

Accepted : May, 2010

Comparative study on yield and nutritional aspect of *Pleurotus eous* mushroom cultivated on different substrate

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ABSTRACT

Pleurotus eous was grown on different agro wastes viz., soybean, paddy, wheat, Jowar, Bajra, tur and sunflower straw to study the effect of these agro waste on yield, bio-efficiency and proximate composition of mushroom, *P. eous* on paddy straw showed significantly maximum stipe weight (1.10 g), Ca (360 mg / 100 g) content where as Bajra straw showed maximum pileus weight (5.98 g). Significantly maximum yield (820.33g/kg dry straw) with 82.03 % B.E. , protein (30.50 %) crude fiber (9.00 %), ash (6.50%), P(965mg), Fe (15.60 mg) content of mushroom were observed with soybean straw. Jowar straw favoured to show highest moisture (91.21 %) content, wheat straw showed maximum fat (2.62 %) content and sunflower straw showed maximum carbohydrate content (52.00%) in mushroom fruiting bodies.

Key words : *Pleurotus eous*, Tur and Sunflower straw, Mushroom fruiting bodies

INTRODUCTION

Mushrooms are rich in protein, Minerals, vitamins and they contain an abundance of essential amino acids (Sadler, 2003). Therefore, mushroom can be a good supplement to cereals (Chang and Buswell, 1996). Mushroom normally ranges between 20 and 40 % protein which is better than many legume sources like soybeans, pea nuts and protein yielding vegetables foods (Chang and Buswell, 1996; Chang and Mshigeni, 2001). Edible mushroom species are highly nutritious, their nutritional value comparing favorably with that of meat, eggs and milk (Zakhary *et al.*, 1983.). Additionally, several edible mushroom species act as sources of physiological agents for medicinal application, possessing anti-tumor, cardiovascular, antiviral, antibacterial and other activities. *Pleurotus* species commonly known as oyster fungus is a common primary decomposer of wood .This fungus has high quantities of protein, total carbohydrates, minerals like Ca, P, Fe and vitamins like folic acid, thiamin, riboflavin, niacin (Patil *et al.*, 2008, Syed Abrar *et al.*, 2009 Necla 2007) for many reasons the fungi of the *Pleurotus* genus

have been intensively studied in many different parts in the world. They require shorter growth time as compare to other edible mushroom, they demand few environmental controls, and their fruiting bodies are not very often attacked by cultivated in a simple and cheap way (Patrabansh and Madan, 1997). This experiment was undertaken to study the yield performance and nutritional content on different agro wastes.

MATERIALS AND METHODS

The study was undertaken in department of Botany, Yeshwant College, Nanded. The Culture of *Pleurotus eous* 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. 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

Telang, S.M., Patil, S.S. and Baig, M.M.V. (2010). Comparative study on yield and nutritional aspect of *Pleurotus eous* mushroom cultivated on different substrate, *Food Sci. Res. J.*, 1 (2) : 60-63.

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 mushroom 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 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 was subjected to statistical analysis as per the procedure recommended by Panse and Sukhatme (1967).

RESULTS AND DISCUSSION

The results reveal the stipe weight, pileus weight, yield, B.E. and moisture content of *P. eous* cultivated on different agro wastes (Table 1). The maximum stipe weight (1.10 g) was found on paddy straw where as maximum Pileus weight (5.98 g) of mushroom was obtained when it was cultivated on bajra straw. The highest yield of *P. eous* was obtained when cultivated on soybean straw (820.33 g/ kg straw) with 82.03 % B.E. The moisture content of fruiting bodies was found maximum (91.21%) on jowar straw while least was recorded with soybean straw (83.15%). These results were confirmed with findings of Patil *et al.* (2008).

The protein, fat, carbohydrate, crude fiber, ash and minerals like Ca, P and Fe content of mature fruiting bodies of *P. eous* cultivated on different substrate are shown in Table 2.

Table 1 : Effect of different substrate on fresh stipe, pileus weight, yield, bio-efficiency and moisture content of *P. eous*

Substrats	Stipe wt. (g)	Pileus wt. (g)	Yield g / kg dry straw	B.E. (%)	Moisture (%)
Soybean straw	0.80	4.50	820.33	82.03	83.15
Paddy straw	1.10	3.80	798.26	79.82	86.20
Wheat straw	0.98	4.85	750.66	75.06	85.17
Jowar straw	0.89	4.78	731.99	73.19	91.21
Bajra straw	0.62	5.98	716.00	71.60	88.50
Tur stalk straw	0.70	5.88	680.33	68.03	89.46
Sunflower stalk	0.58	5.20	615.00	61.50	90.23
S.E.±	0.04	0.32	14.40	-	0.80
C. D. (P=0.05)	0.13	0.96	43.62	-	2.52

Table 2 : Effect of different substrates on protein, fat, carbohydrate, crude fiber, ash and minerals

Substrates	Protein (%)	Fat (%)	Carbohydrate (%)	Crude fiber (%)	Ash (%)	Ca	P	Fe
Soybean straw	30.50	2.60	50.50	9.00	6.50	345	965	15.60
Paddy straw	29.34	2.40	48.00	8.00	6.25	360	950	15.31
Wheat straw	27.80	2.62	50.20	7.75	6.00	355	895	14.10
Jowar straw	27.35	2.10	49.00	7.45	6.40	340	850	14.37
Bajra straw	26.62	2.10	49.00	7.45	6.40	340	850	14.37
Tur stalk	26.62	2.30	51.40	7.30	5.50	310	815	10.20
Sunflower stalk	27.38	2.20	52.00	7.92	5.25	260	735	13.12
S.E.±	0.36	0.06	0.58	0.35	0.21	6.05	5.98	0.33
C. D. (P=0.05)	1.08	0.18	1.75	1.06	0.62	18.32	18.12	1.02

The values of Ca, P, and Fe are in mg/100gm

P. eous fruiting bodies produced on soybean straw possessed the highest protein content (30.50%) on dry weight basis followed by on paddy straw (29.34 %). The fat content of *P. eous* was 2.62 % when grown on wheat straw being the highest followed by soybean straw (2.60 %). The protein and fat content were similar as reported in earlier studies (Patil *et al.*, 2006; Patil and Dakore, 2007). Maximum carbohydrate content of mushroom was 52.00 % when grown on sunflower straw. The crude fiber content of *P. eous* was found maximum (9.00 %) when grown on soybean straw while least was found (7.30 %) on tur stalk. These results were confirmed with findings of Bonatti *et al.* (2004).

The highest ash content of *P. eous* was found on soybean (6.50%) straw while minimum was recorded on sunflower stalk (5.25%). similar results were reported by Patil *et al.* 2008. The calcium content of *P. eous* was found maximum (360 mg/100g) when cultivated on paddy straw, followed by Tur straw (260 mg/ 100 g). Mandhare *et al.* (2003) reported similar observations.

The maximum phosphorous content (965n mg/ 100g) in *P. eous* was found on soybean straw where as minimum was recorded with sunflower stalk (735 mg/ 100 g). These results were confirmed with Syed Abrar *et al.* 2009. Highest iron content in *P. eous* was found on soybean straw (15.60 mg / 100 g) followed by paddy straw (15.31 mg/ 100 g) while least was recorded with bajra straw (10.20 mg/ 100 g). Similar results were obtained earlier by Rathor and Thakare (2004), Kikuchi *et al.* (1984)

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