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The development and farming of oyster mushrooms (*Pleurotus ostreatus*) and its connection to self-employment economic strategies: A Review

***[1]T.Sreedhar Murthy, [2]M. Sreekanth Reddy, [3]C.Raja Kumar, [4]N.Raja Sekhar Reddy**

[1]Department of Botany- Government Degree College, Porumamilla, YSR (Dt)-A.P

[2]Department of Botany-YSR Vivekananda Government Degree College,Vempalli,YSR (Dt)-A.P

[3]Department of Botany- Government Degree College, Huzurabad, Karimnagar (Dt)-T.S

[4]Department of Botany- Government College for men (A),Kadapa-A.P

Corresponding author: sreedhar.thiruvaipati@gmail.com

Abstract:

This study investigates the relationship between self-employment economic methods and oyster mushroom growing (***Pleurotus ostreatus***). It looks at every stage of oyster mushroom development, from preparing the substrate to harvesting methods. The study looks at the financial effects of doing oyster mushroom farming as a side business, emphasizing how flexible and scalable it is. Policymakers, businesspeople and agriculture enthusiasts may use the findings to better understand how oyster mushrooms can be used to boost the economy, support sustainable development, and give people more options for self-employment. Additionally, mushroom cultivation and production was addressed as well as challenges associated with mushroom farming and an assessment of their nutritional content compared to other food consumed by humans. There is a dearth of knowledge in this area of great natural biodiversity, thus more research on the applications of mushrooms should be done in Drought areas of the nations.

Keywords: Policymakers, Agriculture enthusiasts, Oyster mushrooms, self-employment, economic methods

Introduction:

The cultivation of oyster mushrooms (***Pleurotus ostreatus***) has emerged as a dynamic and versatile venture that has piqued the interest of agricultural enthusiasts, entrepreneurs and policymakers alike **[2].** In recent years, oyster mushrooms have garnered attention not only for their gastronomic appeal but also for their economic viability, placing them at the forefront of sustainable agriculture and entrepreneurial endeavors **[12].** Amidst a global upswing in demand for nutritious, locally sourced food, the cultivation of specialty mushrooms, particularly Pleurotus ostreatus, has gained prominence **[3].** Oyster mushrooms stand out for their rapid growth, adaptability to various substrates and a wide range of culinary applications, making them an attractive option for small-scale farmers and aspiring entrepreneurs seeking self-employment opportunities **[11].** Encompassing crucial stages such

as substrate preparation, inoculation, mycelia growth, fruiting, and harvesting techniques, it aspires to equip potential cultivators with essential insights and knowledge necessary for successful oyster mushroom farming **[1].**

Beyond the agronomic facets, this review delves into the economic implications of engaging in oyster mushroom farming as a self-employment initiative **[2].** Through an examination of various economic models, market dynamics and factors influencing profitability, the review seeks to uncover how individuals can leverage oyster mushroom cultivation to enhance their economic well-being and contribute to the broader spectrum of self-employment strategies **[4].**

The connection between oyster mushroom farming and self-employment is contextualized within the broader framework of sustainable agriculture and rural development **[5].** By emphasizing the adaptability and scalability of oyster mushroom cultivation, according to literature sheds light on its potential as a viable pathway for individuals to achieve economic autonomy, particularly in regions where opportunities for self-employment play a pivotal role in community development and resilience **[3].**

1. Mushroom Cultivation and Production:

The cultivation of mushrooms began in China as early as 600AD **[6].** They are frequently visible as lateral attachments on the surface and have the appearance of an ear or a fan and range in length from 5 to 25 cm **[7].** Occurs in a range of tints from white to grey to tan to dark-brown with white flesh. Its growth is especially noticeable in the world's temperate and subtropical regions **[8].** It requires a moderate temperature range of 20^{o} C to 30^{o} C and a humidity range of 55% to 70% for healthy growth **[11].** The mushroom's balanced nutritional makeup is drawing consumers from all around **[3].** Mushrooms have nutritional properties that aid improves health by being low in calories, sodium, fat, and cholesterol while also being high in fiber, vitamins, and minerals **[12].** Among the several forms of mushrooms accessible, oyster mushroom is the most nutritious and capable of addressing the issue of protein deficiency in developing and impoverished countries **[13].**The oyster mushroom, Pleurotus, is a white-rot basidiomycete fungus with a complex enzyme system and a notable lignocellulolytic characteristic **[14].**

