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MUSHROOM AS FOOD AND MEDICINE

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ABSTRACT:

Mushrooms have been consumed since ancient history; The ancient Greeks believed that mushrooms gave strength to warriors in battle, and the Romans considered them the “food of the gods.” For centuries, Chinese culture has regarded mushrooms as a health food, the “elixir of life.” They have been part of human culture for thousands of years and are of great interest to the most important civilizations in history because of their sensory characteristics; They are known for their attractive culinary properties. Nowadays, mushrooms are a popular valuable food because they are low in calories, carbohydrates, fat and sodium: also, they are cholesterol-free. In addition, mushrooms provide important nutrients including selenium, potassium, riboflavin, niacin, vitamin D, protein and fiber. With a long history as a food source, mushrooms are important in traditional medicine for their healing abilities and properties. It has been reported to have beneficial effects on health and the treatment of certain diseases. Many nutritional properties have been described in mushrooms, such as a higher risk of Parkinson's, Alzheimer's, high blood pressure and stroke.



KEYWORDS : *sensory characteristics , food of the gods , civilizations , nutritional properties , Mushrooms .*

INTRODUCTION:

Mushrooms have been considered an ingredient in gourmet cuisine worldwide; Especially because of their unique taste and they are valued by mankind as a culinary wonder. More than 2,000 species of mushrooms exist in nature, but about 25 are widely accepted as food and some are cultivated commercially. Mushrooms are considered a delicacy with high nutritional and functional values and are also accepted as nutritious foods; They are of considerable interest due to their organoleptic quality, medicinal properties and economic importance. However, there is no easy distinction between edible and medicinal mushrooms as many common edible species have medicinal properties and many edible ones are also used for medicinal purposes. The most cultivated mushroom worldwide is *Agaricus bisporus*, followed by *Lentinus edodes*, *Pleurotus* spp. and *Flamulina* are velutipes. Mushroom production continues to grow, with China being the world's largest producer. However, wild mushrooms are becoming more important for their nutritional, sensory and especially medicinal properties.

Mushrooms can be an alternative source of new antimicrobial compounds, mainly secondary metabolites, such as terpenes, steroids, anthraquinones, benzoic acid derivatives and quinolones, but

also some primary metabolites such as oxalic acid, peptides and proteins. *Lentinus edodes* is the most studied species and appears to have antimicrobial activity against both gram-positive and gram-negative bacteria.

Mushrooms are widely consumed by many ethnic groups in southern and southwestern Ethiopia. Rural people eat more mushrooms than urban people, however, older consumers value mushrooms more than younger ones. Tangible information about the traditional use of wild mushrooms in Ethiopia is obtained from rural senior citizens. Mushrooms are known by a few local names for the many species of mushrooms found in the region. In Amharic, the terms *engude* and *yejib tila* are used for mushroom. *Yejib Tila*, also named "Shadow of the Hyena", is a negative term. It seems that mushrooms appear in places where the shadows of animals appear, and the growth of mushrooms is somewhat mysterious.

USES OF MUSHROOM AS FOOD AND MEDICINE:

Usefulness of Mushroom as a Food:

Mushrooms have a unique texture with a good aroma, taste and flavor that differentiates mushrooms from other food crops. Edible species of mushrooms found abundantly in native forests are; *Macrolepiota*, *Auricularia*, *Armillaria*, *Foliota* and *Coprinus*. Many species of *Macrolepiota* and *Agaricus* are popular in the upland grazing areas. Mushrooms found in exotic plantations such as *Pinus* and *Cupressus* remain unknown to local people and are not collected for consumption. The most common poisonous mushroom is *Chlorophyllum molybdites*, this mushroom is similar to other edible members of *Agaricaceae* and difficult to distinguish from edible mushrooms to native people. Mushrooms are a highly nutritious, low-calorie food with high-quality protein, vitamins and minerals. Mushrooms are an important natural source of food and medicine. Being high in fiber, low in fat, and low in starch, edible mushrooms have been considered ideal foods for obese individuals and diabetics to prevent hyperglycemia. They are also known for promising anti-oxidative, cardiovascular, hypercholesterolemia, antimicrobial, hepato-protective and anti-cancer effects.

