AGRI MAGAZINE
(International E-Magazine for Agricultural Articles)
Volume: 02, Issue: 09 (September, 2025)
Available online at http://www.agrimagazine.in
©Agri Magazine, ISSN: 3048-8656

Button Mushroom Cultivation Technology: A Simple Guide for Farmers

*Abhishek Tiwari[1], Dr. Divya Singh[2], Pushkar Tripathi[1], Shreya Singh[1], Shraddha Singh[3], Amit Kumar[4], Kishan Sharma[5] and Pranav Singh[6]

[1]M.Sc. (Ag.) Genetics & Plant Breeding, Prof. Rajendra Singh (Rajju Bhaiya) University, Prayagraj, Uttar Pradesh, India

[2]Assistant Professor, Department of Genetics & Plant Breeding, Prof. Rajendra Singh (Rajju Bhaiya) University, Prayagraj, Uttar Pradesh, India

[3]Department of Agriculture, Pratapgarh, Uttar Pradesh, India

[4]M.Sc. (Ag.) Agronomy, Maharishi University of Information & Technology (MUIT), Lucknow, Uttar Pradesh, India

[5]M.Sc. (Ag.) Horticulture (Fruit Science), Bihar Agricultural University, Sabour, Bhagalpur, Bihar, India

[6]Master of Business Administration (Agribusiness), Acharya Narendra Deva University of Agriculture and Technology, Ayodhya, Uttar Pradesh, India

*Corresponding Author's email: aktiwari2177@gmail.com

The cultivation and consumption of button mushroom (*Agaricus bisporus*) in India has witnessed rapid growth in recent years, driven by rising health consciousness, changing food habits, and the need for alternative protein sources. Button mushroom, often called "vegetarian meat," is rich in high-quality proteins, essential amino acids, vitamins, minerals, and bioactive compounds, making it a functional food with immense nutritional value. Its short production cycle, low land requirement, and reliance on agricultural residues make mushroom farming a highly profitable and sustainable enterprise, particularly suitable for smallholders, women, and rural youth. This article reviews the morphological and biological characteristics, nutritional profile, and major species and varieties of button mushroom, along with detailed insights into production technology, cost–benefit analysis, challenges, opportunities, and future research directions. Currently, India produces around 2.5 lakh tonnes of mushrooms annually, with button mushroom contributing over 70%. The enterprise not only ensures attractive returns for farmers but also contributes to environmental sustainability through recycling of farm residues and the use of spent mushroom compost. Despite its potential, constraints such as environmental control, compost contamination, pest and disease incidence, and inadequate storage and marketing infrastructure hinder large-scale adoption. Future strategies should focus on developing high-yielding and climate-resilient varieties, designing low-cost controlled structures, promoting farmer cooperatives, and applying biotechnology-based solutions for disease management. Overall, button mushroom cultivation offers a unique convergence of nutrition, profitability, sustainability, and entrepreneurship. With research support, institutional backing, and market expansion, it can evolve into a significant contributor to food security, rural employment, and agricultural diversification in India.

Keywords: Button mushroom, compost, spawning, casing, crop management, marketing, controlled cultivation.

Introduction

The cultivation and consumption of mushrooms, particularly button mushroom (*Agaricus bisporus*), is witnessing remarkable growth in India. In recent years, the awareness about healthy eating, dietary diversification, and the need for alternative sources of protein has encouraged people to include mushrooms in their diet. Among the different species, button mushroom has emerged as the most popular one due to its mild flavor, attractive appearance, and wide acceptance across different cuisines. In urban centers, the popularity of button mushroom has grown exponentially. It has become a common ingredient in fast–food chains, hotels, restaurants, and even household kitchens. From pizzas, soups, and salads to curries and pickles, button mushrooms are being incorporated in diverse culinary preparations. Consumers, especially the health-conscious younger generation, perceive it as a nutritious alternative to conventional vegetables. As a result, its market demand is steadily increasing not only in metropolitan cities like Delhi, Mumbai, Bengaluru, and Kolkata, but also in semi-urban towns and smaller cities.

