

TECHNOLOGICAL AND MARKETING FISSURES OF BUTTON MUSHROOM AT TRADITIONAL AND SCIENTIFIC KNOW-HOW IN MID HILLS OF UTTARAKHAND STATE, INDIA

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ABSTRACT

Mushroom growers from Pauri, Khirsu, Kaproli and Thailisain of mid hills of Uttarakhand State of India, were randomly selected for white button mushroom cultivation trials to find out tech-fissure, market-fissure and benefit:cost ratio. It was found that all these growers recorded longer period of spawn and less yield, than that recorded at Bharsar centre. Out of total yield obtained during 7 cropping weeks, 44.83-58.79% yield was obtained within first 2 cropping weeks from all trials, as compared to 60.13% yield obtained from Bharsar for the same period of time. There were negative/inferior tech-fissures with all mushroom growers when calculated on period of spawn run, casing and first harvest interface, yield, number and average weight of fresh mushroom fruit. Mushroom growers were sold their fresh mushroom in local market at local prevailing rates against fixed invested cost of ₹992.18. Growers from Pauri sold mushroom relatively at much higher rates of ₹120/kg and earned highest net income of ₹1355.02 q⁻¹ compost with 8.15% positive market-fissure and 2.36:1 benefit:cost ratio over that of Bharsar centre, in which ₹1252.82 was earned as a net income with 2.26:1 benefit:cost ratio. Both, tech and market-fissure were recorded most negative from the Village Kaproli with very poor net income and benefit:cost ratio in comparison to the rest of the trials located in urban and semi-urban towns like, Pauri, Khirsu, Thailisain and Bharsar.

Keywords: technological-fissure, market-fissure, benefit:cost ratio (BCR)

INTRODUCTION

White button mushroom is most popular mushroom in India contributing about 85% of the total 1,000,00 ton production of mushrooms in the country. It involves both seasonal and high-tech growing system. Uttarakhand is one of the States of India, ranked second by producing 8,000 ton mushroom in same year after Punjab [1]. Mushroom industry of this State is dominating with marginal, small mushroom growing units and their mushroom productivity varies from 14-18 kg q⁻¹ compost/8 weeks of harvesting period, if owner purchased compost from composting units [2]. Although, mushroom growing principles and methods are same for all marginal and small mushroom growers. Despite of this growers of mid hills have great difference in their mushroom production and sale that of. Therefore, present investigation was led down to see the technological and marketing gap in form of tech-fissure and market-fissure, respectively among 4 seasonal mushroom growers in Pauri District of Uttarakhand State, India. Technological fissure was based on the comparative study of spawn run, casing- first harvest interface, cropping pattern, yield and numbers of white button mushroom. However, marketing fissure was established on net income earned by selected growers along with benefit:cost ratio.

MATERIALS AND METHODS

Selection of Mushroom Growers

Four mushroom growers designated as MG1, MG2, MG3 and MG4 each from Pauri, Khirsu, Kaproli and Thailisain of mid hills of Uttarakhand State of India, were randomly selected for white button mushroom cultivation. The places selected in this study had high proportion of demand and supply of button mushrooms in both winter and summer months of the year. Selected mushroom growers were thought to be well acquainted with growing techniques of white button mushroom, as they adopted it as an entrepreneur at small level years back. Additionally mushroom unit located at Vir Chandra Singh Garhwali, College of Horticulture Bharsar centre was chosen as a standard check to make comparison with results received

from other mushroom growers. All selected places were described under social status, latitude, longitude, altitude, average temp and mountain facing direction (Table 1). Social status and geographical information (longitude, altitude and mountain facing) was gathered from district head quarter, Pauri. However, average temperature of the experiment was recorded from thermometers supplied to the mushroom growers.

