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Performance of various substrates on oyster mushroom (*Pleurotus florida*) cultivation

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Abstract
The performance of the oyster mushroom *Pleurotus florida* on various substrates was evaluated, as well as the best substrates for mushroom cultivation. Six different substrates, *viz*., banana leaves, sugarcane bagasse, teak leaves, bamboo leaves, coconut husk fibre, and paddy straw, were used for oyster mushroom production. The banana leaves (438.95 g) produced a significantly higher yield next to paddy straw (455.54g).

Keywords: Oyster mushroom, *Pleurotus florida*, yield performance

1. Introduction
Mushrooms are edible fungi belonging to the class Basidiomycetes. An alluring feature of oyster mushrooms is that they can utilise most of the agricultural waste products and convert the lignocellulose biomass into high quality food with flavour and nutritive value (Mondal *et al*., 2010) [2]. Oyster mushrooms are rich in carbohydrates (57.6%), proteins (30.4%), fibre (8.7%), ash (9.8%) and fat (2.2%) with a 345 K (cal) energy value on a 100 g dry weight basis. Oyster mushroom cultivation can play an important role in managing organic wastes, but its disposal has become a problem (Pathmashini *et al*., 2008) [3].

2. Materials and methods
We used the six different substrates listed below as treatments for oyster mushroom production.

Treatments	Substrates
T1	Banana Leaves
T2	Sugarcane bagasse
T3	Teak Leaves
T4	Bamboo leaves
T5	Coconut husk fibre.
T6	Paddy straw

2.1 Location
Mushroom Cultivation Shed, Faculty Centre for Agricultural Education and Research (FAR), Ramakrishna Mission Vivekananda Education and Research Institute (RKMVERI),. Coimbatore.

2.2 Collection of the substrate
The banana leaves, sugarcane bagasse, teak leaves, bamboo leaves, coconut husk fibre, and paddy straw used in the experiment as substrates were obtained from the campus premises.

2.3 Source of Spawn
The spawn of *Pleurotus florida* (Variety-Pf1) was purchased from the Tamil Nadu Agricultural University (TNAU) Coimbatore.

2.4 Pre-Treatment of Substrate
The dried substrates were chopped into 3-5 cm pieces and soaked in fresh water for 8–16 hours. After removing excess water from substrates, the wet substrates were filled in gunny

bags. Water was boiled in a wide-mouth container such as a tub or drum. The filled bag was dipped in hot water at 80-85˚ C for about 10-15 minutes. The pasteurised substrate was shade dried to attain a 60% moisture content. Spawning was done when the substrates reached 60% moisture content (Sonalli and Randive D., 2012) [4].

2.5 Mushroom bed preparations

A polythene cover with a 60 30 cm size and an 80 gauge thickness was taken. The well-grown bed spawn is divided into two halves. (Two beds were prepared from the single spawn.) The straw was filled to a height of 5 cm in the bottom of the polythene cover, and a handful of spawn was sprinkled over the straw layer, concentrating more on the edges. Similarly, five layers of straw and spawn were filled into the cultivation bag layer by layer. The second layer onwards maintained the straw height of up to 10 cm. Each layer of straw was gently pressed, and the polythene cover was tied at the top with a thread. The beds were hung inside the mushroom cultivation shed.

A temperature of 25–28 ˚ C and a humidity of 70–85% were maintained by spraying water twice a day on the walls and floor (Sonalli and Randive D., 2012) [4].

2.6 Statistical analysis

The dataset was subjected to statistical analysis following the method of variance described by Gomez and Gomez (1984) [1]. At 5% level, least significant difference (LSD) at 5% level was calculated to find significant differences between treatments.

3. Result and Discussion

Different substrates were collected from different localities in Coimbatore. Results revealed that among the substrates, T6-Paddy straw substrate supported early bud initiation (13.33 days), followed by T1-Banana leaves (14.67 days). T4–Bamboo leaves (15.00 days) initiated buds earlier than T2–Sugarcane bagasse (15.33 days). The days for bud initiation were delayed in T3-Teak leaves (19.00 days) and T5-Coconut husk fibre (19.67 days).

Among the substrates, T6-Paddy straw substrate supported early harvest (16.33 days), followed by T1 & T4-Banana and Bamboo leaves (19.33 days). The first harvest was delayed in T3-Teak leaves (21.60 days) and T5-Coconut husk fibre (22.33 days).