Mushrooms are often referred to as "vegetarian meat" because of their rich nutritional profile. They contain high-quality proteins with all essential amino acids, making them an excellent substitute for animal protein, particularly for vegetarians. In addition, mushrooms are rich in vitamins (B-complex, C, D, and folic acid), minerals (potassium, phosphorus, iron, and selenium), dietary fiber, and bioactive compounds such as antioxidants and polysaccharides that strengthen immunity and protect against chronic diseases. With only about 36 kcal per 100 g of fresh weight, button mushrooms are also classified as a low-calorie functional food suitable for weight management and healthy living. For farmers, mushroom cultivation presents a highly profitable and sustainable enterprise. Unlike traditional crops that require large tracts of land, mushroom farming can be successfully practiced in limited space, even in backyard sheds, cellars, or specially designed mushroom houses. The production cycle is short, usually 30–45 days, which allows farmers to obtain multiple crops in a year. Moreover, mushroom cultivation utilizes agricultural residues such as wheat straw, paddy straw, and poultry manure, thereby promoting recycling of farm waste and contributing to environmental sustainability. With minimal investment in land, irrigation, and inputs, farmers can earn significant returns, making it an ideal option for small and marginal landholders.

Currently, India's annual mushroom production stands at approximately 2.5 lakh tonnes, and more than 70% of this is contributed by button mushroom alone. The states of Uttar Pradesh, Haryana, Punjab, Himachal Pradesh, and Bihar are the leading producers, with new production clusters emerging in Madhya Pradesh, Jharkhand, and West Bengal. While large-scale commercial units dominate urban supply chains, small farmers and rural entrepreneurs are also entering the sector, encouraged by training and support from agricultural universities, Krishi Vigyan Kendras (KVKs), and government schemes. The increasing demand for button mushroom is also linked to socio-economic changes. Rising disposable incomes, rapid urbanization, exposure to global cuisines, and changing lifestyles have created a favorable environment for mushroom consumption. Additionally, the growing awareness of lifestyle diseases such as obesity, diabetes, and cardiovascular disorders has motivated consumers to shift toward functional foods rich in nutrients and antioxidants, thereby enhancing the scope for button mushroom. Apart from domestic consumption, button mushroom also holds export potential. Indian mushrooms are being exported in both fresh and processed forms to countries in the Middle East, Europe, and Southeast Asia. The establishment of cold storage facilities, improved logistics, and processing units for canning and drying are further supporting this growth. By strengthening the value chain—from production and packaging to marketing and export—India can enhance its position in the global mushroom market.

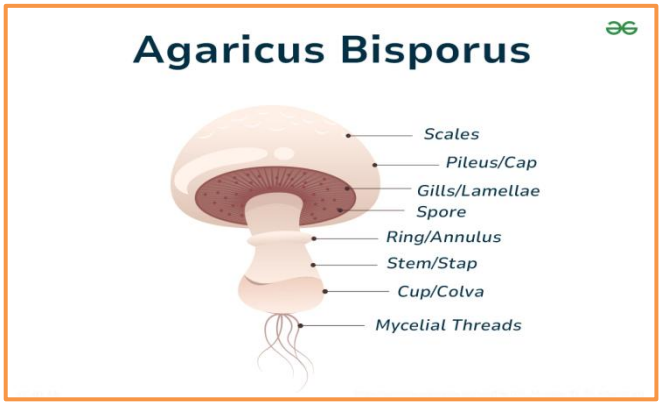
Despite its rapid rise, several challenges remain in scaling up button mushroom cultivation. The crop requires controlled conditions of temperature and humidity, which may not be easily available in tropical regions during summer. Lack of technical knowledge,

inadequate cold chain infrastructure, and limited awareness among farmers also hinder expansion. However, with proper training, adoption of low-cost controlled structures, and farmer cooperatives, these challenges can be overcome. In conclusion, the popularity of button mushroom in India reflects a combination of nutritional awareness, market demand, and profitable production potential. It not only provides consumers with a healthy food option but also empowers farmers with an alternative income source. With increasing research support, improved production technologies, and expanding markets, button mushroom cultivation is poised to become one of the most promising sectors in Indian agriculture.

