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RESEARCH PAPER

Use of vermicompost as casing material for cultivation of *Agaricus bisporus* (Lange) Sing

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Abstract : In *Agaricus bisporus* cultivation, use of vermicompost as an casing material was found superior as compared to 25, 50 and 75 per cent vermicompost when added in standard casing material. Maximum mushroom yield (300.00 g/2 kg of compost) and number of fruit bodies (29.75) were obtained as compared to other treatments. By using 100 per cent vermicompost as a casing medium maximum, yield and number of fruit bodies were obtained.

Key Words : Vermicompost, Casing material, *Aganicus bisporus*

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INTRODUCTION

The use of casing is important and pre-requisite for pinning in *Agaricus bisporus* cultivation and healthy crop growth. The casing medium used universally is peat. Peat is scarcely available in India and an alternative to peat is FYM and spent compost

It is normally believed that fruit bodies of mushrooms are produced when some stress is provided. By applying casing layer which is not nutritionally as rich as compost, conditions of stress necessary for induction of fruit bodies are created. Besides, casing is also known to supply water for growth and development of fruit bodies and maintain humidity and temperature in cropping room by evaporative cooling. It provides a medium of low osmotic value compared to compost and hence provides a proper mix for developing pinheads and above all, it provides physical support to developing fruit bodies. Importantly, casing medium contains a large population of bacteria, specially that of *Pseudomonas putida* and *Bacillus* spp. which are reported to induce fruit bodies (Eger, 1961; Hayes *et al.,* 1967; Shandilya, 1987).

Leached vermicompost was found to give the yield comparable to standard FYM casing (Shandilya, 2000). Bhardwaj (2000) used vermicompost as casing material resulted in highest yield. Doshi and Sharma (2000) also used vermicompost as casing material gave good yield.

MATERIALS AND METHODS

The use of casing is important and prerequisite for pinheed formation. The layers of casing soil forms the environment in which the mycelium changes from vegetative phase to the reproductive phase, casing layer of 1.5 inch was applied on fully spawn run compost after pressing it and light irrigation with water and then casing was applied and immediate after application of casing layer water was sprayed over casing medium to maintain the moisture in the casing soil

After application of casing layer the temperature was reduced to 16-18°C and water was sprayed two to three times a day to maintain humidity (85-90%) in the cropping room. Besides this ventilation was provided to induce fruiting. When the pin heads started appearing, then humidity of cropping room was more than 70 per cent and once or twice a day water was applied to the bags.

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To know the effect of vermicompost as casing material on the yield of *A. bisporus* the experiment was laid out by addition of vermicompost per cent (w/w) in the casing soil. In this experiment the fully spawned compost filled bags were taken. Different proportions on weight by weight basis *viz*., 25 per cent, 50 per cent, 75 per cent and 100 per cent vermicompost was mixed with casing soil. A suitable control without vermicompost was maintained. Each treatment had four replications. Observations were recorded on mushroom yield, number of fruit bodies and stipe pileus ratio.

RESULTS AND DISCUSSION

Vermicompost is nutrient medium with good WHC, porosity, therefore, an experiment was conducted in which four combinations of vermicompost with standard casing material [FYM+Soil+Sand+Spent compost (1:1:1:1)] were tried to find out the effect on yield and number of sporophores of *A. bisporus.*

It is clear from the Table 1 that with the increase in the proportion of vermicompost up to 100 per cent corresponding significant increase was observed in yield and number of sporophores of white button mushroom. The results were highly significant at 5 and 1 per cent level of significance.

The results recorded in Table 1 clearly indicate that significantly maximum mushroom yield (300.00 g/2kg of compost) with 29.75 number of fruit bodies were obtained when casing mixture 'd' was used as casing medium.

It was followed by mushroom yield 291.25 g (30.25), 270.00 g (24.50) and 226.25 g (20.75) per 2kg of compost when casing mixture c, b, and a were used as casing medium, respectively.

The maximum average individual fruit body weight was recorded in casing mixture b (11.02g) followed by casing mixture a (10.90g), d (10.08g) and c (9.62g), respectively.

The maximum average biological efficiency was recorded in casing mixture d (15.00%) followed by c (14.56%), b (13.50%) and a (11.31%). All the treatments increased the mushroom yield significantly over control.

In the present investigation, with the standard casing medium, addition of vermicompost was studied. The preparation of vermicompost on w/w basis added to casing medium was (a) 25 per cent (b) 50 per cent, (c) 75 per cent, (d) 100 per cent vermicompost, (e) without vermicompost (control). The results revealed that with the increase in the proportion of vermicompost up to 100 per cent corresponding significant increase was observed in yield and number of fruit bodies of mushroom. The data clearly indicated that significantly maximum mushroom yield 300 g/2 kg of compost with 29.75 number of fruit bodies were obtained when casing mixture 'd' was used as casing medium. It was followed by mushroom yield 291.25 g (30.25), 270.00 g (24.50) and 226.25 g (20.75) per 2 kg of compost when casing mixtures 'c', 'b' and 'a' were used as casing medium, respectively.

These results are in accordance with the findings of Shandilya (2000) who reported that leached vermicompost was found to give the yield comparable to standard FYM casing. Addition of leached vermicompost to cropping beds after third flush of cultivated mushroom resulted in about 25 per cent enhanced yield. This type of compost when used in combination with FYM resulted in better yield than their use alone. Shandilya (2000) studied bacterial population in casing layer of leached vermicompost and FYM during cultivation of *A. bisporus*. The highest number of bacteria occurred at the onset of fruit body formation (pin head stage) in both the casing media. However, variation in colony types was found during different stages in cropping which was evident in both the casing media. Bhardwaj (2000) found that the vermicompost bed as casing material resulted in highest yield as compared to locally available material FYM+loam soil (1:1 v/v). The physical and chemical properties of FYM loam soil, forest soil, spent compost were compared with vermicompost. FYM at the maximum WHC and porosity. Vermicompost normal had the highest salt concentration. EC of vermicompost was reduced by leaching to the level of 146 and 145 per cent m mhos/cm from the initial higher levels.

Table 1 : Effect of different concentration of vermicompost as casing materials on the yield and number of fruits bodies of *Agaricus bisporus*

Sr. No.	Vermicompost mixed in casing material on w/w basis (%)	Avg. mushroom yield (g/2 kg of compost)	Avg. No. of fruit bodies (2 kg of compost)	Avg. individual fruit body wt.*	Avg. biological efficiency (%)
1.	25 (a)	226.25	20.75	10.90	11.31
2.	50 (b)	270.00	24.50	11.02	13.50
3.	75 (c)	291.25	30.25	9.62	14.56
4.	100 (d)	300.00	29.75	10.08	15.00
5.	Control (without vermicompost) (e)	196.25	19.75	9.93	9.81
	S.E. $\pm$	5.64	0.97		
	C.D. (P=0.05)	16.98	2.92		
	C.D. (P=0.01)	23.49	4.05		
	CV (%)	4.39	7.73		

* Average of four replications

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