Potential Of Various Types of Media for Breeding Oyster Mushroom F2

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Abstract. This research was conducted at the Laboratory of Biotechnology 1 and Farmers' Land in Karanganyar village, Poncokusumo, Malang. The materials used in this study were white oyster mushroom F1 seeds, 70% alcohol, soybean seeds, corn seeds, rice, sawdust, rice bran and mushroom baglog. This study used an experimental design, namely Completely Randomized Design (CRD) with 8 treatment levels B1 = corn kernels (100%), B2 = soybean seeds (100%), B3 = rice (100%), B4 = sawdust (100%), B5 = corn kernels (50%) + sawdust (40%) + rice bran (10%). Parameters observed were height of Mycelium-covered Media (cm), Mycelium Growth Speed (cm/day), Contamination Occurrence Percentage (%). The average yield of the highest seedling height was 12.79 cm in treatment B8. The parameter of mycelium growth rate in B8 treatment had the fastest growth rate of 1.82 cm/ha. The lowest contamination was found in treatment B5, B6 by 4% and B7 by 20%. Treatment B3, B4 and B8 did not experience contamination.

Keywords: Biotechnology , CRD, Oyster Mushroom

1 Introduction

Use The production value of white oyster mushrooms continues to increase and its prospects as one of the non-oil and gas export commodities. Indonesia has only been able to supply 0.9% of the world's mushroom needs, even though mushroom cultivation is very easy to develop domestically, especially since the land required is not large. Based on data from the Central Statistics [1], the national mushroom production increased by only 0.07% in 2012 to 2016 from 40,886 tons to 40,914 tons. It is necessary to increase the production of mushrooms, especially oyster mushrooms, so that the demand for oyster mushrooms continues to increase to meet consumption needs. The development of oyster mushrooms does not require a large area of land. Oyster mushroom production period is relatively faster so that the harvest period and time is shorter

The stages in the oyster mushroom cultivation process include seeding, making planting media, media inoculation, incubation and maintenance. An important problem in nurseries is the availability of quality and quality mushroom seeds that can produce oyster mushrooms to the maximum so that to get good and profitable oyster mushroom results, the main factor is F2 seeds.

So far, the production of oyster mushroom seeds, both parent seeds and ready-to-plant seeds, can only be done by people who are trained and experienced so that there are business opportunities to provide oyster

mushroom seeds of good quality. The quality of white oyster mushroom F2 seeds is influenced by several factors including seedling media and seedling age. F2 seed media is very influential on the quality of F2 seeds because in the media there are nutrients needed for fungal mycelium growth

The problem that has arisen so far is that if the availability of sawdust is scarce, alternatives are made from other materials, previously underutilized and easy to obtain, such as the use of seeds in F2 seed media so that it is expected to be able to increase production in baglog and white oyster mushroom yields.

2 Research Method

This research was conducted at the Laboratory of Biotechnology 1 and Farmers' Land in Karanganyar village, Poncokusumo, Malang. This research was carried out from April 2020 to October 2020. The materials used in this study were white oyster mushroom F1 seeds, 70% alcohol, soybean seeds, corn seeds, rice, sawdust, rice bran and mushroom baglog. This study used an experimental design, namely Completely Randomized Design (CRD) with 8 treatment levels B1 = corn kernels (100%), B2 = soybean seeds (100%), B3 = rice (100%), B4 = sawdust (100%), B5 = corn kernels (50%) + sawdust (40%) + rice bran (10%). Parameters observed in F2 seeds are:

Mycelium Growing Media Height (cm), Mycelium Growth Speed (cm/day) , Contamination Occurrence

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Percentage (%) size as the main text (10 point). Try to ensure that lines are no thinner than 0.25 point.

3 Result and Discussion

Based on the research that has been done, the results and discussion are described as follows.

Table 1. Average Height of Seedlings Overgrown with Mycelium on Grain Media Composition Treatment Ages 7, 14, 21, and 28 HSI.

