Effect of Stipe Size on the Mycelia Performance of *Pleurotusflorida*

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***Abstract*: - A preliminary experiment was carried out to analyze the growth performance of *Pleurotus florida* mushroom culture using Potatoes Dextrose Agar (PDA), based on the stipe size of the mushroom. This study is mainly aimed to investigate how fast the mycelia of a mushroom can grow in a culture media plate in relation to the length of stipe. Studies revealed that the joint portion of cap and stripe produced vigorous mycelium growth in minimum time; the average maximum growth was obtained from the shortest mushroom stipe. This shows that, the mycelium is more viable or active in a growing mushroom with short stipe than a fully grown mushroom with a longer stipe.**

Different length of mushroom was used for the experiment. Three treatments were observed: Treatment (A_1,A_2, A_3), (B_1, B_2, B_3) and (C_1, C_2, C_3). Where treatment (C_1, C_2, C_3) was the least in the stipe size, but had the highest or rapid growth rate of mycelia in the petri dish. This was followed by treatment (B_1, B_2, B_3), and lastly treatment (A_1, A_2, A_3).

The study concluded that there are more active mycelia with shorter stipe of *Pleurotus florida* mushroom. This will help to speed up in the spawn preparation for the production of mushroom.

Keywords: **Mycelia, stipe size, PDA**

I. INTRODUCTION

The term mushroom applies mostly to those fungi that have stem (stipe), cap (pileus), hymenium (lamellae) and pores on the underside of the cap (Masarirambi *et al*., 2011).

In mycology, a stipe is the stem or stalk-like feature supporting the cap of a mushroom. Like all tissues of the mushroom other than the hymenium, the stipe is composed of sterile hyphal tissue. In many instances, however, the fertile hymenium extends down the stipe some distance. Fungi that have stipes are said to be stipitate.

The evolutionary benefit of a stipe is generally considered to be in mediating spore dispersal. An elevated mushroom will more easily release its spores into wind currents or onto passing animals.

Mushroom myceliums grow on natural or semi-synthetic composts and absorb nutrients for their survival. The mycelium branches produce enzymes which digest complex carbohydrate, lipids and protein, which are further easily absorbed by their hyphae. The mycelium penetrates the compost during spawn run stage and store energy until fruiting bodies are formed. The maintenance and production of a reliable pure culture mycelium with magnificent qualities is a key operation and is the first critical stage towards the success of spawn production and mushroom cultivation. Santosh Kumar *et al.,* (2018)

Mushrooms are a good source of non-starchy carbohydrates, with high content of dietary fiber and moderate quantity of proteins, including most amino acids, minerals, and vitamins Alam,S.M. *et al*.,(2001).

II. MATERIALS AND METHODS

Culture preparation

Potato Dextrose Agar (PDA) culture media: This agar media was prepared as described by Chang and Hayes (1978). 39 g of potato dextrose agar was added to 1 litre distilled water, placed in a boiling water bath to dissolve agar. It was autoclaved at 121^{o}C for 15 min. After cooling, it was then dispensed into Petri dishes (85 mm). The Pure culture of fleshy fungi/mushrooms was prepared through tissue culture. Different lengths of mushrooms of the species under study were collected from the wild, and their basidiocarp after alcohol sterilization is cut longitudinally into 2 halves and bits from collar region and was transferred to pre sterilized PDA culture medium. The Petri-plates are incubated at 25C ± 2C in BOD incubator for one week. The flasks having media were sterilized in the autoclave at 15lb/sq. inch pressure for one hour and then poured in 90 mm Petri dishes under the laminar flow hood to avoid contamination. Media were cooled to 37^{o}C. The mushroom was sliced into two halves form the pileus and longitudinally down the stipe. Tissues of the fresh mushrooms were inoculated on culture media.. Radial growth of mycelium of different portions was observed until the Petri dishes were filled with it. The plates was incubated at 37^{0}C and observed for 15 days during which the mycelia vegetative growth of *Pleurotus florida* were recorded.

Measurement of mycelia growth

The vegetative growth of the mycelium of the mushroom on different media was assessed by measuring the diameter of mycelium in the petri dish prior to inoculation. The colony approximate is measured by taking the perpendicular measurement starting from the longest side. Then, they are multiplied and the growth area can be gotten. If the fungus

grows more circularly, you can measure the diameter and calculate the area of a circle.

