

[Article ID : 01/V/07/0521]

AN OVERVIEW ON NUTRITIONAL AND MEDICINAL VALUE OF MUSHROOM

Rajneesh Thakur. Dharmesh Gupta. Savita Jandaik

Department of Plant Pathology,
Dr Yaswant Singh Parmar University of Horticulture and Forestry
Nauni Solan HP 173230

Abstract

Nowadays, mushrooms are popular foods because of their nutritional and medicinal value. Mushrooms contain high protein, fibers, vitamins, minerals contents, low fat level and all the necessary amino acids also with different bioactive compounds. Mushrooms degrade complex lignin rich compounds and thus by it decomposed all lignin rich organic waste materials from surrounding leading to clean environmental conditions. Agricultural wastes (straw, leaves, etc) and waste from forest and industry can be gainfully used as substrates for the cultivation of mushrooms and after harvesting of mushrooms these substrates can be reused as manures in agriculture and floriculture. This also constitutes an excellent means of recycling many of the farm wastes.

Keywords : Mushroom, nutritional value, proteins, carbohydrates.

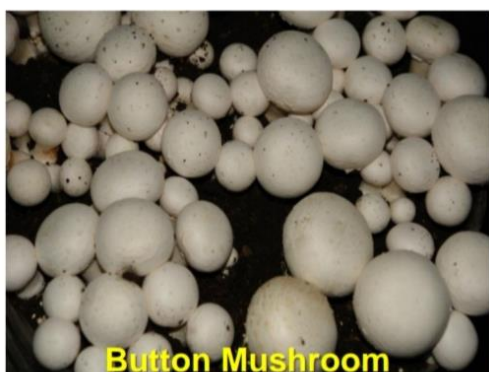
Introduction

Mushrooms are known as healthy foods throughout the world with proteins, vitamins, minerals, chitin, essential amino acids as well as low fat and calories. Mushrooms are defined as “a macro fungi with a distinctive fruiting body” and are traditionally used worldwide as nutritious food and as medicinal sources including antioxidant activity (Kumari *et al.*, 2011; Kumari and Atri, 2014.). Further, mushrooms are great recyclers and decomposers and therefore play a significant role in the ecosystem. Mushrooms are frequently mentioned as alternative sources for food. Modern mushroom culture produces more proteins per unit area of land than by any other form of agriculture. Mushrooms have been considered one of the world’s greatest natural resources since they have the ability to transform required input into nutritional substance and high protein food. In the event of large increase in population resulting in scarcity of nutritious food, the mushrooms offer a good source of nutrition due to being rich in minerals and vitamins.

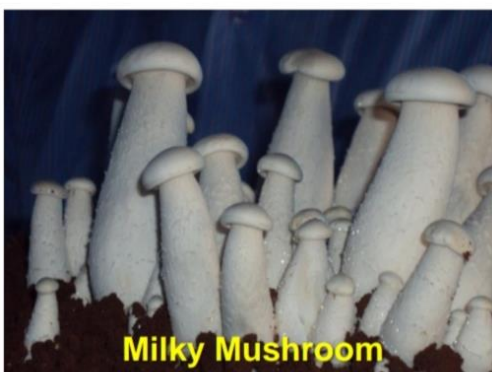
Area and Production

In India, mushrooms are raised as a seasonal crop on a commercial scale round the year under the controlled environmental conditions. Himachal Pradesh, Jammu & Kashmir, Haryana, Uttarakhand, Uttar Pradesh and Punjab are the major mushroom growing states of India. Mushroom industry in India had its humble beginning in late 1960’s when a few progressive growers in Himachal Pradesh and Kashmir started growing button mushroom on commercial scale. The annual world production of all types of mushrooms is estimated to be over 25 million tones. At present, the total mushroom production in India is approximately 0.13 million tons. From 2010-2017, the mushroom industry in India has registered an average growth rate of 4.3% per annum. Out of the total mushroom produced, white button mushroom share is 73% followed by oyster mushroom (16%), paddy straw mushroom (7%) and milky mushroom (3%) (Sharma VP *et al.*, 2017).

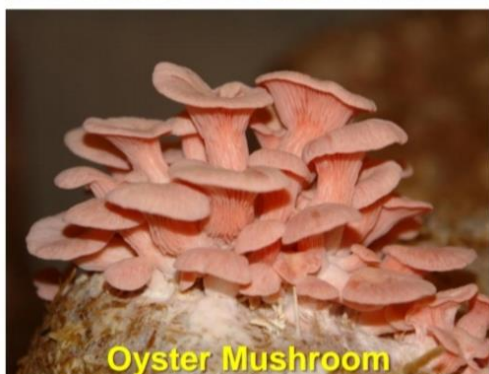




Button Mushroom



Milky Mushroom



Oyster Mushroom



Paddy Straw Mushroom

Major growing mushroom in India

Mushrooms grown indoors, no additional land is required for their culture, cultivation is labour intensive and can offer self-employment to unemployed both educated and illiterate persons. Mushrooms can be produced in large quantities within a short time. The efficiency with which mushrooms convert carbohydrates into proteins is about 65 per cent in comparison to about 20 per cent for pork, 15 per cent for poultry and 45 per cent for beef. Mushrooms degrade complex lignin rich compounds and thus by it decomposed and produce nutritious fruiting bodies of mushroom (Dehariya and Vyas, 2013.).

