

## Medicinal Properties Of Oyster Mushroom

(*Pleurotus Spp.*)

Noor Saima

ARTICLE ID: 074

### Abstract

Mushrooms have been a great source of nutrients and traditional medicinal food from ancient times, especially in the Eastern Asian Countries. In recent time, the consumption of mushroom has increased. A number of research had been carried out on these mushrooms to know more about its health-related benefits. One such is the oyster mushroom (*Pleurotus* species) which is considered as a functional food or nutraceuticals due to their high-quality proteins with essential amino acids, physiologically important polysaccharides and essential fatty acids, vitamins, fibres and many other medicinal properties. Due to the presence of various active ingredients in it, it has been reported to have antidiabetic, antibacterial, anti-cholesteric, antiarthritic, antioxidant, anticancer anti-inflammation, anti-hypercholesterolemia, anti-hypertensive, hepato-protective and anti-allergic activities. Also found to be beneficial for eye health and antiviral activities. In this review, a few such properties have been discussed.

**Keywords:** Oyster mushroom, functional food, medicinal properties, *Pleurotus* spp.

### INTRODUCTION

In recent times Mushroom has been a vital part of normal human diet. The consumption of variety of mushroom species has been raised greatly. There are more than 2000 species of mushroom that can be consumed. Some of them are cultivated commercially and few of them are highly poisonous in nature and should not be consumed. [1] 40 different species of mushroom fall under the genus *Pleurotus* and are commonly referred to as “Oyster mushroom”. Oyster mushrooms are one of the most common edible mushrooms among all. Oyster mushroom was first cultivated in 1917 by a German man named Flank. They

grow mainly on decaying woods and their cultivation is easy. They are edible but wild mushrooms, commercially grown all over the world. They have slightly sweet taste with the smell of anise (licorice), tender flesh, mild flavour and velvety texture. Oyster mushrooms get their name because of their resemblance to fresh-shucked oysters. These mushrooms are good source of essential minerals and vitamins including thiamine, niacin, riboflavin and vitamin B6. There have very low or negligible fat content or are mostly fat-free.

A lot of health benefit is associated with these oyster mushrooms such as they lower's cholesterol, help in better immune system functioning, boost heart health and improve metabolic health. With such taste, flavour, high nutritional values and medicinal properties these oyster mushrooms are consumed all over the world.



Source – Green Deane

A number of research around different regions of the world confirmed that the oyster mushrooms have high nutritive values and also contain various bioactive compounds such as phenols, alkaloids, terpenoids, steroids, lectins and nucleotides, which have been outlined and pick out from the fruit body, mycelium and cultural broth of mushrooms shown to have promising biological effect. Oyster mushrooms reported to have antidiabetic, antioxidant, antiarthritic, antibacterial, anticholesterolemic, anticancer and also promote eye health and

haven antiviral activities due presence of numerous nutritional compositions and various active ingredients.

Mushrooms are investigated as functional foods because they bring out their beneficial impact on human body in multiple ways. Functional foods are those foods which are enriched or modified and consumed as normal diet to give health enhancing benefits. Functional food incorporated of products of microbial, plants and animal origin containing physiologically active compounds profitable for human health and reducing the risk of chronic diseases. Functional foods comprises of nutraceuticals, medicinal foods, dietary supplements, vita foods, pharma foods, phytochemicals, mycochemicals and so on . Many mushrooms are helpful in human ailments because they possess many typical pharmacological features like: to act as metabolic activators, prevent/control intoxication and microbial/viral infections, help in immune-balancing and immunomodulation, as antioxidants with rejuvenating and energy boosting properties .

### **Taxonomic classification of oyster mushrooms**

Taxonomic Classification:

Kingdom: Fungi

Phylum: Basidiomycota

Class: Agaricomycetes

Order: Agaricales

Family: Pleurotaceae

Genus: *Pleurotus*

### **NUTRITIONAL VALUE**

Their nutritive and medicinal values of oyster mushroom were known from 1500 BC based upon many ancient literatures work. [5,6]. In 1986 it was first time reported the hypotensive activity of *Pleurotus* mushroom in mouse model, later antitumor activity was shown by

Nanba [8] in this mushroom, since then a number of studies are done to indicate its nutritive and medicinal properties.

