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Low-Cost Oyster Mushroom Cultivation: A Pathway to Sustainable Farming and Rural Income

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Oyster mushroom (*Pleurotus* spp.) cultivation is a simple, low-cost and eco-friendly farming enterprise that converts agricultural waste into nutritious food and additional income. It can be practised by farmers, rural youth and women with limited investment and space. This article highlights the cultivation process, including substrate preparation, spawning, incubation, fruiting and harvesting, along with basic management practices. Oyster mushroom cultivation offers promising opportunities for rural entrepreneurship, employment generation and sustainable agricultural waste utilization.

Keywords: *Pleurotus* spp., low-cost cultivation, agricultural waste, rural entrepreneurship, sustainable agriculture.

Introduction

Mushroom cultivation is an emerging agricultural enterprise that provides nutritious food, additional income and employment opportunities. Among the different cultivated mushrooms, oyster mushroom (*Pleurotus* spp.) is particularly suitable for low-cost production because it can grow on agricultural wastes such as paddy straw, wheat straw and sugarcane bagasse. Its simple cultivation technique, short production cycle and limited space requirements make it suitable for small and marginal farmers, rural youth and women entrepreneurs. Moreover, converting agricultural residues into valuable food products helps reduce waste and promotes sustainable agriculture. Therefore, oyster mushroom cultivation offers a promising opportunity to improve rural livelihoods through affordable production technology and efficient utilization of locally available resources.

Importance of Oyster Mushroom Cultivation

Oyster mushroom cultivation offers several benefits, including nutritional security, income generation and sustainable agricultural waste management. It is rich in protein, dietary fibre, vitamins and minerals, making it a valuable addition to the human diet. Its cultivation requires limited space and comparatively low investment, making it suitable for small and marginal farmers, rural youth and women entrepreneurs. Agricultural residues such as paddy straw and wheat straw can be used as growing substrates, converting waste materials into valuable food products. In addition, oyster mushrooms can be processed into dried mushrooms, mushroom powder, soups and pickles, creating opportunities for value addition and small-scale enterprises. Thus, oyster mushroom cultivation can contribute to rural employment, supplementary income and resource-efficient agriculture.

Suitable Species and Cultivation Conditions

Different species of oyster mushroom are suitable for cultivation under different temperature conditions. *Pleurotus ostreatus* and *Pleurotus florida* are suitable for cooler conditions,

whereas *Pleurotus sajor-caju* and *Pleurotus citrinopileatus* can be cultivated under relatively warmer conditions. Pink oyster mushroom (*Pleurotus djamor*) is another option for warm environments. According to the source document, oyster mushrooms can be grown on agricultural residues such as paddy straw, wheat straw and sugarcane bagasse. Successful cultivation depends on selecting a suitable species and maintaining appropriate temperature, relative humidity, ventilation and moisture during different growth stages.

Low-Cost Oyster Mushroom Cultivation Technology

Oyster mushroom cultivation is a simple and economical process that can be carried out using locally available agricultural residues, such as wheat straw, paddy straw and other suitable plant materials. The major steps involved in production are substrate preparation, pasteurization, spawning, incubation, fruiting and harvesting.

1. **Substrate preparation:** Wheat or paddy straw is commonly used as a substrate. The straw should be chopped into small pieces of approximately 3–5 cm and soaked thoroughly in clean water to ensure uniform moisture.
2. **Substrate pasteurization:** The chopped straw can be pasteurized by immersing it in hot water maintained at 60–70°C for approximately 1–2 hours. After treatment, the straw should be drained properly and cooled to room temperature. The moisture content should be maintained at approximately 65–70%, so that the substrate remains moist without releasing excess water when squeezed.
3. **Spawning and bag filling:** Once the substrate has cooled, good-quality oyster mushroom spawn should be mixed or layered uniformly with the substrate. Spawn is generally used at approximately 3–5% of the wet substrate weight, depending on the production method and spawn recommendations. The substrate is then filled into clean polythene bags, ensuring proper distribution of spawn and avoiding excessive compaction.
4. **Incubation or spawn running:** The filled bags should be kept in a clean, shaded room under suitable temperature and humidity conditions. During this stage, the fungal mycelium gradually spreads throughout the substrate. The bags should be protected from direct sunlight, excessive moisture and contamination. Adequate hygiene is essential for successful mycelial growth.
5. **Fruiting and crop management:** After complete colonization of the substrate, the bags should be opened or perforated according to the cultivation method to promote fruiting. Relative humidity should generally be maintained at around 80–90%, with adequate fresh-air circulation and diffuse light. Regular misting may be required to maintain humidity, but direct and excessive spraying on developing mushroom clusters should be avoided. Poor ventilation and high carbon dioxide concentrations may result in elongated stalks and small caps.
6. **Harvesting:** Oyster mushrooms should be harvested when the caps are well developed, and their margins are still slightly curled. The clusters should be harvested carefully without damaging the substrate. Under suitable conditions, additional flushes may develop after the first harvest. Total yield depends on the mushroom strain, substrate quality, spawn rate and environmental conditions.

This low-cost cultivation method enables farmers, rural youth and women to convert agricultural residues into a nutritious food product and an additional source of income. Maintaining substrate moisture, hygiene, suitable environmental conditions and good-quality spawn is essential for successful production.

Major Contaminants and Their Management

Contamination is one of the major challenges in oyster mushroom cultivation and may reduce both yield and quality. Common fungal contaminants include *Trichoderma* spp., which cause green mould, along with *Penicillium* and *Aspergillus* spp. Bacterial contamination may also occur, resulting in soft rot and dark spots, particularly under conditions of excessive moisture and poor ventilation. To minimize contamination, good-quality spawns should be used, and the substrate should be properly pasteurized before spawning. Cultivation rooms, growing bags,

tools and other equipment must be kept clean. Appropriate temperature, humidity and ventilation should be maintained throughout the production cycle. Contaminated bags should be removed promptly from the cultivation area and handled carefully to prevent the spread of contaminants to healthy bags. Excessive watering should be avoided, and unnecessary chemical applications should not be practiced. Regular monitoring and proper sanitation are essential for maintaining healthy mushroom growth and achieving successful production.



Fig:1 Oyster Mushroom

Conclusion

Oyster mushroom cultivation is a low-cost, eco-friendly and profitable enterprise that offers significant opportunities for rural employment and entrepreneurship. It enables the effective utilization of agricultural residues, such as wheat and paddy straw, for producing nutritious food with relatively low investment and limited space. Successful cultivation depends on the use of quality spawn, proper substrate pasteurization, maintenance of suitable temperature and humidity, adequate ventilation and effective contamination management. With appropriate technical guidance and improved cultivation practices, oyster mushroom production can become a valuable supplementary source of income for farmers, rural youth and women while contributing to sustainable agriculture and agricultural waste management.