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The Effect Of Giving Chicken Dung In The Mushroom Media Composting Process Merang On Growth Characteristics And Results Of Straw Mushroom (*V Olvariella Volvaceae*)

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Abstract:
Volvariella volvaceae (Bull. Ex. Fr), commonly known as straw mushroom, is the most recognized species among numerous tropical and subtropical mushroom species, particularly among the Southeast Asian community. The straw mushroom is also a source of several types of enzymes, particularly trypsin, which plays an important role in aiding the digestion process. Straw mushrooms can also be used as a protective food due to their complete B-complex vitamin content, including riboflavin, as well as having a fairly complete range of essential amino acids. The purpose of this research is to examine the effect of straw mushroom media containing chicken manure on the growth of straw mushrooms. (Volvariella volvacea). This research was conducted at the oyster mushroom cultivation facility of the Faculty of Agriculture at Nahdlatul Wathan University in Mataram. The implementation period started in August and ended in October 2023. This research uses a Completely Randomized Design (CRD) with a single treatment, namely the effect of chicken manure application on the composting process of straw mushroom media. The treatment is placed on 5 racks in a stacked manner. The treatments used were as follows: 300 kg of straw, 30 kg of rice bran, 25 kg of lime, and 50 kg of chicken manure. The application of chicken manure in the composting process of straw mushroom media significantly affected the time it took for the pinhead of the straw mushroom fruit body to appear; however, there were no significant differences in the parameters of the number of fruit bodies, diameter of the fruit bodies, length of the fruit bodies, and fresh mushroom media significantly affected the time it took for the pinhead of the straw mushroom fruit body to appear ; however, there were no significant differences in the parameters of the number of fruit bodies, diameter of the fruit bodies, length of the fruit bodies, and fresh weight of the straw mushrooms.

Keywords: Chicken Manure, Straw Mushroom, Growth and Yield of Straw Mushroom (Volvariella Volvaceae)

1. Introduction

Volvariella volvaceae (bull. ex. fr) or known as straw mushroom, is the most well-known mushroom species among the many tropical and subtropical mushroom species, especially for Southeast Asian people. Straw mushroom is also a source of several types of enzymes, especially trypsin, which plays an important role in helps the digestive process. Straw mushrooms can also be used as protective food because of their complete vitamin B-complex content including riboflavin and have quite complete essential amino acids (Sinaga, 2001). This mushroom has long been cultivated as a food ingredient, because it is included in the group of mushrooms that delicious and has a good texture so many people like it.

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Fresh straw mushrooms have high nutritional content. The protein contained in fresh straw mushrooms is 1.8 % . The protein in fresh straw mushrooms is greater than other vegetables such as cabbage, carrots and tomatoes in fresh form (Agromedia, 2009). The high consumer demand for mushroom commodities has not been balanced by the level of production. Mushroom production in Indonesia in 2011 to 2014 tended to fluctuate, in 2011 mushroom production in Indonesia was 45,854 tons, in 2012 it decreased to 40,886 tons, in 2013 it increased again to 44,565 tons and in 2014 it decreased to 37,410 tons (Ministry of Agriculture, 2015a). The level of consumption of mushrooms by the Indonesian people in the last 2 years has increased. According to data from the Ministry of Agriculture (2015b), mushroom consumption per capita in Indonesia from 2013 to 2014 increased by around 300 grams, so with the assumption of + 250 million people multiplied by 300 grams it becomes 75,000 tons per capita per year. The increase in public consumption is not comparable to the fluctuating production so that an increase in mushroom production is needed.

Straw mushrooms are widely cultivated because they have a short life cycle of approximately one month, making them very easy to cultivate. In addition, straw mushrooms have good taste and texture, making them popular (Sinaga, 2012) . The Indonesian Mushroom Agribusiness Society (MAJI) dominates straw mushroom production by 55-60% of the total national mushroom production (Agrina, 2007). Straw mushroom growth requires a temperature of around 30-36oC, humidity of 75% - 80% and light intensity of 5-10% (Trubus, 2012).

