edible fungi, can prevent or reduce vitamin deficiency, improve the body's immunity. It is not only rich in vitamins, protein, sugar and other nutrients, but also essential amino acids (Li, Wang, 2016). Polyaccharides and other active substances in edible fungi have anti-cancer, lowering blood fat, blood sugar (Chen, 2012).

As an organic, nutritious and healthy green food, edible fungus is paid more and more attention and loved by people of all countries due to its higher nutrition, medicinal and health value of edible fungi. At present, the research on edible fungi at home and abroad mainly focuses on the separation and purification of total sugar, polysaccharide and reduced sugar and its antioxidant activity evaluation (Xu, Cai, Wang, 2010); (Xu, 2016); (Zhang, 2016), Biological activity (Ganoderma lucidum, 2012); (Jiang, Gu, 2005) In other aspects, less research on the determination and analysis of subentities. Chinese people often say that "Food is the paramount necessity of the people". In the 21st century, they pay more attention to "food tonic" as a way of health.

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However, there is not much research on the nutritional differentiation of edible fungi in China, and the people know little about the composition of edible fungi and their corresponding functions. This experiment determined and analyzed the nutrients of 7 edible fungi mainly planted in our province (Shi, Shao, 2003). The aim is to horizontally compare the quality and nutritional composition of common edible fungi such as Pleurotus ostreatus, lentinus edodes and Flammulina mushroom, make contributions to the full use of edible fungus resources, broaden the processing and development path of edible fungus industry, and provide theoretical basis and technical guidance for the research of the nutritional value of edible fungi.

2 MATERIALS AND METHODS

2.1 Test Materials

Six kinds of edible fungus fresh entity Pleurotus mushroom (*Pleurotus eryngii*),white jade mushroom (*white Hypsizygus marmoreus*), Flammulina mushroom (*Flammulina velutipes*), sea mushroom (*Hypsizygus marmoreus* (Peck) H.E.Bigelow), Pleurotus ostreatus (*Pleurotus ostreatus*), lentinus edodes (*Lentinus edodes* (Berk.)sing) picked from Edible Fungi Demonstration Base of Jinkou River District, Leshan City, Sichuan Province, selected fresh edible fungus without pests or mechanical damage, consistent maturity, uniform size, full shape; one kind of dried edible fungus black fungus(Auricularia auricular (L.ex Hook.)Underw), provided by Leshan Hongxiang Fungus Industry. Determination of edible fungi immediately after procurement, and other fresh edible fungus entities not tested were transferred into the self-sealed bag and placed in the foam plastic box with ice bags. The dry sample is dried with 50 ℃ electric thermal constant temperature blast dry box for 6 h, over 20 eyes (0.9 mm) sieve and put in the covered glass bottle for standby.

2.2 Test Method

2.2.1 Determination of Moisture Content of Seven Edible Fungi

Refer to the Direct drying of of ure in GB 5009.3-2016 *National Standard of food Safety — Determination of moisture in food* (Determination of moisture in GB/T 5009.3-2016, foods.).

2.2.2 Determination of Soluble Protein Content of Seven Edible Fungi

Refer to Wang Weiguo to test the Masbright Blue Law (Wang, Wu, 2003), Standard curve is y=0.0089x-0.0302, R2=0.9958.

2.2.3 Determination of Vitamin C of Seven Edible Fungi

Refer to the GB 5009.86-2016 *Determination of Ascorbic Acid in the National Standard for Food Safety and Food*.

2.2.4 Determination of Total Sugar Content of Seven Edible Fungi

Referring to GB 15672-1995 *National standard for food safety Method for Determination of total sugar content of edible fungi* and Liu Budong Tittration Method (Liu, 2008); (GB /T 15672-1995).

Microsoft Excel 2010 software and DPS software and Duncan using the new complex polar difference method in ANOVA analysis. lowercase letters indicate a significant level of σ =0.05.

