MUSHROOM CULTIVATION: MOST PROFITABLE BUSINESS

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Abstract: **present study based on secondary data in mushroom production India is very poor but huge scope in consumption as well as production. There is need of society to aware health benefits and one of the most profitable agricultural businesses. India has tremendous potential for mushroom production and all commercial edible and medicinal mushrooms can be grown. There is increasing demand for quality products at competitive rate both in domestic and export market. Though growth of mushroom will depend on increasing and widening domestic market in coming years, export market will be equally attractive. The possible value-added products can be developed either by converting freshly harvested mushrooms into ketch-up, murabba, candy, chips and pickles or by dehydrating freshly harvesting mushrooms into dehydrated form and then making**
soup powder, biscuit, nuggets ant RTE

***Keywords*: Mushroom cultivation, Business and Mushroom product.**

Introduction:
The word mushroom is derived from the French word for fungi and moulds. Since ancient times, mushrooms have been treated as a special kind of nutritious food. Greeks regarded mushrooms as commodity providing strength for warriors in battle and the Romans regarded mushrooms as the "Food of God". In the earlier times, mushrooms were collected from their natural growing habitats, but with the passage of time, several attempts have been made to domesticate mushrooms under controlled conditions. So far, more than 2,000 edible fungal species are widely accepted for human consumption, but only a few of them are commercially cultivated worldwide and only 5 mushroom species viz; *Agaricus bisporus*, *Pleurotus* spp., *Volvariella volvacea*, *Calocybe indica* and *Lentinula edodes* are popularly cultivated in different parts of India. However, since then, better and more effective methods have been developed and there has been a huge increase in mushroom cultivation.

In the last 50 years, the Netherlands has grown into the largest mushroom production country within the European Union, with an annual production of 270 million kilograms and more than 10,000 jobs. Next to China and the United States, the Netherlands holds 3rd place in the market. China is the largest producer of mushrooms in the category of top ten nations with a market share of 70 per cent followed by Italy 10.67 per cent, USA 5.29 per cent. Every year, millions of tons of mushrooms are cultivated worldwide. However, Poland was the largest exporter of mushroom in the world. In terms of consumption, Netherland with 11.62 kg per head per annum topped in the list of major mushroom consumers. In China, Japan, Poland and India, the per capita mushroom consumption stood below 1 kg per annum.

In mushroom production India is very poor but huge scope in consumption as well as production. There is need of society to aware health benefits and one of the most profitable agricultural businesses that anyone can start with small capital with small space is mushroom growing. In India, mushroom farming is increasingly becoming more popular as a secondary source of income for Indian farmers. Today, mushroom farming is India's most productive and profitable industry. It is progressively gaining popularity in India because it quickly turns the painstaking labor of farmers into profit. In India, farmers employ mushroom growing as a secondary source of income. Mushroom cultivation is mainly carried out in the all states. Mushroom are delicious in taste it is rich in proteins, fibers, potassium, copper, and other vital minerals. Mushroom comes from a family of fungi but included in the family of vegetables (Chang ST and Miles PG, 2004).

They possess the same characteristics as that of a plant they have 90 percent of water in them and a significantly low number of calories and fats. Mushroom diet is good for heart due to its low fat content, higher proportion of unsaturated fatty acids and absence of cholesterol. Minimal sodium with rich potassium in mushroom enhances salt balance and facilitates blood circulation in human and found suitable for high blood pressure patients. The diabetic and obese patients choose mushroom as an ideal food owing to its low calorific value, no starch, and less sugars. The fermentable dietary fiber in mushrooms augments healthy functioning of bowel system as fiber serves as a food for beneficial microbes in human digestion system (Poongkodi, G. K. and D, Sakthisekaran. 1995). Compounds restricting tumor activity such as Kresin is widely used as a leading cancer drug in pharmaceutical industries. Ergothioneine is a specific antioxidant found in *Flammulina velutipes* and *Agaricus bisporus*, which is necessary for healthy eyes, kidney, bone marrow, liver and skin consequently reducing the aging process. Antioxidants present in mushroom scavenge the free radicals present in body system and reduce cell maturity. The vitamin D content of a mushroom depends on postharvest handling,

in particular the unintended exposure to sunlight. Thus, by it acts as an anti-aging agent. A diverse collection of polysaccharides (beta glucans) and minerals, isolated from mushroom is responsible for regulation and strengthening the human immune system, (Sardar Singh 2020).

Why mushroom farming is popular?

In recent years, many urban gardeners, as well as small farmers, are offering into mushroom farming as it is becoming a good choice for starting a profitable business. Mushrooms are known for excellent source of proteins, vitamins, and minerals, thus starting the key to a balanced diet. Given its immense health benefits, more and more people are opting for mushrooms in their diet. The rising consciousness for nutrient-rich foods has led to a rise in demand for this superfood and opened new possibilities for farmers to start a mushroom farming business (Chang, S. T. and J. A. Buswell. 1996).

