



Evaluation Different Cultivation Methods of Paddy Straw Mushroom (*Volvariella volvacea*)

N. Ranasingh^{1*}, D.K. Debata², Lata Mallick³, D. Behera⁴ and Srikrushna Behera⁵

¹Associate Professor (Plant Pathology), College of Agriculture, OUAT, Bhubaneswar (Odisha), India.

²Senior Scientist (Plant Pathology) RRTTS, G.Udayagiri, Kandhamal (Odisha), India.

³Scientist (Soil Science) KVK, Kalahandi (Odisha), India.

⁴Associate Professor (Horticulture), College of Agriculture, OUAT, Bhubaneswar (Odisha), India.

⁵Training Assistant KVK, Kalahandi (Odisha), India.

(Corresponding author: N. Ranasingh*)

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ABSTRACT: Among the different study made under four cultivation methods revealed that highest yield (1635.80g/bed) was obtained from indoor cultivation as compared to outdoor, shade net and polyhouse condition. Among all the six numbers of different bed dimension tested, standard cuboidal beds (2'x2'x1'9") give highest yield 1140.50 gm/bed and Biological Efficiency (11.42%) followed by square bed with cross bundle (1103g/bed).

Keywords: *Volvariella volvacea*, Different dimensions, standard cuboidal, Biological Efficiency, square with cross bundle.

INTRODUCTION

Paddy straw mushroom (*Volvariella volvacea*) is the sixth most significant fungus farmed worldwide with an annual production of 180800 metric tons, accounting for 3% of the total global mushroom production (Chang and Miles, 2004) According to Thakur and Mohapatra (2013), Odisha is the state that produces the most straw mushrooms in the nation, accounting for 66% of the state's yearly production of 12,000 tonnes of mushrooms. Different farming techniques with varying dimensions are used in various regions of Odisha. We examined the appropriate methods providing the best yield after taking four methods and six dimensions to assess the standardization of methods with varying dimensions.

MATERIALS AND METHODS

Four cultivation methods viz. cultivation under Shade net, Poly house, thatched shed and outdoor cultivations were evaluated during the main growing season to assess their mushroom yielding ability. The trial was conducted in RBD with five replications for each treatment. Beds were raised in different situations observing standard protocol and due after care was taken till the harvest of both the flushes. Similarly beds

of the following dimensions were evaluated using variable substrate (straw) quantity. We examined four methods and six dimensions in order to assess the standardization of methods with varying dimensions, and we determined which methods produced the maximum yield.

1. Square bed (2' x 2' x 1'9")
2. Rectangular bed (4' x 2' x 1'9")
3. Square with cross bundle (2'x2'x1'9")
4. Square without cross bundle (2'x2'x1'9")
5. Round compact bed (18" height 3'8" diameter)
6. Bag method (80cm x 40cm)

Due to intensification of mushroom cultivation of paddy straw mushroom (*V. volvacea*) in outdoor, farmers are facing lot of problems and there is no standard cultivation method, present paper reports the different cultivation methods viz. indoor, outdoor, under shade net and poly house. Similarly, standardization of dimension for bed preparation was also studied. We took four techniques and six dimensions, and we examined the appropriate methods that produced the best yield in order to assess the standardization of methods with varied dimensions.

Good quality paddy straw was procured and soaked for 12 hours in clean and cold water. Excess water was

drained off from the bundles. Beds of the above mentioned sizes /dimensions were laid out. For each bed dimension, four replications were maintained as per procedure. Ten kg of paddy straw was taken for one, three and four treatments and 20kg for second treatment. 42 kg for fifth treatment and 1 ½ kg for sixth treatment. The beds were covered with transparent polythene sheets to maintain warm temperature within to facilitate good vegetative growth of the fungus. In above both the experiments, observations on days taken for emergence of pin heads, days to first harvest, number of sporophores, average weight of sporophores, weight of fruit bodies were recorded. Biological efficiency in respect of individual treatment was calculated. We evaluated the appropriate methods that yielded the maximum yield after taking four methods and six dimensions to assess the standardization of methods with varied dimensions.

