

Pharmacological and Nutritional Benefits of Edible Mushrooms

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ABSTRACT

Mushrooms are edible fungi enjoyed around the world for their unique taste and flavor. Packed with nutrients, they provide numerous health benefits, yet their full potential is often overlooked. Mushrooms contain bioactive compounds that make them strong candidates for developing new medications. Their therapeutic properties include anti-cancer, anti-bacterial, anti-oxidant, anti-viral, anti-diabetic and anti-allergic effects. In many countries, mushrooms are used to treat a variety of conditions, including cancer, diabetes, hypertension and inflammation. Nutritionally, mushrooms are rich in essential vitamins such as B-complex vitamins and vitamin D, which is notably the only plant-based source of this nutrient. They also provide key minerals like zinc, selenium, copper, potassium, magnesium and phosphorus, as well as proteins, carbohydrates and healthy fats.

Keywords: Mushroom; Health benefits; Nutrition; Antioxidants; Pharmacological effects; Immunity

INTRODUCTION

Mushrooms are micro fungi which are safe to eat in nature and are fed on as a delicacy in diverse elements of the world. They are rich in numerous vitamins and have numerous pharmacological consequences in people, but their tremendous significance isn't always that a lot regarded to each person. Mushrooms are eaten all over the international due to their extraordinary taste and flavour. Mushrooms have a remarkable ability due to owning bioactive secondary metabolites and there's a huge capacity for the use of them as tablets. Their pharmacological houses encompass anti-most cancers, anti-bacterial, anti-oxidative, anti-viral, anti-diabetic and anti-allergic. Mushrooms at the moment are used in exclusive nations for the treatment of diverse sorts of cancers, diabetes, hypertension, infection and plenty of different diseases. They include nutrients like vitamin B-complex, zinc, selenium, protein, pantothenic acid, copper, potassium, glycerol, mannitol, β -glucans, phosphorus, polysaccharides, magnesium and so forth. The dietary composition of mushrooms money owed for 50%-65% on a dry weight basis. The sugars present encompass distinct monosaccharides and oligosaccharides. Numerous alcoholic sugars like mannitol and trehalose are also found in mushrooms. The protein content material of mushrooms varies from

19%-35% and the fat content material varies from 2%-6% on dry count number foundation. The mushroom includes polyunsaturated fatty acids which includes palmitic acid, oleic acid and linoleic acid. Mushrooms are rich in diet D and are thought to be the handiest vegetarian supply of diet D. Suitable for eating mushrooms may be a supply of many specific neutraceutical together with unsaturated fatty acids, phenolic compounds, tocopherols, ascorbic acid and carotenoids. They comprise various minerals which might be required by our frame. Studies have proven their influential effects towards malignancy (most cancers), LDL cholesterol lower, strain, napping problems and asthma and many others. The excessive content of protein present in mushrooms may be used to save you scientific and subclinical signs and symptoms of protein deficiencies. Their low carbohydrate and cholesterol content cause them to appropriate for intake in diabetic in addition to cardiovascular disease patients [1,2].

LITERATURE REVIEW

The mushrooms have been used in ethno-drugs or traditional drug treatments as they have incredible capacity for curing numerous fitness diseases. The biochemical compounds found in mushrooms plays a vital role for contributing the numerous

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pharmacological roles of mushrooms [3]. The biochemical compounds found in mushroom encompass triterpenes, polysaccharides, germanium, adenosine, ganoderic quintessence, amino acids, nutrients, minerals, beta-glucan, heteroglycan, proteoglycan and nucleotides. The numerous sorts of mushrooms consist of:

- Button mushroom
- Hedgehog mushroom
- Cremini mushroom
- Portobello mushroom
- Maitake mushroom
- Morel mushroom
- Shiitake mushroom
- Porcini mushroom
- Lobster mushroom
- Enoki mushroom
- Clamshell mushroom

Mushrooms contain a wide number of minerals and minor components like potassium and copper and nutrients, riboflavin, niacin and folates. Mushrooms are low in energy and fat yet high in protein and dietary fiber. Bioactive metabolites such as phenolic compounds, sterols and triterpenes are also present in mushrooms. Mushrooms are a treasured food that has immense roles in curing various degenerative and metabolic diseases [4].