3 RESULTS AND ANALYSIS

3.1 Water Content in Seven Edible Fungi

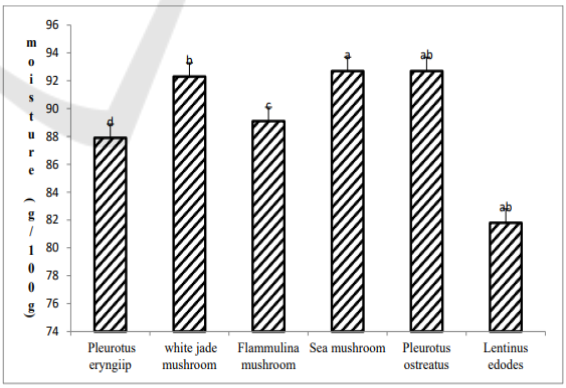

Figure 1: Determination Results of Water Content in Seven Edible Fungi.

The large amount of water contained in the edible fungus determines the characteristics of the edible fungus entities that look fresh and delicious. Water content and distribution will directly affect the appearance, tenderness, flavor and freshness of the sea mushroomsea mushroom entity (Xu, Cai, Wang,

2010). It is directly related to the storage characteristics of edible fungi. It can be seen that the moisture content of 6 kinds of edible fungi is: Sea mushroom> Pleurotus ostreatus> white jade mushroom> Flammulina mushroom> Pleurotus mushroom> Lentinus edodes. This research results show that the moisture of edible fungi is basically 81%~93%. The test data of DPS analysis software showed that at 0.05 (Zhang, 2012), the water content of instant black fungus was not significantly different from fresh mushroom, Pleurotus ostreatus and white jade mushroom; the water content and Pleurotus ostreatus; the water content of sea mushroom and Flammulina mushroom were not significantly different.

3.2 Soluble Protein Content in Seven Edible Fungi

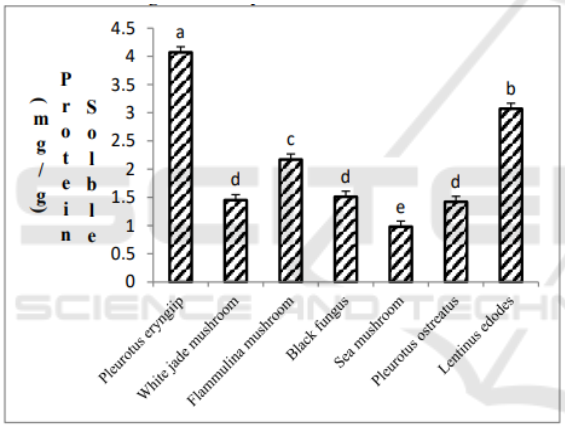

Figure 2: Determination of Solble Protein in Seven Edible Fungi.

Protein is the most important component in food nutrition and is of great significance to the rational development and utilization of food resources and improving product quality (Huang, Liu, 2014). Usually the higher the protein content of the subentity, the better the quality, the protein content generally accounts for 3%~4% of the fresh weight, and 3~6 times higher than vegetables (Jing, 2019) It can be seen that the soluble protein content of 6 edible mushroom and one instant dried mushroom is: Pleurotus mushroom>Lentinus edodes>Flammulina mushroom>Black fungus>White jade mushroom>Pleurotus ostreatus>Sea mushroom. The results showed that Pleurotus mushroom had more soluble protein content. Through DPS analysis software, it is found that at 0.05 level. Pleurotus mushroom and black fungus, black fungus and white jade mushroom were significantly different, and that of black fungus and sea mushroom.

3.3 Vitamin C Content in Seven Edible Fungi

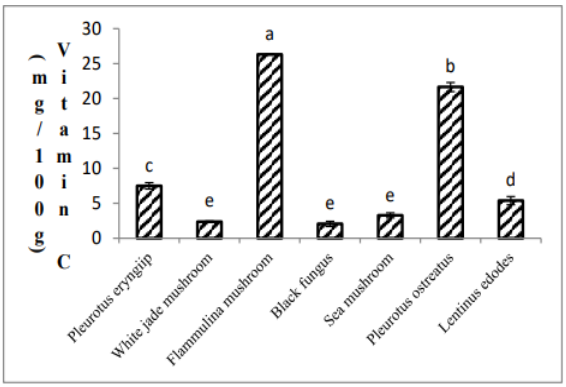

Figure 3: Determination of Vitamin C in Seven Edible Fungi.

