

Evaluation of different substrate for yield performance of *Auricularia polytricha* a medicinal mushroom

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ABSTRACT

In search of the suitable substrate for cultivation of *Auricularia polytricha* different locally available agro-wastes like wheat straw (WS), paddy straw (PS), rapeseed straw (RS), Maize stalk (MS), WS + 4% wheat bran (WB), PS + 4% wheat bran, RS +4% wheat bran and MS + 4% Wheat bran were evaluated consecutively for two years, i.e. 2002-03 and 2003-04 for the yield performance. In all the substrate spawn run completed in 27-29 days while pinheads appear 10-12 days after slitting of the bags during both the years of cropping. The yield performance of this mushroom on substrate RS +4 % WB was found maximum i.e. 483.00 and 473.15 g per 500g dry substrate (96.6% and 94.63% biological efficiency) during the year 2002-03 and 2003-04 respectively. The substrate WS + 4% WB and RS alone were found statistically similar to RS + 4% WB during both years in terms of yield. The poor yield was recorded on paddy straw alone in 6 week harvesting period during both the year of evaluation.

Key words : *Auricularia polytricha*, Medicinal mushroom, Agro-waste, Black-ear mushroom, Biological efficiency

INTRODUCTION

Auricularia, the First mushroom cultivated by man around 600 AD (Chang and Miles, 1978), has long been a favorite in Chinese cuisine and also used for some medicinal properties. The genus *Auricularia* belongs to a group of edible fungi of the class Basidiomycetes, sub class Tremellomycetidae, order Auriculariales, family Auriculariaceae (Kirk *et al.*, 2001) commonly known as wood ear, Juda' ear, mu erh. (cloud ear) or black ear mushroom. It grows naturally on trunks of broad leaf tree of oake, neem, mango, sheesham, poplar or on dead wood during rainy season. The fruiting body of this mushroom is gelatinous, elastic, semi-translucent, cup or ear-shaped, red brown in colour and rubbery ion texture but becoming hard when dry. This mushroom but been widely used for thousands of years in Chinese cuisines for their chrematistic texture. There are considerable records about the medicinal effect of this mushroom including the "compendium of material medica" by Li Shi-Zhen of the Ming Dynasty.

In traditional Chinese medicine, the wood ear mushroom is mild and sweet in nature (Ying *et al.* 1987). It activates the blood and stops pain. It is considered specific for bleeding, especially excessive uterine bleeding, abdominal and tooth pain. It is often used to treat hemorrhoids, to help build up energy and to act as an anticoagulant as well as source of dietary fiber for the prevention of geriatric disorders. Polysaccharides extracted from this mushroom have shown the various activities, such as antimutagenic, anti-ulcer with little effect on the gastric acid secretion and pepsin action, anticoagulant, cholesterol and triglyceride lowering, antidiabetic, immunostimulatory, anti-tumor and antibiotic. It may prevent egg implantation in animals and thus terminate early and mid-term pregnancy. Therefore, owing to its possible anti-implantation effects, this mushroom should not be taken by the pregnant women (Hobbs. 1995).

At present, its cultivation has become a major occupation in some of the south-east Asian countries where farms have been exclusively set up for home consumption and export. Its production has steadily increased with a total annual world production of 4,85,300 tonnes and ranked fourth among all the cultivated mushroom (Chang, 1999). In India, this mushroom is collected and consumed in northeast hills (Singh and Devi, 1986) while its artificial cultivation has been done by Bhandal and Mehta in 1986. In search of the suitable substrate for its artificial cultivation an experimental trial has been conducted to evaluate the different locally available agro-waste for the yield performance.

MATERIALS AND METHODS

Culture of *Auricularia polytricha* was obtained from culture and spawn unit of Mushroom Research and Training Centre, Pantnagar and multiplied on 2% Malt extract Agar medium. Spawn was prepared on boiled and autoclaved wheat grain in glass bottles. A small bit of 10 days old mycelial culture was inoculated in autoclaved spawn bottles under aseptic condition and incubated at 25±1°C for 20days.