Straw mushroom cultivation requires stages that must be carried out, namely making a mushroom house, fermentation for growing media, making a steam generator, filling the media and pasteurization, watering, maintenance process, controlling OPT, harvesting and post-harvesting. Straw mushroom cultivation methods must be carried out properly in order to produce quality mushrooms. The selection of planting media greatly affects the growth of mushrooms. (Zuyasna, Nasution and Fitriani 2011),

The growth and yield of straw mushrooms are greatly influenced by the type of planting media. The planting media has a very significant effect on the weight of the fruit and the diameter of the cap. The better the media used, the better the growth of the mushrooms produced. Straw mushrooms generally grow on media that are sources of cellulose such as piles of straw, paper mill waste, and palm oil waste (Sinaga, 2012). Based on the explanation above, it is necessary to conduct research activities that aim to determine the effect of providing chicken manure in the composting process of straw mushroom media.

Formulation of the problem :

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How does chicken manure affect the growth of straw mushrooms (*Volvariella volvacea*).

Research purposes

To test the effect of straw mushroom media containing chicken manure on the growth of straw mushrooms (*Volvariella volvacea*).

Benefits of research

Providing information on the development of straw mushroom cultivation (*Volvariella volvacea)* in the future, especially related to mushroom growth using chicken manure as a medium. In addition, for farmers, it provides solutions in utilizing chicken manure.

2. Research Methods

Place and Time of Research

This research was conducted in the straw mushroom barn of the Faculty of Agriculture, Nahdlatul Wathan University, Mataram. The implementation time starts from August-October 2023.

Research materials and tools

The materials needed in this study are: straw mushroom seeds, straw, water, lime, bran and chicken manure. The tools used include sterilization drums, water tanks, scoops, thermometers, sprayers, pipes, calipers, scales, buckets, rulers, and stationery.

Experimental Design

This study used a Complete Randomized Block Design (RAK L) with a single treatment, namely the effect of chicken manure on the composting process of straw mushroom media. The treatment was placed on 5 shelves in a row. The treatments used were as follows: Straw 300 kg, bran 30 kg, lime 25 kg, chicken manure 50 kg.

Research Procedures

a. Mushroom Making

Mushroom houses or buildings for growing mushrooms are made from bamboo frames and walls made of plastic mulch and have a tarpaulin roof and the inside is lined with UV plastic and made of... The shelves on the left and right are 5 layers long, 6 meters wide, 4 meters high and 7 meters high.

b. Preparation of Planting Media and Composting

The planting medium used is rice straw that has been composted for 8 days, the planting medium used is 25 cm thick.

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c. Pasteurization Media

Pasteurization of the media using a steam generator in the form of three 200-liter drums connected with PVC pipes into the mushroom house. The pipes are perforated to channel hot steam from the water boiled in the drum. The flow of steam until the temperature reaches 80 ° C is maintained for 7 hours, with the temperature after pasteurization the mushroom house window is opened so that the temperature drops to 32-35 ° C.

d. Planting Seeds

The seeds used for each plot are 100 grams, planting is done by sowing the seeds over the entire surface of the media. After planting the seeds, the windows and doors of the mushroom house are closed for 3 days, on the fourth day the windows are opened for 5 minutes during the day, watering is carried out if the media is dry.

e. Maintenance

Maintenance includes temperature, humidity, and OPT control, the temperature is maintained at around 28-35 °C and humidity is 80-95%. OPT control is used by ensuring that all materials used are not contaminated, discarding fungi that have different growth from the fungi planted, and controlling OPT manually.

f. Harvest

Harvesting is done on the 15th day after planting. Harvesting is done for one month with an interval of 5 days.

Observation Variables

pin head appeared , the time of first harvest, the length of the harvest period, the number of fruit bodies, the length of the fruit bodies, the diameter of the fruit bodies and the fresh weight of the fruit bodies.

1. **When the first pin head appears** : the first time a small white lump (straw mushroom bud) appears.
2. **Number of fruit bodies** : obtained by adding up the number of fruit bodies at each harvest.
3. **Length of fruit body** : observed by measuring the fruit body from the base of the stem to the top of the cup in cm.
4. **Fruit body diameter** : observed by measuring the fruit body circumference in cm.
5. **Fresh fruit body weight** : The fruit body weight is weighed by adding up the total fruit body weight each time

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Physical factors of the environment of straw mushrooms

The physical environmental factors of straw mushrooms (*Volvariella volvacea*) that will be measured are the pH of the planting medium, temperature and humidity of the room. pH and humidity are measured using a soil tester. The normal pH of the media is generally around 6-7. The temperature is measured in the straw mushroom barn using a thermometer.