The fact that it requires little space or land makes it a profitable option for both rural farmers who have small landholdings or urban farmers who want to start cultivation out of their homes. Mushrooms can grow without sunlight or fertile soil, require low investment and little maintenance. Thus, many farmers are growing mushrooms on a part-time basis. Mushroom farming can also improve the sustainability of farming practices through recycling agro wastes, which otherwise pollute the soil, that's why farmers and common man concentrating for mushroom cultivation.

Types of mushrooms

There are mainly 3 different types of mushrooms cultivated in India-

1.Button Mushrooms- These creamy white to pale tan mushrooms offer a firm texture and a unique flavor. Predominantly grown during the winter season, these are the most popular variety in the country. Known for their delicious and juicy taste, they are also extremely economical. Button mushrooms can be eaten raw or cooked in a variety of recipes.

2.Oyster Mushrooms- Oyster mushrooms are high in nutrients. They have significant level of zinc, iron, potassium, calcium, phosphorus, vitamin C, folic acid, niacin, vitamins B-1 and B-2. It has a high anti-oxidant compound and is known to save us from variety of diseases and also helps us in beating stress. Oyster mushrooms are available in a wide range of colors and are known to be the most beneficial for human health. Consuming this variety of mushrooms can drastically reduce cholesterol and reduce the risk of cancer due to its low-fat content. Grown in the northern plains of India, it is much preferred by farmers as it has a simple production process.

3.Paddy straw Mushrooms- The paddy straw mushroom can grow in temperatures from 35-40 degrees Celsius and requires fairly low investment. This variety of mushrooms offers great taste, aroma, and nutrients. Mostly grown in south-east Asia, this variety fruits quickly, usually 5-7 days from spawning.

Among these three mushrooms, oyster mushrooms is very popular and socio economics important towards the cultivation practices and way to its processing. Oyster Mushrooms is very easy and affordable sources as well as sustain in tropical zone also

Oyster Mushrooms

The easiest to produce and very pleasant to eat is the oyster mushroom. this kind of fungus does not need special growing conditions. The oyster mushroom is one of the most suitable fungal organisms for producing protein rich food from various agro wastes without composting. Oyster mushroom can be grown in the plains and in temperatures ranging from 32 to 38 degrees centigrade and a humidity of 55 to 70 percent. By adding the additional humidity required for its growth in the summer, it can also be grown there. The best growing season is from March or April to September or October in mountainous places, and from September or October to March or April in lowland regions. Mushroom, which is pure vegetarian food, is good for diabetic patients. It also has other medicinal properties. It is good for stomach-related ailments like gastric ulcer and has high fibre content and no sugar. It is also rich in protein. Mushroom cultivation has become a profitable business with the produce fetching good returns in the market Oyster mushrooms are grown with minimum effort as compared with the button mushroom.

Substrate:

Oyster Mushroom culture and prepared spawn, production of subculture, production of mother spawn, and production of grain spawn as outlined by the method. Different organic wastes used as substrates, prepared bed and sterilized with fungicides and Formaldehyde (37-40%) the substrates were then drained to remove excess water and packed into transparent plastic standard with 14 x 22 cm size for mushroom cultivation (Thapa et.al. 2016).

Bag filling Method:

The bag filling method was used throughout the studies. The polythene bags, tied bottom with rubber to provide a flat circular bottom to the mushroom beds. The first layer was filled with the substratum up to 5 cm in height. The spawn was sprinkled over the entire surface of the substratum. Similarly, such layers filled with the substratum. Inoculation made with pure grain spawn at 10 grams per kg of the substrate on a dry weight basis under aseptic conditions. The bags tied and provide vents .

Climate & other conditions:

The bags put on the wooden racks, water sprayed on the bags to keep them moist, the floors also wetted to help increase the humidity to not less than 85.0%, were mentioned at culture room. Formation of fruit bodies evident within 13-14 days of incubation removal the poly bags. The maintained beds up to the harvest.

Harvesting:
The cap should be gently torn off during harvest. To do this, hold it gently between your forefingers, press it into the ground, and then twist it off. Cut off the base of the stalk where mycelial threads and dirt granules adhere. The cost of mushroom cultivation in India costs around 1,00,000 lakh rupees to 1,50,000 lakhs rupees respectively.

Cost of mushroom production:
The cost items in the mushroom farming included different types of fixed, variable and opportunity costs. On the return side, gross return included revenue from mushroom and its by product.

Fixed costs :
The fixed costs of mushroom farming considered farm house making materials as bamboos, polythene, cloths, plastic pipes, water supply pipes, tins, water supply machines, rent of house, gunny bags, woods, concrete pillars and others (electricity, water supply materials etc).