DISCUSSION

Nutritional properties of mushrooms

Source of macronutrients: Mushroom is rich in proteins with digestibility as high as 75%-82%. The protein content of mushrooms depends on the variety, size and harvest time of the mushrooms. It basically contains protein ranging from 19%-35% which is higher as compared to convenience food crops like rice, corn and wheat. The quality of protein is also high as it contains all the essential amino acids required by the body. Carbohydrate content present in mushrooms is about 50%-65% on a dry matter basis. Water-soluble carbohydrate has pharmacological effects in the body. The fat content in mushroom ranges from 2%-6% which includes the essential fatty acids [5].

Vitamins: Mushrooms are wealthy supply of B-complex nutrients. Mushrooms are wealthy with B-complicated vitamins like thiamine, cyanocobalamine, riboflavin, pyridoxine, niacin and pantothenic acid. Those vitamins act as co-enzyme for facilitating the numerous metabolic reactions taking place inside the frame. Mushrooms also have better content of diet D. The ascorbic acid is also found in mushrooms in small amounts. Provitamin A and nutrition E also are found in mushrooms.

Minerals: Mushrooms have principal minerals like ok, P, Na, Ca, Mg etc. which constitute approximately 50%-76% of the whole ash content of the mushrooms. Wild mushrooms have greater mineral content than the cultivated ones. Zinc, selenium, copper, iron etc. also found in mushrooms. Selenium and zinc have antioxidant potential and might assist in preventing oxidative damage. Zinc plays the maximum

important position for the frame's protecting (immune) gadget to nicely work and it also help in mobile department, mobile development and wound restoration. Copper enables in the manufacturing of erythrocytes which can be used to supply oxygen everywhere in the frame. Selenium works as an antioxidant to guard our body cells from harm that might likely result in coronary coronary heart ailment and also prevents ageing. The potassium to sodium ratio in mushrooms is higher *i.e.*, 110:1, that is helpful in improving blood flow and additionally prevents high blood strain [6].

Biologically active compounds: Mushroom contain aromatase enzymes which are important for production of estrogen in the body. Various alkaloids like cordycepin, lectins, levostatin etc. are beneficial for various functions in the body. The mushroom sterol (ergosterol) performs the same function as cholesterol. Antioxidants present in mushrooms include a compound called ergothioneine, which have protective functions against CVDs, chronic inflammations and neurodegenerative diseases.

Pharmacological properties of mushrooms

Anticancer properties of mushrooms: The bioactive metabolites play a crucial function in anticancer homes of mushrooms. One of the mushrooms named tiger milk mushrooms incorporate high stage of beta-glucans which play an essential characteristic in boosting the immune system of the body and it also prevents the cancer forming mobile and their spreading. Mushrooms comprise unique bioactive compounds such as polysaccharides, polysaccharide-protein edifices and β -glucan, which show off mitigating, most cancers prevention agent, antagonistic to proliferative and immuno-adjusting influences. In historic times the powder of reishi mushroom has been applied to treatment most cancers in China. It was used for appearing chemotherapy in most cancers patients and that they were found to be useful to lower tumor and malignant cellular boom in patients with breast and prostate cancers. Numerous RCT investigations exposed the position of Polysaccharide K (PSK) from mushrooms to standard chemotherapy extended the patience of patients after recuperation gastric malignancy resection over chemotherapy alone. This confirms the potential of polysaccharides to cause apoptosis and result in various type of cellular demise facilitated by means of immunological components present inside the mushrooms. The cancer stopping movement of mushrooms can be correlated to the phenolic components together with flavones, flavonoids and so forth. Of mushrooms that have anti-cancer capability [7].

