



Agri-preneurship through Oyster Mushroom Cultivation in Eastern U.P.

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Abstract

In order to provide high quality food at low cost, focus on mushroom cultivation is an important step. Mushrooms are rich in protein, minerals and vitamins alongwith many health benefits. So in the present investigation, starting with raising pure culture of oyster mushroom to capacity building programme were done. The mother culture was collected from Indian Institute of Vegetable Research, Varanasi and mass multiplied on wheat grain in research laboratory of Department of Botany, K. N. Govt. P. G. College, Gyanpur, Bhadohi. The ready spawn were used during capacity building programme organized for undergraduate, postgraduate students and villagers. The areas under study were Bhadohi, Varanasi and Chandauli region. In these areas training programmes were conducted which include step wise knowledge sharing regarding cultivation of Oyster mushroom with blend of hands on training. Follow up were taken regularly from the areas were training programmes were conducted.



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Introduction

Mushroom cultivation is now a days become popular among the farmers and consumers because it fulfil the dietary requirements and also becoming an additional source of income. Mushroom provides opportunity especially to those farmers with insufficient land to grow it in multitier/multi-storeys. That's why it is also popularly known as 'Kheti bina khet ke' as well as 'Generation of wealth from the waste'. Mushroom production technology is women friendly technology and required minimum inputs and

labourers. Those who are retired and the women who are homemaker can cultivate mushrooms in small boxes and utilize their time to earn money. When a small quantity of mushroom spawn grown in suitable medium, provide highly profitable crop inside a room within almost three to five weeks, where no others agriculturally important crops would grow. This cultivation can be done indoor in any mud or brick houses/rooms, thatched shed, basement or garages, etc. which should be well ventilated. Mushrooms are highly nutritious products which

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can mostly grow on lignocelluloses waste materials and are rich in crude fiber and protein. Mushrooms provide more protein than any other vegetables. So, it is also known as vegetable protein.¹ Mushrooms are also characterized by low fat and calories with good vitamins. 86 grams of oyster mushrooms contain: 28 calories, 2.9 grams of protein, 5.2 grams of carbohydrates, 2 grams of fiber, and 0.3 grams of fat.² It will provide an additional vegetable of high quality which enrich the diet with high quality proteins, minerals and vitamins that direct benefit human health and fitness.³

The Present study was undertaken to trained the students and villagers and to determine selected socioeconomic characteristics of the mushroom beneficiaries of concerned area. The study also covers impact of mushroom cultivation on the mushroom beneficiaries.

Material and Methods

Production of spawn

Spawn production involves following three steps

- Raising of pure culture
- Mother spawn preparation
- Spawn multiplication.

Raising of Pure Culture of Mushroom

Pure culture of mushroom was raised by tissue culture method. In this method, a fully grown mushroom was selected and from which a small portion from gill region was taken with the help of forcep. This portion was inoculated in petri-plate containing potato dextrose agar medium under aseptic condition. The mycelium covers the entire surface of petri-plate within a week and this culture becomes ready for further multiplication.

Substrate Preparation and Multiplication

Good quality of wheat grains were taken for substrate preparation. These grains were boiled in water for 20 – 30 minutes. After boiling, the grains become soft. Then these grains were taken out from water after cooling and spread evenly on a cotton cloth to drain out the water. When the excess water drained out, three percent chalk powder (30g / kg of grain) was mixed for adjusting the pH and to keep the grains

loose. 250 gm of prepared grain was then filled in cleaned and dried glucose polypropylene bags (PP bags) which were plugged tightly with non absorbent cotton at the mouth of the bag. Sterilization of these bags were done in autoclave by exposing them to 121°C and 15lbs pressure / sq inch for 20 minutes.

Capacity Building Programmes on Mushroom Cultivation Technology

Training programmes were organized for undergraduate students as well as women of villages in selected areas of Eastern U.P. Bhadohi, Chandauli and Varanasi were the places where these training programmes were conducted. Training programme include learning by doing method in which beneficiaries first understand the basics of mushroom cultivation and then exposed to hands on training session.

Collection of Data

Primary Data

First the beneficiaries were identified on the basis of their education.

Secondary Data

Secondary data involve participation by male, female, reason for choosing mushroom cultivation, availability of raw material, source of spawn.⁴

Sampling Size

Sampling size is restricted upto 100 for Group I and upto 50 for Group II.

Statistical Tool for the Study

Simple percentage analysis tool and chi square test is used for the study.

Result

Raising of Pure Culture

Mother culture of oyster mushroom collected from Indian Institute of Vegetable Research, Varanasi was raised on potato dextrose agar medium in Research laboratory of Department of Botany, K. N. Govt. P. G. College, Gyanpur, Bhadohi.

