



Research Article

COMPARATIVE STUDY ON THE YIELD PERFORMANCE OF VARIOUS VARIETIES OF OYSTER MUSHROOMS (*Pleurotus florida*, *Pleurotus sajor-caju*, *Pleurotus eous* and *Pleurotus djamor*)

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Abstract: Oyster mushrooms are considered an important health food all over the world. There are various varieties of mushrooms cultivated by the growers. The main objective of this study is to identify the high-yielding variety of oyster mushrooms. In this experiment, the spawn of various varieties of oyster mushrooms was inoculated in paddy straw and kept in a mushroom cultivation shed. The investigation shows that the highest yield (974.05 g) was recorded in *Pleurotus florida* with a biological efficiency of 97.40%, followed by *Pleurotus sajor-caju* with an 825.28 g yield and a biological efficiency of 82.53%. *Pleurotus djamor* recorded a low yield (552.30 g) with 55.23% biological efficiency.

Keywords: Oyster mushroom, *Pleurotus*, Yield performance

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Introduction

The oyster mushroom (*Pleurotus* spp.) is an edible variety of mushroom having an excellent taste. Mushrooms have an 85-95 percent water content, a 3% protein content, a 4% carbohydrate content, a 0.1 percent fat content, and a 1% mineral and vitamin content [1]. In terms of world mushroom production, *Pleurotus* sp. accounts for 25% of total world production of cultivated mushrooms and ranks second, after *Agaricus bisporus*. India recorded an average annual increase rate of 4.3%. Productivity has been raised from 20% to 24.5% [2]. Oyster mushroom production is one of the most important production processes as they are nutritional supplements and cash crops for the landless poor as they are high-yielding, fast-growing crops [3]. Oyster mushrooms call for distinctive nutrients and positive environmental situations if you want to grow and reproduce [4]. Mushrooms supply more nutrients, mainly minerals, proteins, and also vitamins C and D [5]. Mushrooms are considered a potential source of muscle protein attributable to their high digestibility [6]. In addition to protein, mushrooms are a first-rate supply of vitamin D, which isn't available in other meals or dietary supplements [7]. *Pleurotus florida* is an edible mushroom with excellent flavour and taste and is increasingly becoming popular as a protein-rich, delicious vegetable [8]. *Pleurotus sajor-caju* (grey oyster mushroom) is a typical edible fleshy fungus. It comprises highly nutritious foods, including carbohydrates, proteins, fats, minerals, and multivitamins [9]. *Pleurotus eous* is a pink edible oyster mushroom. *P. eous* has been appropriate in antioxidant residences, with methanol and ethyl acetate extracts being more effective. The fungi *P. eous* are more often used for food than for medicinal purposes [10]. *Pleurotus djamor* is also a pink oyster mushroom released by IIHR. Scientists are interested in this species because it contains phytochemical constituents [11].

Keeping in view of the above aspects, the present study aimed to analyse the maximum production of mushrooms under *Pleurotus* species of *P. florida*, *P. sajor-caju*, *P. eous*, and *P. djamor*.

Materials and Methods

The present investigations were carried out in the mushroom cultivation shed, Ramakrishna Mission Vivekananda Educational and Research Institute

(RKMVERI), Faculty Centre for Agricultural Education and Research (FAR), Coimbatore, which is situated at 11.137501° latitude and 76.942355° longitude and at an elevation of 432m above MSL.

Experiment-I

Cultivation of Various Varieties of Oyster Mushrooms

Preparation of Substrates: Paddy straw was used as a substrate for mushroom production. Paddy straw was harvested from the crop cafeteria, Department of Agronomy (RKMVERI FAR, Coimbatore). It is then soaked in water overnight. On the next day, the substrates were sterilised by boiling for 15 minutes at 80 degrees Celsius and then allowed to cool at room temperature for several hours [12].

Spawning: The dried straw was filled into polythene bags of 80-gauge thickness and 60 x 30 cm in size. The bottom of the poly bags was changed into knots with thread to provide a flat circular backside to the mushroom beds. For each bed, 1000 g dry weight of chopped sterilised straws and 150 g of spawn were used. The straw bits were evenly placed at the bottom of the polythene bags to a height of five cm. The spawn was uniformly distributed around the periphery of the bags. Repeat the process for up to five layers, and several (6–8) holes were punched on the sides of the plastic bags to facilitate ventilation.

Cropping: The bags were kept in the spawn running room. After 15 days, the spawn-filled bags were fully covered with white mycelial growth. The bags were then transferred into crops by the method of the hanging rope system. The temperature and relative humidity were maintained at 22–28°C and 80–85%, respectively. Inoculated bags have been watered 2–3 times a day to preserve the mycelia. Relative humidity (RH) and room temperature were monitored and maintained with a thermo-hydro meter, and RH was maintained between 80 and 85% [13].