These mushrooms are considered important in the human diet as they are rich source of protein, dietary fiber, minerals, and vitamin- B, non-starchy carbohydrates, containing zero cholesterol, and are fat-free. Proteins in these mushrooms are of high quality and they contain an abundance of essential amino acids (Sadler, [2003](#)).

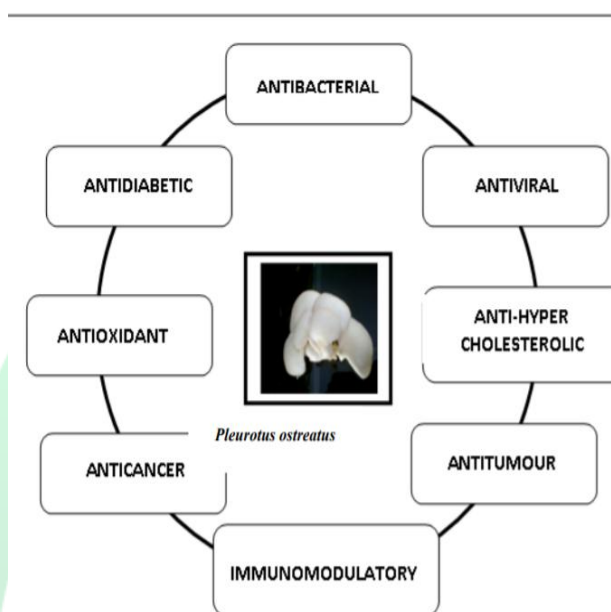
Table 1: Macronutrients of *P. ostreatus* (Khan 2010)

Nutrients	Content (g/100g dried mushroom)
Protein	17-42
Carbohydrates	37-48
Lipids	0.5-5
Fibers	24-31
Minerals	4-10
Moisture	85-87%

## MEDICINAL PROPERTIES

Mushrooms are used in folk medicine across the world since ancient time as ‘the ultimate health food’ [9]. Mostly Eastern Asian countries used and demonstrated the traditional medicinal properties of mushroom. Although there are limited direct human intervention trials,

there is a rapidly growing volume of in vitro and in vivo animal trials describing a possible range of health benefits [10].

Fig.1 – Pharmacological properties of *P. ostreatus*

Source - Krishnamoorthy Deepalakshmi and Sankaran Mirunalini., 2014

These mushrooms have a number of medicinal properties like antimicrobial, antiviral, antioxidant, antidiabetic and so on.

### Antimicrobial

Anti-microbial activity of mushrooms is due to the presence of various bioactive secondary metabolites, protein-polysaccharide compounds, some phenols, some phytochemicals, free fatty acids and their derivatives (Bala et al., 2012; Gyawali and Ibrahim, 2014)

Methanolic extracts of *Pleurotus* species demonstrated an inhibition in growth of *Bacillus megaterium*, *S. aureus*, *E. coli*, *Klebsiella pneumoniae*, *C. albicans*, *C. glabrata*, species of *Trichophyton* and *Epidermophyton* to different degrees that was lower with respect to two antifungal agents: Streptomycin and Nystatin [11]. Antimicrobial and antifungal activity of OM depended upon the nature of the solvent, ether extract were more active against Gram negative bacteria as compared to acetone extract.

**Anticancer-** According to (Hetland et al., 2011; Roupas et al., 2012) these mushrooms produces bioactive compounds such as 1,6-branched 1,3- $\beta$ -glucans which have been reported to inhibit tumor growth by stimulating the immune system via activation of macrophages, balance of T helper cell populations and subsequent effects on natural killer (NK) cells and also by cytokine production.

### **Antiviral**

The purpose to study or discover about specific antiviral agents is to inhibit the viral multiplication without affecting the normal cell division. Laccase enzyme has been purified from oyster mushroom, which is capable to inhibit the hepatitis C virus entry into peripheral blood cells and hepatoma HepG2 cells and its replication in 2010. Ubiquitin, an anti-viral protein was isolated and identified from fruiting body oyster mushroom [13]. Not only intracellular proteins but its extracellular extract also contains polysaccharides that have immuno-modulating effects observed.

