

Performance of *Pleurotus florida* on different substrates in mid-hill Garhwal Himalaya of Uttarakhand

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Oyster mushroom is commonly known as "Dhingri". It is a lignocellulosic fungus and grows naturally in temperate and tropical forests. The growing and consumption interest of oyster mushroom is increasing largely due to its taste, medicinal and nutritional properties. *Pleurotus florida* was cultivated on five different substrates, viz. wheat straw, paddy straw, barnyard millet straw, finger millet straw and poplar leaves. The observations recorded that wheat straw gave the minimum spawn run period (19.00 days), appearance of pin head (25.75 days) and fruiting bodies formation (29.22 days) besides this maximum stipe length (3.37 cm), and cap diameter (8.37 cm) were also found on wheat straw. Similarly, flush wise yield (g) was maximum in wheat straw. The maximum average total yield in (g) was also found in wheat straw and the Biological efficiency (BE) was maximum (78.33%) on wheat straw. In other way on poplar leaves maximum spawn run period (28.40 days), appearance of pin head (35.40 days) and fruiting bodies formation (41.47 days) were observed and besides this minimum stipe length (2.35 cm), and cap diameter (4.82 cm) were found on poplar leaves. Among all these substrates flush wise yield (g) was minimum on poplar leaves, so the average total yield in (g) and the (BE) was minimum (38.05%) on poplar leaves.

Key words: *Pleurotus florida*, substrates, yield, biological efficiency, Garhwal Himalaya

INTRODUCTION

Oyster mushroom is commonly known as "Dhingri". It is a lignocellulosic fungus and grows naturally in temperate and tropical forests. Oyster mushroom belonging to the genus *Pleurotus* which are broadly cultivated in the edible mushroom in the world. The name *Pleurotus* has its origin from Greek word "*Pleuro*" which means formed laterally or in a side way position. The genus *Pleurotus* is characterized by a complex taxonomic structure and include about 30 species. Oyster mushroom fresh fruiting bodies indicates a high quality of moisture (90.8%), where dry as well as fresh oyster mushrooms are rich in carbohydrate (57.6%), protein (30.4%), fiber (8.7%), fat (2.2) and ash (9.8) with 345 kilocalories energy value on 100g dry weight (Iqbal *et al.* 2016). Oyster mushroom, contains most of the mineral salts required by human body, such as K, Na, P, Fe and Ca. The growing and consumption interest of oyster

mushroom is increasing largely due to its taste, medicinal and nutritional properties. Like other mushroom, *Pleurotus* spp. have much diversity in their adaptation to the varying agro climatic conditions, as well as locally available substrates. Mushrooms can easily and successfully be cultivated on wheat, paddy, barley, oat and gram straw, banana, sugarcane and maize leaves, empty corn cobs and millet heads, cotton waste, sticks and boll locules, sugarcane baggasse, banana pseudostems, sawdust, logs, straw papers, manure etc. The cultivation of *Pleurotus florida* was tried on wheat, ragi and rice straw. Temperature is important aspect in the selection of mushroom for the tropics where high temperature remains for most of the time. Mushroom species are usually attributed for higher growth rate 20-30 °C.

MATERIALS AND METHODS

The experiment was carried out at laboratory and Mushroom Research Unit, Department of Plant

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Table 1: Comparative evaluation of *Pleurotus florida* for time required (days), different growth stages on different substrates

Treatments	Spawn running (days)* ±SE(m)	Appearance of pin head (days)* ± SE(m)	Fruiting bodies formation (days)* ± SE(m)	Stipe length (cm)* ± SE(m)	Cap diameter (cm)* ± SE(m)
Wheat straw	19.00±0.57	25.75± 0.47	29.22± 0.77	3.37±0.17	8.37±0.25
Paddy straw	23.20±0.58	30.75± 1.10	35.50 ±0.64	3.02±0.20	7.10±0.16
Barnyard millet straw	22.37±1.06	29.50± 0.28	34.47± 1.23	2.45±0.26	5.72±0.18
Finger millet straw	23.50±0.28	30.55 ±0.91	36.95 ±1.12	2.35±0.13	6.47±0.29
Poplar leaves	28.40±0.46	35.40± 0.25	41.47 ±1.51	2.35±0.13	4.82±0.22
SE(d)	0.92	0.98	1.56	0.26	0.32
C.D. _(0.05)	1.97	2.12	3.36	0.56	0.69

