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The Influence of Green, Corn, and Rice Seed Media Composition on Mycelium Growth of F2 Main Seeds (*Pleurotus ostreatus* (Jacq. Ex Fr) Kummer)

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ABSTRACT
White oyster mushroom (*Pleurotus ostreatus*) is a type of fungus wood that has a high nutritional content. White oyster mushroom cultivation begins with the provision of good quality seeds which include 4 stages, namely F1 seeds, F2, F3 and baglog. This study aims to influence the composition of the green bean, maize and rice grain media composition on the growth of mycelium F2 parent white oyster mushroom. This research was conducted at the *Microbiology Laboratory, Department of Biology.* The research design used a randomized block design (RBD), with the parameters of observing the propagation length, color and thickness of the mycelium. The results showed that the composition of different media had a significant effect on the propagation of mycelium in P2, P9, P10, P18, P19, P20 with the highest length of 14 cm, compact white color and evenly thick on combination media. Environmental conditions suitable for the growth of mycelium seeds F2 white oyster mushroom include temperature 27-28℃, humidity 60-62%, and light intensity 24-54 Lux.

Keywords: *Pleurotus ostreatus, mycelium F2 seeds, green beans, corn, rice grains*

1. INTRODUCTION

One of the agricultural products that is much in demand by the community is the cultivation of white oyster mushrooms. White oyster mushrooms are a type of food fungus that has high nutrients when compared to other types of food mushrooms and impacts market demand [1] Oyster mushroom cultivation is relatively easy because white oyster mushrooms are able to adapt to meet the needs of the market. This is due to the limited production of white oyster mushrooms which are hampered by various factors such as the provision of quality white oyster mushroom seeds and the availability of very few so far mushroom entrepreneurs supply white oyster mushroom seeds from Java Island. to the environment. Based on the results of interviews with mushroom entrepreneurs in Jayakarta Village, Bengkulu Tengah stated that the cultivation activity of white oyster mushrooms is still relatively low when compared to the needs and demand of white oyster mushrooms that increase every day. Several groups of mushroom entrepreneurs have already cultivated this mushroom. However, entrepreneurs have not been able

This greatly affects the price of expensive white oyster mushrooms on the market.

Cultivation of white oyster mushrooms begins with the provision of quality seedlings. Good white oyster mushroom seedlings have the characteristic of an even,

thick and white mycelium growth. Poor seedlings will affect the production of white oyster mushroom cultivation. One factor in the success of quality seedlings is the availability of seed media. White oyster mushroom nursery covers four stages, namely F1 seedlings, F2 seeds, F3 seeds and baglog. In Indonesia in general, f2 seed media in the form of corn or grain mixed with some mixed materials such as Bran. According to [2] corn has a content of 73.4% carbohydrates, 4.4 fats, 9.1% protein, 1.9% sugar, 1.2% ash, and 9.5% fiber. However, the problem that is often faced in the use of this corn is the difficulty of obtaining corn with good quality. In addition to corn that has the potential for high nutrient content, there are still many types of media that can support the growth of white oyster mushrooms. Grains that have a close content of carbohydrates and proteins with corn so that it can be used as an alternative medium in the nursery F2 are green beans, and rice grains.

Based on the results of [3] the content of carbohydrates and proteins every 100 gr of green beans is carbohydrates 56.7 gr, protein 24 gr. Rice seeds contain a high nutritional value of carbohydrates of 77-89 gr, protein of 4.5-10.5 gr, fat 0.3-0.5 gr [4]. Some of the ways that are done to overcome the low quality of white oyster mushroom seedlings and can improve the quality of the mushrooms harvested is by combining the constituent ingredients of seed growth media more precisely the composition. Based on the above description, the researchers intend to utilize the source of carbohydrates derived from corn, rice grains and green bean seeds as a media substitution of the growth of mycelium seeds F2 white oyster mushrooms (*Pleurotus ostreatus*) (Jacq. ex Fr) Kummer) so that a combination of media suitable for each medium of planting quality seedlings with a large amount and a relatively short time by facilitating the cost of production.

2. MATERIALS AND METHODS

2.1 Research design

Research using tools in the form of autoclave, scales, glass bottles, spatulas, spiritus, laminar air flow. Materials used in research in the form of green beans, corn and rice grains. Research using Randomized Group Design. The combination of treatment is a combination of corn seeds, beans, and rice grains weighing 0, 60, 75, 100, 150, 200, and 300 grams, respectively. Each combination of treatments has a final weight of 300 grams, so there are 27 combinations of treatments.

Observed observation parameters include the length of the mycelium patch (cm), the thickness and color of the mycelium. The data obtained from the study was analyzed using the Analysis of Variance (ANOVA) test and then the data was analyzed on a 5% variety fingerprint to find out the true level of the test. If there is data on the treatment of real differences then it will be followed by dmrt test (Duncan's Multiple Range Test [5].