The locally available agro-waste like wheat straw (WS), Paddy straw (PS) rapeseed straw (RS), Maize stalk (MS), WS + 4% wheat bran (WB) were used as the substrates for the evaluation trial during the year 2002-03 and 2003-04. All the substrates were soaked in tap water for 20 hours after draining out excess water and 2 kg wet substrate (500 g dry) was filled in the polypropylene (PP) bags (41 x 30cm). These bags were plugged with non-absorbent cotton with help of PP neck and autoclaving and cooling of these bags were inoculated aseptically (spawned) with the grain spawn @ 2% by weight of the prepared substrate. The spawned bags were kept in the crop room at 25±2°C for the spawn run. The polypropylene bags were exposed for fruiting when substrate was completely colonized with mycelial growth. The bags were given four slits (4 x 20 cm) on both sides and hanged in the cropping room. During entire cropping period temperature ranged between 22-30°C and relative humidity maintained between 75-85% by spraying of water 2-3 times/day. Mushrooms were harvested before spraying of water and yield was recorded for 42 days (6 weeks.)

RESULTS AND DISCUSSION

The fungus took 27-29 days for spawn run in all the substrates while pinheads initiated after 10-12 days from slitting of the bags. It took 8-10 days for the development of full size (mature) mushroom (Fig. 1a and 1b) from the pinhead initiation. Yield data recorded in 6 weeks of harvesting period presented in table 1. Maximum yield 473.15g and 483.30g/500g dry substrate (96.66% and 94.63 % biological efficiency) in the year 2002-03 and 2003-04 respectively was recorded on rape seed straw supplemented with 4% wheat bran among the tested substrate. Wheat straw supplemented with 4% wheat bran was found next best substrate in terms of the yield performance during both the years of evaluation. Statistically similar yield was obtained from the substrate rape-seed straw + 4% Wheat bran., wheat straw + 4% Wheat Bran., Maize stalk + 4% Wheat bran and rape-seed straw alone in 2002-03. However, in the year 2003-04 the rape-seed straw + 4% Wheat bran, wheat straw +4% wheat

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Fig. 1a: Mature sporocarp of *Auricularia polytricha* on wheat straw+4% wheat bran



Fig. 1b: Mature sporocarp of *Auricularia polytricha* on Rapeseed straw +4% wheat bran

Table 1: Yield performance of *Auricularia polytricha* on different substrate

Sl. No.	Substrate	Days taken for spawn run		Days taken for pinheads		Avg. yield / 500 g dry substrate					
						2002-03			2003-04		
		2002-03	2003-04	2002-03	2003-04	No.	Wet (g)	B.E. (%)	No.	Wet (g)	B.E. (%)
1	Wheat straw	27	27	11	10	61.16	382.25	76.45	64.26	377.25	75.45
2	Paddy straw	28	29	11	12	54.84	348.65	69.73	51.34	336.15	67.23
3	Maize stalk & leave	28	--	12	--	60.93	402.20	80.62	-	-	--
4	Rapeseed straw	27	28	10	11	66.57	428.10	85.62	65.25	434.25	86.85
5	Wheat straw + 4% wheat bran	27	27	10	10	69.28	450.36	90.07	74.78	460.86	92.17
6	Paddy straw + 4% wheat bran	28	27	12	11	57.79	391.25	78.25	57.00	384.25	76.85
7	Maize stalk & leaves + 4% wheat bran	27	--	11	--	68.00	442.30	88.46	-	-	-
8	Rapeseed straw + 4% wheat bran	27	27	10	11	68.04	483.30	96.66	63.00	473.15	94.63
	CD at 5%					2.22	55.82	--	NS	58.19	--

bran and rape-seed straw alone were found at par in terms of yield. Lowest yield was recorded on paddy straw substrate during both the year. The results are inconsonance with the findings of Bhandal and Mehta (1986) who have cultivated *Auricularia polytricha* on fresh as well as composted wheat straw supplemented with rice bran and reported 60-80% biological efficiency (B.E). Upadhyay (1999) cultivated *A. mesenterica* on wheat straw with different supplement and reported 91-174% B.E. in the 8 week of harvesting period.

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