

Substrate evaluation for cultivation and nutritional value of *Pleurotus sajor caju*

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Accepted : February, 2010

SUMMARY

This study was conducted to evaluate the substrate for maximum yield and nutritional content of *Pleurotus sajor caju* when grown on different agro wastes like soyabean, paddy, wheat straw and their combinations in 1:1 proportion. Significantly maximum yield (with 85.76 % B.E.), protein (26.00%), fat (2.60 %), carbohydrate (56.66 %), crude fibre (7.20 %) content were found when mushroom was cultivated on soyabean straw. Paddy straw showed maximum moisture (89.09 %) and ash content (6.65 %) in mushroom fruit bodies.

Key words : *P. sajor caju*, Biological efficiency, Yield, Nutritional value

Mushrooms are valuable, healthy foods being low in calories and high in proteins, vitamins and minerals (Racz *et al.*, 1996). Mushrooms have a long history of use; its consumption is increasing even in the developing world, due to their good contents of proteins and minerals (Agrahar- Murugkar and Subbulakshmi, 2005). Huseyn *et al.* (2009) suggested the edible mushroom is an anti-hypertensive diet. Mushrooms have also been reported as therapeutic foods, useful in preventing diseases such as hypercholesterolemia, hypertension and cancer. These functional characteristics are mainly due to their chemical composition (Manzi *et al.*, 2001). In general mushroom fruiting bodies on dry weight basis contains about 39.9 % carbohydrate, 17.5 % protein and 2.9 % fat and rest being the minerals (Demirbas, 2001; Latiff *et al.*, 1996). The mushrooms have the capacity to convert nutritionally valueness substances in to high protein food (Chang and Hayes, 1978).

Among the various edible mushrooms, *Pleurotus* species are efficient lignin degrading mushroom and more suitable in tropical and sub-tropical countries, which can grow easily on fresh agro wastes after boiling in water. Oyster mushroom can be used as food and medicine, as it provide high protein, containing all essential amino acids and good source of vitamins, minerals. The objective of this work was to evaluate the substrate for cultivation and nutritional quality of *Pleurotus sajor caju*.

Yeshwant college , Nanded. The Culture of *Pleurotus sajor caju* was obtained from N.C.I.M. National Chemical Laboratory (NCL), Pune . The substrates *viz.*, soyabean straw, paddy straw, wheat straw and their combination in 1:1 proportion were used for filling the bags. It 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°C 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 22-30°C and 80-90 %, respectively. When spawn run (mycelial growth) was completed, the polythene bags were removed to promote mushroom formation. The bags 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)

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

MATERIALS AND METHODS

The study was undertaken in Department of Botany,

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Table 2 gives the data for proximate composition of mushroom. The moisture content was determined by the direct oven drying method. The protein; fat and ash were determined by the procedure recommended. Total carbohydrate was determined by phenol sulphuric acid method. Crude fiber was estimated as per the method recommended. The recorded data in the present work

Table 1 : Effect of different substrate on yield of *P. sajor caju*

Substrate	Yield (gm/kg dry straw)				B.E. (%)
	1 st picking	2 nd picking	3 rd picking	Total	
Soybean straw	405.33	280.00	172.33	857.66	85.76
Paddy straw	376.00	318.33	126.00	820.33	82.03
Wheat straw	290.66	268.00	199.33	757.99	75.79
Soybean + Paddy straw	398.33	308.00	119.33	825.66	82.56
Soybean + Wheat straw	332.66	268.00	165.00	765.00	76.50
Wheat + Paddy straw	304.66	255.33	150.00	709.99	70.99
S.E.+ ₋	17.82	6.56	14.67		
C.D. (P=0.05)	56.07	20.66	46.17		

Table 2 : Effect of different substrate on nutritional content of *P. sajor caju*

Substrate (%)	Protein (%)	Fat (%)	Carbohydrate (%)	Crude fiber (%)	Ash (%)	Moisture (%)
Soybean straw	26.00	2.60	56.66	7.20	6.50	85.36
Paddy straw	25.45	2.46	56.00	7.00	6.65	89.09
Wheat straw	22.25	2.40	55.50	6.80	6.20	87.79
Soybean + Paddy straw	24.00	2.50	55.80	7.00	6.55	87.29
Soybean + Wheat straw	23.66	2.46	52.00	6.30	6.06	86.49
Wheat + Paddy straw	24.50	2.30	53.33	6.45	6.30	86.78
S.E.±	0.45	0.04	0.38	0.18	0.09	0.37
C.D. (P=0.05)	1.43	0.13	1.22	0.58	0.30	1.18

was subjected to statistical analysis 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 mushroom was obtained when cultivated on (857.66 gm/ kg straw) soybean straw with 85.76 % B.E., followed by on combination of soybean + paddy straw (825.66 gm/ kg straw) with 82.56 % B.E. Minimum yield was found on combination of wheat + paddy straw (709.99 gm/ kg) with 70.99% B.E. Comparing different substrates, soybean straw supported best growth of *P. sajor caju* as evident by complete and heavy colonization of substrate forming a compact white mass of mycelium. The values for moisture, protein, fat, carbohydrate, crude fiber and ash content of *P. sajor caju* cultivated on different substrates are reported in Table 2.

The maximum moisture content of mushroom was shown by paddy straw (89.09%) and minimum moisture content was observed when cultivated on combination of soybean + Wheat straw (86.49%). Protein content of *P. sajor caju* was 26.0% when grown on soybean straw being the highest, followed by on paddy straw (25.45%)

while minimum protein of mushroom was found on (22.25 %) wheat straw. Maximum fat content of mushroom was found on (2.60 %) soybean straw and minimum was found on combination of Wheat + Paddy straw (2.30 %). The highest carbohydrate content of mushroom was observed on (56.66 %) soybean straw followed by on paddy (56.00 %) straw and lowest carbohydrate was reported when grown on combination of soybean + wheat straw (52.00 %).

The crude fiber content of *P. sajor caju* was maximum when cultivated on soybean straw (7.20 %), followed by on paddy straw and combination of soybean + paddy straw (7.00 %) where as minimum crude fiber content was found on combination of (6.30%) soybean + wheat straw. The ash content of mushroom was 6.65% on paddy straw being the highest followed by on combination of soybean + paddy straw (6.55 %), where as the least content of ash was found on combination of (6.06 %) soybean + wheat straw. The % content of moisture, protein, fat, carbohydrate, crude fibre and ash determined in this research were generally in accordance with the previous studies (Patil *et al.*, 2006, Patil *et al.*, 2008; Kadam *et al.*, 2008).

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