2.2 Medium and Breeding of Fungi

Research begins by providing F1 seeds and F2 seeds. The growth of F1 seedlings by exposing white oyster mushrooms into a Petri dish containing PDA media, and inkubated for 14 days. Next is the process of breeding the F2 seedlings of white oyster mushrooms on each combination of treatments. The maintenance of f2 seedlings of white oyster mushrooms is carried out by maintaining environmental factors such as temperature and humidity. Good temperature on white oyster mushroom mycelium ranges from 22-28°C with humidity of 60-90%. To maintain its moisture is done by spraying the special room of the mushroom with clean water [5].

3. RESULT AND DISCUSSION

3.1 Growth of mycelium seedlings F1 white oyster mushrooms

The results of the study obtained that the growth of mycelium using PDA grew spread filled the media, looked compact white like cotton, and thick evenly filled the medium of F1 seedlings. The fungus mycelium that grows reaches the 14th day since the day of inoculation.

3.2 Growth of mycelium seedlings F2 white oyster mushrooms

Based on the observations of F2 seedlings at 7 - 28 HSI shows the average length of white oyster mushroom tethering ranges from 0.91 cm to 14 cm. The highest mycelium length at 28 DAI is obtained in P2, P9, P10, P18, P19, and P20 treatments with a length of mycelium (14 centimeters), and the P15 treatment has

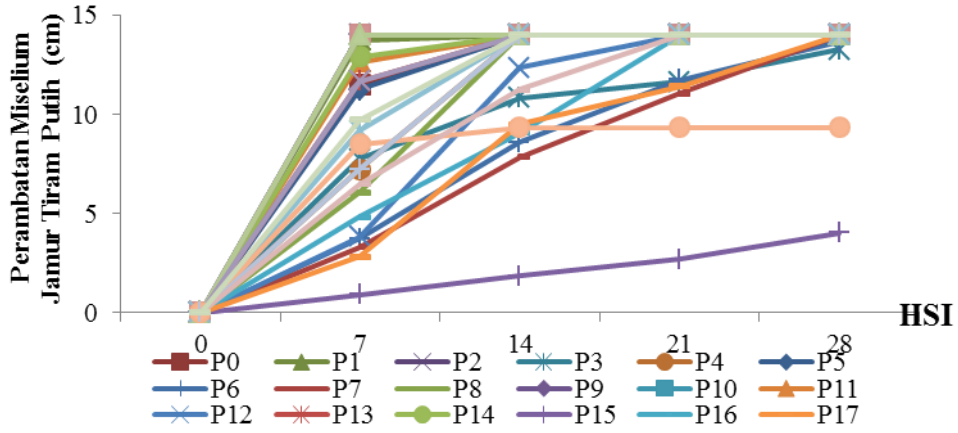

Figure 1. Graph of average growth length of mother seed mycelium (F2) white oyster mushrooms on days 7, 14, 21, and 28 DAI

the shortest mycelium length (2.36 centimeters). An average graph of the growth length of mycelium seedlings F2 white oyster mushrooms seen on (Figure 1).

Observations on ANOVA obtained F Count > FTable 5%. Day 7 is 8.38*, day 14 is 3.88*, the 21st day is 4.097*, and the 28th day is 4.986* greater than the FTable value of 1.70 at a rate of 5% so that the media exerts a noticeable influence on the long tethering of the F2 seed linguism of white oyster mushrooms. To find out the difference between each media combination treatment is done duncan double distance test as in (Table 1).

This treatment does not differ noticeablely but differs noticeablely in other treatments with a length of 14 cm. the shortest tethering length of all seedlings is P15. According to the results of [6] stated that the treatment is not different given the same concentration with different types of media but the appropriate concentration so as to support the tethering of white oyster mushrooms quickly. [7] states the speed of fungal mycelium tethering is strongly influenced by the source of nutrients obtained from the media for the result of good tethering. The factor that affects the tethering of white oyster mushrooms is the nutrients in each medium used differently. This is reinforced by the results of [8] which stated that the fast-growing mycelium filling the growing media will supply more nutrients earlier than the slow-growing mycelium in the growing medium.

[9] stated that the nutrients needed by white oyster mushrooms include Carbon (C), Nitrogen (N), Vitamins and Minerals. Carbon is needed as an energy-producing metabolism that forms a long sugar chain of lignin and cellulose. While nitrogen is needed with the synthesis of cell-building proteins. Grains contain a lot of carbohydrates and proteins as carbon and nitrogen producers. According to [2] corn has a content of 73.4% carbohydrates, 4.4 fats, 9.1% protein, 1.9% sugar, 1.2% ash, and 9.5% fiber. [9] stated that green bean beans are also able to support the encroachment of white oyster mushrooms because they contain 56.7 gr carbohydrates, 24 gr protein per 100 grams. Nutrient content in carbohydrate rice seeds 77-89 gr, protein of 4.5-10.5 gr, fat 0.3-0.5 gr [4]. The nutrients in the grains are able to support the tethering of white oyster mushrooms.