Morphological and Biological Characteristics

The button mushroom (*Agaricus bisporus*) follows a distinct life cycle that progresses through four major stages: mycelial growth, spawn run, casing, and fruiting.

- **Mycelial growth:** The fungus begins with the development of mycelium, which appears as fine, white, thread-like structures. These spread throughout the compost, absorbing nutrients essential for further development.
- **Spawn run:** During this stage, the compost becomes completely colonized by the growing mycelium, creating a uniform white layer.
- **Casing:** Once the spawn run is complete, a 2–3 cm thick casing layer of soil is applied over the compost. This layer helps maintain moisture, improves aeration, and stimulates the initiation of fruiting.
- **Fruiting:** Within 10–12 days after casing, small pinheads begin to emerge, which gradually enlarge and mature into button mushrooms. The cap is typically round and white, while the stipe is short, stout, and fleshy, making the fruiting body compact and attractive.



This well-defined biological cycle not only explains the growth dynamics of button mushroom but also highlights the importance of maintaining proper environmental conditions at each stage for successful cultivation.

Nutritional Value

Button mushroom is regarded as a highly nutritious food with a unique combination of essential nutrients and bioactive compounds. On an average, 100 g of fresh mushrooms provide approximately 3.7% protein, 5% carbohydrates, 0.3% fat, 0.9% fiber, and nearly 90%

moisture content. Owing to this composition, it supplies only about 36 kcal of energy, making it an ideal low-calorie diet component. Apart from macronutrients, button mushrooms are also enriched with B-complex vitamins, vitamin D, potassium, phosphorus, iron, and selenium, which play a vital role in maintaining overall health. The high-quality protein and essential amino acids present in mushrooms make them an excellent dietary alternative for vegetarians. In addition, mushrooms contain several bioactive compounds such as antioxidants, polysaccharides, and phenolic compounds, which help in boosting immunity and protecting the body against oxidative stress. Some studies also suggest their potential in reducing the risk of chronic diseases, including cancer and cardiovascular disorders. Due to this balanced profile of nutrients and health-promoting elements, button mushroom is increasingly recognized as a "superfood", suitable for both nutritional security and preventive healthcare.

Major Species and Varieties

Button mushroom is primarily classified under the species Agaricus bisporus, which is the most widely cultivated type across the world. In India, the commonly grown varieties of this species include MS–39, NCS–6, and NCS–11, all of which are well adapted to local agro-climatic conditions. In addition to *A. bisporus*, some varieties of Agaricus bitorquis, such as NCB–1 and NCB–6, are also cultivated in certain regions. Among these, *A. bisporus* is regarded as the most suitable for Indian conditions, as it performs optimally within a temperature range of 16–25°C. Its adaptability, good yield potential, and consumer preference for its quality make it the dominant choice for commercial cultivation.

