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RESEARCH ARTICLE

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Biological efficiency and nutritional value of *Pleurotus sapidus* cultivated on different substrates

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ABSTRACT

Pleurotus sapidus **was cultivated on different substrates *viz.*, soybean straw, paddy straw, wheat straw, jowar straw, bajra straw, tur straw and sunflower stalk, to determine the effect of these substrates on yield and nutritional contents of *Pleurotus sapidus.* Soybean straw showed significantly highest yield (with 72.86 % B.E.) with maximum protein (26.75%) and ash (7.00% content). Maximum carbohydrate (52.00 %), fat (2.60%) and moisture (91.33 %) content in fruiting bodies were recorded on wheat straw cultivation. Highest crude fiber content in fruiting bodies (8.00%) was recorded when cultivated on paddy straw**

Key words : *Pleurotus sapidus*. Soybean straw, Paddy straw, Wheat straw, Biological efficiency

INTRODUCTION

Mushrooms are rich in proteins, vitamins and minerals. Cultivation of edible mushrooms not only help in recycling of agro - wastes but also filling up the protein gap prevalent among the large population. The mushrooms have the capacity to convert nutritionally valueless substrates into high protein food (Chang and Hayes, 1978). Zakhary *et al*. (1983) reported the edible mushroom species are highly nutritious. Their nutritional value comparing favorably with that of meat, eggs and milk. Among the various edible mushrooms *Pleurotus* sp. are efficient lignin degrading mushrooms and more suitable to tropical and sub-tropical countries, which can grow easily on large variety of lignocellulosesic residues by secreting spectrum of enzymes require shorter growth time as compared to other edible mushroom types. *Pleurotus* species commonly known as Oyster fungus which can be used as food and medicine as it provide high protein contains all essential amino acids and good source of vitamins, minerals (Mandhare *et al.*, 2003). The *Pleurotus* species are intensively studied in many different parts of the world.

In present study the productivity and nutritional content of *Pleurotus sapidus* were analyzed. Based on earlier studies and local availabilities of the agricultural wastes, soybean straw, paddy straw, wheat straw, jowar straw, bajra straw, tur straw and sunflower stalk were utilized for the cultivation of *Pleurotus sapidus*.

MATERIALS AND METHODS

The study was undertaken in Department of Botany, Yeshwant College, Nanded. The Culture of *Pleurotus sapidus* was obtained from N.C.I.M. National Chemical Laboratory (NCL), Pune. The substrates *viz.*, soybean straw, paddy straw, wheat straw, jowar straw, bajra straw, tur straw and sunflower stalk were used for filling the bags. These were was chopped to pieces of 2-3 cm. and soaked in water over night to moisten it. After soaking, the substrate was steam sterilized at 121^0C for 30 minutes in an autoclave. The polythene bags of size 35-45 cm were used and filled with sterilized substrate (1kg dry substrate sample in each bag). Multi- layered technique was adopted for spawning the substrate. The spawn was added to bags at the rate of 2% of the wet weight of substrate. Five replicates were maintained for each treatment. After inoculation, the bags were transferred to mushrooms house where temperature and humidity were maintained at 22-

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30^0C and 80- 90 %, respectively. When spawn run (mycelial growth) was completed, the polythene bags were removed to promote mushroom formation. The beds were moistened and ventilated throughout the harvest period. The beds were maintained up to the harvest of three flushes.

The data was recorded for yield and biological efficiency (Table 1). The biological efficiency was expressed in per cent and calculated by formula. (Chang *et al.*, 1981).

$$\text{B.E. (\%)} = \frac{\text{Fresh wt. Of mushroom}}{\text{Dry weight of substrate}} \times 100$$

The moisture content was determined by the direct oven drying method (AOAC, 1990) .The protein, fat and ash were determined by the procedure recommended by AOAC (1984). Total carbohydrate was determined by phenol sulphuric acid method (Wankhede and Tharanathan, 1976) Crude fiber was estimated as per the method recommended by Maynard (1970). The recorded data in the present work were subjected to statistical analaysis as per the procedure recommended by Panse and Sukhatme (1967).

