

EVALUATION OF STRAW OF SOME PADDY VARIETIES AS SUBSTRATES FOR CULTIVATION OF MILKY MUSHROOM (*CALOCYBE INDICA*) IN ORISSA*B K Pani*

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ABSTRACT

A study was conducted to evaluate straw of ten popular paddy varieties of Orissa for sporophore production of the milky mushroom, *Calocybe indica*. The variety CR-1014 recorded the highest mushroom yield (70.5 % BE) followed by Kanchan (69.9 % BE), Jagabandhu (69.6 % BE), Lalat (68.5 % BE), Swarna (66.1 % BE), Pratikshya (63.3 % BE), CR-1018 (61.2 % BE), CR-1009 (55.3 % BE), IR-64 (53.2 % BE) and IR-36 (53.1 % BE).

Key words: Paddy straw, Substrate, Mushroom, Sporophore, *Calocybe indica*

INTRODUCTION

Mushrooms are prized for their delicacy and distinctive flavor. Because of their unique nutritional status, they are known as “the ultimate health food” (King 1993). Though mushrooms rank below most animal meat in crude protein content, they are compared more favourably with most other foods (Crisan and Sands 1978; Li and Chang 1982). It is also claimed that mushrooms contain other beneficial health promoting substances (Chang and Miles 1987). Mushrooms represent one of world’s greatest untapped resources of nutritious and palatable food. They possess extensive and efficient enzyme systems to degrade successfully a wide variety of inexpensive substrates such as lignin, cellulose, hemicelluloses, pectin and other industrial wastes resulting in the cheapest method of waste disposal as well as production of protein rich food. Paddy straw is reported as the most suitable substrate for cultivation of white summer mushroom, *Calocybe indica* (Krishnamoorthy and Muthusamy 1997; Pani 2010). However, literature is almost silent on the appropriate variety of paddy straw for mushroom cultivation excepting Rath (1976). Therefore, the present study was undertaken to evaluate some popular paddy varieties of Orissa for their relative suitability in supporting the sporophore yield of *C. indica*.

MATERIALS AND METHODS

Paddy straw of the varieties such as CR-1014, IR-64, IR-36, Kanchan, Swarna (MTU 7029), Lalat, CR-1009, CR-1018, Jagabandhu and Pratikshya (OR 201-5) were evaluated as substrates for production of *Calocybe indica*. These were well dried, uncrumpled, less than one year old and hand threshed. The straw was chopped into 2-3 inch pieces and soaked in water for 9 hours. Excess water was then drained off. The wet substrate was sterilized by steaming for one hour and allowed to cool to room temperature. Moisture content about sixty per cent was allowed in the substrate at the time of filling into the bags.

Mushroom cultivation was done in 60 cm x 40 cm transparent cylindrical high density polyethylene (HDPE) bags of 100 gauges. One kilogram of dry substrate was used to fill up each bag. Spawning was done @ 200 g/bag in four layers with 21 days-old wheat grain spawn. Two hundred grams of boiled wheat grains were used as additive for each bag. One-fourth each of spawn and boiled wheat grains were placed in a single layer so that more of these materials were applied towards the periphery. Immediately after spawning, the substrate was pressed slightly from the top for better contact of spawn with individual layers. Finally the open end of the bag was tied with a rubber band and about 15 to 20 holes were made around the polythene bags for exchange of gas. The spawned bags were incubated in dark till they were fully impregnated with the mushroom mycelia. Then the top end of the bag was opened and the polythene was rolled outward exposing the surface of the substrate. No casing was made (Pani 2007). These bags were transferred in to the cropping room for fruiting at a temperature of 25-35^o C and 80 to 90 per cent humidity. Sufficient light and controlled ventilation were allowed. Water was also sprayed regularly to keep the substrate moist. Mushrooms were harvested from two flushes and fresh weights were immediately recorded. Per cent biological efficiency was calculated as per Pani (2010).

RESULTS AND DISCUSSION

Results (Table 1) revealed that the variety CR-1014 recorded the highest mushroom yield (70.5 % BE) followed by Kanchan (69.9 % BE), Jagabandhu (69.6 % BE), Lalat (68.5 % BE), Swarna (66.1 % BE), Pratikshya (63.3 % BE), CR-1018 (61.2 % BE), CR-1009 (55.3 % BE), IR-64 (53.2 % BE) and IR-36 (53.1 % BE). The fungus took 15 days for substrate colonization, 29 days for primordial initiation and induced 6 numbers of mature fruiting bodies. On an average a single sporophore weighed 117.5 g. The pileus to stipe ratio was found to be 1: 1.15. The stiff and long

stem of CR-1014 provided appropriate compactness to the beds and increased the water holding capacity of the beds during the process of mushroom cultivation which might have contributed

Table 1: Effect of different varieties of paddy straw on the production of *Calocybe indica*

Variety	SC (days)	PI (days)	Sph. (No)	Size of mushroom		Yield (g)	Avg Sph. Wt.	BE (%)
				Pileus diameter (cm)	Stipe length (cm)			
CR-1014	15	29	6	14.5	16.8	705.0	117.5	70.5
IR- 64	16	32	4	11.0	13.6	532.0	133.0	53.2
IR – 36	15	31	4	10.8	14.8	531.0	132.7	53.1
Kanchan	15	30	6	12.8	13.7	699.0	116.5	69.9
Swarna	15	31	5	12.0	14.3	661.0	132.2	66.1
Lalat	15	31	6	11.5	12.8	685.0	114.1	68.5
CR -1009	16	32	4	9.9	12.3	553.0	138.2	55.3
CR -1018	14	30	5	10.8	12.9	612.0	122.4	61.2
Jagabandhu	15	30	6	13.8	15.7	696.0	116.0	69.6
Pratikshya	15	31	5	14.0	16.4	633.0	126.6	63.3

CD (0.05)

78.55

Each observation was the average of three determinations.

SC- Substrate Colonization PI- Primordial Initiation Sph.- Sporophore

for the higher yield. The softness and succulent nature of paddy straw of varieties like IR-64 and IR-36 resulted in rotting of straw during the cropping period resulting in poor yield. Rath (1976) suggested that high yielding varieties of paddy straw when used to make beds for paddy straw mushroom

cultivation required longer period of cropping and produced inferior yields as compared to local varieties straw beds. He also reported that it was uneconomical though might not be quite unsuitable to use the straw of high yielding varieties for the commercial cultivation of paddy straw mushroom.

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