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Growth of *Pleurotus florida* (Oyster Mushroom) on different media

Priyanka J Prajapati, ManishaS Shinde, Sneha Mistry and Rajesh Waghunde

Abstract
Using six distinct culture conditions, the mycelium growth performance of *Pleurotus florida* was examined on Six distinct culture medium were examined for *P. florida* mycelial development, including potato dextrose agar, malt extract agar, compost extract agar, wheat extract agar, nutritional agar media, and bajara agar media. The optimum media for *P. florida's* mycelial development among the evaluated mediums was determined to be malt extract agar. On potato dextrose agar, *P. florida* showed significantly lower mycelial growth (28.00, 31.00, and 90.00 mm) on the third, fifth, and eighth days following incubation than on malt extract agar.

Keywords: *Pleurotus florida*, culture media, mycelial growth and growth study

Introduction
The class of higher fleshy fungus known as oyster mushrooms, or *Pleurotus* species, belongs to the Basidiomycetes family. Many countries cultivate them as one of the four primary edible mushrooms for human use. *Pleurotus*, which has a large number of species, offers a profitable means of improving human nutrition by growing edible mushrooms and easing the suffering caused by certain diseases by using medicinal mushrooms and their derivatives pharmaceuticals and nutraceuticals.

Foods such vegetables and grains, etc., have lower protein contents than vitamins (Kazeli and Dzabaridee 1994) [18] and mushrooms (Hayes and Haddad 1976; Jandaik and Kapoor 1975; Bano *et al*. 1980) [19, 20, 21]. In terms of overall nutrition, mushrooms come in third place among the best vegetables and animal protein sources (Benjamin 1995) [22]. However, unlike mammals, most fungi are static and cannot hunt their prey. Mims and Alexopolus (1996) [23] and Kendall (1985) [24]. Because of their quick growth, mushrooms have a lot of production potential and yield a lot of harvest that is unmatched by any other crop (Robinson and Davidson, 1959) [25]. For mushroom cultivation, the right humidity and temperature are needed (Singh 1981) [26]. Mushrooms have similar amino acids to animal protein (Aletor 1995) [27] and are a rich source of carbohydrates, fibre, protein, and minerals (Senatore 1990; Adewasi *et al*. 1993) [28, 29]. Respawn, growing media, pH, temperature, moisture content, and light intensity are some of the variables that have a significant impact on mushroom growth (Kadiri and Kehinde, 1999) [8]. The first crucial step in growing mushrooms successfully is maintaining and producing a dependable pure culture spawn with the necessary potentials. In order for mushroom species to be used as reference strains in both research and industrial settings, they must be kept clean, viable, and stable (Bhatt *et al*., 2010). Finding the right agar medium, substrate, and incubation temperature is crucial to achieving a high mushroom production and quality (Hasan Sardar *et al*., 2015) [6]. Therefore, the purpose of this study was to determine whether various media were suitable for the growth and development of *P. florida* (oyster mushroom).

Materials and Methods
The mycelial growth rate of *P. florida* (oyster mushroom) grown on six different media Nutrient Extract Agar, Bajara Extract Agar, Compost Extract Agar, Potato Dextrose Agar, and Malt Extract Agar was measured in this study. This research was carried out in 2022 at the Mushroom Laboratory, Polytechnic in Agriculture, Sardarkrushinagar Dantiwada Agricultural University, Deesa (Gujarat). Determining the ideal medium for *P. florida* (oyster mushroom) growth is the aim of the current investigation.

Maintenance of the culture

An oyster mushroom (*P. florida*) pure culture was acquired from the ICAR's Directorate of Mushroom Research in Solan, Himachal Pradesh. The additional research was conducted using the same culture. Under aseptic circumstances, a 5 mm disc of *P. florida* was inoculated into a Petri plate using Potato Dextrose Agar (PDA) medium. The Petri dish was then incubated at 25 ± 2 °C. The fungus was placed on PDA plates and left to develop for six days at a temperature of 25 ± 2 °C. It was then kept in the refrigerator. PDA slants underwent periodic sub culturing.

Media preparation

List media were used during this experiment and their ingredients are as mentioned in the below table.

Table 1: List of different media used to check the growth of *P. florida*

Sr. No.	Type medium	Ingredient	Agar-agar
1	Potato Dextrose Agar (PDA)	Peeled and sliced potato (250 g) + Dextrose (20 g)	20 g
2	Malt Extract Agar (MEA)	Malt extract (20 g)	20 g
3	Compost Extract Agar (CEA)	Pasteurized compost (200 g)	20 g
4	Wheat Extract Agar (WEA)	Wheat grains (32 g)	20 g
5	Nutrient Agar (NAM)	Nutrient agar	28 g
6	Bajara Agar Media (BAM)	Bajara grain	28 g

Note: All prepared media were sterilized in an autoclave at 121.6 °C temperature and pressure of 15 psi for 20 minutes.

After the preparation of media, all the media were poured into a flask about 2/5th of its volume and plugged with non-absorbent cotton and sterilized in autoclave at pressure of 15 *psi* and 121 °C for 30 minutes. Mixed well and poured into sterile petri plates.

Observation recorded

P. florida mycelial growth was observed on various medium on the third, fifth, and eighth days following inoculation. To analyse the data from various treatments, a complete randomized design was used. When the results were significant at the five percent level of significance, the critical difference value was computed (Steel and Torrie, 1980) [15].

