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Mushroom: An Overview

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SUMMARY

Mushrooms are the edible fruiting bodies of the edible fungi having high nutritive and pharmaceutical values with delicacy. Mushrooms with their flavour, texture, nutritional value, very high productivity per unit area and time, less dependance on land and avaibility to grow on a variety of residual agricultural wastes, have rightly been identified as a food source to fight malnutrition in developing countries. Mushroom being a good vegetarian food provides sufficient quantities of various proteins, minerals, carbohydrates and vitamins which are essential for maintaining of our proper health. Mushroom have also serves as medicines. Altogether there are 2000 varieties of edible mushrooms of which 20 varieties are artificially grown. In India, three types of mushrooms viz., Agaricus bisporus (white button) volvariella volvaceae (Paddy straw) and Pleurotus ostreatus (Oyster) can be grown at different temperature in different seasons, thus making mushroom cultivation "a year round crop". In this article we have discussed general and medicinal importance of mushroom, nutritional value of mushroom and also discussed in brief the different important types of mushroom.

INTRODUCTION

Mushrooms are unique in the produce section because they are fungi and vegetables. What we typically think of as a mushroom is the fleshy, fruiting, spore bearing body of a fungus. The mushrooms we are generally compose of a Stipe (stem), a Pielus (cap), and Lamellae (gills). There are however, many morphological varieties have these features. There are approximately 14,000 different species of mushroom, many of which are inedible. Mushrooms form from a small structure called a primordium which grows on some type of substrate. It is considered as the source of protein, vitamins, fats, carbohydrate, amino acid and minerals. The protein value of the mushroom is twice as that of Asparagus and potatoes, four times as that of tomatoes and carrots, six times as that of orange. The protein content determined on the dry weight basis approximately varies between 4 to 44%. The mushrooms contain thiamin, riboflavin, niacin, biotin and ascorbic acid, all are essential for human health. The most common fats, available in different mushrooms are palmitic, steric, oleic and linoleic acids. Mushrooms are mainly recommended to diabetic and aenamic patients owing to their high folic acid content. Mushroom extracts also inhibites the growth of some viruses like influenza. Cardiotonic proteins are present in different edible mushrooms, which lower the blood pressure, and also active against tumor and anti-cancerous cells. Some mushrooms are mycorrhizal, used for the establishment of forests, to improve the soil fertility. Some mushrooms are also known as condiments, cleaning detergent, tinder, snuff, dyeing agents, painting and writing material, ornamental depending upon their use.

Importance of Mushroom

The economic importance of the mushroom is primarily in its use as food for human consumption. Mushrooms are highly proteinaceous and are used as food. The white button mushroom is sold fresh or is canned and made into soups, sauces and other food products. Proteins in mushrooms have 60-70% digestibility and contains all the essential amino acids. It also has medicinal properties. A high amount retene is present in the button mushroom which is supposed to have an antagonistic effect on some form of tumors.

Types of Mushroom

Edible Mushroom	Non-Edible Mushroom
White button mushroom	*Amanita phalloides*
Paddy straw mushroom	*Amanita verna*
Black Mushroom	*Amanita vorosa*
Oyster or Dhingari	*Galerina autumnalis*
White milky Mushroom	*Galerina marginata*
Shitake mushroom	*Conocybe filaris*
Wood ear Mushroom	*Amanita mormorata*
Agaric field mushroom	*Amanita phalloides*

Nutritive Value of Edible Mushroom:

Nutritive value of different mushrooms (Dry weight basis g/100g)

Mushroom type	Carbohydrate	Fibre	Protein	Fat	Ash	Energy K cal
Pleurotus ostreatus (oyster)	54.80	5.50	37.50	2.60	1.10	305
Agaricus bisporus (Button mushroom)	57.60	8.70	30.40	2.20	9.80	265
Volvariella volvaceae (Paddy straw)	46.17	20.90	33.48	3.10	5.70	499
Calocybe indica (Milky mushroom)	64.26	3.40	17.69	4.10	7.43	391
Lentinula edodes (Shiitake Mushroom)	47.60	28.80	32.93	3.73	5.20	387
Flammulina velutipes (Winter mushroom)	73.10	3.70	16.60	1.90	7.40	378
Auricularia auricular (Black ear)	82.80	19.80	4.20	8.30	4.70	351

Edible Mushrooms:

Oyster Mushroom (*Pleurotus ostreatus*)

Oyster mushroom (*Pleurotus* sp.) belong to class Basidiomycetes and family: Agaricaceae. In india, it is known as “Dhingri” mushroom.

- **Botanical description:** The oyster mushroom consists of 3 distinct parts viz., fleshy shell or spatura shaped cap (pileus), a short or long latera; or central stalk called stipe and long ridges or furrows underneath the pileus called gills or lamellae. The gills bear the spores. The mycelium is pure white in colour.
- It can be grow on dying trunks of trees, dead and decaying wooden logs or even on decaying organic matter.
- Fruit bodies are shell or spatula with different shades of white, cream, grey, pink, yellow or light brown in colour depending on species.