Himachal Pradesh has congenial atmosphere to grow mushrooms throughout the year without incurring much expenditure on maintaining temperature & humidity. Mushrooms promote immune function; boost health; lower the risk of cancer; inhibit tumor growth; help balancing blood sugar; ward off viruses, bacteria, and fungi; reduce inflammation; and support the body's detoxification mechanisms. Mushrooms enhance the chances of improving the economy of the local villagers, farmers as well as the entire state and to maintain the health of forests. It nvolved in the formation of ectomycorrhizal associations with the rootlets of the trees. Mushroom cultivation recycles agricultural wastes into an easily digestible protein source that enriches the human diet (Gupta *et al.*, 2016).

Nutritional Values of mushroom

Mushrooms, which serve as a good source of food for human beings for centuries, have high nutritional value due to the vitamins and minerals they contain. Mushrooms have been included in the human diet for centuries because of their specific taste and flavour.

Nutritional Values of edible mushroom	
Water	88-90%
Protein	Most mushrooms have a high protein content, usually around 20-30% by dry weight (3-8%).
Fiber	Helps lower cholesterol and is important for the diagestive system



Vitamin D	Essential for the absorption of calcium.
Copper	Aids in helping the body absorb oxygen and create red blood cells.
Selenium	An antioxidant that helps neutralize free radicals, thus preventing cell damage and reducing the risk of cancer and other diseases. Mushrooms contain more selenium than any other form of produce
Potassium	An extremely important mineral that regulates blood pressure and keeps cells functioning properly
Other important minerals	Phosphorous, zinc, and magnesium
Low levels	Fat (0-3%), calories, and sodium
No	Cholesterol

Mushrooms are also rich in vitamin C and vitamin D. Mushroom contain 5-10 times more vitamin B3 than vegetable and calcium, phosphorus, iron, copper, chlorine, sodium, zinc, manganese and bromine in trace amounts; B vitamins A and B complex vitamins B1 (Thiamin), B2 (Riboflavin), B3 (pantetonic acid), B5 (Nicotinic acid), vitamins also found. It is also a food ingredient recommended for those who do not eat cholesterol because the fat content of mushroom is low. The richness of vitamins is known to have a calming and softening effect on the nervous system of humans. They have been considered nutritionally healthy foods due to the high contents in carbohydrates, proteins, minerals and vitamins, and low fat levels (Kalac, 2009; Thatoi and Singdevsachan, 2014). Nowadays, they attract attention because of their bioactive compounds, beneficial effects and possible use in the prevention or treatment of diseases, being classified as functional foods and sources of nutraceuticals (Kumari and Atri, 2014).

Some of the mushrooms bioactive properties are related with their antioxidant activity and antioxidant compounds (Ferreira et al., 2009). In fact, antioxidants are in constant activity in living organisms, being required to be in sufficient amounts to neutralize the toxic effects of reactive oxygenspecies (ROS), reactive nitrogen species (RNS) and reactive sulphur species (RSS) that are produced continuously (Carocho and Ferreira, 2013). They are well recognized as supplementary food due to their high nutritional values and medicinal importance, which includes their antioxidant and antimicrobial activities (Cai *et al.*, 2015; Chowdhury *et al.*, 2015), immune enhancer and to be effective for the treatment of diabetic and few types of cancers as well.

Summary

Today, increasing population is a big challenge from the limited land resource for our country. In addition to this, malnutrition and associated diseases are more common among the economically poor population. This compels us to search for cheap alternative quality nutritional sources for our huge population. Non green revolution otherwise referred as mushroom farming ways to meet this challenge because mushroom grow on wastes without requiring additional land besides its exceptional nutritional and medicinal properties.

References

- Cai M., Lin Y., Luo Y., Liang H., Sun P. 2015. Extraction, antimicrobial, and antioxidant activities of crude polysaccharides from the wood ear medicinal mushroom *Auricularia auricula-judae* (Higher Basidiomycetes). *The International Journal of Medicinal Mushrooms*. 17(6): 591–600.
- Carocho M., Ferreira ICFR. 2013. A review on antioxidants, prooxidants and related controversy: Natural and synthetic compounds, screening and analysis methodologies and future perspectives. *Food Chem. Toxicol.* 51: 15–25.
- Chowdhury MMH., Kubra K., Ahmed SR. 2015. Screening of antimicrobial, antioxidant properties and bioactive compounds of some edible mushrooms cultivated in Bangladesh. *Annals of Clinical*



Microbiology and Antimicrobials. 14:8.

Dehariya P., Vyas D. 2013. Effect of different agro-waste substrates and their combinations on the yield and biological efficiency of *Pleurotus sajor-caju*. *IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS)*. 8(3): 60-64.

Ferreira ICFR., Barros L., Abreu RMV. 2009. Antioxidants in Wild Mushrooms. *Current Medicinal Chemistry*.16: 1543–1560.

Gupta S., Summuna B., Gupta M. and Mantoo A. 2016. Mushroom cultivation: A means of nutritional security in India. *Asia-Pacific Journal of Food Safety and Security*. 2(1), 3-12.

Kalac P. 2009. Chemical composition and nutritional value of European species of wild growing mushrooms. *A review: Food Chemistry*. 113: 9–16.

Kumari B., Atri NS. 2014. Nutritional and nutraceutical potential of wild edible macrolepiotoid mushrooms of north India. *International Journal of Pharmacy and Pharmaceutical Sciences*. 6: 200–204.

Kumari D., Reddy MS., Upadhyay RC. 2011. “Nutritional composition and antioxidant activities of 18 different wild *Cantharellus* mushrooms of Northwestern Himalayas,” *Food Science and Technology International*. 17(6): 557–567.

Thatoi H and Singdevsachan SK. 2014. Diversity, nutritional composition and medicinal potential of Indian mushrooms: a review: *African Journal of. Biotechnology*. 13(4):523–545.

