Suitability of various substrates on productivity and proximate composition of Pleurotus florida in Eastern Uttar Pradesh

Abstract

The objective of this experiments was to study the effect of different substrates on productivity and proximate content of mushroom. Significantly maximum yield, protein, fat & and total carbohydrate content of mushroom was found when cultivated on Soyabean straw. Maximum moisture and ash content were found on paddy straw and crude fiber content on okra stem.

Keywords: Substrates, Biological efficiency, Productivity, Proximate composition, Mushroom.

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Introduction

Mushroom cultivation is the most suitable technology for creating wealth out of waste from plant, animal and industries which are abundantly available in eastern Uttar Pradesh. Mushrooms are good source of high quality protein, vitamins and minerals (Pant and Pandey, Kumar *et.al;* 2009; 2012). Oyster mushroom can play on important role in managing organic wastes which have become problematic for disposal (Das and Mukherjee, 2007). *Pleurotus spp.* has remarkable ability to degrade lignin, cellulose and hemi-cellulose into nutritious food. It has been successfully cultivated on many agro wastes viz coffee pulp, grass (Hernadez *et.al;* 2003), straw of rice, wheat, ragi, bazra, maize, sorghum (Bano *et.al;* 1997, Chang *et.al;*1981, Bonatti *et.al;* 2004, Mandahare, 2000 and Ragunathan *et.al;* 1996), woods of popular, oak, horse chest nut, *Acasia sp.*(Pant. *et.al;* 1987); cotton and pigeon pea stalk, Pea shells and popular saw dust (Patil 2006, Kumar *et. al;* 2009 in other parts of the country. The present paper deals with evaluation of various locally available substrates for the productivity and proximate composition of *Pleurotus florida* in eastern Uttar Pradesh.

Materials and Methods

The present study was conducted in the department of Botany, M.L.K.(P.G.) College Balrampur during August 2012 – August 2013. The culture of *Pleurotus florida* was obtained from N.D.A.U. Kumarganj, Faizabad. Eight substrates viz. okra stem, cowpea stem, pigeon pea stalk, soyabean straw, paddy straw, wheat straw, jowar straw and bajra straw were used for filling the bags. It was chopped to piece of 2-3 cm. and soaked in water over night to moisture it. After soaking, the substrates were steam sterilized at 121 ^{0}C for 35 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 substrates. The spawn was added to bags at the rate of 2% of the wet weight of substrate. After inoculation, the bags were transferred to mushroom house where temperature and humidity were maintained as 22-30 ^{0}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. Five replications were maintained for each treatment. The data was recorded for yield and biological efficiency (B.E.) in the Table 1. The biological efficiency was expressed in percent (%) and calculated by the formula (Chang *et.al;* 1981).

$$B.E.(\%) = \frac{\text{Fresh Weight of Mushroom}}{\text{Dry Weight of Mushroom}}$$

The Table 2 presents the data for proximate composition of mushroom. The moisture content was determined by the direct oven drying method (AOAC, 1990). Total carbohydrate was determined by phenol sulphuric acid method (Wankhede and Tharanathan, 1976). The protein, fat and ash were determined by the procedure recommended by AOAC (1984). Crude fiber content was estimated as per the method

recommended by Maynard (1970). The recorded data in the present work was subjected to statistical analyse as per the procedure recommended by Chandel (2004).

Results and Discussion

The results revealed that, the maximum yield (85.07% B.E.), Carbohydrates (63.00 %), protein (27.00 %), and fat (3.00 %) were found when mushrooms were cultivated on soyabean straw. Similar results were obtained by Mandahare, (2000), Ragunathan (1996) and Patil (2006). The crude fiber content was found maximum on okra stem (8.60%). These results are in accordance with the findings of Khydagi *et.al.* (1998), Hafiz *et.al;* (2003), and Kumar *et.al;* (2009). The moisture (93.60%) and ash (6.35%) content of mushrooms were found maximum when cultivated on paddy straw. These results are in agreement with the findings of Bonatti *et.al.*(2004) and Patil (2006).

In the present study it is observed that the soyabean straw favors to give maximum yield, carbohydrates, proteins and fat content of mushroom. The substrate okra stem is better to give maximum crude fiber content of mushroom and paddy straw is better substrates to show maximum moisture and ash content in mushroom. From the study, it is clear that substrates used for the cultivation influenced the yield and chemical composition of mushroom.

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Table 1

Evaluation of different substrates on yield of *P.florida.*

Substrates	Yield (gm./kg.) dry straw			Total	B.E.(%)
	1st Picking	2nd Picking	3rd Picking		
Okra stem	270.66	217.33	119.33	607.32	60.73
Cow pea stem	271.33	223.66	123.00	617.99	61.79
Pigeon pea stalk	279.00	228.00	129.00	636.00	63.60
Soyabean straw	389.00	299.30	162.40	850.70	85.07
Paddy straw	360.40	281.33	149.50	791.23	79.12
Wheat straw	295.00	258.50	173.33	726.83	72.68
Jowar straw	297.33	290.00	163.66	750.99	75.09
Bajra straw	286.33	27.00	172.40	725.73	72.57
Mean (Aver)	306.13	258.14	149.07	-	-
S.D.	41.24	29.76	20.88	-	-
S.E.M.±	14.62	10.55	7.40	-	-
C.D.(P=0.05)	27.19	19.62	13.76	-	-

Table: 2
Evaluation of different substrates on proximate content of *P. florida.*

Substrates	Protein (%)	Carbohydrate (%)	Fat (%)	Crude Fibre (%)	Moisture (%)	Ash (%)
Okra Stem	22.98	57.66	2.28	8.60	89.15	5.48
Cow Pea Stem	23.50	56.33	2.30	8.00	89.35	5.42
Pigeon Pea Stem	25.00	60.80	2.56	7.82	89.98	5.50
Soyabean Straw	27.00	63.00	3.00	7.45	88.70	6.00
Paddy Straw	25.00	61.10	2.85	7.95	93.60	6.35
Wheat Straw	26.60	61.50	2.82	7.88	90.40	6.12
Jowar Straw	24.66	59.33	2.84	7.69	89.00	5.60
Bajra Straw	23.25	58.66	2.58	7.72	89.38	5.90
Mean (Ave.)	24.76	59.79	2.65	7.88	89.94	5.79
C.D.(P=0.05)	1.392	2.03	0.22	0.3	1.46	0.3
SEM ±	0.49	0.71	0.07	0.10	0.51	0.10
C.D.(P=0.05)	0.91	1.32	0.13	0.186	0.94	0.186

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