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Open Access Journal of Mycology & Mycological Sciences
ISSN: 2689-7822

Growth of *Pleurotus Florida* (Oyster Mushroom) on Different Media

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Research Article
Volume 7 Issue 1
Received Date: May 17, 2024
Published Date: June 07, 2024
DOI: 10.23880/oajmms-16000187

Abstract

The mycelium growth performance of *Pleurotus florida* on six different culture media were investigated. Six different culture media viz., potato dextrose agar, malt extract agar, compost extract agar, wheat extract agar, nutrient agar media and bajara agar media for mycelial growth of *P. florida* were tested. Among these media tested, malt extract agar was found to be the best medium and the mycelial growth of *P. florida*. Significantly highest mycelial growth of *P. florida* was recorded on malt extract agar at the 3rd, 5th and 8th days after incubation which was 28.00, 31.00 and 90.00 mm, respectively followed by potato dextrose agar.

Keywords: *Pleurotus Florida*; Culture Media; Mycelial Growth; Growth Study

Abbreviations: PDA: Potato Dextrose Agar; MEA: Malt Extract Agar; CEA: Compost Extract Agar; WEA: Wheat Extract Agar; NAM: Nutrient Agar; BAM: Bajara Agar Media.

Introduction

Pleurotus species, commonly known as oyster mushroom are a group of higher fleshy fungi belonging to the Basidiomycetes. They are considered as one of the four major edible mushrooms cultivated in different countries for human consumption. *Pleurotus* with its great variety of species constitutes a cost-effective means of both supplementing the nutrition to humans kind through the production of edible mushrooms and alleviating the suffering caused by certain kinds of illnesses through the use of medicinal mushrooms and their derivatives as nutriceuticals and even as pharmaceuticals.

The protein contents of the food stuffs like vegetables and cereals, *etc*. is low as compared to mushroom and vitamins. For overall nutrition, mushroom falls between the best vegetables and animal protein sources. Unlike the animals, most Fungi are stationary and can't pursue their food.

Mushroom has a lot of production potential and due to their rapid growth, it gives so large amount of crop which could not be compared with any other crop. Suitable temperature and humidity are required for mushroom cultivation. Mushrooms are good sources of sugars, fiber, protein and minerals, with comparable amino acid with animal protein. Mushroom growth is highly influenced by several factors such as spawn, growing media, pH, temperature, moisture content and light intensity [1]. The maintenance and production of a reliable pure culture spawn with required potentials is a key operation and the first

critical stage for successful mushroom cultivation. Storage and maintenance of mushroom species in a pure, viable and stable condition is essential for their use as reference strain, both in research and industrial scales [2]. The identification of suitable agar media, substrate and incubation temperature is essential to obtain high yield and quality of mushroom [3]. Hence, the aim of the present study was testing of different media for their suitability for the growth and development of the *P. florida* (oyster mushroom).

Material and Methods

In the study, *P. florida* (oyster mushroom) grown on different six media *i.e*. Nutrient Extract Agar, Bajara Extract Agar, Compost Extract Agar, Potato Dextrose Agar and Malt Extract Agar media and their mycelial growth rate was determined. This study was conducted at Mushroom laboratory, Polytechnic in Agriculture, Sardarkrushinagar Dantiwada Agricultural University, Deesa (Gujarat) during the year 2022-23. The purpose of present study is to signify a media for the best growth of *P. florida* (oyster mushroom).

Maintenance of the Culture

Pure culture of oyster mushroom (*P. florida*) was obtained from the Directorate of Mushroom Research, ICAR, Solan (Himachal Pradesh). The same culture was used for the further study. Potato Dextrose Agar (PDA) medium used and Petri plate was inoculated with a 5 mm disc of *P. florida* under aseptic conditions. Then, the Petri plate was incubated at 25 ± 2°C. The fungus was transferred on PDA plates and allowed to grow at 25 ± 2°C temperature for 6 days. Then it was stored in the refrigerator. Periodically subculturing was done on PDA slants.

Media Preparation

List media were used during this experiment and their ingredients are as mentioned in the below (Table 1).

