

Mushrooms In Indian Diets For Nutritional Security

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Introduction: Mushroom cultivation is such a component of farming system that not only imparts diversification but helps in addressing the problems of quality food, health and environment issues through waste recycling. It is one of the most diverse organisms on earth and since primitive times have played a vital role in human welfare. It plays a major role in the conservation of natural resources and increases the recycling of agro-waste.

Mushroom cultivation is a highly profitable and sustainable enterprise for small and marginal farming community. Farmers who are not gaining good returns from agriculture are also keen to adopt other agriculture related activities to enhance their income and mushroom cultivation is one of them as it provides extra income to them unlike field crops in just 2 – 3 months duration. It does not require large area and can be grown in houses and people with limited or no land can start mushroom cultivation as a venture for income generation. It is the highly economical way of upgrading lingo cellulolytic waste and is the way to increase the income of the farmers along with field crops.

Moreover, the diversity in soil and climatic conditions in India allows the production of different mushrooms in various parts of the country providing vast potential due to abundance in raw material and favourable climatic conditions. It can help alleviate poverty and strengthen livelihoods through generation of fast yielding, highly nutritious food source and a reliable source of income.

Nutritional profile of mushrooms:

- The fresh mushroom contains about 85.0 – 90.0% moisture, 3.0% protein, 4.0% carbohydrates, 3.0 – 4.0% fats and 1.0% minerals and vitamins along with medicinal properties that help in lowering blood cholesterol levels, defend against cancers and invigorating hair growth.
- On a fresh weight basis, mushrooms are superior in protein content to all vegetables and fruits, but are inferior to meat and dairy products.
- Mushrooms on dry weight basis are similar to dried yeast but superior to dried peas and beans. The mushroom derived preparation and substances are used as novel class of dietary supplements (DS) or “nutraceuticals”.
- A mushroom nutraceutical is a refined or partially refined extract or dried biomass from either the mycelium or the fruiting body of mushrooms which can be consumed as capsules or tablets for dietary supplements to enhance the immune response of human body.
- Clinical studies showed that mushroom species have medicinal and therapeutic value in the prevention / treatment of cancers, viral diseases, hypercholesterolemia, blood platelet aggregation and hypertension along with other life style diseases.

Health benefits of mushrooms:

- Mushrooms are well-suited to be added to vegetarian diets as supplement that lack proteins and are called “vegetable meat”.
- Carbohydrate and fat contents of edible mushrooms is quite low. The absence of starch in mushrooms

makes it an ideal food for diabetics, people with cardiac conditions and weight management.

- The low total fat content and high proportion of polyunsaturated fatty acids (72.0 – 85.0%) relative to total fatty acids is a significant contribution to nutritional value of mushrooms.
- Fresh mushrooms contain relatively large amounts of carbohydrates ranging from 51.0 – 88.0%. They are rich in complex carbohydrates, like chitin, hemicellulose, β and α -glucans, mannans, xylan and galactan which make highly suitable as prebiotics.
- Mushrooms act as a prebiotic to stimulate the growth of gut microbiota conferring health benefits to humans.
- Mushrooms are rich in free amino acids, chitin, amines, nucleic acids and urea. Its proteins contain all the essential amino acids and are especially rich in lysine and leucine which are lacking in cereals.
- 4.0 – 20.0% mushrooms appear to be a good source of vitamins including thiamine, riboflavin, niacin, biotin and ascorbic acid.

Medicinal benefits of mushrooms:

- Mushrooms comprise a vast and yet largely untapped and a source of powerful new pharmaceutical substances that can treat simple and common diseases like skin diseases and pandemic diseases.
- They play a crucial role in cancers due to the presence of reactive oxygen species inducer, mitotic kinase inhibitor, antimetabolic, angiogenesis inhibitor, topoisomerase inhibitor leading to apoptosis and eventually checking cancer proliferation.
- They possess liver protection, antioxidant, anti-hypertensive and hypocholesterolemic, anti-inflammatory activity, anti-diabetic, antiallergic, antiviral and antimicrobial activity.
- They are help in detoxification and have hepatoprotective effects as well as protect against tumour development and inflammatory processes.

Economic benefits of mushroom cultivation:

- Mushroom cultivation is a space confined technology requiring marginal investment using agricultural residue as substrate for mushroom production.
- Mushrooms constitute one of the most promising resources for promoting rapid socio economics development and a means for poverty alleviation.
- It requires low technical knowledge and even in an indoor setting it is possible to cultivate mushrooms at homes like rearing poultry with minimal capital to not only empower rural women but also alleviate poverty from the grass root level in rural areas too.

Environmental benefits of mushrooms:

- Mushrooms play an important ecological role helping in bioconversion process of organic substances through recycling of organic matter thus reducing pollution.
- The dumping in landfill and field burning openly were used to dispose of straw which contribute to serious environmental degradation such as global warming as it destroys untargeted flora and fauna in the soil and surroundings thereby adversely affecting public health

Value-added mushrooms products:

- Mushrooms have a unique flavour with great nutritional value and are considered an important ingredient in gourmet cuisine all over the world.
- Fresh mushrooms should be consumed within two to four days of harvesting
- They can be used as appetizers in marinated form and as an ingredient in soups, sauces, salads, stuffing and meat dishes.
- Processing into profitable value-added products is an option to reduce the losses due to quality deterioration

for gaining income and boosting consumption of mushrooms

- The available mushroom products available on markets include snacks, fried mushrooms, burgers, pastries, nuggets, popcorn, pickles, biscuits, ketchup, soup powders and candies.

Challenges of mushroom production in India: Mushroom cultivation can be one of the most remunerative enterprises but its adoption among the farmers has not been up to the mark due to certain constraints like non-availability of raw materials particularly spawn and compost, complicated loan procedure, absence of government initiative, lack of awareness on nutritive value, absence of adequate technical guidance and improved cultivation technology, irregular fluctuating production, perishable nature, lack of transport to the nearest town and regulated markets, lengthy and cumbersome compost preparation methodology as well as limited post-harvest processing. The other hurdles in mushroom production include lack of cold storage, high labour cost and fluctuating market prices are also contributing to unsustainable mushroom industry

Conclusion: Mushrooms are used not only as a source of nutrients, but also as medicinal resources. Polysaccharides from mushrooms exhibited immunomodulation properties, antitumour, antioxidant, antimicrobial and prebiotic activity. Mushroom cultivation is relatively economical because they can be grown on inexpensive agricultural or forest wastes like rice straw, corn cobs and saw dust. Despite many benefits, there is lack of spawn input, technological, socio-cultural and crop management constraints.

Management from ‘waste-to-wealth’ is essential for more sustainable farming globally and boosting the commercial value of fresh or processed products can increase their demand and encourage market orientation.



Fresh mushrooms



Dried mushrooms



Mushroom pickle



Brine pickled mushrooms



Mushroom soup



Mushroom curry