

Saw Dust and Wheat Bran Substrates for the Cultivation of New Wood Ear Mushroom (*Auricularia polytricha* (Mont.) Sacc

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Abstract: Surveys were conducted in the hills of Nilgiris, Shervoy's and Lower Pulneys during rainy season. A wood ear mushroom was collected from coffee plantations of Horticultural Research Station, Yercaud. The fungus was identified as *Auricularia polytricha* (Mont.) Sacc. based on cultural and morphological characters. The studies conducted at MR & TC, TNAU, Coimbatore revealed that the paddy straw +wheat bran (3:1) ratio recorded minimum days for spawn run (21.3 days), pin head formation (31.3) and first harvest (35.6 days). The same combination also recorded the highest yield of 147.6 g/bed bioefficiency of 59.04 percent. The total cropping period was also the minimum in the same treatment. In the trials conducted at Vijaya Mushrooms, Coimbatore (North), paddy straw+ wheat bran (3:1) ratio again recorded a significantly higher yield of 132.0 g/bed and bio efficiency of 58.20 percent with minimum cropping period of 47.3 days. The yield performance trials conducted at Maha Mushroom, Kovaipudur and Coimbatore (South) also revealed the same trend as paddy straw+wheat bran (3:1) again recorded significantly higher yield of 130g/bed and bioefficiency of 52.00 percent.

Key words: *Auricularia polytricha* • Edible mushroom, • Substrates • Spawn production

INTRODUCTION

Auricularia polytricha is widely distributed throughout the tropical and subtropical regions of the world [1]. Nowadays, *Auricularia* mushrooms are among the top four most important cultivated mushrooms in the world, grown mainly in China and Southeast Asia, with a world annual production of 4, 20,000 tons [2]. Their unique jelly texture and horizontally septated basidium make them significantly different in taste and morphological characters from other cultivated mushrooms such as *Agaricus bisporus*, *Lentinula edodes* and *Pleurotus* spp. Besides their taste and nutrition, they also have medical functions, such as anti-tumour, immuno-stimulating, hypolipidaemic and hypo cholesterolemic effects [3]. They can grow well on wide ranges of agricultural and industrial organic wastes. Recently, a nature-imitated cultivation method has been developed in China by cultivating *Auricularia* mushrooms in corn fields and thereafter, using the spent compost as organic fertilizer and soil conditioner [4].

Wood ear mushrooms (*Auricularia* spp.) are commonly cultivated in Asia. Plastic bag cultivation is gaining popularity due to the scarcity of suitable logs and the ease with which different species of *Auricularia* can be cultivated on sawdust. The technology can be expected to spread in the near future. There are many *Auricularia* species of which *A. polytricha*, *A. fuscusuccinea* and *A. auricul-judea* are the most commonly grown. *A. polytricha* is most suitable species to cultivate in tropical regions where temperatures are high [5].

The objective of the present study are selection of best substrate for spawn production and cultivation of *A. polytricha*.

MATERIALS AND METHODS

Collection and Maintenance of Wood Ear Mushroom:

Surveys were conducted in the hills of Nilgiris, Shervoy's and Lower Pulneys during rainy season. A wood ear mushroom (*Auricularia* sp.) was collected from coffee plantations of Horticultural Research Station, Yercaud.

The fungus was isolated and maintained in the PDA medium for future study.

Growth and Yield Performance Studies of *A. Polytricha* Mushroom Research and Training Centre (Mr and Tc), Dept. Of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore: The spawn of *A. polytricha* was prepared on sorghum grain+wheat bran (3:1) substrate. After complete spawn run, beds were prepared following the method described by Sharma *et al.* [6] with modifications. The beds were prepared using different substrates *viz.*, Paddy straw alone and in combination with saw dust, rice bran, wheat bran at the ratio of 3:1 and 1:1 for comparison. The substrates of different combinations were wetted thoroughly with water for overnight (16-18 hours). Two fifty gram of the substrate with 60 percent of moisture was filled in poly propylene bags of size 12"×12" (80 gauge thickness) and autoclaved at 20lbs pressure for 2 hours. After sterilization, the bags were inoculated with 100g of spawn each and incubated at 25-28°C. After full mycelial growth the bags were completely opened and temperature of 24°C and relative humidity of more than 85 percent was maintained. Three replications were maintained.

The observations on Days for spawn run (DFSR), Days for pin head formation (DFPF), Days for first harvest (DFFH), Days to complete two harvests (Total cropping period) and Total yield were recorded.