### **Antioxidant**

Antioxidants such as phenolic and flavonoid compounds are delaying and inhibiting oxidative processes. Fruiting bodies of *Pleurotus* possessed higher concentration of antioxidants than other commercial mushrooms [15]. In 2010 it was reported that, an extract of *P. ostreatus* enhanced the Catalase gene expression and decreased the incidence of free radical-induced protein oxidation in aged rats, thereby protecting the occurrence of age-associated disorders that involve free radicals and this was because *Pleurotus* mushrooms are rich in vitamin and selenium content which are the important natural antioxidants in biological systems (Chang and Miles 1989). Ethanolic extract of oyster mushroom are reported to have potent antioxidant activity in both in vitro and in vivo. They are also reported to have phenolic compounds having free radical scavenging property that reduces inhibitory effects of mutagens and carcinogens.

### **Antidiabetic**

Hyper-glycemia is an important feature of diabetes mellitus. *P. ostreatus*, *Murrayakoenigii* (curry leaves) and *Aegle marmelos* (bel) was orally administration to alloxan induced

diabetic rats, and was found it produced synergistic effects which showed blood glucose-lowering effect in both insulin-dependent and insulin-independent diabetic conditions. More study is going on *Pleurotus* mushroom for their Antidiabetic property although they are promising; but there is lack of enough clinical evidences. The mechanism behind the antidiabetic effect of *Pleurotus* mushroom is not clear.

### Conclusion

This review shows that oyster mushroom possesses many promising therapeutic properties. Oyster mushroom is now widely used ingredients in dietary supplements hoping to maintain health and to prevent diseases, due to their number of bioactive compounds. It is a novel edible mushroom with many promising medicinal properties which require a lot of high-tech approaches for more exploration. They are based on in vivo and in vitro studies, more clinical trials are needed to fully realize its potentials. They also have high nutritional values and if focused on them more it can fight against the diseases caused by malnutrition.

### References

1. Meng, G.L. and F.L. Li, 1997. Fungal toxin and their application value. *J. Biol.*, 14: 28-29
2. Sadler, M. and M. Saltmarsh, 1998. Functional foods: The consumer, the products and the evidence. Royal Soc. Chem., Cambridge.
3. Hasler, C.M., 1996. Functional food: the western prospective. *Nutrit. Rev.*, 54: 506-510.
4. Wasser, S.P., 2002. Medicinal mushrooms as a source of antitumor and immunomodulating polysaccharides (minireview). *Appl. Microbiol. Biotechnol.*, 60: 258-274.
5. Sagakami, H., T. Aohi, A. Simpson and S. Tanuma, 1991. Induction of immunopotential activity by a protein-bound polysaccharide PSK. *Anticancer Res.*, 11: 993-1000.
6. Wasser, S.P. and A.L. Weis, 1999. Medicinal properties of substances occurring in higher Basidiomycetes mushrooms: Current perspectives (Review). *Int. J. Med. Mush.*, 1: 31-62.

7. Tam, S.C., K.P. Yip, K.P. Fund and S.T. Chang, 1986. Hypotensive and renal effect of an extract of the edible mushroom *Pleurotussajor-caju*. *Life Sci.*, 38: 1155.
8. Nanba, H., 1993. Maitake mushroom-the king mushroom. *Mush. News*, 41(2): 22-25.
9. King, T.A., 1993. Mushrooms, the ultimate health food but little research in U. S to prove it. *Mush. News*, 41: 29-46.
10. Alam N, Amin R, Khan A, Ara I, Shim M, Lee MW et al. (2009)
11. Akyuz, M., A.N. Onganer, P. Erecevit and S. Kirbag, 2010. Antimicrobial activity of some edible mushrooms in the eastern and southeast anatolia region of Turkey. *GU J. Sci.*, 23(2): 125-130
12. Iwalokun, B.A., U.A. Usen, A.A. Otunba and D.K. Olukoya, 2007. Comparative phytochemical evaluation, antimicrobial and antioxidant properties of *Pleurotus ostreatus*. *Afri. J. biotechnol* 6:1732-1739
13. Piraino, F. and C.R. Brandt, 1999. Isolation and partial characterization of an antiviral, RC-183, from the edible mushroom *Rozitescaperata*. *Antiviral Res.*, 43(2): 67-78.
14. Selegean, M., M.V. Putz and T. Rugea, 2009. Effect of the Polysaccharide Extract from the Edible Mushroom *Pleurotus ostreatus* against Infectious Bursal Disease Virus. *Intl. J. Mol. Sci.*, 10:3616-3634.
15. Zadrazil F., 1978. Cultivation of *Pleurotus*. In: *The Biology and Cultivation of edible mushrooms*, Eds., S.T. Chang and W.A. Hayes, Academic Press, USA, pp: 521-557