Table 1. Social and geographical information of selected places

Name of place	Social Status	Latitude	Longitude	Altitude (msl)	Temp (°C)	Mountain facing direction
Pauri	Urban	29.80 °N	78.74 °E	1814	17-21	North-East
Khirsoo	Semi-Urban	30.17 °N	78.86 °E	1700	18-20	East
Kaproli	Village	30.03 °N	79.02 °E	1800	22-22.5	East-South
Thailisain	Semi-Urban	30.02 °N	79.04 °E	1700	18-21	South
Bharsar (Check)	Village (College)	30.05 °N	78.99 °E	1900	16-20	North-East

Preparation and Supply of Raw Materials

Full matured compost, sterilized casing, spawn and polybags were supplied to the selected farmers to lay down the experiment by using their inherent techniques and skills of mushroom cultivation. Each mushroom grower was facilitated with 100 kg compost, 20 kg sterilized casing, 650 gm spawn, 10 polybags of 10 kg capacity, 1kg capacity balance, knife, KMS, data sheets etc. They were strictly taught about making 10 replications and 7 weeks cropping period. Compost was prepared using long method of composting [3] and casing was prepared using standard procedure, therein humus rich forest litter and 2.5 year old spent mushroom substrate were used in equal proportion [4].

Tech-fissure, Market-fissure and Benefit:Cost Ratio

Tech-fissure was established by calculating per cent difference within identical parameters namely days of spawn run, casing and first harvest interface in days, yield q^{-1} compost, number of fresh mushrooms q^{-1} compost and average weight of fresh mushroom fruit in g among the selected locations. Tech-fissure was said to be either per cent superior or inferior in the excellence of adaptation and functioning of mushroom growing technology by mushroom growers over to that of Bharsar centre and calculated using formula: $\{(\text{value of selected parameter of Bharsar} - \text{value of selected parameter of MG}) / \text{value of selected parameter of Bharsar}\} \times 100$. However, Bhatia described it as a gap occurred between the level of recommendation and extent of their adoption [5]. Market fissure was based on the per cent negative/positive difference in net income earned by the mushroom growers over to that of Bharsar Centre. It was calculated with the formula $\{(\text{Net income of Bharsar} - \text{Net income of MG}) / \text{Net income of Bharsar}\} \times 100$. Benefit:Cost Ratio of the present investigation was based on the ratio of gross income earned by the MGs/total cost involved in mushroom production. The total cost was fixed of ₹992.18 to all mushroom growers as all inputs were supplied to them from Bharsar Centre.

RESULTS AND DISCUSSION

Quantitative Parameters

Data obtained from 5 different places were summarized and arranged in the Table 2 in form of period of spawn run, casing-first harvest interphase, yield, number and average weight of fresh mushroom fruit. The duration of spawn run (18-20 days) and casing and first harvest interface (16-24 days) was found more in all the mushroom growing farms over Bharsar Centre in which a minimum period of 15 days was recorded in both the cases. The trial conducted at Vir Chandra Singh Garhwali College of Horticulture, Bharsar was best and gave 22.45 kg fresh mushrooms q^{-1} compost followed by 19.56 kg fresh mushrooms q^{-1} compost from MG1. The yield received from MG2 and MG4 were statistically at par with 14.23 and

15.29 kg q⁻¹compost. Though, MG3 from Kaproli village was stood most inferior with 12.57 kg yield of fresh mushroom. The mushroom numbers obtained from Bharsar and MG1 were statistically identical and counted maximum 2826.78 and 2748.21q⁻¹compost. However, MG3 from Kaproli was again inferior in production of mushroom numbers, in which only 1942.85 mushrooms were sum up. Almost similar average fruit body weight was calculated from all mushroom growers that ranged from 6.5-7.19 gm in contrary to 8.02g average fruit body weight recorded from Bharsar centre. Previous results have shown 14 and 15-25 days for spawn run and casing and first harvesting interphase, respectively and yield and numbers of mushroom were found less but with more average weight of fruit body in comparison to our findings [6].