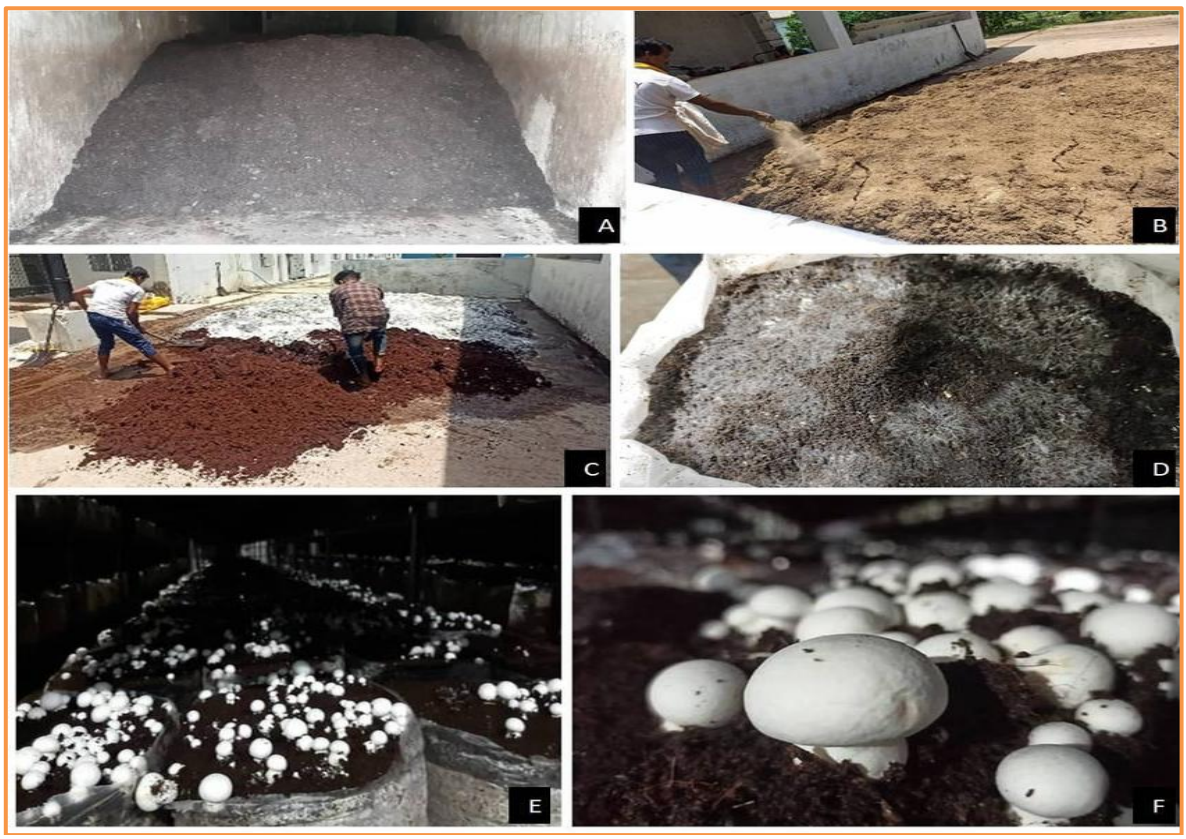
Production Technology

The success of button mushroom cultivation largely depends on adopting appropriate production technology. Each stage, from compost preparation to marketing, requires careful management of inputs and environmental conditions. The key steps involved are described below.

Compost Preparation: Compost is the most critical substrate for button mushroom cultivation, as it provides the essential nutrients and physical environment required for the growth of mycelium. The quality of compost directly influences yield and mushroom quality. For preparing compost, raw materials such as wheat or paddy straw, poultry manure, urea, wheat bran, and gypsum are commonly used. Straw serves as the bulk material, while poultry manure and urea provide nitrogen. Bran supplies carbohydrates, and gypsum maintains the texture and prevents greasiness.

There are two principal methods of composting:

- **Long Method (27 days):** In this traditional technique, wheat or paddy straw is soaked in water and then layered with poultry manure, urea, and other supplements. These layers are stacked in heaps and turned at intervals of 3–4 days to maintain aeration and uniform decomposition. Typically, 7–8 turnings are required over a 27-day period. During this process, the microbial activity generates heat, helping in partial sterilization of the compost. By the end of the cycle, good-quality compost appears dark brown, crumbly, free from ammonia odor, and rich in nutrients. This method is low-cost and widely adopted in rural areas but requires more time and labor.
- **Short Method (18–20 days):** This improved method involves composting the straw–manure mixture for 7–8 days followed by pasteurization in tunnels at controlled high temperatures (55–60°C). The pasteurization eliminates harmful microorganisms, pests, and weeds, while allowing beneficial thermophilic microbes to thrive. Within 18–20 days, a high-quality compost with consistent nutrient availability and better hygienic standards is ready. Although this method is relatively costlier due to the requirement of pasteurization chambers and infrastructure, it is highly effective for commercial mushroom farming.

