

MUSHROOM: THE FANTASTIC FUNGI AND THEIR MEDICINAL AID

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INTRODUCTION

Mushroom, the fruiting body of a huge network of mycelia beneath the soil play a fundamental ecological roles as decomposers and mutualists, growing in almost all habitats. And is an important sources of food, health benefits, income and maintain forest health. Edible mushrooms are the one that improve the human health and promote the quality lifestyle. Recent review mentioned 3283 mushroom species as confirmed edible or conditionally edible, accounting for ~20 % of all mushroom taxa recorded in the global sources. Common edible mushrooms in India include *Agaricus bisporus*, *Pleurotus ostreatus*, *Calocybe indica*, *Lentinula edodes*, *Hypsizyguis ulmarius* and others.

Centuries have witnessed the interest of pharmaceutical potential of mushrooms and is being increased rapidly. It is suggested that many mushrooms with miraculous biological properties act as pharmaceutical factories producing compounds of medical interest. Many medicinal functions of mushrooms are known and the key medicinal aids include antidiabetic, anticancer, antiallergic,

antioxidant, cardiovascular protection, immunomodulation, anticholesterolemic, antiviral, antibacterial, antifungal, antiparasitic and hepatoprotective effects along with protection against tumour development and inflammatory process.

NUTRITIONAL ASPECTS OF MUSHROOM

Mushrooms are the nutritional powerhouse. Addition of 84 gram or that equivalent of 5 medium white mushrooms to USDA (United States Department of Agriculture) food patterns increased several shortfall nutrients including potassium as well as other B vitamins and minerals and had minimal to no impact on overall calories, sodium or saturated fat. The nutrient content of mushrooms as per the USDA is presented as in the table.

NUTRIENT	Per 100 g (gram) of mushroom
Carbohydrate	3.3 g
Protein	3.1 g
Fat	0.3 g
Iron	2 %
Magnesium	2 %
Vitamin B6	5 %
Vitamin C	3 %
Vitamin D	1 %

Source: United States Department of Agriculture

MEDICINAL PROPERTIES OF MUSHROOM

Agaricus bisporus

Also widely known as button mushroom. It's extract contains ergothioneine, beta-glucans, ergosterol, flavonoids and vitamin D besides, peptides, essential amino acids, triterpenoids, glycoproteins, nucleosides, fatty acids and their derivatives. Hence, it's also known for various medicinal applications. In athymic mice antiproliferative and proapoptotic action of mushroom extracts through the action of conjugated linoleic acid inhibited the growth of prostate cancer and is also known as a potent nephroprotective agent.



Ganoderma lucidum

Also known as Reishi mushroom, is at present the most widely used medicinal mushroom in the world. The medicinal properties of Reishi is mainly due to two major groups of metabolites viz., triterpenes and polysaccharides. Triterpene compound derivatives like lanosterol, ganodermic acid, ganoderic acids, ganodermic alcohols, lucinedic acids and lucidones possess marked antitumor, antimetastatic, cytotoxic and enzyme inhibitory properties. The important polysaccharides like α -1,3, β -1,3 and β -1,6-D-glucans and ganoderan characterized by a strong antiangiogenic and immune system-strengthening properties. These two categories of molecules by suppressing cell proliferation, metastasis, invasion and by promoting apoptosis, combined with it's immunostimulating, antioxidant and anti-inflammatory activities act as anticancerous agent. An example to quote, ganoderic acid D inhibited the proliferation of HeLa human carcinoma cells and induced G2/M cell cycle arrest and apoptosis. Apart from these it's also an effective antiaging and anti-diabetic agent.



Hericium erinaceus

Lion's mane, contains the compounds erinacines (cyathin diterpenoid) and hericenones (benzyl alcohol derivative). Both the compounds have demonstrated neurotropic and neuroprotective effects and have also reported to induce nerve growth factor synthesis.



Lentinula edodes

It's also called as Shiitake mushroom. Lentinan (β -1,3-D-glucan), a polysaccharide extracted from this mushroom is able to activate the inflammasomes, components of the innate immune system and is responsible for enhancing inflammatory responses. Lentinan has also found to reduce endotoxin lethality of *Listeria monocytogenes* by the activation of the *Listeria*-mediated AIM2 inflammasome. A study based on the lung carcinoma cell line LAP0927 using lentinan produced an inhibitory effect on tumour angiogenesis. The current use of lentinan as an adjuvant in oncological therapies are also under preclinical studies.



Pleurotus sp.

A polypeptide from *Pleurotus eryngii* mycelium demonstrated significant free radical scavenging and antitumor activity in breast, cervical and stomach cancer cells and found to have an activating effect on the macrophage mediated immune response. The capacity of *Pleurotus ostreatus* to reduce blood glucose, cholesterol, and triglycerides in diabetic patients is also established.



CONCLUSION

Indian diet is primarily based on cereals (wheat, rice and maize), which is deficient in protein. Supplementation of mushroom recipe in Indian diet will bridge protein gap and improve the general health and economic condition of socio-economically backward communities. The expanded knowledge of biochemical compounds of mushrooms and molecular basis of neoplasm and metastasis has given the opportunity to discover new drugs against abnormal molecular and biochemical signals leading to cancer. Fungi are key to our survival and are we doing enough to protect them? the query yet to be answered practically. In spite of mycologists and mushroom specialists dedication to popularize mushroom cultivation among the rural communities, still it's striving hard to retain its place as a part of agriculture within rural India because of their perishable nature. Further research work should focus on preservation and pharmaceutical applications of mushrooms. Hence, through the bridge between its cultivators and pharmaceutical industries it'll be a noticeable success in uplifting the rural community and in its medicinal applications.