Growth and Yield Performance Studies at Different Locations: The beds were prepared as mentioned and maintained at the following locations for comparative studies. 1. Vijaya Mushrooms, Coimbatore (North) 2. Maha Mushrooms, Coimbatore (South) The observations on Days for spawn run (DFSR), Days for pin head formation (DFPF), Days for first harvest (DFFH), Days to complete two harvests (Total cropping period) and Total yield were recorded.

Growth and yield performance of *A. polytricha*: Growth and yield parameter of *A. polytricha* were recorded at Mushroom Research and Training Centre (MR and TC), Dept. Of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore and also at two selected Commercial Mushroom Farms *viz.*, Vijaya Mushrooms (Coimbatore-North), Maha Mushrooms (Coimbatore-South).

Growth and Yield Performance of *A. Polytricha* at Mr and Tc, Dept. Of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore: The results of trial conducted at MR and TC, Dept. of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore are presented in Table 4. The results indicated that mixing of wheat bran and rice bran with paddy straw at 3:1 ratio was found to induce faster growth of *A. polytricha* in beds. However, mixing of saw dust at 3:1 ratio with paddy straw recorded slower growth when compared to paddy straw alone. Total cropping period was minimum (50.6 days) in paddy straw + wheat bran at 3:1. This was followed by paddy straw + rice bran at 3:1 ratio (55.0 days). Paddy straw+ saw dust (1:1) recorded maximum days (69.3) of cropping period when compared to other combinations.

The beds prepared with paddy straw +wheat bran at 3:1 ratio also recorded maximum mean yield of 147.6 g/bed with the bioefficiency of 59.04 percent, whereas paddy straw+saw dust (1:1) recorded the lowest mean yield of 107.3 g/bed with the bioefficiency of 42.92 percent. Paddy straw + wheat bran (3:1) also recorded lower days of spawn run (21.3), lower days for pinhead formation (31.3) and lower days for first harvest (35.60). This was followed by paddy straw+ rice bran (3:1). Paddy straw + saw dust (1:1) took longer days for spawn run (46.3), longer days for pinhead formation (51.0) and maximum days for first Harvest (55.00), when compared to other substrates (Table 1).

Growth and Yield Performance of *A. Polytricha* at Selected Commercial Mushroom Farms of Tamil Nadu Vijaya Mushrooms (Coimbatore-north): The trials conducted at Vijaya mushrooms, Coimbatore (North) also revealed the same trend. The beds prepared with Paddy straw +wheat bran at 3:1 ratio recorded maximum mean yield of 147.0g/bed with a bioefficiency of 58.80 percent, followed by paddy straw +rice bran (3:1) as it recorded the second highest mean yield of 132.00 g/bed with the bioefficiency of 52.8 percent. Same trend was also observed in days for spawn run, days for pinhead formation and days for first harvest (Table.2).

Maha Mushrooms (Coimbatore-South): The second trial was conducted at Maha mushrooms, Kovaipudur, Coimbatore. In this case also paddy straw+ wheat bran at 3:1 ratio recorded the lowest days for spawn run (DFSR), days for pinhead formation (DFPF) and Days for first harvest (DFFH) when compared to other treatments.

Table 1: Growth and yield performance of *A. polytricha* at MR and TC, TNAU, Coimbatore

S.No	Substrate	DFSR	DFPF	DFFH	I YIELD	II YIELD	TOTAL CROPPING		Bio efficiency (percent)
							PERIOD	TOTAL YIELD	
1	Paddy straw	30.0 ^e	40.0 ^d	45.3 ^{cd}	70.0 ^e	65.0 ^b	56.6 ^{dc}	135.0	54.00
2	Paddy straw+wheat bran(3:1)	21.3 ^e	31.3 ^f	35.6 ^e	77.3 ^a	70.3 ^a	50.6 ^e	147.6	59.04
3	Paddy straw+rice bran(3:1)	26.0 ^f	37.0 ^e	42.6 ^{dc}	73.6 ^b	66.6 ^b	55.0 ^{ed}	140.2	56.08
4	Paddy straw+saw dust (3:1)	41.0 ^b	47.6 ^b	52.3 ^{ab}	60.0 ^e	52.6 ^e	64.6 ^b	112.6	45.04
5	Paddy straw+wheat bran(1:1)	33.6 ^d	43.0 ^e	48.3 ^c	66.6 ^d	59.0 ^e	59.3 ^c	125.6	50.24
6	Paddy straw+rice bran(1:1)	36.6 ^c	44.3 ^c	50.6 ^b	62.0 ^e	55.3 ^d	63.6 ^b	117.3	46.92
7	Paddy straw+saw dust (1:1)	46.3 ^a	51.0 ^a	55.0 ^a	57.0 ^f	50.3 ^e	69.3 ^a	107.3	42.92
	CD (P=0.05)	1.12	2.96	2.80	2.72	2.38	3.43		

