Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 02, Issue: 03 (MAY-JUNE, 2022)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

# Mushroom: Improving Human Health and Source of Employment Opportunities

(*Ranveer Kumar*1 and Jaya Bharti2)

[1]G.B. Pant University of Agriculture & Technology, Pantnagar, Uttrakhand
[2]Birsa Agricultural University, Ranchi, Jharkhand-834006, India
*ranveera35@gmail.com

Mushroom cultivation is one of the most profitable agribusiness that can be started with bare minimum investment and space. Mushrooms have been an integral component of the evolution of Indian agriculture from being conventional and non-commercial to a competent modernized business sector. Mushroom farming in India is growing steadily as an alternative source of income which provides an additional income for the small and marginal farmers as well as lucrative employment prospect for the rural youth and farm women.

**Keywords-** Agribusiness, Conventional, Employment, Farming, Modernized

## Introduction

Mushrooms are a reliable and rich source of unconventional food protein to the health concern population of today's world (Borah *et al.*, 2013). It is an indoor activity requiring less capital, less space, less time and labour therefore a feasible venture for the farm woman and subsidiary income generating avenue for the rural youth and farmers. It also provides recycling of agro total waste as the cellulosic agro bye products can be used as substrate for mushroom cultivation (Thakur, 2014). Mushrooms are known by different names in the local dialects of the North Eastern states like 'Tit' (Meghalaya) 'Kathphula' (Assam and Tripura), 'Cheaoe' (Sikkim), 'Chenggum' (Manipur), 'Pa' (Mizoram), 'Konger' (Aodialect, Nagaland) and 'Indeo' (Galo dialect, Arunachal Pradesh). Most of the edible and non-edible mushrooms grow wild in the region (Gogoi *et al.*,2006). In nature, a number of species of mushrooms are found mainly during the rainy season, on almostall types of soils, on decaying organic matter, wooden stumps etc.

### What is mushroom?

Mushrooms are prehistoric organisms known as fungi (macro fungi). They lack the chlorophyll content and mostly grow saprophytically on dead decomposed matter. They derive their nutrition with the help of the mycelium that penetrate into the substratum

(decaying organic matter, rotting wood or soil) where conditions are favorable for their growth. When the mycelium has grown abundantly by absorbing sufficient food materials, it develops the spore bearing reproductive structure or fruiting body, which is generally referred as **'Mushroom'**. The fundamental structure of mushroom consists of an umbrella like cap or theoretically called pileus, bearing gills and a stalk or stipe. All fungi are not mushrooms and all mushrooms are not edible.

## Mushrooms as Food and Health Benefits

Mushrooms are not only delicious, but they are also a nutritional source of power packed with many nutrients. Rich in protein, mushrooms supplement the carbohydrate rich, protein deficit primarily cereal based Indian diet. All types of edible mushrooms contain varying degree of protein, minerals, vitamins, antioxidants and fiber (Manikandan, 2011). These can have various health benefits. Moisture content in the fruit bodies is usually 80-90% with sufficient carbohydrates (26-82%) and low fat content. In mushrooms, cholesterols is absent, instead it contains ergosterol which acts as a precursor for vitamin D synthesis. Apart from high crude protein content (12-35%), they are also rich in dietary fiber (8- 10%) and an excellent source of vitamins and minerals. In free amino acids content, theronine and valine are abundantly present but deficient in methionine and cystein. The minerals like potassium, sodium and phosphorous are abundantly found in the fruit bodies along with traces of copper, zinc and magnesium but lack iron and calcium. Mushrooms are also known to provide some amount of folic acid or folate which is beneficial supplement during pregnancy to boost fetal health.

## Types of Mushroom

There are many species which can be selected for growing in the different climatic conditions prevailing throughout the region according to the climatic requirements and availability of raw materials (Singh, 2011).

1. **Oyster mushroom** (***Pleurotus* spp.**):

The common name of this species is in accordance to the shape of the fruit bodies which resembles the shell of sea oyster and also fan or spatula. The fruit bodies put up with different shades of white, cream, yellow, pink, grey or light brown depending upon the species. It can be grown in wide range of temperatures and has species suitable for temperate and sub-tropical regions. Some of the advantages of growing this mushroom are –

- Grows on wide range of cellulosic agricultural wastes (paddy straw is the best substrate)
- Possesses highest bioconversion ability (more than 60% and sometimes upto 100%)
- Not exigent in its requirement of temperature – 20$^{o}$C to 30$^{o}$C
- It's growing season is longer – 8 months in a year
- Simple Cultivation technology and growth rate is faster
- Low cost of production and most efficient use of space
- Post-harvest processing is easy (sun drying)

This mushroom is widely cultivated in the North Eastern India, West Bengal, Orissa, Tamil Nadu, Kerala and Andhra Pradesh. Some of the common oyster mushroom species are – *Pleurotus florida, P. sajor-caju, P. ostreatus, P. citrinopleatus, P. sapidus, P. flabellatus, P. eous, P. eryngii, Hypsizygus ulmaris* etc.

**2. Milky mushroom** (***Calocybe indica***): *Calocybe indica* popularly known as milky mushroom or white summer mushroom is commercially grown in the tropical areas (Tamil Nadu, Andhra Pradesh and Karnataka). Successful cultivation of the mushroom has been initiated in the north and few places of north eastern states during summer months. Some special features of milky mushroom are–

- Can be grown at higher temperatures ranging from (28$^{o}$C to 35$^{o}$C)
- Cultivation method similar to oyster mushroom but requires casing as in button mushroom
- Requires special type of cropping room to let more light during fruit bodies formation
- It has the highest biological efficiency, up to 100% and more
- Attractive white mushroom with excellent keeping quality (5-7 days at room temperature and 20 days in perforated poly propylene bags at 4$^{o}$C)
- This mushroom has good consistency which is retained after cooking
- Most suitable for pickle making

The fruit bodies bear bitterness which can be removed by blanching.

