

Nutritional Importance of Mushroom Cultivation

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Introduction

Since earliest times mushrooms have been treated as a special kind of food. The Greeks believed that mushroom provided strength for warriors in battle. The Pharaohs prized mushrooms as delicacy and Romans regarded mushrooms as a “Food of the God”. Some mushrooms are a food of good nutritional value, some have medicinal value as dietary supplement and there are some that have both properties. The people has become increasingly concerned about health and nutrition matters in recent years and it has sparked commercialization natural foods like mushroom.

Importance of Mushroom

Mushroom is considered to be a complete, health food and suitable for all age groups. The nutritional value of mushroom is affected by numerous factors such as species, stage of development and environmental condition. Mushrooms are rich in protein, dietary fiber, vitamins and minerals. In addition to nutritional value, mushroom possess unique color, taste, aroma and texture, which make them attractive for human consumption.

A. Protein

The protein content of four popular mushrooms, *Agaricus bisporus*, *Lentinula edodes*, *Pleurotus* spp., and *Volvariella volvacea* which are commercially cultivated, ranges from 1.75 to 3.63% of their fresh weight. On a dry weight basis, mushrooms normally contain 19 to 35% protein as compared to 7.3% in rice, 13.2% in wheat, 39.1% in soybean and 25.2% in milk. Therefore, in amount of crude protein, mushrooms rank well above most plant products, including milk which is an animal product.

Proximate protein content in some mushrooms

Species	Protein content (% DWB)
<i>Volvariella volvacea</i>	21.32
<i>Agaricus bisporus</i>	27.80
<i>Pleurotus ostreatus</i>	27.40
<i>Pleurotus florida</i>	37.19
<i>Pleurotus sajor-caju</i>	36.94
<i>Lentinula edodes</i>	17.50
<i>Auricularia auricula</i>	8.10
<i>Flammulina velutipes</i>	21.90

B. Essential amino acids

Proteins are made up from over 20 amino acids in varying amounts, out of which 9 are essential amino acids (Leucine, Isoleucine, Valine, Tryptophan, Lysine, Threonine, Phenylalanine, Methionine, and Histidine). The plant foods often lack some of the important amino acids; e.g. cereal grains have too little lysine and pulses usually lack the methionine and tryptophan. The protein of commonly cultivated mushrooms contains all 9 amino acids essential for humans. In mushroom, the most abundant essential amino acid is lysine and the lowest levels among the essential amino acids are those of tryptophan and methionine. In mushrooms, in addition to essential amino acids, the less common amino acids such as methionine sulfoxides, cystic acid, phosphoserine, citrulline, ornithine etc. are also present.

C. Fat

The fat content in different mushroom ranges from 1.12 to 8.30% on dry weight basis with an average content of 4%. In general, the crude fat of mushrooms has representative of all classes of lipid compounds including free fatty acids, monoglycerides, diglycerides, triglycerides, sterols, sterol esters, and phospholipids. Cholesterol level in mushroom is very low or absent and high content of ergosterol is present. At least 72% of the total fatty acids have been found to be unsaturated in mushroom. The high content of unsaturated fatty acids is mainly due to linoleic acid, which is 76% in *L. edodes*, 70% in *V. volvacea* and 69% in *A. bisporus* of the total fatty acids. Unsaturated fatty acids are essential in our diet, whereas saturated fatty acids, which are present in animal fats, may be harmful to our health.

D. Vitamins

Mushrooms are a good source for several vitamins including thiamine (vit. B₁), riboflavin (vit. B₂), niacin, biotin and ascorbic acid (vit. C). The thiamine content in some mushrooms is 0.32 mg in *V. volvacea*, 1.1 mg in *A. bisporus*, 1.16 to 1.80 mg in *Pleurotus* spp. and 7.8 mg in *L. edodes*. The niacin content varies from species to species i.e. 54.9 mg in *L. edodes*, 47.55 mg in *V. volvacea*, 55.7 mg in *A. bisporus*, and 46.19 to 64.88. mg in *Pleurotus* spp. The riboflavin content was higher in *A. bisporus* (5.0 mg), and *L. edodes* (4.9 mg) than in *V. volvacea* (1.63 mg). *L. edodes* had the highest vit. C (ascorbic acid) content (9.4 mg/100 g dry wt.), the other mushrooms were having 1.4 mg in *V. volvacea*, 1.8 mg in *A. bisporus*, and 7.4 mg in *Pleurotus sajor-caju*. Mushrooms are rich in ergosterol which later converts into Vit. D in our body.

E. Carbohydrate & fiber

Pentoses, Hexoses, disaccharides, sugar alcohols, amino sugars and sugar acids are major constituents of mushroom carbohydrates. *Pleurotus* spp contain carbohydrates, ranging from 46.6 to 81.8% as compared to 60% in *A. bisporus* on dry wt. basis. The polysaccharides present in mushroom have ability to inhibit the growth of tumor. Fiber is considered to be an important ingredient in a balanced and healthy diet. The fiber content ranges from 7.4 to 27.6% in *Pleurotus* spp., 10.4% in *A. bisporus* and 4 to 20% in *V. volvacea*.

F. Minerals



The major mineral constituents of mushrooms are potassium (K), phosphorus (P), sodium (Na), calcium (Ca) and magnesium (Mg). Major minerals, constitute about 56-70% of total ash content. Potassium is particularly abundant and accounts for nearly 45% of the total ash content. Na and Ca are present in approximately equal concentrations in all the mushrooms except for *L. edodes* in which Ca is present in large amount. The minor mineral constituents of mushrooms are copper (Cu), Zinc (Zn), iron (Fe), manganese (Mn), molybdenum (Mo) and Cadmium (Cd). The Cu content varied from 12.2 to 21.9 ppm in *Pleurotus* spp.