Experiment-II

Assessment of the Yield Performance of Various Varieties of Oyster Mushrooms by Calculating Their Biological Efficiency (*Pleurotus florida*, *Pleurotus sajor-caju*, *Pleurotus eous* and *Pleurotus djamor*)

Fig-1 Comparison of growth of various oyster mushrooms (*Pleurotus florida*, *Pleurotus sajjar-caju*, *Pleurotus eous*, *Pleurotus djamor*)Table-1 Comparison on yield performance and Growth behaviour of different varieties of oyster mushroom (*P. florida*, *P. sajjar-caju*, *P. eous*, *P. djamor*)

SN	Varieties	Days for spawn running*(days)	Days for Pin Head Formation* (days)	Days for First Harvest*(days)	Days for Second Harvest*(days)	Yield* (g)	Biological efficiency* (%)
1	Pf-1 (<i>Pleurotus florida</i>)	17 ^b	20.33	24 ^c	27.33	974.05 ^a	97.40 ^a
2	M2 (<i>Pleurotus sajjar-caju</i>)	16 ^b	19.33	23.67 ^{bc}	29	825.28 ^b	82.53 ^b
3	APK-1 (<i>Pleurotus eous</i>)	12 ^a	15.67	19.33 ^a	25.33	653.05 ^c	65.31 ^c
4	Arka Om-1 (IIHR-PDJ-1) (<i>Pleurotus djamor</i>)	13 ^a	17	21 ^{ab}	26	552.30 ^d	55.23 ^d
	CD (0.05)=	1.8829	2.306	2.927	3.0747	59.2069	5.9181

Harvesting

The fruiting pin heads started to appear in about two weeks of spawning. These would mature with a lobbed appearance. The right stage for picking can be judged by the shape, texture, and size of the fruit. In young mushrooms, the edge of the cap is thick and the cap margin is enrolled even as the cap of a mature mushroom grows to be flat and inward curling starts to evolve. The matured mushrooms were handpicked in a hygienic manner. The mushrooms are detached from the bags and collected in trays, cleaned, weighted and packed.

Biological efficiency

Biological Efficiency (B.E.) was determined by the ratio of fresh weight (g) of mushrooms (up to 2nd flush) to the dry weight (g) of substrate and expressed as a percentage [14].

$$BE (\%) = [\text{Yield of fruiting body (g)} / \text{Total dry weight of substrate used (g)}] \times 100$$

Statistical analysis

A Completely randomised design (CRD) was employed for all the experiments. All the data was statistically analysed. The Critical Difference (CD) was worked out at a five per cent probability level [15].

Results

Nowadays, most people like to consume mushrooms to meet their nutrient requirements. In this connection, most of the mushroom growers are looking for high-yielding varieties. So, this study will help commercial oyster mushroom growers select the high-yielding varieties.

P. florida, *P. sajjar-caju*, *P. eous*, and *P. djamor*: growth patterns

With 12 and 15.67 days, respectively, *P. eous* supported early spawn running and pin head formation. *P. florida* recorded the late spawn running and pin head formation at 17 days and 20.33 days, respectively (Table 1).

Yield performance of *P. florida*, *P. sajjar-caju*, *P. djamor* and *P. eous*

The total yield obtained from the various species of oyster mushroom was found to be high in *Pleurotus florida*, consisting of 974.05 grammes when compared to *Pleurotus sajjar-caju* (825.28 g), *Pleurotus eous* (653.05 g) and *Pleurotus djamor* (552.30 g) [Table-1].

The results show that *Pleurotus florida* is better performing than *Pleurotus sajjar-caju*, *Pleurotus eous*, and *Pleurotus djamor*.

Discussion

Pleurotus florida was the better yielding variety, with a yield of 1363 g/kg of dry substrate than that of *Pleurotus sajjar-caju*, which was 940 g/kg of dry substrate with an efficiency of 136.3% and 94.0%, respectively [14].

Conclusion

In general, the demand for oyster mushrooms in the market has been increasing day by day. Though numerous varieties of oyster mushrooms are available, *Pleurotus florida*, *Pleurotus sajjar-caju*, *Pleurotus eous*, and *Pleurotus djamor* are among the most common and easily cultivable ones. Based on current research, it can be concluded that the *Pleurotus florida* (97.40% BE) species of oyster mushroom are the best for mushroom growers, followed by *Pleurotus sajjar-caju* (82.53% BE) in terms of yield potential (Table 1). Hence, the present investigation will have held the mushroom growers to the selection of *Pleurotus florida* for its yield potential.

Application of research: The high-yielding varieties of oyster mushrooms are required for achieving a good return. So, the selection of oyster mushroom varieties should be based on yield performance.

Research Category: Oyster mushrooms yield performance

Abbreviations: BE-Biological efficiency, RH-Relative humidity

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Study area / Sample Collection: Faculty Centre for Agricultural Education and Research (FAR), Coimbatore

Cultivar / Variety / Breed name: *Pleurotus florida*, *Pleurotus sajor-caju*,
Pleurotus eous and *Pleurotus djamor*

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

Ethical Committee Approval Number: Nil

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