RESULT AND DISCUSSION

Among the four cultivation methods evaluated in this investigation, indoor cultivation in thatched sheds resulted in significantly highest yield (1635.80g/bed) as compared to outdoor cultivation with straw mushroom as an intercrop in coconut plantations (1452.60g/bed). Poly house and shadenet cultivations were having low yields at 729g/bed and 950.80g/bed respectively. However, days to emergence of pinhead was comparatively lower (8.40 d) with a modest crop duration of 14.40 days. This was followed by the outdoor cultivation where from a yield of 1452.60g/day was realized with days to emergence of pinhead and crop duration of 8.60d and 15.60d, respectively. However, the shade net and polyhouse cultivation were found inferior in terms of number of sporophores, average weight of sporophore and weight of fruiting bodies. (Table 1)

Pinhead emergence was earlier (7.25 days) in T3 (square with cross bundle) and 7.5days in T4 (square without cross bundle). It took 8-9days in other bed types except the cylindrical one (bag method) in which days to pinhead emergence was 13.75 days. The rectangular bed (4'x2'x1' 9'') and round compact bed (18'' height and 3'8'' dia) yielded well but with low biological efficiency and therefore were uneconomic. Similarly, the bag method (80cmx40cm) had low yields, but with high biological efficiency. However, this method might not be acceptable for large scale cultivation owing to complicated procedure of bags. Square beds/cuboidal (2'x2'x1' 9'') and square beds with little modifications (T1, T3 and T4) gave good yields with acceptable biological efficiency (> 10%). Square bed (2'x2'x1' 9'') and square bed with cross bundle (2'x2'x1' 9'') gave yield and biological efficiency of 1140.50g and 11.42%, respectively

followed by square with cross bundle (2'x2'x1' 9'') giving a yield of 1103g and biological efficiency of 11.05%. Weight of sporophore was highest (19g) in case of T4 (2'x2'x1' 9''), square bed without cross bundle was at par with standard cuboidal (2'x2'x1' 9'') with the fruit body weight of 18.75g. Similarly, days to first harvest was lowest (12days) in case of T4 (2'x2'x1' 9'') square without cross bundle bed (Table 2).

Indoor cultivation in thatched shed could give significantly superior yields with a biological efficiency of 16.40% followed by outdoor cultivation with 14.57% biological efficiency. Poly house and shade net cultivations were inferior in terms of productivity (7.34-9.55% biological efficiency). It is agreed upon by workers that indoor cultivation is far more superior as compared to outdoor conventional system (Chang, 1979; Quimio *et al.*, 1990; Ahlawat and Tewari, 2007). Mohapatra *et al.* (2010) reported that under conventional method of farming under shade, yield is unstable and low with average biological efficiency of 10%. However, as low cost technology, this has been popular among the poor farmers. Workers had diverse views on standard bed size for straw mushroom for different seasons. (Gupta *et al.*, 1970; Agarwal, 1973; Singh, 1976; Garcha, 1983; Sarkar and Chakravarty, 1986; Mohapatra *et al.*, 2011 and Thirubhumanmala *et al.*, 2012). However, it was accepted that smaller sized beds (2'x2'x1' / 2'x1'x1') and medium sized beds (2' x 2' x 1' 9'') were suitable for realization of good yields during summer and rainy seasons respectively in case of straw mushroom.

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Table 1: Evaluation of cultivation methods on mushroom productivity.

Sr. No.	Treatment	Weight of fruiting bodies (g)	Biological efficiency (%)
1.	Shadenet cultivation	950.80	9.55
2.	Polyhouse cultivation	729.00	7.34
3.	Indoor cultivation	1635.80	16.40
4.	Outdoor cultivation	1452.60	14.57
	C.D. (0.05)	31.04	—

Table 2: Evaluation of Bed dimension on mushroom productivity.

Sr. No.	Treatment	Weight of fruiting bodies (g)	Biological efficiency (%)
T1.	2'x2'x1'9" Cuboidal	1140.50	11.42
T2.	4'x2'x1'9" (Rectangular)	1678.00	8.40
T3.	2'x2'x1'9" (Square with cross bundle)	1103.00	11.05
T4.	2'x2'x1'9" (Square without cross bundle)	1066.75	10.68
T5.	Circular bed (1'6"height and 3'8" dia)	1548.00	3.69
T6.	Bag method (80cm x 40cm)	161.00	10.86
	C.D. (0.05)	73.598	

CONCLUSIONS

Among the different study made under four cultivation methods revealed that highest yield (1635.80g/bed) was obtained from indoor cultivation as compared to outdoor, shade net and poly-house condition. Among all the six numbers of different bed dimension tested, standard cuboidal beds (2'x2'x1'9") give highest yield 1140.50 gm/bed and Biological Efficiency (11.42%) followed by square bed with cross bundle (1103g/bed).

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Conflict of Interest. None.

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