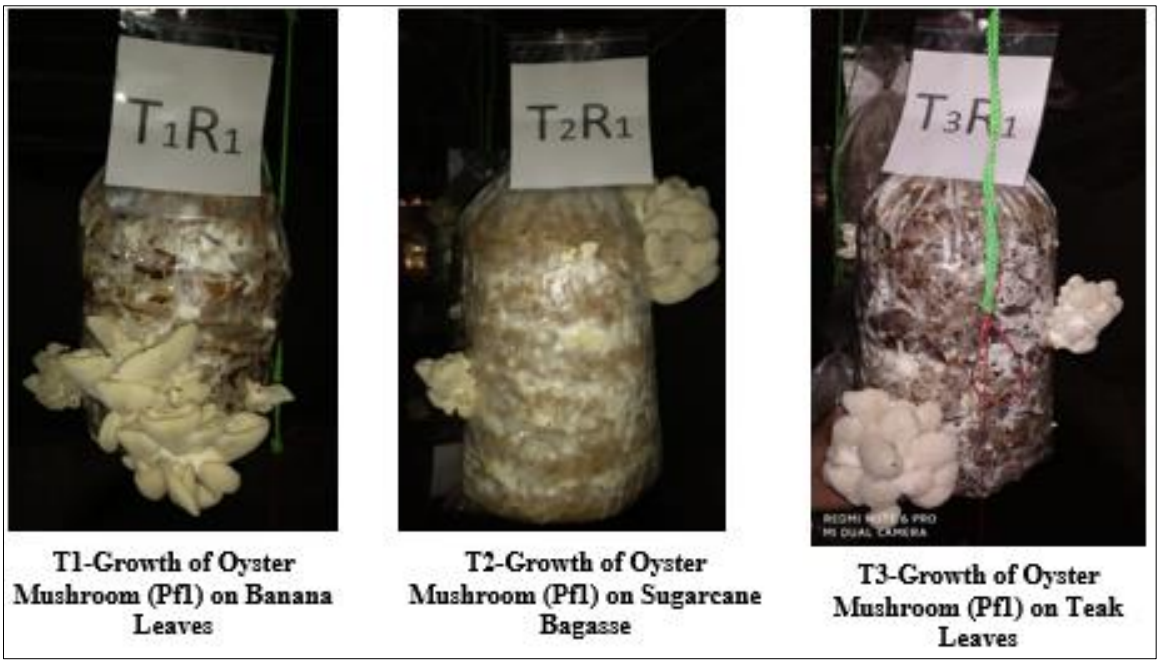
The study showed that the use of various substrates brought about a significant ($P < 0.05$) effect on the yield of *P. florida*. The yield was maximum in T6-Paddy straw (455.54gms), followed by T1-Banana leaves (438.95gms). While the least was recorded with T5-Coconut husk fibre (140.50gms) (Table 1, Plate 1).

Vidyajyotitirkey (2017) [5] recorded the maximum yield in banana leaves when compared with wheat straw.

Table 1: Screening of the best substrate for Oyster mushroom (Pf1) cultivation

S. No.	Treatments	Substrates	Days for bud initiation*	Days for first harvest*	Yield* (g)
1	T1	Banana Leaves	14.67	19.33	438.95
2	T2	Sugarcane bagasse	15.33	19.67	330.50
3	T3	Teak Leaves	19.00	21.60	360.00
4	T4	Bamboo leaves	15.00	19.33	434.03
5	T5	Coconut husk fibre	19.67	22.33	140.50
6	T6	Paddy straw	13.33	16.33	455.54
CD(0.05)			0.2275	0.1346	31.1406

*Mean of three replications



T1-Growth of Oyster Mushroom (Pf1) on Banana Leaves

T2-Growth of Oyster Mushroom (Pf1) on Sugarcane Bagasse

T3-Growth of Oyster Mushroom (Pf1) on Teak Leaves

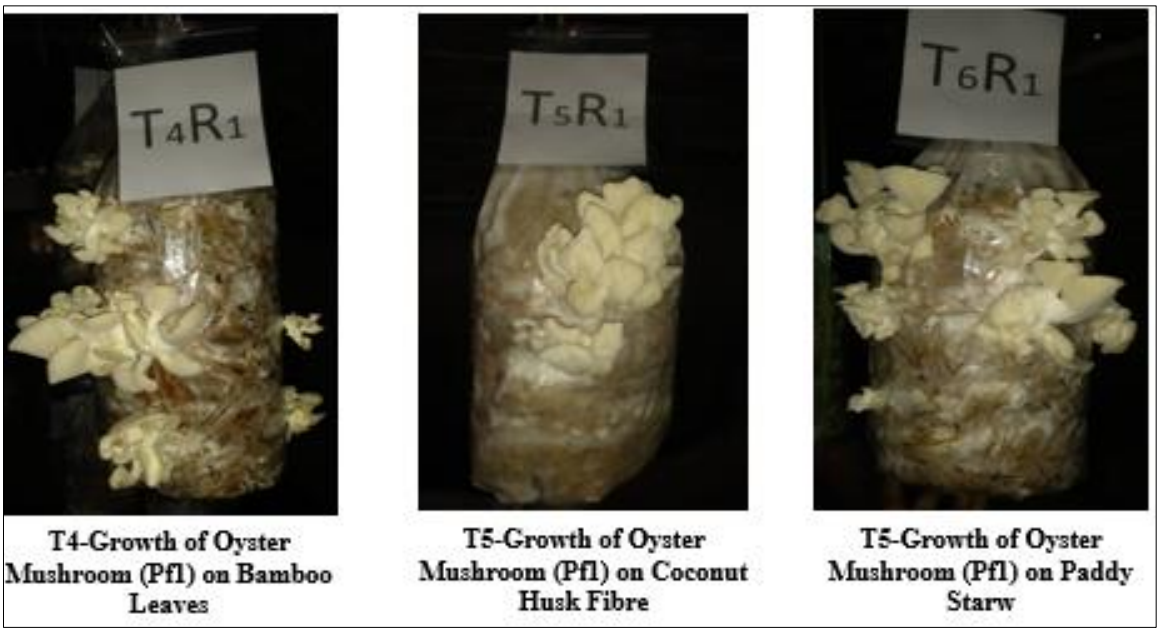


Plate 1: Assessment of the Performance of Different Substrates on Oyster Mushroom (*Pleurotus florida*) Cultivation

4. Conclusion

Banana leaves produced a significantly higher yield next to paddy straw. Although paddy straw is commercially used as a substrate for mushroom cultivation, next to paddy straw, banana leaves might be the best alternative substrate when compared to other substrates like sugarcane bagasse and banana leaves.

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