COMPONENTS OF NUTRITION IN MUSHROOM:

Carbohydrate in Mushroom:

Carbohydrate content in mushrooms represents the bulk of the fruiting body, ranging from 55 to 70% on a dry weight basis. The free sugar content is about 13%. In a study by Florezak et al. reported that *Coprinus atramentarius* contained 26% carbohydrates on a dry weight basis. Mannitol, also known as mushroom sugar, makes up about 83% of the total free sugars, so it is dominant. According to a study by Singh NB and Singh P, fresh mushrooms contain 0.8% mannitol, 0.27% reducing sugars, 0.61% glycogen and 0.94% hemicellulose. The carbohydrates of *Agaricus bisporus* are raffinose, sucrose, glucose, fructose and xylose.

Protein in Mushroom:

Mushrooms provide 2.4 grams of protein per cup, which represents just a fraction of our daily needs. So, make sure to eat protein rich foods like legumes, nuts, dairy products, meat or fish as part of a balanced diet.

Protein is an important component of mushroom dry matter. The protein content of mushrooms depends on the composition of the substratum, the size of the pileus, the time of harvest and the mushroom species. The protein content of mushrooms has also been reported to vary from flush to flush. Protein in *A. bisporus* mycelium ranged from 34 to 44% on a dry weight basis. Mushrooms generally contain more protein than other vegetables and most wild plants contain 14.74 to 17.39% and 15.22 to 18.89% protein in the fruiting bodies of *Lactarius deliciosus* and *Lactarius sanguifusus*, respectively. Mushrooms contain all the amino acids needed by an adult.

Fats in Mushroom:

Mushrooms are not high in fat content compared to carbohydrates and proteins. Fats present in mushroom fruiting bodies are mostly unsaturated fatty acids. The fat content of mushrooms varies between species ranging from 2.06% in *Suillus granulatus* to 3.68% in *Suillus luteus* and 2.34% in *A. campestris*. Mushrooms are rich in linolenic acid, an essential fatty acid. Mushrooms are considered a good source of fats and minerals. The fat fraction in mushrooms is mainly composed of unsaturated fatty acids.

Mushroom Sources of Vitamin:

Mushrooms are especially good sources of vitamins; Wild mushrooms contain more vitamin D2 than dark cultivated *Agaricus bisporus*. Mushrooms also contain small amounts of vitamin B-complex and vitamin C, but they are low in vitamins A, D, and E.

Composition of Mineral:

Mushrooms contain high-level mineral elements that are essential for human health. Major mineral elements in mushrooms are K, P, Na, Ca, Mg and elements like Cu, Zn, Fe, Mo, Cd. Mushrooms have the potential to accumulate heavy metals such as Cd, Pb, Ar, Cu, Ni, Ag, Cr and Hg. The mineral content of mushrooms depends on the species, age, and diameter of the fruiting body of that mushroom. It also depends on the type of substratum provided for mushroom cultivation. Wild edible mushrooms have a higher mineral content than cultivated ones.

Mushroom as Medicine:

Aspirin, digitoxin, progesterone, cortisone, morphine, vincristine, vinblastine, taxol and many other medically used drugs are derived directly or indirectly from higher plants. Clinically important and well-known drugs of fungal origin are penicillin, griseofulvin, ergot alkaloids and cyclosporine. Among the great sources of fungi, higher basidiomycetes especially mushrooms are an unlimited source of therapeutically useful biologically active compounds. There are approximately 700 species of higher basidiomycetes that have been found to have significant medicinal activity. Modern scientific studies on medicinal mushrooms have expanded rapidly in the past two decades, not only in Japan, Korea, and China, but also in the USA, and scientific explanations are increasingly being established to show the function of mushroom-derived compounds in the human system. Medicinal mushrooms have an established history of use in traditional oriental medicine. Many traditionally used mushrooms from the genera *Auricularia*, *Flamulina*, *Ganoderma*, *Grifola*, *Lentinus*, *Trametes* (*Coriolus*) and *Tremella* have been shown to have significant medicinal properties. Neoplastic diseases continue to pose a major threat to human life and thus the pursuit of anti-tumor drugs is imperative. Efforts have been made in many parts of the world to find the use of mushrooms and their metabolites to treat various human ailments. The most significant medicinal effect of mushrooms and their metabolites that have attracted public attention is their anti-tumor properties. Lucas and his colleagues first demonstrated the antitumor activity of higher basidiomycetes in 1957. Important medicinal effects and physiological properties of mushrooms are bioregulation (increasing immunity), maintenance of homeostasis and regulation of biorhythms, treatment of various diseases and prevention and improvement of life. Dangerous diseases like cancer, cerebral stroke and heart disease. Mushrooms are also known to be effective substances for antifungal, anti-inflammatory, antitumor, antiviral, antibacterial, hepatoprotective, antidiabetic, hypolipidemic, antithrombotic and hypotensive activities.