Table 2: Yield, Biological efficiency (B.E.%) of *Pleurotus florida* on different substrates

Treatments	Yield (g)/ 400g dry substrate					B.E. (%)
	Harvesting of 1 st flush±SE(m)	Harvesting of 2 nd flush±SE(m)	Harvesting of 3 rd flush±SE(m)	Harvesting of 4 th flush±SE(m)	Total yield±SE(m)	
Wheat straw	100.15± 2.52	84.75 ±1.10	70.87 ±1.74	57.55 ±1.31	313.32 ±36.60	78.33
Paddy straw	75.00 ±1.22	60.00 ±1.58	55.30 ±1.26	46.25 ±1.65	236.55 ±24.03	59.13
Barnyard millet straw	87.25 ±1.37	71.50± 1.75	64.25± 0.10	48.90± 0.66	271.90 ±31.86	67.97
Finger millet straw	77.50 ±0.86	63.75 ±1.79	57.80 ±1.62	51.00 ±1.58	250.05 ±22.53	62.51
Poplar leaves	55.25 ±1.37	45.00 ±0.91	28.10 ±1.05	23.85 ±.65	152.20 ±29.32	38.05
SE(d)	2.22	2.08	1.96	1.77	41.47	
C.D. _(0.05)	4.79	4.48	4.21	3.80	89.20	

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Carbendazim + 500 ppm formaldehyde for 18 hours for preventing the mould infestation. The ingredients were mixed thoroughly with hands and filled in polythene bags (400g/bag), spawning was done @ 2% wet weight of substrate. Four replication of each treatments. Substrates filled bags were kept in dark room. The bags were opened after complete spawn run by the help of sterilized knife. For spawn run temperature and relative humidity were maintained between 15-18°C and 70-90% respectively.

Observations for spawn run period (days), appearance of pin head (days), fruiting bodies formation (days), stipe length (cm), cap diameter (cm), flush wise yield (g), total yield(g) and biological efficiency(%) were recorded.

$$\text{B. E. \%} = \frac{\text{Weight of fresh mushroom fruiting bodies (g)}}{\text{Weight of dry substrate (g)}} \times 100$$

The data were obtained in crop room condition and analyzed by using simple CRD (Complete Randomized Design) with the help of OPSTAT

RESULTS AND DISCUSSION

The analysis of growth and yield on all five substrates gave more or less significant results, the data showed in Table.1 and 2. The effect of *Pleurotus florida* on different substrates for spawn running, the minimum spawn running period was recorded (19.00 days) on wheat straw and maximum (28.40 days) on poplar leaves. The study indicated that *P. florida* can be successfully grown on almost all agriculture wastes. Earlier workers like Iqbal *et al.* (2016), Ahmed *et al.* (2009), Holkar and Chandra(2016) found the similar results. Time taken for first appearance of pinhead after spawning on *Pleurotus florida* was minimum in wheat straw (25.75 days) and maximum time taken by poplar leaves (35.40 days) similar work have done by Iqbal *et al.* (2016), Holkar and Chandra (2016) also show the same results. In case of fruiting bodies formation minimum time was taken by wheat straw (29.22 days), maximum time was taken by poplar leaves (41.47 days) The difference in time period for the fruiting bodies formation was reported by Naeem *et al.*(2014). After in case of stipe length, the maximum stipe length was recorded on wheat straw (3.37 cm) whereas, the minimum stipe length was recorded on poplar leaves (2.35 cm). In case of cap diameter maximum was recorded in wheat straw (8.37 cm) and the minimum was recorded in poplar leaves (4.82 cm). Similar work was carried by Girmay *et al.* (2016).

Flush wise yield (g) was maximum in wheat straw (1st 100.15g, 2nd84.75g, 3rd70.87g and 4th 57.55g) and minimum in poplar leaves. Chauhan *et al.* (2014) found the same results for the poplar leaves

(1st 55.25g, 2nd45.00g, 3rd28.10g and 4th 23.85 g). The maximum average total yield in gram was found on wheat straw (313.32 g) and the minimum average total yield (152.20 g) was found on poplar leaves. There is difference in yield obtained from different substrates. Iqbal *et al.* (2016) found the similar results in wheat straw and paddy straw on *P. florida*. Biological efficiency (BE) was maximum (78.33%) on wheat straw and minimum (38.05%) on poplar leaves. Similar type of results also found by Chauhan *et al.* (2014) they recorded that highest (BE) in wheat straw and lowest in poplar leaves.

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