Fig. Oyster Mushroom

Origin: Cultivation of oyster mushroom (*Pleurotus oestreatus*) started in 1917 in Germany by Flack on tree stumps and wood logs.

Production: China is the world leader in production of oyster production. Oyster is the third largest cultivated mushroom. India produces about 1500 tonne of oyster mushroom due to low demand. Korea, Japan, Italy, Taiwan, Thailand, Philippines also produce oyster mushroom.

Agroclimatic requirement:
Temperature & RH: Moderate ranging from 20^0-30^0C and RH is 55-70% it can be grown for a period of 6-8 months in year with above climate conditions.
States Growing Oyster Mushroom: Include Orissa, Karnataka, Maharashtra, Mandhya Pradesh, Andhra Pradesh, west Bengal and North-Eastern hill states etc.
Varieties cultivated: Among all the mushrooms cultivated, *Pleurotus* sp. has maximum number of commercially species suitable for round the year cultivation.
All the species or varieties of oyster mushroom are edible except. *P. olearius* and *P. nidiforms* which are poisonous. Cultivated species of *Pleurotus* are-

1. *P. flabelltus*
2. *P. Sajor caju*
3. *P. sapidus*
4. *P. citrinopileatus*
5. *P. eous*
6. *P. membranaceous*

These species are grown over the world during summer months.

7. *P. ostreatus*
8. *P. floridia*
9. *P. fossulatus*
10. *P. eryngii*, etc

These species are grown during winter

White button Mushroom (*Agaricus bisporus*)

The white button mushroom (*Agaricus bisporus*) is most popular throughout the world and is the most important mushroom of commercial significance in India. The national production of mushrooms, in India is estimorted to be 50,000 tonnes with 85 per cent being of white button mushroom.
Origin: Cultivation of button mushroom started in the 16th century.

Fig. Button Mushroom

Botanical Description:
- The vegetative mycelium is composed of the many interwoven septate hypae.
- The reproductive phase is initiated by the formation of small knob like swellings at different points of interwoven mycelial strands.
- These swellings increase in size and break through the surface of the substratum as small balls constituting the button shape.
- A mature basidiocarp (fruit body) is whitish in colour and consists of thick short stipe with annuals.
- The stipe supports the pilus which appears as a hat like expansion.

- On the underside of pileus, a number of radiating gills or lamella are present which are pink when young and become purple-brown when mature.

Agroclimatic requirement: In india, button mushrooms are generally grown seasonally and in environmental controlled cropping houses. Which button mushrooms required following conditions**.**
Temerature & RH: During vegetative growth (spawn run): 22-28 ^{0}C temperature is required. During reproductive growth: 12-18 ^{0}C temperature is required and RH is 80-90 %
Growing seasons: During winter season in north west plains, and 8-10 months on hills in india. Button mushroom is grow in winter. The most suitable temperature for the spread of the mycelium is 24-25 ^{0}C, while 16-18 ^{0}C is essential for formation of fruit bodies.
Growing/ potential belts: Himachal Pradesh, Uttar Pradesh, Punjab, Haryana, Maharashtra, Andhra Pradesh, Tamil Nadu, Karnataka.
Varieties grown: Ooty 1 and Ooty 2 (released in 2002) are the two strain of button mushrooms for commercial cultivation by horticulture research stations.

Paddy straw mushroom (*Volvariella* spp.)

Paddy straw mushroom is the most popular one in south-east Asian countries like China, Korea, Singapore, Hong-Kong, Philippines, Malaysia, Thailand, Myanmar and India. In India, it was first cultivated at Coimbatore. The term paddy straw mushroom indicates that such mushrooms are cultivated on paddy straw as substrate.

Species: Several species of *Volvariella, V. diplasia* (White), *V. volvaceae* (Blackish) *V. esculenta*. Etc. *V. bomycine* differs from the cultivated *V. volvaceae* in terms of habitat as well as in color. In India, above all species are cultivated.

Fig. Paddy Straw Mushroom

Botanical Description: It produces quite large fruiting bodies. Initially the fruiting bodies appear as bird's egg in size and shape. When this egg type structure ruptures from middle of the paddy straw. Mushroom is characterized by appearance of cup-shaped converging at the base (Volva) and umbrella shaped pilus with long stripe. Gills are found on the under surface of the pilus which are white when young and later becomes pinkish to flesh coloured radiating plate like structure (gills).

Agroclimatic requirement:
Temperature & RH: Paddy straw thrives within a temperature range 28-36^{0}C. The decline in yield is recorded after 36^{0}C temperature. Paddy straw mushroom can be grown at around 35^{0}C. Temperature should not go below 30^{0}C as alone 40 ^{0}C for more than 4-8 hrs during growing period. The optimum relative humidity required is 85-90%.
Growing season: the suitable period for cultivation of paddy straw mushroom ranges from March to October in wide range of temperature.

CONCLUSION

Mushroom have high nutritive as well as medicinal value also require specific temperature and relative humidity according to its species.

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