Treatment	Height of Seedlings Overgrown with Mycelium (cm)							
	7 HSI		14 HSI		21 HSI		28 HSI	
B1 (100% corn kernels)	2.59	c	4.27	bc	5.54	bc	5.53	bc
B2 (100% soybean seeds)	0.00	a	0.00	a	0.00	a	0.00	a
B3 (100% rice)	2.15	bc	2.94	b	3.20	b	3.48	b
B4 (100% sawdust)	4.05	d	8.45	d	10.35	d	11.73	ef
B5 (50% corn kernels + 40% sawdust + 10% rice bran)	2.67	c	5.75	c	10.21	d	12.73	f
B6 (50% soybean + 40% sawdust + 10% rice bran)	1.78	b	3.73	b	5.55	bc	6.57	cd
B7 (50% rice + 40% sawdust + 10% rice bran)	1.87	bc	4.27	bc	6.59	c	9.23	de
B8 (89% sawdust + 10% bran + 1% lime)	2.35	bc	6.06	c	10.28	d	12.79	f
DMRT 5%	0.26		0.60		0.84		0.88	

Note: The numbers followed by the same letter in the same column show no significant difference in the 5% DMRT test; HSI = Days After Inoculation.

The results of the analysis of variance in Table 1. showed a very significant effect on the height of the mycelium-covered seed medium. The average yield of the highest seedling height was 12.79 cm in treatment B8 (89% sawdust + 10% rice bran + 1% lime). Treatment B2 (100% soybean seeds) had the lowest seedling height of 0.00 cm.

Table 2. Average Mycelium Growth Rate on Grain Media Composition Treatment Ages 7, 14, 21, and 28 DAI.

Treatment	Mycelium Growth Rate (cm/day)							
	7 HSI		14 HSI		21 HSI		28 HSI	
B1 100% corn kernels	0.37	cd	0.61	bcd	0.79	bc	0.79	bc
B2 100% soybean seeds	0.00	a	0.00	a	0.00	a	0.00	a
B3 100% rice	0.29	bcd	0.42	b	0.45	b	0.49	b
B4 100% sawdust	0.58	e	1.20	e	1.48	d	1.67	ef
B5 50% corn kernels + 40% sawdust + 10% rice bran	0.39	d	0.80	cd	1.46	d	1.82	f
B6 (50% soybean + 40% sawdust + 10% rice bran)	0.25	b	0.53	bc	0.79	bc	0.93	cd
B7 (50% rice + 40% sawdust + 10% rice bran)	0.26	bc	0.61	bcd	0.93	c	1.32	de
B8 (89% sawdust + 10% bran + 1% lime)	0.33	bcd	0.86	d	1.46	d	1.82	f
DMRT 5%	0.04		0.09		0.12		0.13	

Note: The numbers followed by the same letter in the same column show no significant difference in the 5% DMRT test; HSI = Days After Inoculation.

The average yield of the fastest growth rate was 1.82 cm/day in treatments B8 (89% sawdust + 10% bran + 1% lime) and B5 (50% corn kernels + 40% sawdust +

3.1 Height of Seedlings Overgrown with Mycelium

The average yield of mycelium-covered seedling media as a result of media treatment for seeds aged 7, 14, 21, and 28 DAI was presented in Table 1.

3.2 Mycelium Growth Speed

The results of the average growth rate of mycelium due to media treatment of grains aged 7, 14, 21, and 28 DAI are presented in Table 2.

10% bran). Treatment B2 (100% soybean seeds) had the lowest seedling height of 0.00 cm/day.

3.3 Percentage of Contamination

The results of the effect of adding grain media to the percentage of contamination (%) are presented in Table 3.

Table 3. Average Mycelium Growth Rate on Grain Media Composition Treatment Ages 7, 14, 21, and 28 DAI.

Treatment	Contamination Percentage (%)	
B1 (100% corn kernels)	88	d
B2 (100% soybean seeds)	72.33	c
B3 (100% rice)	0	a
B4 (100% sawdust)	0	a
B5 (50% corn kernels + 40% sawdust + 10% rice bran)	40	bc
B6 (50% soybean + 40% sawdust + 10% rice bran)	4	ab
B7 (50% rice + 40% sawdust + 10% rice bran)	20	ab
B8 (89% sawdust + 10% bran + 1% lime)	0	ab
DMRT 5%	13.01	

Note: The numbers followed by the same letter in the same column show no significant difference in the 5% DMRT test.

The results of the analysis of variance in Table 3. show the average results of the highest percentage of contamination, namely 88% in treatment B1 (100% corn seeds) and 72.33% in treatment B2 (100% soybean seeds). Treatments B3, B4, B6, B7, B8 and B5 showed no significant difference.