Results and Discussion

This experiment assessed the suitability of six distinct culture media for the growth of the oyster mushroom (*P. florida*): Bajara agar media (BAM), nutrient agar medium (NAM), compost extract agar (CEA), potato dextrose agar (PDA), and malt extract agar (MEA). *P. florida* mycelial growth was observed three, five, and eight days following inoculation. According to the findings in Table 2, the mycelial growth of oyster mushrooms (*P. florida*) differed depending on the kind of media that was utilised.

Mycelial growth on 3rd day after inoculation

The results of the mycelial growth on 3rd day after inoculation ranged from 14.00 to 28.00 mm which is presented in Table 2. Among the various media tested, after 3rd days of inoculation, the mycelial growth of oyster mushroom (*P. florida*) was significantly maximum (28.00 mm) on malt extract agar which was followed by potato dextrose agar (22.00 mm). The next best treatment in the order of merit was bajara agar media (20.00 mm), wheat extract agar (19.00 mm) and nutrient agar medium (15.00 mm). While, after 3rd days of inoculation significantly lowest mycelial growth of *P. florida* was observed in compost extract agar (14.00 mm).

Table 2: Effect of various culture media on the growth of oyster mushroom (*Pleurotus florida*)

Tr. No.	Treatments	Mycelial growth (mm)		
		3 DAI	5 DAI	8 DAI
T_1	Potato Dextrose Agar	22.00*	29.00*	89.00*
T_2	Malt Extract Agar	28.00	31.00	90.00
T_3	Compost Extract Agar	14.00	15.00	40.00
T_4	Wheat Extract Agar	19.00	21.00	53.00
T_5	Nutrient Agar Medium	15.00	17.00	46.00
T_6	Bajara Agar Media	20.00	25.00	61.00
	S.Em. ±	0.37	0.44	0.69
	C. D. at 5%	1.11	1.31	2.04
	C.V. %	3.79	3.83	2.18

DAI: Days after inoculation; *Mean of four repetitions in all treatments

Mycelial growth on 5th day after inoculation

As indicated in Table 2, the mycelial growth findings on the fifth day following inoculation ranged from 15.00 to 31.00 mm. The oyster mushroom (*P. florida*) mycelial growth was significantly highest on malt extract agar (31.00 mm) after 5 days of inoculation, followed by potato dextrose agar (29.00 mm) among the other medium examined. In terms of merit, nutritional agar (17.00 mm), wheat extract agar (21.00 mm), and bajara agar medium (25.00 mm) were the next best treatments. On the other hand, the oyster mushroom (*P. florida*) developed the smallest mycelial growth (15.00 mm) in compost extract agar following the fifth day after inoculation.

Mycelial growth on 8th day after inoculation

As indicated in Table 2, the mycelial growth findings on the eighth day following inoculation ranged from 40.00 to 90.00 mm. After eight days of inoculation, the mycelial development of oyster mushrooms (*P. florida*) was seen to be substantially greater on malt extract agar (90.00 mm)

compared to the treatment potato dextrose agar (89.00 mm), which was statistically equivalent. Bajara agar medium (61.00 mm) came next. Wheat extract agar (53.00 mm) and nutrient agar medium (46.00 mm) were the next best treatments in terms of merit. However, in compost extract agar, the oyster mushroom (*P. florida*) showed the lowest mycelial growth (40.00 mm) following the eighth day of inoculation. Among the many media utilized in this study, MEA, PDA, and BAM were found to be among the most effective choices for the mycelial development of oyster mushrooms (*P. florida*). Different carbon sources and another vital nutrient may be available in different media, which could explain the variations in mycelial growth in those media. On a medium containing maltose, glucose, and sucrose, mycelium growth was slightly better than on other sources. According to Sardar *et al*. (2015) [13], PDA may also have more carbon sources and nutrients that are appropriate for the mycelial growth of both wild and produced mushrooms in petri plates.

The results of Sahu (2012) [12], who observed 89.50 mm mycelial growth of *P. eous* on malt extract agar medium, are consistent with the current findings. Bhivaji (2016) [4] obtained results that were somewhat comparable, recording that the greatest colony diameter of *P. eous* on PDA was 90.00 mm, followed by MEA (88.16 mm). The following studies also validated the use of malt extract agar and potato dextrose agar as appropriate media for oyster mushroom culture: Kapoor *et al*. (1997) [9], Das *et al*. (2000) [5], Yadav (2000) [17], Rathod *et al*. (2002) [11], Bhanwar (2003) [2], Sawale (2004) [14], Abdel *et al*. (2018) [1], Vilas *et al*. (2020) [16], and Lenka *et al*. (2022) [10].

This outcome confirmed the findings of Sardar *et al*. (2015) [13], who found that the ideal medium for *Pleurotus* sp. growth was potato dextrose agar. According to Hoa and Wang (2015) [7], PDA and YDA (yam dextrose agar) were the best media for *P. ostreatus* mycelium development, whereas PDA, MEA, YDA, and SPDA (sweet potato dextrose agar) were the best media for *P. cystidiosus* mycelium growth.

Conclusion

Pleurotus florida was used to measure the growth's radius. It has been documented how various culture medium affect *P. florida* mycelia growth. The optimal media for *P. florida* growth was found to be malt extract agar media, which performed best.

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