

Mushroom value chain: A novel approach

empowering women through production and value-addition

**Raghubar Sahu^{1*}, Brajendu Kumar², Dharmendra Kumar³, R. K. Sohane⁴
and Majhrool Hak Ansari¹**

¹VKS College of Agriculture, Dumraon, Buxar, Bihar 802 136

²Krishi Vigyan Kendra, Banka, Bihar 813 102

³Bihar Animal Science University, Patna, Bihar 800 014

⁴Bihar Agricultural University, Sabour, Bhagalpur, Bihar 813 210

Growing mushrooms has the potential to be a very lucrative agricultural enterprise that tackles a number of contemporary issues, including resource use, creation of ecologically conscious jobs, sustainability, erratic weather, and nutritional security. Since most farmers in India are small-scale, marginal landowners with little money, mushroom production could prove to be a blessing because it uses agricultural waste as a growing medium and requires less money, land, and water. In addition to increasing their availability nationwide, increasing mushroom production and value-addition would also boost the income of small and marginal growers and lessen nutritional insecurity. The nutritional and therapeutic potential of mushrooms are enormous, but the production and consumption of mushrooms in our country is relatively new. Many of the challenges that mushroom growers face, such as a lack of technical expertise, poor infrastructure, an unorganized market, costly inputs, etc., still require adequate research and additional legislative solutions that are specific to the needs of Indian mushroom growers.

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CEREALS (rice, wheat, and maize) make up the majority of the Indian diet, which is low in protein. Incorporating mushroom recipes into Indian diets can help bridge the protein gap and enhance the general health of underprivileged populations. In the past, mushrooms were regarded as a costly vegetable and were used in cooking by wealthy people. The general public now views mushrooms as a high-quality meal because of its many health advantages. Mushroom is now being considered as a consolidated, healthful food that is appropriate for all age groups—from young children to the elderly. The fleshy fungus known as mushrooms make up a significant portion of the lower plant kingdom. The mold colony itself, which is made up of a mat of entangled hyphae and can occasionally be several feet in diameter, is found in the soil beneath the mushroom. The mushroom initially appears as little, white balls with a pikeus (cap) and a short stem (stipe), which open up like an umbrella. If allowed to fully grow, the fragile membrane or veil (velum) that surrounds the cap breaks off, revealing lamella (gills) that radiate from

the stalk into the cap. As the basidiospores (seeds) grow into millions and fall to the ground to begin their new lifecycle for the second generation of mushrooms, these gills darken. Since mushrooms do not require sunlight to develop, they can be grown in total darkness, albeit this is not a necessary condition. They grow quickly, don't need fertile soil, and use air space to increase output because they are grown on composted or uncomposted agricultural waste in addition to the floor. A labour-intensive indoor activity, it can aid landless people, small and marginal farmers, diversify economic activity, and offer gainful employment, particularly for women, young people without jobs, and the weaker segments of society.

Nutritional value of mushroom

Environmental conditions, developmental stage, and species all have an impact on the nutritional content of mushrooms. Mushrooms are high in vitamins, minerals, dietary fiber, and protein. Starches, pentoses, hexoses, disaccharides, amino sugars, sugar alcohols, and sugar

SUCCESS STORY

Practical Example of Mushroom Cultivation: Mrs. Vinita Kumari from Jhirwa Village, Bauka, Bihar has been cultivating mushrooms since 2012.

When Mrs. Vinita arrived at her in-laws' house after marriage, she found herself in a terrible predicament with regard to the state of the household, which made housekeeping extremely difficult. She considered strategies to make money from home-based work as a housewife with little education. One of the women proposed that she could increase the household income by growing and producing mushrooms. She was given the Krishi Vigyan Kendra's contact details in Jagatpur, Banka, by this person. Following that, Mrs. Vinita Kumari, a resident of Jhirwa village, arrived at Krishi Vigyan Kendra in Banka and received instruction from the home scientist in 2012 on how to produce mushrooms. Vinita Kumari began growing mushrooms after receiving instruction at the Krishi Vigyan Kendra, beginning with ten bags. About 20 kg of mushrooms were produced for her initial investment of ₹ 1,000, and they sold for ₹ 3,000. Her confidence surged after this triumph, and she used the money she made to increase the size of her mushroom crop. Oyster, button, milky, and brown button mushrooms are among the varieties of mushrooms that Vinita Kumari now grows.