Agaricus blazei is a common medicine used against various diseases like cancer, chronic hepatitis, diabetes, arteriosclerosis and hyperlipidemia. Interest in using this mushroom and/or its extracts as a dietary supplement has grown significantly, in part because of its antitumor, anticarcinogenic, antiviral, anti-inflammatory, hypoglycemic, hypocholesterolemia, and antihypertensive effects. Mushrooms are used as a remedy for chronic pain of breasts and joints, lowering blood cholesterol levels, improving blood circulation, tuberculosis, rheumatism, gout, jaundice, dropsy, intestinal worms and anti-tumor, anti-viral, night sweats. and anti-cancer agents.

Mushrooms are very effective for hypertension, kidney effects and diabetic patients, immunomodulatory and antitumor activity of polysaccharide protein complex (PSPC) from mycelial cultures and immunomodulatory and antitumor activity of lectins from edible mushrooms give medicinal value. Bracket mushroom (*Ganoderma lucidum*) is frequently used in the disease management of patients with HIV and AIDS and may support weight gain.

Antimicrobial Action of Mushroom:

The mushroom known as *Osmoporus odoratus* produces petroleum ether, chloroform, acetone and water extracts useful for their antibacterial activity against *Staphylococcus aureus*, *Streptococcus pyogenes*, *Bacillus subtilis*, *Escherichia coli* and *Pseudomonas aeruginosa*. A water extract of *Osmoporus odoratus* acts as an antibacterial agent against the organism and is comparable to ampicillin rather than chloramphenicol. Methanol, Ethanol, Acetone and G. Antimicrobial activity of several soluble extracts such as aqueous extract of mushroom *lucidum* against six bacterial species *E. coli*, *S. Aureus*, *K. Pneumonia*, *b. subtilis*, *S. Typhi* and *P. aeruginosa* is applied. Methanolic extracts of six wild mushrooms from the Western Ghats of Karnataka, India showed *B. subtilis*, *S. Aureus*, *E. Colie*, *P. aeruginosa* and showed significant antimicrobial activity against *Candida albicans*. Antibacterial and antifungal activity of methanol and aqueous extracts of fruit bodies from *Felinus* applied against five bacterial pathogens such as *E. Colie*, *P. aeruginosa*, *S. Typhi*, *S. aureus* and *Streptococcus mutans* and five fungal strains *Penicillium spp.*, *A. fumigatus*, *Aspergillus niger*, *Aspergillus flavus* and *Mucor indicus*.

Antioxidant of Mushroom:

Oxidation is essential in many organisms to generate energy to drive biological processes. However, uncontrolled production of oxygen-derived free radicals leads to the initiation of many diseases such as cancer, arthritis and atherosclerosis, as well as degenerative processes associated with aging. Ethyl acetate, methanol and aqueous extracts of *G. lucidum* highly inhibited $O_2\cdot$ and OH radicals, but aqueous extract could not inhibit ferrous ion induced lipid peroxidation, while ethanol extract of mycelium of *G. lucidum* showed high antiperoxidative activity.