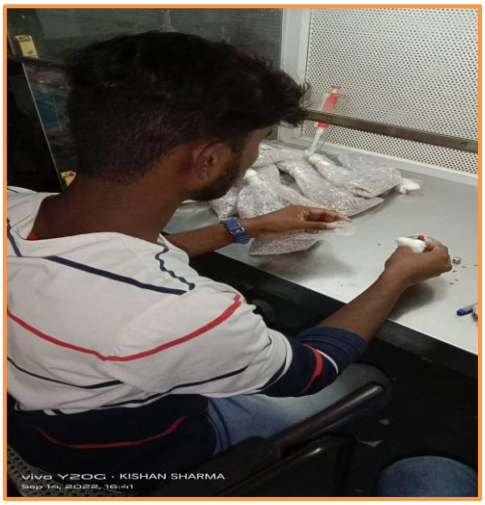


Spawning (Spawn Running): Once the compost is prepared, the next step is spawning. Spawn is the vegetative inoculum or "seed" of mushrooms, usually prepared on sterilized grain media. In practice, about 1–1.5% spawn by weight of compost is sufficient. The spawn is thoroughly mixed into the compost, which is then filled into polythene bags, wooden trays, or shelves depending on the scale of operation. The compost is incubated under favorable conditions of 22–25°C temperature and 60–70% relative humidity. During this period, the white mycelium gradually spreads through the compost, a process called spawn run. Within 15–20 days, the compost becomes fully colonized and appears uniformly white, indicating readiness for the next stage. Proper spawning is crucial, as incomplete colonization often results in poor yields and contamination.

Casing: After successful spawn run, a thin layer of casing soil (2–3 cm) is applied on the surface of the colonized compost. The casing layer is not nutritive but plays several vital roles:

- It retains moisture and prevents the compost from drying.
- It facilitates gaseous exchange between the compost and the atmosphere.
- It induces physiological changes in the mycelium, triggering fruit body formation.

Casing materials commonly used include a mixture of garden loam soil, well-rotted farmyard manure, and sand, sterilized before use to prevent contamination. The casing is lightly pressed to form a uniform surface. Moisture must be carefully maintained by light sprinkling of water without waterlogging.



Crop Management: The crop management phase is the most sensitive, as environmental conditions directly influence fruiting.

- **Temperature and Humidity:** The optimum range for fruiting is 14–18°C with 80–85% relative humidity. Maintaining this microclimate is essential, especially during pinhead formation. In tropical climates, farmers often use insulated mushroom houses, evaporative cooling pads, or humidifiers to regulate conditions.
- **Watering:** Light watering (fine mist spray) 2–3 times a day keeps the casing moist. Excessive watering should be avoided to prevent anaerobic conditions and fungal infections.
- **Ventilation:** Adequate air circulation is necessary to remove excess carbon dioxide produced by mycelium respiration. High CO_2 levels may lead to malformed fruit bodies with elongated stalks.
- **Sanitation:** Mushroom crops are highly vulnerable to pests and diseases such as green mold (*Trichoderma*), flies, and mites. Strict hygiene, use of sterilized tools, and timely removal of diseased beds help in minimizing losses. Preventive measures such as regular disinfection of mushroom houses are strongly recommended.

Efficient crop management ensures healthy pinhead initiation and uniform fruit body development, which directly contribute to yield.