Table 2. Quantitative observations of selected parameters

Name of Place	Spawn run (days)	Interface of casing and Ist harvesting	Yield Kg q ⁻¹ compost	Fruit number sq ⁻¹ compost	Weight/fruit body (gm)
Pauri (MG1)	19	22	19.56	2748.21	7.19
Khirsu(MG2)	18	16	15.29	2364.28	6.51
Kaproli (MG3)	20	24	12.57	1942.85	6.55
Thailisain (MG4)	18	24	14.23	2203.57	6.5
Bharsar (Check)	15	15	22.45	2826.78	8.02
CD at 5%			1.05	294.17	0.72

Cropping and Production Pattern

Seven weeks cropping pattern on yield and numbers of *Agaricus* fruits was also studied and mentioned in the Fig. 1 and 2, respectively. The seven weeks cropping pattern on yield basis for Bharsar and MG1 was almost similar with their highest peaks got at the end of I week and then it started decline gradually to its shortest peaks at VII week. The rest trials were shown their highest peaks of the yield at the end of II week then declined steadily and attained similar shortest peaks as found with Bharsar centre and MG1 (Fig. 1). Number of mushroom fruits of all trials were exponentially increased by the II week and then decline gradually to their minimum number ranged from 80.36-198.86/q compost to the last week of the crop (Fig. 2). Dhar *et al.*, demonstrated that out of 10 treatments of casing mixtures, 8 treatments showed highest yield at the end of I week, followed by II week and 5 treatments showed highest numbers of mushroom fruits/quintal compost followed by I week [6]. Thus, the cropping pattern of yield and numbers of 4 different places were seemed to be almost similar to that of Bharsar centre but it was very interesting to note that the major share of yield and number of mushrooms in all trials was achieved within 2 previous weeks of cropping period. Highest 60.13% and 56.79% yield and numbers of mushroom, respectively was recorded from Bharsar centre for first two initial weeks out of total yield and number of mushroom obtained in an entire cropping period of seven week. Rest four trials also produced 44.83-58.79% yield and 36.54-57.62% number of mushrooms within a time frame of 2 initial weeks. Ahlawat also recorded about 60% yield within

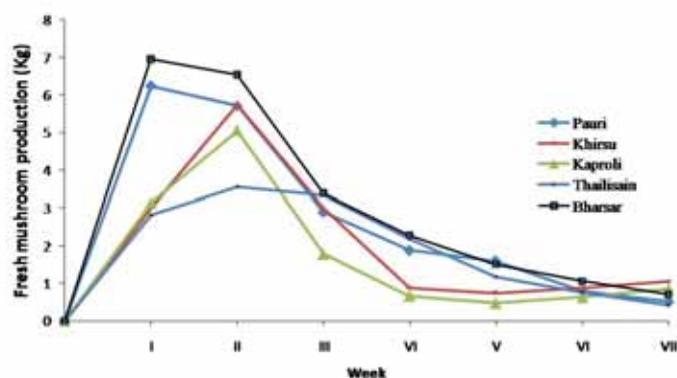


Figure 1. Cropping Pattern of Fresh Mushroom Production (Kg) q⁻¹ Compost

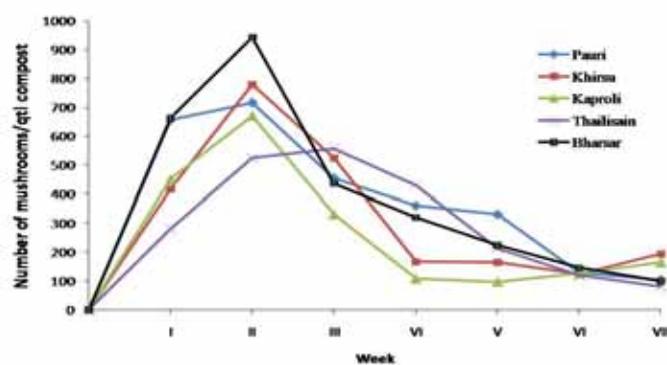


Figure 2. Cropping Pattern of Number of Button Mushroom q⁻¹ Compost

2 initial flushes of button mushroom [7]. Therefore, major share of yield and numbers was achieved within first two initial weeks of 6 weeks period crop.