Variable costs :
Variable cost share is the largest amount in the total cost of mushroom farming. Variable costs encompass the cost of spawn bags (purchasing and making cost) and all labor cost (family and permanent hired labor) for mushroom production (Basanta K et. al.2012)

Market potential:
Mushroom cultivation has been declared as a major thrust area by Govt. of India. However, there is huge demand supply gap. Mushroom dish is a common item in all the big hotels. Day by day there is continuous increase in the demand of mushroom which denotes that there is huge market potential in near future. Mushrooms are marketed as fresh, dried and preserved. Market for mushrooms is growing rapidly because of their nice aroma, subtle flavour, nutritious values and special taste. Many exotic preparations are made from them like soup, pickles, vegetables etc. It is also used for stuffing several food preparations and for garnishing. But its consumption is still confined to urban and semiurban population. Mushrooms have very short life after harvesting and hence they are sold in fresh form. Just after harvest, the mushrooms cannot be stored for more than 24 hours at ambient temperature (Lal Kaushal and Sharma, 1995). Due to presence of more than 90 per cent moisture content, mushrooms are highly perishable and start deteriorating immediately after harvest. They develop brown colour on the surface of the cap due the enzymatic action of phenol oxidase, this results in shorter shelf life. Loss of texture, development of off flavour and discolouration results in poor marketable quality and restricts trade, their shelf life can be enhanced by processing them. Processed mushrooms are packed in special quality polythene bags or canned. This variety can be sold to far off places and there is certain idea to sell mushroom direct to consumer for that farmers were aware about the market ideas as bellow

1. Restaurants- The growing consumer awareness around the health benefits of mushrooms has led to a sharp rise in demand. Restaurants and hotels are quickly incorporating mushrooms into their menus. Thus, this would be a great channel for you to reach out to. Restaurants are always open to sourcing their ingredients from a local grower who can bring freshness and quality to their dishes. Hand out free samples to the chef to try your product. If the restaurant likes the quality, you can get order based on their demand.

2. Farmers Markets- Many customers today are shifting towards a vegetarian diet. Mushrooms are therefore being used as a substitute for meat, pushing customers to experiment and try new varieties of mushrooms. There is also a rising interest in fresh and local food due to which urban consumers are flocking to these farmer's markets. Thus, selling your mushrooms at the local farmer's markets can be extremely profitable, as customers are willing to pay a fair price for the quality.

3. Selling online- This is a great way to sell your mushrooms if you are looking for convenience. Check out apps like Farmsnation, Amazon, Flipkart, etc. which aim to empower farmers by helping them find customers in their area. As a farmer, all you have to do is upload your product details, images, price, etc and Farmsnation will take care of the rest. Farmsnation aims to provide sales education and e-commerce tools so that farmers are able to attract more customers. Customers who come to the app are majorly looking for quality foods that they can't find at their nearby grocery store. Hence this would be a good place to sell your high-quality, gourmet mushrooms.

5. Packaged products- Customers today are open to trying new foods, and food producers are making use of this opportunity. As a mushroom cultivator, you can use your mushrooms to make delicious mushroom sauce, pickled mushrooms, or mushroom seasonings. Such gourmet products can be sold at a high markup provided you offer rich taste and high quality. Just after harvest, the mushrooms cannot be stored for more than 24 hours at ambient temperature (Lal Kaushal and Sharma, 1995). Due to presence of more than 90 per cent moisture content, mushrooms are highly perishable and start deteriorating immediately after harvest. They develop brown colour on the surface of the cap due the enzymatic action of phenol oxidase, this results in shorter shelf life. Loss of texture, development of off flavour and discolouration results in poor marketable quality and restricts trade of fresh mushrooms. In view of their high perishable nature, the fresh mushrooms have to be processed to extend their shelf life for off season use. This can be achieved by adopting appropriate post-harvest technology to process surplus mushrooms into novel valueadded products. The value-added products are the need of the hour for the mushroom growers not only to reduce the losses but also to enhance the income by value-addition and boost the consumption of this important horticultural crop. The possible value-added products can be developed either by converting freshly harvested mushrooms into ketch-up, murabba, candy, chips and pickles or by dehydrating freshly harvesting mushrooms into dehydrated form and then making soup powder, biscuit, nuggets ant RTE.

While many rural and urban farmers find mushroom cultivation easy and fascinating, many struggles with finding buyers for their produce. While the demand has grown exponentially, it is important to identify the right sales channel for your business. Once you identify where to sell your mushrooms, mushroom farming can be one of the most profitable businesses as a farmer.

Conclusion:

India has tremendous potential for mushroom production and all commercial edible and medicinal mushrooms can be grown. It is need of young researchers and entrepreneur to lead in this business for feasibility of production and improve the income sources. There is increasing demand for quality products at competitive rate both in domestic and export market. Though growth of mushroom will depend on increasing and widening domestic market in coming years, export market will be equally attractive. To be successful in both domestic and export market it is essential to produce quality fresh mushrooms and processed products lacking of pesticide residues and at competitive rate. It is also important to commercially utilize the compost left after cultivation for making manure, vermi compost, briquettes, etc. for additional income and total recycling of agro wastes

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