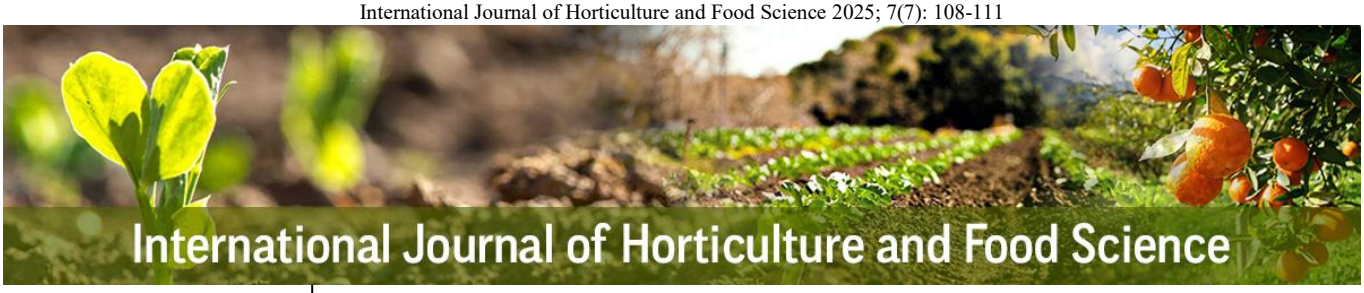

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Economic assessment of selected mushroom products: A case study of pilot mushroom farm, Bhandara district

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Abstract
Mushrooms have gained prominence as a sustainable agricultural crop, offering high nutritional value and income opportunities. This study presents an economic evaluation of value-added mushroom products at the Pilot Mushroom Farm in Bhandara District, with a focus on mushroom pickle, papad, and dry mushrooms. Data was collected through interviews, observations, and farm record analysis. Results revealed that value-added products like pickle and papad showed higher profitability due to better market demand, despite higher input costs. Dry mushrooms offered consistent but lower returns. Key constraints identified include inadequate storage facilities and limited market access. The study highlights the potential of mushroom processing to boost rural income if production and marketing challenges are addressed.

Keywords: Mushroom cultivation, value-added products, market demand

Introduction
Mushrooms have long been valued for their nutritional, medicinal, and economic benefits, with records of cultivation dating back to ancient China and Europe. In India, commercial mushroom farming began in the 1960s and has since evolved into a promising agri-business across various agro-climatic zones. Among the different varieties, oyster mushrooms (*Pleurotus* spp.) are especially popular due to their adaptability, low input requirements, and high market value. Mushroom cultivation presents a sustainable option for small and marginal farmers, requiring minimal land and using agricultural waste, making it ideal for rural income generation. India's mushroom industry is rapidly growing, supported by government schemes, rising health awareness, and changing dietary trends. In this context, the current study focuses on Pilot Mushroom Farm in Bhandara district, a progressive unit established in 2016. The farm specializes in oyster mushroom cultivation and produces a range of value-added products such as pickle, papad, powder, jam, cookies, and dried mushrooms. The study explores the economic viability, marketing channels, and challenges associated with mushroom-based value-added products like mushroom pickle, papad, and dry mushrooms. Given the increasing need for sustainable livelihoods, this research aims to evaluate cost-return structures, marketing strategies, and constraints, thereby offering insights to improve mushroom farming practices and promote agri-entrepreneurship. The present study aims to identify the various mushroom products produced by the Pilot Mushroom Farm. It further seeks to estimate the cost and returns associated with the selected mushroom products to evaluate their economic viability. In addition to this, the study focuses on understanding the marketing practices adopted for these products. Finally, the study seeks to pinpoint the major challenges encountered by the owner in both production and marketing processes.

Methodology
Area of Study
The present study was conducted at Pilot Mushroom Farm, 156, Ground Floor, Gandhi Ward, Bramhani, Palora, District - Bhandara, Pauni- 441910, Maharashtra, India.

Analytical tools

Fixed cost

The fixed cost comprises expenses related to machinery, building, land, furniture, staff salaries, wages for hired labor, taxes, and other associated costs, as gathered from the selected firm.

Variable cost

The variable cost includes expenditures incurred on the procurement of raw materials, wages for casual labour, electricity consumption, machinery repairs, and maintenance, among other recurring expenses

Total cost

The total processing cost was determined by combining both fixed and variable expenses.

Total cost = Fixed cost + Variable cost

Gross Returns

Gross return refers to the total income earned from an investment before subtracting any expenses.

Gross return = Quantity of the product * Price per unit

Net Returns

Net return is the amount remaining after all expenses are deducted from the gross return earned through the investment.