III. RESULTS AND DISCUSSION

Difference in length of stipe (cm)

Growth measurement of mycelia and the length of stipe were presented in table 1. This shows that sample C with least length of stipe grows rapidly to a full length in the petri dish from the 11th day after inoculation; this was closely followed by sample A and B respectively. The ANOVA table for the length of stipe was presented in (Table 2). There was significant difference ($p \leq 0.05$) on length of stipe (Table 2). It was observed that sample A has the highest length of stipe followed by sample B with the mean length of 8.76 cm and 6.30 cm respectively; this was followed by sample C with least length of 4.60 cm.

Effect of length of stipe on mycelia growth (cm)

ANOVA for the growth of mycelia based on the length of stipe was presented in table 4. Despite the sample C having the fastest rate of growth, there was no significant difference on mycelia growth as influenced by different stipe size (Table 3) suggesting that the growth on mycelia in petriplates cannot be completely related to the stipe size of the mushroom. It was observed that mycelia growth was higher in sample C with the mean mycelia growth of 2.16 cm ±1.65this was closely followed by sample B with mean mycelia growth of 2.00cm ±0.91and sample A which is the least, with mycelia growth length of 1.73cm ±0.70 respectively. The effect of stipe size on mycelia growth was observed for 14 days after inoculation. The variation in mycelia growth with stipe size could be due to their viability difference in composition (Shah *et al*., 2004).

Table 1: Growth measurement of mycelia and the length of stipe

Days of growth	**Measurement of Tissue Culture on Petri Dish (mm) (Radial)**											
1st	**A1**	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**
2nd	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
3rd	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
4th	0.5	0.6	0.4	0.5	0.5	0.4	0.5	0.6	0.3	0.3	0.3	0.3
5th	0.7	0.8	0.6	0.6	0.7	0.8	0.8	0.7	0.3	0.5	0.6	0.5
6th	1.3	1.4	0.9	0.7	0.9	1.3	1.3	1.1	1	1.1	1.1	1
7th	1.7	1.7	1.3	1.1	1.3	1.5	1.5	1.4	1.3	1.6	1.5	1.5
8th	2.2	1.9	1.3	1.2	1.4	1.8	1.7	2.1	1.5	2	2.1	2.1
9th	2.5	2.2	1.4	1.2	1.6	2.1	2.2	2.5	1.8	2.5	2.3	2.5
10th	3	2.3	2.2	1.2	1.9	3	2.8	3	2.4	3.4	3.5	3.4
11th	3.8	3.5	2.5	1.3	2.4	3.2	3.4	3.4	2.5	3.5	4.5	4.1
12th	4.4	4.4	2.3	1.3	2.4	3.8	3.8	3.8	3.2	4.4	4.5	4.5
13th	4.4	4.4	2.3	1.5	2.7	4.3	4.3	4.3	3.7	4.5	4.5	4.5
14th	4.5	4.5	2.3	1.5	3.3	4.5	4.5	4.5	4.3	4.5	4.5	4.5
Length of stipe	7.5	8.1	9.6	8.6	6	6.3	6.2	6.4	5.5	5.8	4	4

Table 2: ANOVA for length of stipe

Groups	*Count*	*Sum*	*Average*	*Variance*
A	3	26.3	8.766667	0.583333
B	3	18.9	6.3	0.01
C	3	13.8	4.6	1.08

Table 3: Length of stipe

Group	Mean	±SE		
A B C	8.76 6.30 4.60	0.58a 0.01b 1.08c		

Table 4: ANOVA for culture

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	4.800915	2	2.400458	1.148096	0.320012	3.056366
Within Groups	313.6224	150	2.090816			
Total	318.4233	152				

Table 5: length of growth of mycelia

Group	Mean	±SE		
A	1.73	0.70a		
B	2.00	0.91a		
C	2.16	1.65a		

IV. CONCLUSION AND RECOMMENDATION

With the discovery of mushroom as a good source of bioactive compounds of anticancer, antifungal and anti-diabetic in its natural form, it becomes paramount that the mycelia may be used for the large scale production of the compounds as mushrooms are seasonal. With this study, more mycelia from mushrooms can be obtained at faster rate and the need put to use. Therefore, there is the need to advance more on the technology that can better the production of *P.florida* and other species of mushroom from the culture stage.

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