**3. Button mushroom *(Agaricus bisporus)***: Button mushroom is a temperate crop and the most popular variety for domestic and export market. Large scale production of this mushroom over large areas is impeded by non availability of quality raw materials particularly, wheat/paddy straw, chicken manure and sometimes gypsum resulting in poor quality of compost and poor yield. However, organized production and marketing of this mushroom has some benefits –

- Seasonal production is possible in large scale in majority of the northern and north eastern states of the country where winter temperature remains below 20$^{o}$C.
- Production cost is low when the cheap and easily available raw materials for compost and casing is used
- Good domestic and it's export market exists at global level, it ranks first
- Increasing market for processed products

Apart from the benefits derived, there is involvement of high cost of energy for year round production and lack of facilities to produce quality compost, casing material, spawn and processed products. *A. bitorquis* or summer white button mushroom, a species of the genus *Agaricus* grows well in temperature up to 24$^{o}$C and is suitable for subtropical regions.

**4. Paddy straw mushroom** (***Volvariella* spp**.): This is a tropical mushroom mostly preferred for its better taste and flavour as compared to oyster mushroom. Advantages associated with the cultivation of paddy straw mushroom are –

- It is the fastest growing species among mushrooms (it's cropping cycle is usually of 14 days)
- Cultivation method is easy – hot water treatment is not essential, unlike for oyster

- Simple instruments are required – drum/cement tank, bamboo platform and straw

There are three species namely *Volvariella volvacea*, *V. esculenta* and *V. diplasia*. Of these, *V. volvacea* is widely grown. However, this mushroom variety has low production (biological efficiency about 13-15%) and poor keeping quality. If stored beyond 24 hours, mushrooms become watery and emit smell. Its cultivation is confined to few places in Orissa and Tamil Nadu.

**5. Shiitake mushroom *(Lentinula edodes)***: Shiitake a popular mushroom both as food and medicine, ranks second at global level contributing 24% to total mushroom production. Cultivation of this mushroom is negligible in the country (cultivated in small pockets of Manipur and Nagaland). However, its cultivation has been standardized and can be grown on saw dust of non-resinous plants at about 20$^{o}$C. Strains of *Lentinula edodes* are there which can be grown in temperature range up to 24-25$^{o}$C. This mushroom has good scope for cultivation in the country and potential market within and outside the country.

**6. Jew's/Wood /Jelly ear mushroom *(Auricularia auricula)***: This mushroom a health food is the fourth most popular mushroom in the world for its nutritional and medicinal values. Although its cultivation method has been standardized by the Directorate of Mushroom Research, Solan, way back in mid 80s in the country, nowhere till date this mushroom is grown commercially. Occasionally, jew's ear mushroom is available in the local markets of North East India, that are collected from the wild. It grows luxuriantly within temperature range of 20-32$^{o}$C and high relative humidity (90-95%). The keeping quality of this mushroom is very good.

**7. Winter mushroom *(Flammulina velutipes)*:** A popular mushroom in East Asian countries for its neutraceutical as well as pharmaceutical properties is gaining grounds in the country as well and its production technology has been standardized. As the name suggest winter mushroom comes to fruiting at temperature range of 10-14$^{o}$C and can be cultivated on saw dust of broad leaves plant supplemented with 10% wheat bran.

8. **Reishi mushroom *(Ganoderma lucidum)***: An important mushroom providing raw materials mainly to pharmaceutical industries is produced to the tune of 6000 tonnes with China's share of 4000tonnes/annum. It is a tropical mushroom growing in temperature range of 30-35$^{o}$C with high humidity. The cultivation technology has been standardized and caution is to be taken in disposal of spent substrate as the fungus is a plant parasite.

## Conclusion

It can be securely said that mushroom farming is a brilliant field with good prediction for an upcoming farmer with better employment opportunities since mushrooms need minimum care, investment and technology. Even, anyone can start mushroom cultivation at home in India. Mushroom farming however gives very good returns as compared to the efforts out in. All these aspects will be crucial in the production of mushrooms with better flavor, appearance, texture, nutritional qualities, and medicinal properties at low cost.

## References

1. Borah, Tasvina R., Hoque, H., Kikon, Lireni E., Deka, Bidyut C. and G. Rajesha (2013). Mushroom cultivation for subsidiary income and nutritional security. ICAR Research Complex for NEH Region, Nagaland Center, Jharnapani, Nagaland. Pp. 47.
2. Gogoi, R.; Rathaiah, Y. and Borah, T.R. (2006) In Mushroom Cultivation Technology. Published by Scientific Publishers, Jodhpur.
3. Manikandan K. (2011) Nutritional and medicinal values of mushrooms In: Mushrooms cultivation, marketing and consumption. Eds. Singh M, Vijay B, Kamal S, Wakchaure G C. pp 11-14. Published by Directorate of Mushroom Research, ICAR, Chambaghat, Solan-173213 (HP).
4. Singh M. (2011) Mushroom Production: An Agribusiness Activity. In: Mushroom-Cultivation, marketing and consumption. Eds. Singh M, Vijay B, Kamal S, Wakchaure G C. pp 1-10. Published by Directorate of Mushroom Research, ICAR, Chambaghat, Solan-173213 (HP).
5. Thakur M P. (2014) Present status and future prospects of tropical mushroom cultivation in India: a review. *Indian Phytopathology*. 67: 113-125.