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

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

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

Observation of mycelial growth of *P. florida* was taken on the 3rd, 5th and 8th days after inoculation on different media. The data obtained from different treatments were studied by using a complete randomized design. Critical difference value was calculated whenever the results were significant at 5 per cent level of significance [4].

Results and Discussion

In this experiment, six different culture media *viz*., potato dextrose agar (PDA), malt extract agar (MEA), compost extract agar (CEA), wheat extract agar (WEA), nutrient agar medium (NAM) and bajara agar media (BAM) were evaluated for their suitability for the growth of the oyster mushroom (*P. florida*). Observation of mycelial growth of *P. florida* was taken on 3rd, 5th and 8th days after inoculation. The data presented in (Table 2) indicates that the mycelial growth of oyster mushroom (*P. florida*) varied with the different types of media used.

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).

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

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

Mycelial Growth on 5th Day after Inoculation

The results of the mycelial growth on 5th day after inoculation fluctuated from 15.00 to 31.00 mm which is shown in (Table 2). Among the various media tested, after 5th days of inoculation, the mycelial growth of oyster mushroom (*P. florida*) was significantly maximum on malt extract agar (31.00 mm) which was followed by potato dextrose agar (29.00 mm). The next best treatment in the order of merit was bajara agar media (25.00 mm), wheat extract agar (21.00 mm) and nutrient agar (17.00 mm). Whereas, after 5th days of inoculation significantly lowest (15.00 mm) mycelial growth of oyster mushroom (*P. florida*) was recorded in compost extract agar.

Mycelial Growth on 8th Day after Inoculation

The results of the mycelial growth on 8th day after inoculation fluctuated from 40.00 to 90.00 mm which is shown in (Table 2). Among the various media tested, after 8th days of inoculation, the mycelial growth of oyster mushroom (*P. florida*) was significantly higher on malt extract agar (90.00 mm) which was statistically at par with the treatment potato dextrose agar (89.00 mm) followed by bajara agar media (61.00 mm). The next best treatment in the order of merit was wheat extract agar (53.00 mm) and nutrient agar medium (46.00 mm). Whereas, after 8th day of inoculation significantly lowest (40.00 mm) mycelial growth of oyster mushroom (*P. florida*) was recorded in compost extract agar.

Among different media used in the present investigation *i.e*., MEA, PDA and BAM proved to be one of the best options for the mycelial growth of oyster mushroom (*P. florida*). The difference in mycelial growth in different media may happen due to the availability of different carbon sources and another essential nutrient in media. Mycelium growth was marginally better on a medium containing maltose, glucose and sucrose than on other sources. Moreover, PDA might exhibit higher carbon sources and nutrients which was suitable for the mycelial growth of wild as well as cultivated mushroom in Petri plate [3].

The present results are in agreement with the findings of Sahu Sk, et al. [5] who recorded 89.50 mm mycelial growth of *P. eous* in malt extract agar medium. More or less similar results were found by Bhivaji AJ, et al. [6] who recorded the maximum colony diameter of *P. eous* on PDA (90.00 mm), followed by MEA (88.16 mm). Malt extract agar and potato dextrose agar as suitable media for culturing of oyster mushroom was also supported by Kapoor S, et al. [7], Das N, et al. [8], Yadav S, et al. [9], Rathod PL, et al. [10], Bhanwar RR, et al. [11], Sawale VV, et al. [12], Abdel ANH, et al. [13], Vilas PM, et al. [14] and Lenka KC, et al. [15].

This result supported the results of Sardar H, et al. [16] who revealed that potato dextrose agar as the best medium for the growth of *Pleurotus* sp. Hoa HT, et al. [17] found that PDA and YDA (yam dextrose agar) was the most suitable media for the mycelium growth of *P. ostreatus* while four media PDA, MEA, YDA and SPDA (sweet potato dextrose agar) were supporting mycelium growth of *P. cystidiosus*.

Conclusion

The radius of the growth was assessed in *Pleurotus florida*. The effect of different culture media on mycelia growth of *P. florida* have been recorded. *P. florida* performed best when grown at temperature of media are concerned malt extract agar media proved to be the best media for the growth of *P. florida*.

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