Net return = Gross return – Total cost

Benefit-cost Ratio

The benefit-cost ratio is a measure that evaluates the relationship between the present value of all expected benefits and the total expenditures or investments involved in a project.

B:C ratio = Gross return / Total cost

Marketing cost

The total cost comprises the expenditures incurred by the producer along with those of the intermediaries engaged in the purchase and sale of mushroom products until the product reaches the end consumer.

Market margin

Market margin denotes the gap between the final price paid by the consumer and the amount received by the producer, reflecting the income earned by intermediaries engaged in the marketing chain.

Market Margin = Selling price - (Purchase Price + Marketing Cost)

Result and Discussion

I. Cost and returns of selected unit

To fulfill this objective of the study concerning the organizational aspects of Mushroom production, the findings related to the costs incurred and returns obtained from the unit are presented below.

Table 1: Annual average fixed cost of processing unit

Sr. No.	Particulars	Value	Percent
1	Depriciation on Building @5 percent	100000	17.63
2	Depriciation on Machinery @10 percent	108980	19.22
3	Depriciation on furniture and fixtures	38437.5	6.78
4	Taxes, Insurance premium	50000	8.82
5	Permanent salary	240000	42.32
6	License fees	5000	0.88
7	Interest capital @ 10%	24741.75	4.36
	TOTAL FC	567159.25	100
	TOTAL FC per kg	47.26	
	Total processsed products(kg)	12000	

The total fixed cost for processing mushroom products amounts to ₹5,67,159.25, with a per kg fixed cost of ₹47.26 based on a total output of 12,000 kg. The major cost contributor is permanent salary (42.32%), followed by depreciation on machinery and building.

II Cost and returns of selected products

The analysis of cost and returns of selected mushroom products provides valuable insights into their economic viability, guiding producers in making informed decisions regarding production, investment, and resource allocation.

Table 2: Production cost of Mushroom pickle

Sr. No.	Particulars	Value	Percent
1	Raw material	257	74.74
2	Packaging cost	5.36	1.56
3	Total L/U cost	11.58	3.37
4	Taxes	0.7	0.20
5	Subtotal	274.64	79.87
6	Intrest on Var cost (8%)	21.97	6.39
A	Total variable cost	296.61	86.26
B	Total fixed cost	47.26	13.74
C	Total cost/kg	343.87	

The total production cost of mushroom pickle is Rs343.87 per kg, with variable costs accounting for Rs296.61 (86.26%) and fixed costs Rs47.26 (13.74%). Raw material is the dominant expense at Rs257 (74.74%), followed by packaging and loading/unloading costs. Interest on working capital also adds a modest share of 6.39% to the total cost.

Table 3: Production cost of Mushroom papad

Sr. No.	Particulars	Value	Percent
1	Raw material	140.8	64.48
2	Packaging cost	5.355	2.45
3	Total L/U cost	11.583	5.30
4	Taxes	0.7	0.32
5	Subtotal	158.44	72.55
6	Intrest on Var cost (8%)	12.68	5.80
A	Total variable cost	171.11	78.36
B	Total fixed cost	47.26	21.64
C	Total cost/kg	218.38	

The total cost of production per kg is driven largely by variable costs at ₹171.11 (78.36%), with fixed costs contributing ₹47.26 (21.64%). Raw material forms the bulk of the cost at ₹140.8 (64.48%), while packaging, labour utility charges, and interest on working capital make up smaller portions. This cost structure reflects a material-intensive production process.

Table 4: Production cost of Dry Mushroom

Sr. No.	Particulars	Value	Percent
1	Raw material	500	82.47
2	Packaging cost	5.36	0.88
3	Total L/U cost	11.58	1.91
4	Taxes	0.7	0.12
5	Subtotal	517.64	85.37
6	Intrest on Var cost (8%)	41.41	6.83
A	Total variable cost	559.05	92.20
B	Total fixed cost	47.26	7.80
C	Total cost/kg	606.31	

The total production cost per kg for this mushroom product is ₹606.31, with variable costs making up ₹559.05 (92.20%) and fixed costs ₹47.26 (7.80%). Raw material is the primary cost driver at ₹500 (82.47%), indicating a highly material-intensive process. Other expenses like packaging, taxes, and interest on working capital contribute marginally to the overall cost.

Table 5: Comparative economics of Selected Products

Sr. No.	Particulars	Pickle	Papad	Dry mushroom
1	Production (Kg)	4000	3000	3000
2	Gross return (Rs)	2,200,000	1,680,000	2,504,840
3	Total cost incurred by producer (Rs)	1375480	873,520	3,000,000
4	Net return (Rs)	824,520.	796,480	495,160
5	Benefit cost ratio	1.60	1.92	1.24

Among the three mushroom products, Mushroom Papad shows the highest profitability with a BC Ratio 1:1.92 and a net return Rs 796,480, indicating strong returns relative to investment. Mushroom Pickle also performs well with a BCR of 1:1.60. In contrast, Dry Mushroom, despite generating the highest gross return, yields the lowest net return and BCR (1:1.24), suggesting higher production costs reduce overall profitability.