The results of the study on the effect of media composition of F2 seeds on the growth and yield of white oyster mushroom (*Pleurotus ostreatus*), showed a very significant effect on each parameter that was carried out. This research was carried out in an incubation room at a temperature of $\pm 26-28^{\circ}\text{C}$, the humidity of the room was maintained until the entire medium was full of white fungal mycelium on F2 seedlings. This is supported by the statement of Ahmad [2] the incubation process is carried out at an optimal temperature between $26 - 28^{\circ}\text{C}$ and a dark place and observations must be carried out periodically. If contamination appears, it is immediately separated and cleaned. Furthermore, Maulana [3] and Maulidina, Rizky., Wisnu Eko Mardiono., Moch. Nawawi [4] the growth of oyster mushroom mycelium will be faster in the dark / without sunlight. The white mycelium that meets the F2 seed medium can be chosen as a good seed

Treatment B8 (89% sawdust + 10% bran + 1% lime) had the highest seedling height of 12.79 cm, not different from treatment B5 (50% corn kernels + 40% sawdust + 10% bran) of 12.73 cm. This is because sawdust contains lignin, cellulose and hemicellulose as materials needed for the growth of oyster mushroom mycelium. The addition of rice bran and lime is also a source of carbohydrates, protein, and a regulator of the acidity of the growing media. The content can be absorbed by the hyphae thereby accelerating the age of mycelium growth. Hyphae itself is a spore that forms white threads and spreads throughout the growing

medium as a tool to take food from the substrate. This is supported by the opinion of Draksi H, Ernita [5] the rapid growth of mycelium is due to the protein content and other nutrients that can be well absorbed by the hyphae. The fungus collects these resources to increase the length of the hyphae. Treatment B5 (50% corn kernels + 40% sawdust + 10% bran) sawdust contains cellulose and hemicellulose which are easily decomposed into nutrients for F2 seeds and mixed with corn seeds which also help the mycelium growth process so that the availability of the nutrients needed by the mycelium quite available.

The parameters of the mycelium growth rate in the treatment B8 (89% sawdust + 10% bran + 1% lime) and B5 (50% corn kernels + 40% sawdust + 10% bran) had the fastest growth rate of 1.82 cm/ days, due to the nutrient content in treatments B8 and B5 both contained sawdust, so that sawdust containing cellulose and hemicellulose was easily decomposed so that it became nutrients for the growth of oyster mushroom mycelium. This is supported by the statements of Utama [6] and Suharnowo, Lukas S., Budipramana., Isnawati [7] sawdust contains cellulose and hemicellulose after being decomposed will turn into simpler materials to make them nutrients. Lignin is resistant to microbial decomposition so that the wood weathering process becomes slow. Treatment B5 contained a mixture composition with corn kernels so that it affected the speed of mycelium growth. The use of corn seeds as a medium for oyster mushroom seeds contains sugar which is a carbon source for fungal growth, so that the availability of nutrient content in B8 and B5 treatments required by mycelium is quite available [1].

Contamination parameters in treatment B1 (100% corn kernels) experienced quite a lot of contamination by 88% due to too long sterilization of the seed media and less sterile culture bottles so that microorganisms could enter the seed media. If F2 oyster mushroom seeds are contaminated, there will be a competition for nutrient absorption in the seeds between the mycelium growing media and other unwanted microorganisms so that it can slow down the mycelium growth rate. According to Asegab [1], the lack of corn seed planting media was more susceptible to contamination. Seed media contaminated by microorganisms can serve as a substrate for the growth of microorganisms including bacteria and other fungi.

4 Conclusion

Based on the description of the results and discussion, it can be concluded as follows.

1. The highest average yield of seedling height was 12.79 cm in treatment B8 (89% sawdust + 10% rice bran + 1% lime).
2. Parameters of mycelium growth rate in treatments B8 (89% sawdust + 10% bran + 1% lime) and B5 (50% corn kernels + 40% sawdust + 10% bran) had the fastest growth rate of 1.82 cm/day.
3. The lowest contamination was found in treatment B5 (50% corn kernels + 40% sawdust + 10% rice bran) at 40%, B6 (50% soybean seeds + 40%

sawdust + 10% rice bran) at 4% and B7 (50 % rice + 40% sawdust + 10% bran) by 20%. Treatment B3 (100% rice), B4 (100% sawdust) and B8 (89% sawdust + 10% bran + 1% lime) did not experience any contamination.

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