

# Cultivation of *Pleurotus Florida* using Agricultural Wastes and its Biochemical Analysis

Deepak Sharma<sup>#1</sup>, Nupur Prasad<sup>\*2</sup>, Aparna Khagwal<sup>#3</sup>, Deepali Bansal<sup>#4</sup>, Akansha Chauhan<sup>#5</sup>

<sup>#1</sup> Assistant Professor, Department of Biotechnology, Meerut College, Meerut. U.P. India

<sup>\*2</sup>, Assistant Professor, Department of Botany, Meerut College, Meerut. U.P. India

<sup>#3,4,5</sup>, B.Sc.-III, Students. Department of Biotechnology. Meerut College Meerut. India

## Abstract

*Pleurotus florida* is an edible mushroom with high quality of proteins, fiber, vitamins and minerals. The cultivation of *Pleurotus florida* using different substrates provides a comparative assessment of its nutritive values. The mushroom grown on paddy straw shows high amount of carbohydrate and protein content as compared to sugarcane base substrate.

## I. INTRODUCTION

Mushroom is a non-traditional horticultural crop having high quality of proteins, high fibre value, vitamins and minerals. Paddy straw mushroom (*Pleurotus florida*) is an edible mushroom of the tropic and sub tropic region. It is one of the choice edible mushrooms which can be cultivated in many countries in the subtropical and temperate zones. Generally *Pleurotus* is referred to as an 'oyster mushroom' over the world, while in China it is known as 'Abalone mushroom' and 'Dhingri Mushroom' in India. An attractive feature of this group of mushroom is that they can utilize a large variety of agricultural waste products and transform lignocellulosic biomass in food highly quality, flavour and nutritive value. In world mushroom production, *Pleurotus* rate second, after *Agaricus biporus*. In 1986, *Pleurotus* species production accounted for approximately 7% of the total world production of edible mushroom. By 1990, the production reached up-to around one million metric tones and accounted for 24% of total mushroom production. *Pleurotus* species have been used by the people in all over the world for their nutritional value, medicinal properties and other beneficial effects.

The fruiting body of the mushroom is also a potential source of lignin and phenol degrading enzymes. Both fruiting body and the mycelium of this mushroom contain compounds with wide-ranging antimicrobial activity and their compounds could be isolated from many mushrooms species and could be of benefit for human

## II. MATERIAL AND METHODS

The experiment was carried out during the months of November - January (2018-2019). The Basidiomycetes *Pleurotus florida* spawns were taken from Sardar Vallabh Bhai Patel Agriculture University, Meerut.

### A. Preparation of mushroom bed

Mushroom beds were prepared using paddy straw and sugarcane trash used as substrates to find out the yield and quality of mushroom. The one spawn bottle can use to prepare two mushroom beds. In our study two beds were prepared to each substrate; size of each bed was 30 x 60 cm. The poly propylene bag method was chosen for mushroom culture. Substrates (paddy straw and sugarcane trash) were chopped into pieces of 2-3 inches length and soaked in sterilized and fungicide treated water for 8 hours and water was then drained off from the substrate by placing them on wire mesh. Afterwards the substrates were sterilized using vertical autoclave at 15 lbs pressure for 20 min. Polythene bags in the size of 30 x 60 cm were procured and filled with the treated paddy straw as follows, A polypropylene bag was tied at one end and sterilized substrates were filled through the open end for about 5 cm. A handful of spawn from the bottle was spread towards the periphery of this layer. Over the spawn some more paddy straw was put and pressed lightly. This process was repeated five times. The mouth of polypropylene bag was rolled and closed with threads. Holes were made over the polypropylene bags for proper aeration. One bottle of spawn was enough to inoculate two bags and they were kept in a ventilated dark chamber. After 15 days it was observed that the mycelia of *Pleurotus florida* had grown all over the substrates and sprayed water 3-4 times per day.