Tech-fissure

In the present investigation it was found that, all 4 locations of the trial showed inferior/poor adoptability in mushroom growing techniques in comparison to Bharsar centre on quantitative parameters. Table 3 revealed that Kaproli was found most inferior by scoring highest 33.33 and 60% tech-fissure in spawn run and casing-first harvest interphase, respectively against to that of very negligible inferior tech-fissure of 6.66% recorded from Khirsu. Yield and number based tech-fissure of Kaproli was also recorded poorer by 44% and 31.16%, respectively in comparison to least inferior tech-fissure for yield (12.87%) and mushroom numbers (2.77%) observed from Pauri. However, on average fruit body weight basis, at least 0.81 per cent inferior tech-fissure was measured in all locations except Pauri (0.89%). In another study minimum 14% tech-gap in spawning and spawn run to maximum 40% tech-gap in compost preparation followed by casing mixture (29%) was recorded out of 6 different practices of mushroom production tested. Psychological traits such as age, family education, socio-economic status, extension contacts, mass media exposure, change proneness, risk orientation and fatalism-scienticism were thought to be major reasons for tech-gap [8].

Table 3. Technological fissure

Name of Place	Negative/Inferior Technological-fissure (%)				
	Duration of spawn run	Casing and Ist harvesting interphase	Yield	Numbers	Fruit body weight
Pauri (MG1)	26.66	46.66	12.87	2.77	0.89
Khirsu (MG2)	20	6.66	31.89	16.36	0.81
Kaproli (MG3)	33.33	60	44.00	31.16	0.81
Thailisain (MG4)	20	60	36.61	22.04	0.81

Market-fissure

Marketing fissure was based on the per cent negative/positive difference in net income earned by the mushroom growers over to that of Bharsar Centre. Positive marketing fissure was achieved only with the MG1 of Pauri in which mushroom grower was achieved 8.15% more income. Remaining 3 MGs showed negative marketing fissures (Fig. 3). Out of them MG3 of Kaproli Village was scored 88.89% negative market-fissure followed by 54.25 and 57.15% negative market-fissure was calculated with MG2 and MG4, respectively. Maximum 2.36:1 BCR was calculated from MG1 followed by Bharsar Centre as it had 2.26:1. Kaproli was known to poorer BCR ratio of 1.14:1. The results of BCR of the present investigation were encouraging than to the BCR of 1.55:1 [9]. Rural and urban status of places and quantity produce were appeared as main causes of market-fissure. The places like Pauri have urban status was found almost equal to the Bharsar centre followed by Khirsu of semi urban status in view to market fissure and benefit:cost ratio. Both tech and market-fissure were recorded most negative from Village Kaproli with very poor net income and benefit:cost ratio. Crop management skill, harvesting time, social relations of grower were seemed as major hurdles resulted poor performance in Village Kaproli.

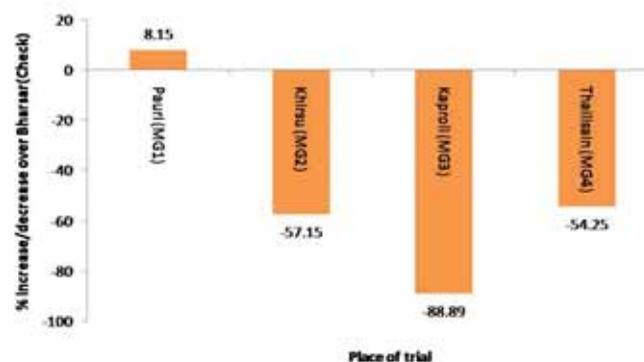


Figure 3. Market fissure

It was quite evident from the present findings that marginal and small mushroom growers of Uttarakhand State of India had rather enough difference in the adaptation and application of mushroom growing technology and marketing strategies in form of tech and marketing fissures, respectively when calculated against scientific know how. Mushroom growers followed the variations in all 5 parameters tested, but parameters like casing-I harvest interphase and yield were seemed to be more efficient to establish quite firm technological fissure among the mushroom growers due to higher variation occurred in them in contrast to the finding of minimum 14% tech-gap was recorded with spawning and spawn run [8]. However, rural and urban status of places and quantity produce were appeared as main causes of market-fissure. Places like Pauri of urban status was found almost equal to the Bharsar centre followed by Khirsu town of semi urban status in view to market fissure and benefit:cost ratio. However, the tech and market-fissure was recorded most negative in the trial located in a village Kaproli with very poor net income and benefit cost ratio.

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