Prepared mushroom spawn



Selling of value-added products of mushroom



Button mushroom production unit



Milky mushroom production

Despite the fact that finding mushroom seeds was extremely difficult, she was able to effectively grow mushrooms by acquiring spawn from the Krishi Vigyan Kendra, Banka and making it available to other women. A scarcity of high-quality seeds had previously prevented many farmers from cultivating mushrooms. As a result, the Banka district now possesses a fully functional spawn laboratory. She is currently getting ready to build up a facility for producing button mushrooms, such that hundreds of kg of mushrooms can be produced every day by establishing an AC plant all year round. She has started mushroom farming training programs in several Bihar districts in addition to growing and selling mushrooms. Using corn cobs significantly improves button mushroom cultivation and lowers the production expenses. Additionally, the creation of mushroom powder and the preparation of dried oyster mushrooms have shown substantial health benefits for ailments like diabetes, night blindness, knee pain,



Milky mushroom production

pregnancy-related concerns, and stomach problems. Vinita Kumari thanked the Banka team and Krishi Vigyan Kendra for training her, which enabled her to perform this work. She opened a mushroom spawn laboratory with a loan from UCO Bank, Banka, after realizing the increasing demand for the scarcely accessible mushroom spawn in the area. Today, she makes mushroom spawn on her own. She established the “Maa Kali Self Help Group,” which has 20 female members, to improve mushroom production even further. Along with growing mushrooms, this organization also makes a range of mushroom-based goods that are sold in local markets, including pickles, Horlicks, bars, dried mushrooms, vermicelli, pakoras, and powder. Because of her creative thinking and commitment to excellence, Mrs. Vinita's mushroom farming business is a success. In contrast to her prior earnings from traditional agriculture, she now enjoys an exceptional yearly income ranging from 2.5 to 3 lakhs. In addition to changing her own life, this financial achievement has improved her standing in the neighbourhood.

Mrs. Vinita's current priorities include growing her mushroom farming company even more, looking into new markets, and perhaps broadening her range of products. Her transformation from a poor farmer to a prosperous entrepreneur sets a positive example for people in her community and demonstrates the ability of creativity, knowledge, and tenacity to overcome obstacles and realize one's goals. Numerous honors have been bestowed upon her in recognition of her services to agriculture, including the Progressive Mushroom Grower Award (2023) from R.K.U.N., Solan, the ICAR Award, and the Innovative Farmer Award (2021) from IIT, Solan.

acids are all part of the digestible carbohydrate profile of mushrooms. On a dry weight basis, the amount of carbohydrates in each mushroom ranged from 26 to 82%. Partially digested carbohydrates and chitin make up the mushroom's crude fiber makeup. Typically, edible mushrooms contain a larger percentage of polyunsaturated fatty acids and a negligible lipid content. All of factors cause foods made from mushrooms to have a low calorific output. There is no cholesterol in mushrooms. Rather, they contain ergosterol, which serves as a precursor for the synthesis of vitamin D in the body. Similarly, when button mushrooms are exposed to sunlight or UV light, their ergosterol is transformed into vitamin D₂. About 80–90% of mushrooms are made of water, and 8–10% are made of fiber. In addition, mushrooms are a great source of vitamins, particularly C and B (thiamine, riboflavin, niacin, and folic acid). The mushroom's fruit bodies have higher levels of potassium, sodium, and phosphorus. It lacks calcium and iron but has trace amounts of other vital elements including copper, zinc, and magnesium. Although it varies widely, edible mushrooms typically have a high protein content. Depending on the species, mushrooms had a crude protein content ranging from 12 to 35%. The content of free amino acids varies greatly, but generally speaking, they are low in sulfur-containing amino acids (ethionine and cysteine) and high in theronine and valine. Thus, mushrooms have been demonstrated

to assist the body's detoxification processes, improve health, lower the risk of cancer, limit tumor growth, help balance blood sugar, protect against bacteria, fungi, and viruses, reduce inflammation, and strengthen the immune system. Mushrooms are rapidly gaining prominence for their ability to treat a wide range of illnesses and for enhancing traditional medications.

SUMMARY

One of the nature's most cherished and useful gifts is the mushroom. It can be processed to create a new product or simply used in any cuisine dish. There are already many mushroom products in the market, including pickles, sauces, drinks, extracts, canned and dried mushrooms, supplements, cosmetics, and more. Apart from the mushroom food products, many innovative products are emerging in other industries as well, such as mushroom based building materials, medicines, mycelium-based platforms, biodegradable packaging, mycelium based leather etc. Mushrooms grow quickly, are easy to farm, and produce no waste or carbon emissions. In addition to offering extra benefits through processing, the fungi are a good source of revenue for the growers. Hence mushrooms hold a bright future in every aspect owing to its diverse properties.

*Corresponding author email: raghubar.bhu@gmail.com