Karuppuraj et al., (2014) reported that the yield improvement of *P. florida* on unexplored locally available lignocellulosic materials such as paddy straw, reeds, banana stem, sugar cane leaves, sugar cane bagasse milled and crushed coir pith sorghum husk and sunflower stem was used.

**B. Biochemical Analysis**

The biochemical analysis was carried out in fruit body of *Pleurotus florida* harvested from different substrates such as paddy straw and sugarcane trash. The following biochemical parameters analysed by using standard procedures like quantitative estimation of total protein by Lowery et al., 1951, quantitative estimation of free amino acid by Jayaraman, 1981, quantitative estimation of total carbohydrate by Dubois et al., 1956 and extraction of lipid-lipid analysis by Sato and Murata, 1988.

**III.RESULT AND DISCUSSION**

The results indicated that the spawn running was completed in the bags 10 to 14 days and pinheads appeared on the 19<sup>th</sup> – 25<sup>th</sup>. Pinheads turned into leaf like 23<sup>rd</sup> day and the first harvest was made at about 26 – 28 days. The second harvest will be another 4 or 5 days.

**TABLE I CULTIVATION OF PLEUROTUS FLORIDA ON VARIOUS SUBSTRATES**

S.No	Substrates	Spawn s run day	Pinhead formation day	Mean no of Fruiti ng bodies
1	Paddy Straw	13	18	11
2	Sugarcane trash	17	21	6

**TABLE 2 NUTRIENT CONTENTS OF PLEUROTUS FLORIDA ON VARIOUS SUBSTRATES**

S.No	Substrate s	Protei ns mg/g	Carbohy drate Mg/g	Amin o acid Mg/g	Lipid Mg/g
1	Paddy Straw	23.1	11.5	8.9	3.9
2	Sugarcane trash	19.1	7.2	5.8	0.5

In the present investigation, *P. florida* was well grew on all the three substrates and formed mycelium meanwhile *P. florida* was fastest spawn run on paddy straw substrate (13th day) followed by sugarcane trash (17th day). The pin head formation also first formed in paddy straw substrate on 18th day followed by sugarcane trash 21st day. The number of fruit bodies also recorded in as Table-1.

In the present study, *Pleurotus florida* gave highest yield in paddy straw used as a substrate followed by sugarcane straw, Table-2.

**TABLE 3 NUTRIENT CONTENTS OF PLEUROTUS FLORIDA ON VARIOUS SUBSTRATES**

S.No	Substrates	Mushroom Production(gm)			Total Average Production (A+B+C/3)
		1st Harvest (A)	2nd Harvest(B)	3rd harvest (C)	
1	Paddy Straw	390	120	175	228.3
		380	131	169	226.6
		375	125	160	220
2	Sugarcane Trash	140	185	136	153.6
		190	177	194	187
		200	110	130	146.6

The maximum content of protein (23.1 mg/g), carbohydrate (11.5 mg/g), amino acid (8.9 mg/g) and lipid (3.9 mg/g) was observed in paddy straw used as a substrate. The lower content of protein (19.1 mg/g), carbohydrate (7.2 mg/g), lipid (0.5 mg/g) was recorded in sugarcane trash used as a substrate (Table 2). Krishna Kumar et al., (2009) the highest percent biological efficiency of *P. florida* was recorded on paddy straw (77.35) followed by areca nut pericarp (57.00), coconut leaf (51.25) and in rest of substrate biological efficiency was less than 50%. Breene (1990) and Cokuner and Ozdemir (2000) reported that the protein contents of mushroom range from 19 to 39 g in 100g dried matter. Nuhualam et al., (2007) reported that the 4 species *P. ostreatus*, *P. sajor-caju*, *P. florida* and *Calocybe indica* protein 20-25% rich in mushroom, carbohydrate content ranged from 37-48% and low amount of lipid 4.5 mg/g.



**Image 1: Pleurotus florida in Paddy straw**



**Image 2: Pleurotus florida in Sugarcane straw**

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