Harvesting and Yield: Within 10–12 days after casing, tiny pinheads appear on the surface. These pinheads enlarge gradually, reaching marketable size in 30–35 days. Mushrooms should be harvested when the caps are firm, white, and closed, as they fetch the best market price. Harvesting is done by gently twisting the stalk from the casing soil and trimming the base. On an average, 100 bags of compost yield 350–400 kg of mushrooms under well-managed conditions. The yield depends on the quality of compost, spawn, and environmental management. Multiple flushes can be harvested from the same crop cycle, usually over a span of 50–60 days.

Packaging and Marketing: Freshly harvested mushrooms are highly perishable due to their high moisture content. To extend shelf life, they are carefully handled, cleaned, and packed immediately after harvest. The most common methods include:

- **Polythene Bags:** Simple and low-cost method suitable for local markets.
- **Tray Packaging:** Mushrooms are placed in plastic trays, wrapped with cling film or shrink film, which provides an attractive appearance and protects them from contamination.
- **Cold Storage:** Storing at 4°C can extend shelf life up to 4–5 days.

In the domestic market, fresh mushrooms are sold at a price of ₹120–160 per kg, though seasonal variations occur. Beyond fresh sales, value addition through canning, drying, powder preparation, soup mixes, and pickles provides longer shelf life and access to distant markets. Export opportunities also exist, particularly for canned mushrooms in the international market.

Summary: Button mushroom production technology is a well-structured process involving compost preparation, spawning, casing, crop management, harvesting, and marketing. Each stage requires precision, particularly in maintaining temperature, humidity, and hygiene. When managed scientifically, the enterprise not only ensures high yield and profitability but also provides farmers with an opportunity to utilize agricultural residues effectively and generate year-round income.

Cost–Benefit Analysis

Economic feasibility is one of the most important factors that determine the adoption of mushroom cultivation by farmers. Button mushroom production, when managed scientifically, has proven to be a low-cost and high-return enterprise. A detailed cost–benefit analysis for a unit of 100 bags is presented below.

Cost of Cultivation

The major expenses involved in mushroom production are associated with compost preparation, spawn procurement, casing material, labor, and basic infrastructure. For a 100-bag unit, the estimated cost is as follows:

- **Compost preparation (straw, manure, gypsum, supplements):** ₹3,000–3,500
- **Spawn (1–1.5% of compost weight):** ₹1,200–1,500
- **Casing soil (collection, sterilization, and transport):** ₹1,000–1,200
- **Labor and miscellaneous expenses:** ₹1,500–2,000
- **Packaging and marketing:** ₹1,000–1,500

Thus, the total cost of production comes to approximately **₹8,000–10,000 per cycle**.

Yield and Returns: On average, 100 bags produce about 350–400 kg of fresh button mushrooms under well-managed conditions. The prevailing market price of fresh mushrooms ranges between ₹120–160 per kg, depending on the season and location.

- **At minimum price (₹120/kg):** 350 kg × ₹120 = **₹42,000**
- **At maximum price (₹160/kg):** 400 kg × ₹160 = **₹64,000**

Hence, the **gross income** generally falls in the range of **₹45,000–55,000 per cycle** under average conditions.

Net Profit: After deducting the cost of production (₹8,000–10,000), the farmer can earn a net profit of ₹35,000–40,000 per cycle. Considering that a crop cycle lasts only 45–60 days, it is possible to take 2–3 cycles annually, depending on climatic conditions and availability of

infrastructure. This translates into an annual profit of ₹1–1.2 lakh from a small-scale unit of 100 bags.

Profitability and Significance

- **High Return on Investment (ROI):** With an investment of about ₹10,000, farmers can achieve returns 4–5 times higher within a short period.
- **Employment Generation:** Mushroom farming requires regular monitoring, composting, harvesting, and marketing, which provides part-time employment, especially to women and rural youth.
- **Value Addition:** Processing into dried mushrooms, powders, pickles, or canned products further increases profitability and opens new markets, including exports.
- **Sustainability:** Since mushroom farming utilizes agricultural residues like straw and poultry manure, it adds value to farm waste and contributes to environmental protection.