Antioxidant properties: Oxidation of any compound inside the human cells outcomes in formations of unfastened radicals. Those unfastened radicals *via* a series of reactions are accountable for the oxidative damage of the cells main to cellular death and tissue damage. Bioactive compounds like natural antioxidants are answerable for ending this chain response and prevention of oxidative harm of the cells. The mushrooms are rich in compounds like selenium, polysaccharides, rufoolivacin C and D and leucorufoolivacin, phenolic compounds and many others which act as antioxidants and forestalls oxidative harm of cells. Those antioxidants

prevent the chain reactions of free radicals like hydroxyl, peroxide and DPPH radicals. Polysaccharide-peptide complicated LB-1b present in mushroom additionally showcase antioxidant activities and save you the haemolysis of erythrocytes. The polysaccharides and phenolic compounds are liable for improving the sports of antioxidant enzymes present in liver, heart and other organs. Polyphenols are also involved in metallic chelation and prevents LDL oxidation which can be correlated to prevention of diverse coronary heart illnesses.

Anti-bacterial properties: Mushrooms like oyster mushroom have polysaccharide that avert the boom and replica of micro-organism like *Bacillus subtilis* and *Streptococcus epidermidis*. The brown oyster mushroom can inhibit the boom of diverse strains of bacteria. Reishi mushrooms additionally have anti-bacterial results. The mushrooms are considered one of the richest supply if natural antibiotics to prevent the growth of microorganisms. Numerous isopyrociferol acetates, triterpenoids and ergosterols found in mushrooms have inhibitory results on gram-superb micro-organism and yeast [8].

Anti-inflammatory properties: Irritation is an herbal reaction of the immune gadget of the frame to diverse physical, chemical or pathogenic elements. Mushrooms are enriched with factors like polysaccharides, phenolic and indolic compounds, myco-steroids, unsaturated fat, carotenoids, vitamins and biometals. Metabolites from mushrooms have cell reinforcement, anticancer and mitigating properties. Those metabolites assist in decreasing inflammation. Persistent irritation within the frame can result in various neurodegenerative, metabolic and autoimmune sicknesses. The results of mushrooms are related to their amino acid contents which can be well known to influence prostaglandin metabolism. Oyster mushrooms have amino acids like leucine, isoleucine, phenylalanine and tyrosine which have houses. Reishi and oyster mushrooms have been observed to inhibit the continual inflammation contributing to different problems like diabetes, melancholy, Alzheimer's disease and other extra severe problems. PUFAs present in mushrooms are the precursor molecules of eicosanoids which act as signalling molecules that assist in right law of cell processes and immune response.

Anti-diabetic properties: Diabetes is a main trouble within the present day world. It additionally alters the metabolism of carbohydrates, lipids and fat inside the body. Numerous *in vivo* and *in vitro* data discovered that polysaccharide content of mushrooms display and anti-hyperglycaemic results due to their fibrous and non-fibrous bioactive compounds. They inhibit the glucose absorption efficacy, improving pancreatic beta-cellular mass and growing the insulin signalling pathways. Those are low glycemic index and glycemic load foods that can be easily fed on with the aid of diabetic sufferers. Dietary supplementation of mushroom can reduce the plasma glucose degree due to bioactivity of compounds like agmatine, sphingosine, pyridoxine, linolenic acid, oligosaccharide and arginine [9].

Anti-allergy properties: Allergies are an increasing problem worldwide. A chemically bioactive compound. Inotodiol is a lanostane triterpenoid present in mushrooms that have an activity to suppress the mast cell function which help in decreasing severe symptoms like anaphylaxis in any allergy.

Neuroprotective properties: Mushroom shows different pharmacological exercises in the anticipation of dementia in conditions of Parkinson's and Alzheimer's disease. Mushroom consumption also helps to relieve mild symptoms of depression and anxiety. Neuro injury may occur due to injury or wound in the cerebrum and spinal cord. Concentrates of mushroom help in speeding recuperation from these sorts of wounds in the brain.

CONCLUSION

Mushrooms contain beneficial polyunsaturated fatty acids and have alcoholic sugars as well as various polysaccharides that contribute to their health-promoting effects. Rich in antioxidants, mushrooms help reduce cancer risk, lower cholesterol, manage stress, improve sleep and treat asthma. They also prevent protein deficiencies, making them ideal for those with diabetes or heart disease. The bioactive compounds in mushrooms are essential for their medicinal benefits.

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