CONCLUSION:

Mushrooms have a long association with mankind and provide profound biological and economic impacts. Since ancient times, man has eaten wild mushrooms for their taste and pleasant taste, perhaps with delicacy. Edible mushrooms provide high-quality protein that can be produced more biologically efficiently than animal proteins, rich in fiber, minerals and a variety of vitamins, especially, vitamin B-complex and vitamin C, and low in fat content, with a high content of polyunsaturated fatty acids. Acids relative to the total content of fatty acids. Fresh mushrooms contain relatively large amounts of carbohydrates and fiber, but starch is absent in mushrooms. Mushrooms also contain significant amounts of phosphorus, sodium and potassium, along with small amounts of calcium and iron. Mushrooms have many potential medicinal uses. Interestingly, *ostratus* naturally produces isomers of lovastatin, which are compounds that lower blood cholesterol. Many of the proteins in *ostriatus* mushrooms have antiviral and even anti-HIV properties.

REFERENCES:

1. Bilal A, Wani R Bodha H, Wani A.H. (2010) Nutritional and medicinal importance of mushrooms, *Journal of Medicinal Plants Research*. University of Kashmir, Hazratbal, Srinagar, India 4(24): 2598-2604.
2. Balakumar R, Sivaprakasam E, Kavitha D, Sridhar D, Kumar JS (2011) Antibacterial and antifungal activity of fruit bodies of *Phellinus* mushroom extract. *International journal of bioscience* 1(3): 72-77.
3. Chang S.T. and Miles P.G., *Mushrooms: Cultivation, Nutritional Value, Medicinal Effect, and Environmental Impact*, CRC Press, Boca Raton, Fla, USA, 2nd edition, 2008.

4. Fekadu Alemu (2015) Cultivation of Shiitake Mushroom (*Lentinus edodes*) on Coffee Husk at Dilla University, Ethiopia, *Journal of Food and Nutrition Sciences* 3(2): 63-70
5. Girma W, Tasisa T. Application of Mushroom as Food and Medicine. *Adv Biotech & Micro.* 2018; 11(4): 555817. DOI: 10.19080/00101 AIBM.2018.11.555817.
6. Heleno S. A., Barros L., Sousa M. J., Martins A., and I. C. F. R. Ferreira (2010), "Tocopherols composition of Portuguese wild mushrooms with antioxidant capacity," *Food Chemistry*, Vol. 119, No. 4, pp. 1443–1450.
7. María Elena Valverde, Talía Hernández-Pérez, and Octavio Paredes-López (2015). Edible Mushrooms: Improving Human Health and Promoting Quality Life. *International Journal of Microbiology*, Volume 2015, Article ID 376387, 1-14.
8. Manjunathan J, Kaviyarasan V (2010) Nutrient composition in wild and cultivated edible mushroom, *Lentinus tuberregium* (Fr.) Tamil Nadu, India. *International Food Resource. Journal* 18(2): 59-61.
9. Pedneault K.P., Gosselia A, Tweddell RJ (2006) Fatty acid composition of lipids from mushrooms belonging to the family Boletaceae, *Mycology. Res* 110(10): 1179-1183
10. Quereshi S., Pandey A.K., Sandhu S.S. (2010) Evaluation of antibacterial activity of different *Ganoderma lucidum* extracts. *People's J. Scientific Res* 3(1): 9-13.
11. Ramesh C., Pattar M.G. (2010) Antimicrobial properties, antioxidant activity and bioactive compounds from six wild edible mushrooms of Western Ghats of Karnataka, India. *Pharmacognosy Res* 2(2): 107-112.
12. Singh NB, Singh P (2002) Biochemical Composition of *Agaricus bisporus*. *J. Indian Bot. Soc* 81: 235-237
13. Sivakumar R, Vetrichelvan T, Rajendran NN, Indira Devi M, Sundaramoorthi K, et al. (2006) Antibacterial activity of mushroom *Osmoporus odoratus*, *Indian J. Pharma, Sci* 68(4): 523-524.
14. Thekkuttuparambil A. Ajith and Kainoor K. Janardhanan (2007). Indian Medicinal Mushrooms as a Source of Antioxidant and Antitumor Agents. *J. Clin. Biochem. Nutr.*, 40, pp. 157–162.