Challenges

Despite the growing popularity and profitability of button mushroom cultivation in India, farmers often face a series of technical and infrastructural challenges. These hurdles not only reduce productivity but also limit the expansion of mushroom farming at the commercial scale. The major challenges are outlined below:

Environmental Control: Button mushroom requires a specific range of temperature (14–25°C) and humidity (80–85%) at different stages of growth. In tropical and subtropical regions of India, maintaining these conditions is difficult, particularly during the summer months. Many small and marginal farmers cannot afford advanced climate-control systems, which restricts year-round production.

Compost Contamination: The quality of compost is the foundation of successful mushroom farming. However, contamination during compost preparation or spawning is a common problem. Improper pasteurization, use of low-quality raw materials, or inadequate hygiene can result in the growth of unwanted microorganisms. This reduces the availability of nutrients for the mycelium and ultimately lowers yields.

Diseases and Pests

Mushrooms are highly sensitive to several diseases and pests. Common fungal diseases include green mold (*Trichoderma spp.*), dry bubble (*Verticillium fungicola*), and wet bubble (*Mycogone perniciosa*). In addition, pests such as mushroom flies, mites, and nematodes often attack the crop, leading to severe economic losses. Effective disease and pest management requires technical knowledge, regular sanitation, and timely interventions, which are often lacking in rural setups.

Packaging and Storage: Fresh button mushrooms have a very short shelf life of 2–3 days at room temperature due to their high moisture content and delicate texture. Farmers without access to cold storage facilities face difficulties in marketing their produce. Inadequate packaging methods further reduce quality, making it difficult to transport mushrooms over long distances or to supply them in organized retail chains.

Technical Knowledge and Training

Mushroom cultivation is a knowledge-intensive enterprise. It requires understanding of microbiology, composting, environmental management, and disease prevention. Many farmers, especially in rural areas, lack access to proper training and technical guidance. Limited extension services and absence of structured farmer training programs remain significant barriers to the widespread adoption of button mushroom farming.

Opportunities and Prospects

Button mushroom cultivation presents immense opportunities for farmers, entrepreneurs, and the food industry in India. With changing food habits, rising health consciousness, and growing demand for nutritious foods, the sector has the potential to expand rapidly in the coming years.

Growing Domestic Demand: Urban consumers are increasingly adopting mushrooms as part of their regular diet. Restaurants, hotels, and fast-food chains use button mushrooms

extensively in pizzas, soups, curries, and continental dishes. Even in semi-urban and rural markets, awareness about mushrooms as a healthy food is increasing. This steady rise in demand ensures a reliable market for farmers throughout the year.

Scope for Processing and Value Addition: Fresh mushrooms are highly perishable; therefore, processing and value addition offer significant opportunities. Products such as canned mushrooms, mushroom powder, soup mixes, pickles, and dried mushrooms are gaining popularity. These not only extend shelf life but also help farmers access distant and export markets. Establishing small-scale processing units can substantially increase profitability while generating rural employment.

Export Potential: India has favorable conditions for producing mushrooms, and with proper post-harvest management, it can become a key player in the global market. Processed button mushrooms, particularly canned varieties, are already exported to the Middle East, Europe, and Southeast Asia. With improvements in cold chain facilities and logistics, the export of fresh mushrooms can also be enhanced, providing farmers with lucrative opportunities.

Employment and Entrepreneurship: Mushroom cultivation is particularly suitable for women, unemployed youth, and small-scale entrepreneurs, as it requires minimal land, low investment, and limited labor. It can be practiced as a household enterprise or scaled up into a commercial venture. Training programs organized by agricultural universities, Krishi Vigyan Kendras (KVKs), and government agencies are further encouraging young farmers to adopt this enterprise.