Since the 1970s, India's mushroom business has grown significantly, with button mushrooms accounting for 89% of all mushrooms cultivated in 2010 **[11].** The mushroom industry in the United States generated $1.22 billion in revenue in 2017, representing a 12% rise in value since 2007**[9].** The industry is consolidating, while the value of production is

increasing. Commercial mushroom production in Bangladesh originated in Europe, with 20 different varieties produced in the wild **[15].** The most acceptable mushrooms for cultivation are oyster and white button mushrooms. Bangladesh is one of the best countries for mushroom growing because of its favorable atmosphere, low production costs, and high market value **[16].** However, various agriculture and marketing concerns must be addressed before production can be increased **[14].**

1.1.Bag Cultivation Method for Oyster Mushrooms (Farming):

Materials Needed:

- Oyster mushroom spawn (mycelium)
- Substrate (commonly a mixture of straw and other organic materials)
- Plastic bags (usually autoclavable bags)
- Water
- Perforator (for making holes in bags)
- Sterilization equipment (pressure cooker or autoclave)

Table:1

S .no	Steps	Procedure	Photos
1	Substrate Preparation	Mix straw with other organic materials such as cottonseed hulls or sawdust. Moisten the substrate with water until it reaches the right moisture content.	
2	Sterilization	Sterilize the substrate to kill any competing organisms and pathogens. This can be done using a pressure cooker or autoclave.	
3	Inoculation	Once the substrate has cooled, inoculate it with oyster mushroom spawn. Mix the spawn thoroughly with the substrate.	
4	Bagging	Fill plastic bags with the inoculated substrate. Seal the bags and leave some space for the mycelium to grow.	
5	Incubation	Allow the bags to incubate in a dark, warm environment. The mycelium will colonize the substrate during this period.	
6	Pinning and Fruiting	After full colonization, induce fruiting by exposing the bags to fresh air and light. Cut holes in the bags to allow mushroom growth. Maintain humidity and fresh air exchange for optimal fruiting conditions.	

7	Harvesting	Harvest the mushrooms when they are fully grown but before the caps flatten out. Twist or cut the mushrooms at the base.	
8	Storage	Store harvested mushrooms in a cool, humid environment or refrigerate them for short-term storage.	

Oyster mushrooms can be cultivated on a variety of substrates, including straw, coffee grounds, and agricultural waste. Sterilization is crucial to prevent contamination during the cultivation process **[17].** Environmental conditions, including temperature, humidity and light, play a significant role in successful cultivation **[18].**

2. Self-employment economic strategies of oyster mushrooms:

Self-employment in oyster mushroom cultivation involves not only the cultivation process but also strategic planning to ensure economic viability **[12].** Here are some economic strategies for self-employment in oyster mushroom cultivation **[18].**

2.1. Market Research and Product Differentiation:

Conduct thorough market research to understand the demand for oyster mushrooms in your region **[12].** Identify potential customers such as local markets, restaurants, grocery stores, and health food stores **[19].** Differentiate your product by offering unique varieties of oyster mushrooms or organic and sustainably grown options **[2].**

2.2. Diversification of Mushroom Varieties:

Cultivate a variety of oyster mushroom strains to cater to different tastes and preferences. Experiment with specialty varieties that may have higher market value **[11].**

2.3. Value-Added Products:

Explore opportunities to create value-added products like mushroom powders, extracts, or dried mushrooms **[20].** Develop recipes or cooking guides to promote the culinary versatility of oyster mushrooms **[17].**