III Marketing cost and margin of selected mushroom products

The evaluation of marketing cost and margin of selected mushroom products offers a clear understanding of the expenses incurred across the supply chain and the profit margins retained by each market participant. This analysis is crucial for identifying cost-effective marketing channels and enhancing overall profitability.

Table 6: Marketing cost and margin of Mushroom Pickle

Sr. No.	Particulars	Channel I	Channel II
1	Manufacturer price	343.87	343.87
2	Marketing Cost (Processing Unit)	19.86	15.86
3	Marketing Cost (Retailer)	----	0.25
4	Total Marketing Cost	19.86	16.11
5	Producer Margin	186.27	90.27
6	Price at which retailer bought	----	450.00
7	Retailer Margin	----	99.75
	Final Selling Price	550.00	

The marketing cost and margin analysis of mushroom pickle across two channels shows that the producer earns a higher margin Rs 186.27 in Channel I Producer-Consumer due to direct selling. In Channel II Producer-Retailer-Consumer, the producer's margin drops to Rs 90.27 as the retailer buys at Rs 450 and earns a margin of Rs 99.75. Despite the difference in margins, the final selling price remains consistent at Rs 550, highlighting how distribution structure affects income distribution.

Table 7: Marketing cost and margin of Mushroom Papad

Sr. No.	Particulars	Channel I	Channel II
1	Manufacturer Price	218.38	218.38
2	Marketing Cost (Processing Unit)	19.90	16.60
3	Marketing Cost (Retailer)	----	0.25
4	Total Marketing Cost	19.90	16.85
5	Producer Margin	181.72	115.02
6	Price at which retailer bought	----	350.00
7	Retailer Margin	----	69.75
	Final Selling Price	420.00	420.00

The data reveals that in Channel I, the producer directly sells to the consumer, earning a higher margin of Rs. 181.72, while incurring a slightly higher marketing cost of Rs. 19.90. In Channel II, the product passes through a retailer, reducing the producer's margin to Rs. 115.02, with the retailer earning Rs. 69.75. Despite different distribution paths, the final selling price remains Rs. 420 in both channels.

Table 8: Marketing cost and margin of Dry Mushroom

Sr. No.	Particulars	Channel I	Channel II
1	Manufacturer price	606.31	606.31
2	Subtotal	19.90	16.60
3	Producer's Total Cost	626.21	622.91
4	Producer's Selling Price	750.00	670.00
5	Producer's Market Margin	123.79	47.09
6	Retailer's Total Cost	----	670.25
7	Retailer's Market Margin	----	79.75
	Final Consumer Price	750.00	750.00

The data shows that while the final consumer price remains the same (Rs. 750) in both channels, Channel I allows the producer to earn a higher margin (Rs. 123.79) as there is no retailer involved. In Channel II, the producer sells at a lower price (Rs. 670), resulting in a reduced margin (Rs. 47.09), while the retailer earns Rs. 79.75. Thus, Channel I is more profitable for the producer, whereas Channel II distributes the margin between producer and retailer.

Conclusion

The study was undertaken to evaluate the economics and marketing of three major mushroom products Mushroom Pickle, Mushroom Papad, and Dry Mushroom produced by the Pilot Mushroom Farm in Bhandara district. These value-added products vary in terms of processing requirements, input costs, and market appeal, making them ideal for comparative analysis. Mushroom Papad emerged as the most cost-efficient product with the highest Benefit-Cost Ratio (1.92), despite having a lower gross return. Mushroom Pickle offered the highest Net Return of Rs. 824,520 and a satisfactory BC Ratio of 1.60, indicating a good return on investment. Dry Mushroom generated the highest Gross Return (Rs. 2,504,840) but also incurred the highest

production cost, resulting in the lowest Net Return (Rs. 495,160) and BC Ratio (1.24).Marketing analysis revealed two key channels: Channel I (Producer-to-Consumer), which gave producers higher margins but involved greater marketing effort, and Channel II (Producer-Retailer-Consumer), which reduced the producer's burden but also their margin.While the final consumer price remained the same in both channels, margin distribution varied, with direct sales proving more profitable for the producer. However, Dry Mushroom faced notable challenges in terms of high production cost and marketing expenses, especially under Channel I. These findings point to the need for cost optimization, better input management, and improved marketing strategies. The study underscores the potential of mushroom-based value-added products in enhancing rural income, provided production and marketing constraints are addressed effectively.

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