Environmental Sustainability

Another significant advantage of button mushroom cultivation lies in its contribution to environmental sustainability. The use of agricultural residues such as wheat straw, paddy straw, and poultry manure in compost preparation reduces farm waste and promotes recycling. After harvesting, the spent mushroom compost can be reused as an excellent organic manure for field crops, improving soil fertility and reducing reliance on chemical fertilizers.

Research and Future Directions

The sustainability and expansion of button mushroom cultivation in India depend largely on continuous research and technological innovations. Although production has increased in recent years, several gaps remain in terms of varieties, infrastructure, disease management, and market organization. Future research and development should therefore focus on the following key areas:

Development of High-Yielding and Low-Cost Varieties

Most of the varieties currently in use are location-specific and sensitive to environmental fluctuations. There is a need to develop climate-resilient, high-yielding, and low-cost varieties of *Agaricus bisporus* that can tolerate higher temperatures and resist common pathogens. Breeding programs must also focus on improving quality traits such as shelf life, texture, and nutrient enrichment.

Affordable Controlled Structures

The cost of environmental control structures is a major barrier for small and marginal farmers. Research should emphasize the design of low-cost polyhouses, naturally ventilated units, and solar-powered cooling systems that make mushroom production viable across different agro-climatic zones. Such innovations would enable year-round cultivation and reduce dependence on costly imported equipment.

Promotion of Cluster Farming and Farmer Producer Organizations (FPOs): Fragmented production often limits market access and bargaining power. Future strategies should encourage cluster-based mushroom farming and the formation of FPOs or cooperatives. This will help in collective procurement of raw materials, sharing of infrastructure such as cold storage and processing units, and direct marketing to consumers and industries. Research on efficient cluster models and their socio-economic impact can provide a roadmap for large-scale adoption.

Biotechnology-Based Disease Management: Diseases and pests remain a persistent challenge in mushroom farming. Traditional chemical-based methods are often ineffective and unsustainable. Future research should focus on biotechnology and microbial solutions such as bio-control agents, molecular diagnostics, and disease-resistant strains. DNA-based tools for early pathogen detection can help farmers take timely action, thereby minimizing losses and reducing chemical use.

Integration with Sustainable Agriculture: Research should also emphasize integrating mushroom cultivation with broader sustainable farming systems. The use of spent mushroom compost (SMC) as an organic amendment, recycling of farm residues for compost, and linkage with organic farming practices are promising directions for future studies.

Conclusion

Button mushroom (*Agaricus bisporus*) cultivation has emerged as a dynamic and profitable enterprise in India, combining nutritional, economic, and environmental benefits. Its growing popularity among consumers reflects rising health awareness, dietary diversification, and the influence of changing lifestyles. For farmers, particularly smallholders, landless laborers, women, and youth, mushroom farming offers a sustainable livelihood option that requires minimal land, low investment, and short production cycles while ensuring attractive returns.

From a nutritional perspective, button mushrooms provide high-quality proteins, essential vitamins, minerals, and bioactive compounds, positioning them as a functional food with immense potential in addressing nutritional security and lifestyle-related disorders. Economically, mushroom cultivation adds value to agricultural residues, generates employment, and opens opportunities for value addition through processing and exports. Environmentally, it supports waste recycling and soil fertility management through the use of spent mushroom compost.

Despite its promise, the sector faces challenges in environmental control, compost quality, pest and disease management, storage, and marketing infrastructure. Addressing these constraints requires stronger institutional support, wider farmer training, and adoption of low-cost technologies. Future growth will also depend on research innovations such as high-yielding varieties, biotechnology-based disease management, affordable controlled structures, and cluster-based farming models.

In conclusion, button mushroom cultivation represents a unique convergence of nutrition, profitability, sustainability, and entrepreneurship. With coordinated efforts from farmers, researchers, policymakers, and industry stakeholders, India has the potential not only to meet its rising domestic demand but also to establish itself as a significant player in the global mushroom market. Strengthening this sector can play a vital role in achieving food and nutritional security while simultaneously empowering rural communities and promoting sustainable agricultural development.