Vitamin C, also known as ascorbic acid, has the function of preventing and treating iron deficiency anemia, can enhance human body immunity and resistance, and can supplement the lack of nutrients in other natural foods (Zeng, 2005). Vitamin C is light-sensitive, and the dye 2,6 dichloroindigo phenol turns pink in an acidic solution and becomes colorless when reduced. In the absence of impurities and color interference, the amount of 2,6-sodium dichloroloindigo phenol slurry solution in a certain range was proportional to the ascorbic acid content in the sample. It can be seen that the vitamin C content of 6 edible mushrooms and 1 kind of instant dried mushroom are: Flammulina mushroom> Pleurotus ostreatus> Pleurotus mushroom> Lentinus edodes> Sea mushroom> White jade mushroom > Black fungus. The results of this study show that Flammulina mushroom contains more vitamin C. Through DPS analysis software, it is found that at 0.05 level, vitamin C content was significantly different from Pleurotus ostreatus, Pleurotus mushroom, Lentinus edodes and vitamin C content from white jade mushroom and black fungus. Vitamin C content of sea mushroom is not significantly different from white jade mushroom and black fungus.

3.4 Total Sugar Content in Seven Edible Fungi

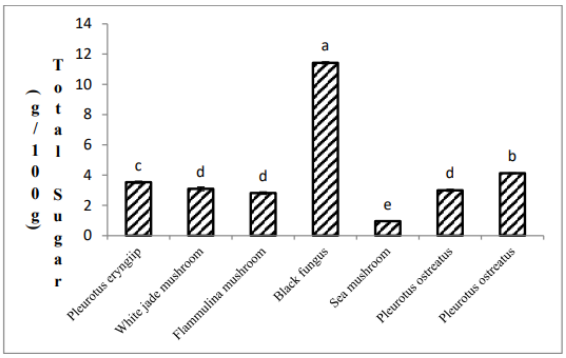

Figure 4: Determination Results of Total Sugar Content in Seven Edible Fungi.

Total sugar is one of the most important nutritional indicators of edible fungi, is the general name of monosaccharides polysaccharides, cellulose and semi-fiber (Zhao, Ma, 2010). Mushroom polysaccharide, poria cocos polysaccharide, ganoderma polysaccharide as a clinical means of treatment or auxiliary physical therapy, to provide treatment ideas for intractable diseases such as tumor and chronic pneumonia (Wang, Zhang, 2017). The method used in this test is to hydrolyze the total sugar acid to reduced sugar, and then drip to the pale yellow end point, the total sugar content can be measured according to the sample consumption. It can be seen that the total sugar content in the 7 kinds of edible fungi is: black fungus> Lentinus edodes> Pleurotus mushroom> white jade mushroom> Pleurotus ostreatus> Flammulina mushroom > sea mushroom. The experimental results show that the total sugar content of black fungus is higher. The experimental results show that the total sugar content of black fungus is higher. Through DPS analysis software, it is found that at the 0.05 level, the total sugar content of black fungus and the Lentinus edodes, the total sugar content and the total sugar content of Flammulina mushroom and the Sea mushroom. general name of monosaccharides.

4 CONCLUSION

After the determination of the nutritional composition of edible fungi, it can be found that although the nutritional content of different edible fungi varies greatly, the edible fungi are measured with the characteristics of sufficient moisture, high protein, vitamin C and sugar content, all of which have high nutritional value and the development prospect of deep processing health care products. Pleurotus ostreatus and Sea mushrooms have the highest moisture content of 92.7 g/100g; Pleurotus mushroom is the highest among measured edible fungi, 4.07 mg/g, and balanced nutrition content; Flammulina and Pleurotus ostreatus have high vitamin C, 26.31 mg/100 g and 21.65 mg/100 g; Black fungus has the highest total sugar content of 11.42 g/100 g Different groups can choose to eat different edible fungi daily to achieve the purpose of eating supplements, Johnson and Johnson; or some patients can choose deep processing products or health care products with edible fungi as raw materials, easy to absorb, and to achieve the effect of "food therapy" to maintain the balance of physical physical indicators.

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