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**Santosh Kumar**

Department of Plant Pathology,  
Sam Higginbottom University of  
Agriculture, Technology and  
Sciences, Prayagraj, Uttar  
Pradesh, India

**Abhilasha A Lal**

Department of Plant Pathology,  
Sam Higginbottom University of  
Agriculture, Technology and  
Sciences, Prayagraj, Uttar  
Pradesh, India

**Julius Munna**

Department of Plant Pathology,  
Sam Higginbottom University of  
Agriculture, Technology and  
Sciences, Prayagraj, Uttar  
Pradesh, India

## Effect of different substrates on growth and yield of *Pleurotus sajor-caju*

**Santosh Kumar, Abhilasha A Lal and Julius Munna**

### Abstract

An experiment was carried out to investigate the cultivation of *Pleurotus sajor-caju* on different treatments such as Wheat straw (control), Wheat straw + bajra leaves, Wheat straw + sarapat leaves, Wheat straw + gram outer coat, Wheat straw + cardboard, Wheat straw + banana leaves, Wheat straw + sawdust. The objective of this study was to evaluate the best alternative treatment that supports the growth of oyster mushroom, produces the maximum yield (g) with highest biological efficiency (%). Total of seven treatments replicated six times were taken under complete randomized design. The minimum time taken for spawn run (17.50 days), pinhead formation (20.17 days) and fruiting body formation (23.83 days) was recorded in T<sub>5</sub> Wheat straw + banana leaves. Maximum yield (203.17 g) and biological efficiency (173.38 %) were recorded in T<sub>5</sub> Wheat straw + banana leaves.

**Keywords:** Biological efficiency, mycelium run, pinhead formation and yield

### Introduction

Oyster mushroom, *Pleurotus* spp. is a macro fungus with a distinctive fruiting body, it is a unique biota which assembles its food by secreting degrading enzymes. *Pleurotus* spp. belongs to the subdivision Basidiomycotina. Mushrooms are heterotrophs that obtain nutrients from organic sources. Secreted mushroom enzymes decomposes dead organisms to absorb as nutrients (Enger *et al.*, 2012) [2]. The production of edible mushroom on a variety of agriculture and forestry residues as substrates has gained prominence in the last few years. Besides being a delicacy, mushrooms are also an important source of food protein for human consumption. Among various species of mushroom, *Pleurotus* spp. are commercially important edible mushrooms commonly known as oyster mushroom. Cultivation of oyster mushroom has recently increased tremendously throughout the world because of their ability to grow at a wide range of agro-based residues. *Pleurotus sajor-caju* is one of the most successfully cultivated species and it is considered to be delicious (Zhang *et al.*, 2002) [6]. Mushroom belonging to *Pleurotus* spp. are called as oyster and locally known as "Dhingri" It has been gaining popularity because of its diverse ability to grow at wide range of temperature (20-35 °C) and humid condition (70-90 % RH).

**Materials and Methods:** The experiment was carried out at the laboratory and Mushroom Crop Room, Department of Plant Pathology and Nutrition analysis at the Department of Agronomy and Soil Science, Sam Higginbottom University of Agriculture, Technology And Sciences, Prayagraj, U.P., India during October, 2018 to January, 2019 for determination of effect of different substrates on the performance of *Pleurotus sajor-caju*.

**Substrate preparation:** Substrates were chopped into small pieces of 2-3 cm and soaked for 24h before use. All substrates (dry and soaked) were spread over clean, slightly inclined surface in thin layers for cooling and draining of the excessive water. After cooling of the substrates (when the moisture content was around 65-70 %), they were filled in the polythene bags of 35 x 40 cm in size after thoroughly mixing with the spawn and wheat straw.

### Results and Discussion

The minimum mycelium running time was recorded in T<sub>5</sub> (Wheat straw + banana leaves) substrate (17.50 days) and minimum time taken for pinhead initiation recorded in T<sub>5</sub> (Wheat straw + banana leaves) substrate (20.17 days). The minimum time taken for pinhead initiation was recorded in T<sub>5</sub> (Wheat straw + banana leaves) substrate (23.83 days). The reason for such findings may be due to the presence of right proportion of alpha-cellulose, hemicelluloses and

**Corresponding Author:**

**Santosh Kumar**

Department of Plant Pathology,  
Sam Higginbottom University of  
Agriculture, Technology and  
Sciences, Prayagraj, Uttar  
Pradesh, India

lignin in banana leaves which may have been responsible for faster mycelium running rate, pinhead initiation and minimum time taken for pinhead initiation (Mondal *et al.*, 2010)<sup>[4]</sup>.

The maximum time taken for mycelium run was recorded in T<sub>2</sub> (Wheat straw + sarapat leaves) substrate (22.17 days) and the maximum time taken from time of inoculation to the time of pinhead initiation was observed in T<sub>2</sub> (Wheat + sarapat) substrate (25.33 days). The maximum time taken from time of inoculation to the time of pinhead initiation was observed in T<sub>2</sub> (Wheat straw + sarapat leaves) substrate from (28.67 days). The maximum yield (g) and biological efficiency (%) was recorded in T<sub>5</sub> - Wheat straw + banana leaves (203.17 g/kg bag and 173.38%, respectively) and the minimum yield (g) and minimum biological efficiency (%) was recorded in T<sub>2</sub>- wheat straw + sarapat leaves (108.56 g/kg bag and 97.79%, respectively). This may be due to the suitable C: N ratio of banana leaves as reported by Obodai *et al.* (2011)<sup>[5]</sup>; Hoa *et al.* (2015)<sup>[3]</sup>.



**Fig 1:** Harvesting of mushroom

**Table 1:** Effect of different substrates on mycelium growth, pinhead initiation, fruiting body formation, biological efficiency (%) and yield (g/kg) of *Pleurotus sajor-caju*.

Treatments	Complete mycelium run days	Pinhead initiation days	Fruiting body formation days	Biological efficiency (%)	Yield (g/kg)
T <sub>0</sub> . Wheat straw	18.67	21.00	26.67	165.69	198.83
T <sub>1</sub> . Wheat straw + bajra leaves	20.00	23.00	26.00	150.17	195.22
T <sub>2</sub> . Wheat straw + sarapat leaves	22.17	25.33	28.67	97.79	108.39
T <sub>3</sub> . Wheat straw + gram outercoat	19.33	22.67	25.33	111.67	134.00
T <sub>4</sub> . Wheat straw + cardboard	20.50	24.00	26.67	152.83	183.39
T <sub>5</sub> . Wheat straw + banana leaves	17.50	20.17	23.83	173.38	203.17
T <sub>6</sub> . Wheat straw + sawdust	20.83	23.33	24.50	169.31	199.39
F- test	S	S	S	S	S
S. Ed.	0.78	0.75	0.76	0.82	10.15
C.D.(P=0.05)	1.66	1.58	1.61	1.75	21.99

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### Conclusion

It may be concluded that among all treatments T<sub>5</sub> (Wheat straw + banana leaves) proved to be best substrate for cultivation of *Pleurotus sajor-caju*. T<sub>5</sub> (Wheat straw + banana leaves) recorded minimum days for mycelium run (17.50), pinhead formation (25.33) and pinhead formation to fruiting body formation (28.67) and maximum yield (203.17 g/kg bag), whereas, T<sub>2</sub> (Wheat straw + sarapat leaves) substrate recorded maximum days (22.17) in mycelium run, pinhead formation (25.33) and pinhead formation to fruiting body (28.67) and minimum yield (108.56 g/kg bag) was recorded in T<sub>2</sub> (Wheat straw + sarapat leaves).

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