Mass Multiplication of Spawn

Pure culture raised on PDA medium used for mass multiplication by using wheat grain as substrate.



Fig. 1: Raising of pure culture of mushroom in laboratory



Fig. 2: Mass multiplication of spawn

Capacity Building Programme in Villages and Colleges

Training programmes were organized in Bhadohi, Chandauli and Varanasi region in which

undergraduate, postgraduate students and villagers participated.

Table 1: Number of Participants in capacity building programme

Region	Number of Participants			
	Group I		Group II	
	Male	Female	Male	Female
Bhadohi	36	62	18	14
Chandauli	00	64	12	15
Varanasi	00	67	19	08

*Group I-Undergraduate Students, Group II- Villagers

They learn the mushroom cultivation technology through hands on training session. The spawn multiplied in laboratory distributed among them so that they can establish themselves as an entrepreneur.

Table 2: Survey on different attributes after receiving training on mushroom cultivation (Simple percentage of participants)

Region	Attributes	Category	Group I	Group II
Bhadohi	Reason for selection of mushroom cultivation	Profit	25	17
		Demand	22	13
		Availability of raw material	18	06
		All the above	45	64
	Availabilty of raw material	Yes	97	98
		No	03	02
	Source of spawn	Prepared by themselves	88	04
		Purchased by Government	12	96
		Department		
	Sterilization technique	Chemical	100	55
		Natural	00	45
	Chandauli	Reason for selection of mushroom cultivation	Profit	12
Demand			10	05
Availability of raw material			08	05
All the above			36	10
Availabilty of raw material		Yes	97	98
		No	03	02
Source of spawn		Prepared by themselves	88	04
		Purchased by Government	12	96
		Department		
Sterilization technique		Chemical	100	55
		Natural	00	45
Varanasi		Reason for selection of mushroom cultivation	Profit	25
	Demand		22	13
	Availability of raw material		18	06
	All the above		45	64
	Availabilty of raw material	Yes	97	98
		No	03	02
	Source of spawn	Prepared by themselves	88	04
		Purchased by Government	12	96
		Department		
	Sterilization technique	Chemical	100	55
		Natural	00	45

Table 3: Relationship between group and profit in mushroom cultivation (Chi square Test)

		Observed Frequencies			
		Column Variable			
Region	Row Variable	Strongly agree	Agree	Neutral	Disagree
Bhadohi	Group I	42	36	18	02
	Group II	12	15	04	01
Chandauli	Group I	20	32	12	00
	Group II	10	15	02	00
Varanasi	Group I	36	28	03	00
	Group II	12	14	01	00

* The chi-square statistic is 8.3333. The p-value is .50094. The result is not significant at $p < .05$.

Discussion

Mushroom cultivation technology is an ecofriendly technique. Many mushroom species have medicinal properties too. Agricultural wastes like paddy straw, wheat straw and sugarcane bagasse in Bangladesh are being lost by improper utilization which is about 30%.⁵ These waste can be utilized as substrate in Mushroom cultivation technology which would be a source of additional income for families on small scale farms with the active participation of members. So for this purpose, the culture raised in laboratory were distributed among the participants of capacity building programmes.

It has been observed that over 70% of agricultural products have not been used to total productivity, which finally discarded as waste.⁶ Because of the recent pandemic, unemployment is rising quickly in both industrialized and developing nations. For tiny, marginally impoverished farm households in this scenario, self-employment can be a significant means of increasing employment rates in order to create jobs and earn additional income. The students and villagers can easily cultivate mushroom at their houses as it requires small piece of land. Findings from table 1 showed that mainly females from Group I and males from Group II participated in the capacity building programmes. Findings from table 2 explain that participants of Bhadohi, Chandauli and Varanasi region have the availability of raw material, spawn availability and they can sterilize the substrate by chemical methods. So the interpretation from the

data is mushroom cultivation might serve as path of generating employment, especially for rural women and youths which in turn help to raise their social status (Table 3). It will also provide additional source of income to the farmers during winter months when the farming schedule is light. Farmers can contribute significantly to the economic development through this technology and become a successful agripreneur. So, mushroom cultivation plays a vital role for socio-economic development of mushroom growers.

Conclusion

Oyster mushroom production technique is cost effective technique and requires minimum labour. These capacity building programmes skilled the undergraduate, postgraduate students and villagers in mushroom production technique.

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Conflict of Interest

The authors do not have any conflict of interest.

Data Availability Statement

This statement does not apply to this article.

Ethics Statement

This research did not involve human participants, animal subjects, or any material that requires ethical approval.

Author Contributions

- **Rashmi Singh:** Conceptualization, Methodology, Writing – Original Draft.
- **Sudarshan Maurya:** Writing – Review & Editing.

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