The properties of miselia obtained media P2, P9, P10, P18, P19 and P20 have a good color of mycelium i.e. thick white evenly on the planting medium. The growth of white oyster mushrooms has a profound effect on temperature, humidity and light intensity as important environmental factors for their growth. The highest temperature is 28.3 °C and the lowest temperature is 27.2 °C. The highest humidity on observation was 62 % and the lowest humidity at 60 %. The high light intensity on observation is 54 Lux, and the low light intensity is 24 Lux.

Table 1. Long-lasting mycelium seed linguism F2 white oyster mushrooms on various media compositions.

Media Treatment	Age of Seedlings Days after inoculation			
	7	**14**	**21**	**28**
P0 ($J_0H_0P_0$)	$11,5^{ghi}$ ±1,27	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00
P1 ($J_0H_0P_1$)	$13,75^{i}$ ± 0,53	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00
P2 ($J_0H_0P_2$)	14^{i} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00
P3 ($J_0H_1P_0$)	$7,75^{c-g}$ ± 5,48	$10,83^{bc}$ ± 5,48	$11,65^{bc}$ ± 4,07	$13,28^{c}$ ±1,24
P4 ($J_0H_1P_1$)	$7,25^{b-g}$ ± 3,38	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00
P5 ($J_0H_1P_2$)	$11,25^{ghi}$ ± 0,66	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00
P6 ($J_0H_2P_0$)	$3,75^{a-d}$ ± 1,14	$8,6^{b}$ ± 2,91	$11,75^{bc}$ ± 2,25	$13,66^{c}$ ± 0,57
P7 ($J_0H_2P_1$)	$3,33^{abc}$ ± 1,15	$7,86^{b}$ ± 1,88	$11,05^{bc}$ ± 2,68	14^{c} ± 0,00
P8 ($J_0H_2P_2$)	$6,08^{b-f}$ ± 2,00	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00
P9 ($J_1H_0P_0$)	14^{i} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00
P10 ($J_1H_0P_1$)	14^{i} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00
P11 ($J_1H_0P_2$)	$12,67^{hi}$± 2,06	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00
P12 ($J_1H_1P_0$)	$3,83^{a-d}$ ± 2,24	$12,36^{bc}$ ± 2,82	14^{c} ± 0,00	14^{c} ± 0,00
P13 ($J_1H_1P_1$)	$11,66^{ghi}$ ± 2,84	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00
P14 ($J_1H_1P_2$)	$12,91^{hi}$ ± 1,03	14^{c} ± 0,00	14^{c} ± 0,00	$4,01^{a}$ ± 1,83
P15 ($J_1H_2P_0$)	$0,91^{a}$ ± 0,52	$1,84^{a}$ ± 0,29	$0,53 \pm 2,68^{a}$	14^{c} ± 0,00
P16 ($J_1H_2P_1$)	$4,83^{a-e}$ ± 4,78	$9,10^{bc}$ ± 6,38	14^{c} ± 0,00	14^{c} ± 0,00
P17 ($J_1H_2P_2$)	$2,83^{ab}$ ± 2,12	$9,51^{bc}$ ± 4,10	$11,41^{bc}$ ± 4,47	14^{c} ± 0,00
P18 ($J_2H_0P_0$)	14^{i} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00
P19 ($J_2H_0P_1$)	14^{i} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00
P20 ($J_2H_0P_2$)	14^{i} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00
P21 ($J_2H_1P_0$)	$12,66^{ghi}$ ± 2,93	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00
P22 ($J_2H_1P_1$)	$9,16^{e-I}$ ± 0,94	14^{c} ± 0,00	14^{c} ± 0,00	$9,33^{b}$ ± 8,08
P23 ($J_2H_1P_2$)	$8,5^{d-h}$ ± 7,37	$9,33^{b}$ ± 8,08	$9,33^{b}$ ± 8,08	14^{c} ± 0,00
P24 ($J_2H_2P_0$)	$7,25^{b-g}$ ± 1,52	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00
P25 ($J_2H_2P_1$)	$6,5^{b-f}$ ± 3,04	$11,25^{bc}$ ± 2,63	14^{c} ± 0,00	14^{c} ± 0,00
P26 ($J_2H_2P_2$)	$9,75^{f-I}$ ± 3,68	14^{c} ± 0,00	14^{c} ± 0,00	14^{c} ± 0,00

The observations showed the maximum highest growth on the 7th to 28th day of DAI which is 14 cm found in the treatment of P2, P9, P10, P18, P19,

Figure 2. Seed F2 oyster mushrooms that have been filled with mycelium (age 28 DAI) on the medium (J0H0P2) (A), (J1H0P1) (B), (J1H0P0) (C), (J2H0P0) (D), (J2H0P2) (E), (J0H0P1) (F).

4. CONCLUSION

Based on the results of the study can be concluded that at the age of 28 DAI, P2, P9, P10, P18, P19, and P20 showed the best results with a wave length of 14 cm with a thick white color of mycelium evenly distributed on the media. on P15 with poor tethering, obtained an average of 2.36 cm tethering with a thin white color of mycelium evenly distributed on the medium.

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