RESULTS AND DISCUSSION

Table 1 reveals the data for yield and biological efficiency. The maximum yield of mushrooms (728.66 g/ kg dry straw) was obtained when cultivated on soybean straw with 72.86% B.E. followed by on paddy straw (646.99 gm/kg straw) with 64.69% B.E. These results are usually in accordance with the findings of Syed Abrar *et al.* (2009). Comparing seven different substrates for the cultivation of *P.sapidus* showed that soybean straw supported best growth of *P. sapidus* as evidenced by complete and heavy colonization of substrate forming a compact white mass of mycelium.

The moisture protein, fat, carbohydrate, crude fiber, ash content of fruiting bodies of *Pleurotus sapidus* cultivated on different substrates are shown in Table 2. The maximum moisture content was shown by wheat straw (91.33%) and minimum moisture content was found when cultivated on (82.10%) tur straw. The Protein content of *Pleurotus sapidus* was 26.75% when grown on soybean straw being the highest followed by paddy straw (23.40%). Maximum carbohydrate content of *Pleurotus sapidus* was found on wheat straw (52.00%), where as minimum was found on (44.25%) tur straw. The percentage content of moisture, protein, carbohydrate were

Table 1 : Effect of different substrates on yield, bio efficiency of *Pleurotus sapidus*

Substrates	Yield (g/ kg) dry straw		Total	B.E. (%)
	1st picking	2nd picking		
Soybean straw	370.00	358.66	728.66	72.86
Paddy straw	368.33	278.66	646.99	64.69
Wheat straw	360.00	262.33	622.33	62.23
Jowar straw	290.00	215.33	505.33	50.33
Bajra straw	256.00	210.66	466.66	46.66
Tur straw	272.00	212.33	484.33	48.43
Sunflower straw	260.33	198.33	458.66	45.86
S.E. ±	11.82	10.50		
C.D. (P=0.05)	35.34	33.97		

Table 2 : Effect of substrates on moisture, protein, carbohydrates, fat, crude fiber and ash content of *Pleurotus sapidus*

Substrate (%)	Protein (%)	Carbohydrate (%)	Fat (%)	Crude fiber (%)	Ash (%)	Moisture (%)
Soybean straw	26.75	24.95	2.10	7.50	7.00	86.75
Paddy straw	23.40	45.65	1.60	8.00	6.35	85.16
Wheat straw	21.35	52.00	2.60	6.80	5360	91.33
Jowar straw	22.80	50.60	2.00	6.75	5.85	86.70
Bajra straw	22.10	47.00	1.80	6.00	5.40	85.80
Tur straw	21.65	44.25	1.50	7.65	6.50	82.10
Sunflower straw	20.12	48.50	2.40	7.32	6.20	85.45
S.E. ±	0.76	0.69	0.36	0.25	0.38	0.45
C.D. (P=0.05)	2.24	2.11	1.08	0.73	1.14	1.48

confirmed with the findings of Guo *et al.* (2007).

The highest fat content of *Pleurotus sapidus* (2.60%) was found on wheat straw and least fat was found on tur straw (1.50 %). The crude fiber content of *Pleurotus sapidus* was maximum (8.00 %) when grown on paddy straw followed by on tur straw (7.65 %) where as minimum was found on bajra straw (6.00%). The result of fat and crude fiber content of *Pleurotus sapidus* are in accordance with the results of Khadygi *et al.* (1998). The ash content of *Pleurotus sapidus* was found 7.00% on soybean straw being the highest followed by on tur straw (6.50%), where as the least content of ash was shown by bajra straw (5.40 %).The content of ash determined in this research are genreally in accordance with the previous studies of Kadam *et al.* (2008).

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