2.4. Local Partnerships and Collaborations:

Partner with local restaurants, chefs, or farmers' markets to establish a direct sales channel. Collaborate with local businesses for mutually beneficial ventures, such as supplying mushrooms for specialty dishes **[12].**

2.5. Community Engagement:

Engage with the local community through farmers' markets, workshops or educational programs**[12].** Establish a strong brand presence by participating in community events **[21].**

2.6. Subscription Models and Direct Sales:

Implement subscription models for regular customers, providing a steady income stream **[17].** Develop a direct sales strategy through online platforms, local deliveries or farm gate sales **[21].**

2.7. Cost Management and Efficiency:

Monitor and control production costs by optimizing substrate usage, energy consumption and equipment efficiency. Explore bulk purchasing options for supplies to reduce costs **[3].**

2.8. Continuous Learning and Innovation:

Stay updated on industry trends, cultivation techniques and market demands **[2].** Innovate by adopting new technologies, sustainable practices or alternative growing methods **[22].**

2.9. Quality Control and Branding:

Prioritize quality control to ensure consistent and high-quality mushroom production **[11].** Build a strong brand by highlighting factors such as organic cultivation, sustainability and freshness **[12].**

2.10. Networking within the Industry:

Attend industry conferences, workshops, and events to network with other mushroom growers and stakeholders. Exchange knowledge, share experiences and explore potential collaborations **[22].**

2.11. Financial Planning and Record Keeping:

Maintain accurate financial records to track income, expenses, and profits **[14].** Develop a comprehensive business plan and budget for short-term and long-term goals **[23].**

2.12. Compliance with Regulations:

Ensure compliance with local regulations and health standards for mushroom cultivation and sales **[1].** Obtain necessary permits and certifications for selling mushrooms. By combining effective cultivation practices with strategic business decisions, individuals engaged in self-employment in oyster mushroom cultivation can build a sustainable and profitable venture **[3].** It's important to adapt strategies based on market dynamics and consistently seek ways to improve efficiency and product quality **[4].**

3.0. Challenges and opportunities of oyster mushroom production:

The cultivation of oyster mushrooms presents a number of difficulties, such as supply chain issues, climate control, seasonal changes, market competitiveness, product deterioration, cultivation complexity, and obstacles in scaling up production **[22].** The increasing demand for healthful meals, on the other hand, presents potential due to factors including local and sustainable farming, value-added products, educational initiatives, technology adoption, partnerships with chefs and restaurants, online and direct marketing, research and innovation, and government backing **[23].** It is difficult for new producers to establish themselves and set themselves apart from the competition because to contamination risk, climate control, seasonal changes, and a short shelf life **[23].** Growers might benefit from expanding into value-added product diversification, providing instructional programmes and utilising technology **[24].** Growers can get a competitive edge and access to new markets by investing in research and innovation. The key to successfully navigating the ever-changing world of mushroom growing is constant learning, adaptability, and quality-focused emphasis **[25].**

4.0. Medicinal properties of oyster mushrooms:

One common culinary component that may offer therapeutic benefits is oyster mushrooms **[9].** Antioxidants such as ergothioneine and selenium shield cells from oxidative stress and lessen inflammation, while beta-glucans found in oyster mushrooms help to enhance the immune system **[9].** Additionally, oyster mushrooms might be helpful for illnesses that include inflammation because of their potential anti-inflammatory properties **[8&9].** Beta-glucans lower absorption in the digestive tract, which may help them control cholesterol levels as well **[2&9].** Oyster mushrooms may be used to prevent infections since they have demonstrated antibacterial activity against specific bacteria and fungus **[8].** Additionally, especially for those who have diabetes, they might have anticancer properties **[9].** Nevertheless, further investigation is required to identify the precise mechanisms of action and suitable dosages for therapeutic application **[7].**