Mean of three replications DFSR-Days for spawn run DFPF-Days for pinhead formation DFFH-Days for first harvest

Table 2: Growth and yield performance of *A. polytricha* at Vijaya Mushrooms, Coimbatore (North)

S.No	Substrate	DFSR	DFPF	DFFH	I YIELD	II YIELD	TOTAL CROPPING		Bio efficiency (percent)
							PERIOD	TOTAL YIELD	
1	Paddy straw	30.0 ^{bc}	37.3 ^c	41.3 ^b	56.0 ^c	47.3 ^c	55.0 ^b	103.3	41.32
2	Paddy straw+wheat bran(3:1)	23.0 ^c	33.0 ^f	33.3 ^c	75.0 ^a	72.0 ^a	47.3 ^d	147.0	58.80
3	Paddy straw+Rice bran(3:1)	27.3 ^d	36.0 ^e	35.6 ^c	72.0 ^b	60.0 ^b	49.0 ^{cd}	132.0	52.80
4	Paddy straw+saw dust (3:1)	30.0 ^c	40.3 ^{cb}	40.0 ^b	55.3 ^c	46.0 ^c	54.3 ^b	101.3	40.52
5	Paddy straw+wheat bran(1:1)	21.6 ^b	37.6 ^c	41.0 ^b	50.6 ^d	45.0 ^c	53.0 ^{bc}	95.6	38.24
6	Paddy straw+rice bran(1:1)	35.0 ^a	41.3 ^{ba}	46.0 ^a	46.6 ^d	40.3 ^d	62.6 ^a	86.9	34.76
7	Paddy straw+saw dust (1:1)	35.0 ^a	43.6 ^a	46.6 ^a	43.3 ^d	36.0 ^e	61.3 ^a	79.3	31.72
	CD (P=0.05)	3.00	2.86	3.19	4.04	2.78	4.09		

Mean of three replications DFSR-Days for spawn run DFPF-Days for pinhead formation DFFH-Days for first harvest

Table 3: Growth and yield performance of *A. polytricha* at Maha Mushrooms, Coimbatore (south)

S.No	Substrate	DFSR	DFPF	DFFH	I YIELD	II YIELD	TOTAL CROPPING		Bio efficiency (percent)
							PERIOD	TOTAL YIELD	
1	Paddy straw	30.0 ^d	35.6 ^c	47.0 ^d	40.0 ^e	36.6 ^e	63.0 ^c	76.6	30.64
2	Paddy straw +wheat bran(3:1)	24.3 ^c	32.3 ^d	33.6 ^f	67.0 ^a	63.0 ^a	47.3 ^e	130.0	52.00
3	Paddy straw+rice bran(3:1)	28.0 ^d	33.3 ^{bc}	42.6 ^e	60.6 ^b	58.0 ^b	58.0 ^d	118.6	47.44
4	Paddy straw+saw dust (3:1)	35.0 ^c	40.0 ^b	53.0 ^c	57.0 ^c	50.0 ^c	69.3 ^b	107.0	42.80
5	Paddy straw+wheat bran(1:1)	39.6 ^b	41.0 ^b	57.3 ^b	47.0 ^d	43.0 ^d	73.0 ^b	90.6	36.24
6	Paddy straw+rice bran(1:1)	42.3 ^{ab}	48.0 ^a	58.6 ^{ab}	44.2 ^e	40.0 ^d	75.6 ^b	84.6	33.94
7	Paddy straw+saw dust (1:1)	44.6 ^a	46.6 ^a	61.0 ^a	38.0 ^e	38.0 ^e	77.0 ^a	74.3	29.72
	CD (P=0.05)	3.33	2.83	3.43	3.37	3.24	3.97		

Mean of three replications: DFSR-Days for spawn run DFPF-Days for pinhead formation DFFH-Days for first harvest

More over, it also recorded maximum mean yield of 130.0g/bed with bioefficiency of 52.00 percent, followed by paddy straw +rice bran at 3:1ratio with bioefficiency of 47.44 percent. (Table 3).

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