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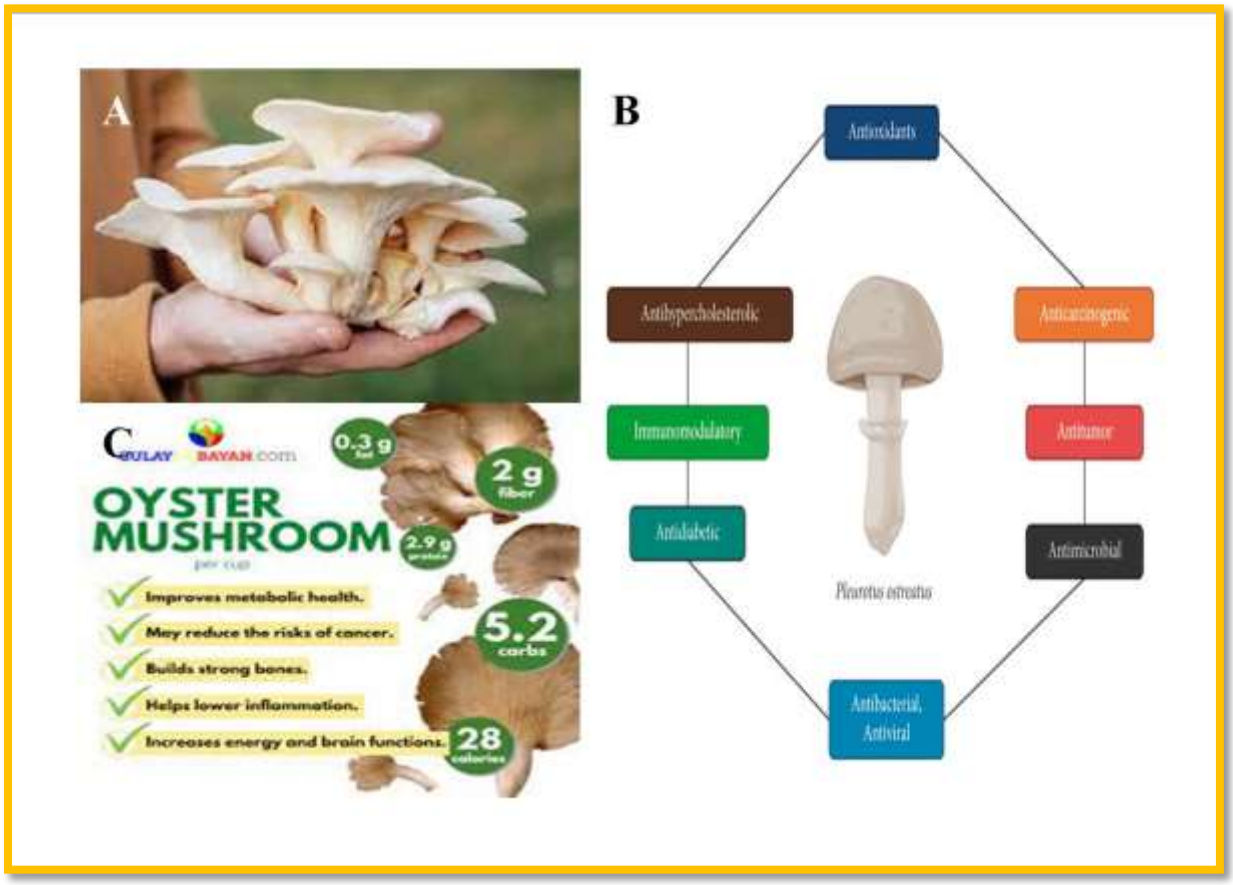
Fig1: Medicinal properties of Oyster mushrooms



Source: www.researchgate.net/figure/Medicinal-properties

Summary and conclusion:

This review investigates oyster mushroom farming, emphasising its potential as a culinary delight, self-employment stimulus, and long-term economic plan, with additional comments on cultivation, economic issues, and local resilience. Long-term investment in mushroom farming is critical owing to the potential influence on personal and national triple bottom lines. Mushroom production generates revenue for farmers, creates jobs, and provides nutrient-dense vegetables. It also adds to nutritional deficits and food insecurity. It also uses local materials and agricultural waste, decreasing waste runoff dangers.

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