Data analysis

Observation data obtained were analyzed using One way anova at the 5% level. It is a testing method of parametric statistical tests. One way anova to test the difference in average data of more than two groups. This ANOVA statistical test was carried out using a significance level of 0.05 (α = 5%). While the parameters when pihead appears use the One sample T Test analysis with a significance of 0.05 (α = 5%).

3. Results And Discussion

Research result

The results of the study showed that the treatment of chicken manure in straw mushroom media had a significant effect on the time of emergence of fruit body pinheads, but there was no significant difference in the parameters of the number of fruit bodies, fruit body diameter, fruit body length, and fresh wet weight of the fruit in the F count test, as can be seen in Table 1.

Table 1. Results of the F-test for each observation parameter

No	Observation parameters	F value calculated 5%	Significance
1.	Pinhead's appearance time	0.005	S
2.	Number of fruit bodies	0.222	Ns
3.	Fruit body diameter	0.260	Ns
4.	Length of fruit body	0.222	Ns
5.	Fresh weight of fruit body	0.233	Ns

Description: S: significant and ns: non-significant

1. The emergence of Pin Head

The beginning of the emergence of pinheads is the first time the straw mushroom stubs appear. The results of observations when pinheads appear can be seen in table 2. below:

Table 2. Table of When Straw Mushroom Piheads Appear (HSTB)

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Ulangan	hari setelah tebar bibit																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Blok I	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1								
Blok II	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1								
Blok III	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1								
Blok IV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1								
Blok V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1								
Blok VI																														
Blok VII																														
Blok VIII																														
Blok IX																														
Blok X																														

It can be seen that the time of pinhead emergence on each shelf is shelf 1 at the age of 7 days, shelves 2 and 3 at the age of 10 days, shelf 4 at the age of 17 days and shelf 5 at the age of 19 days after spreading the seeds (hstb). The effect of chicken manure on the age of pinhead emergence can be seen in (Graph 1).

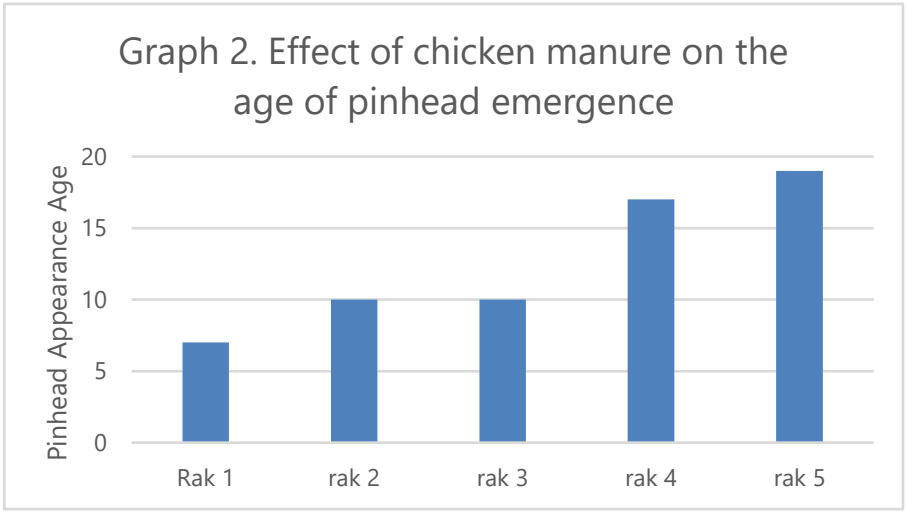

Table 3. Results of the *one sample T test analysis* when the pinhead appears

One Sample Test

	Test Value = 0					
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference Lower	Upper
Pinhead appears	5,494	4	.005	12.60000	6.2323	18.9677

the one sample T Test analysis of the effect of using chicken manure on various shelves show a 2-tailed sig value of 0.005.: if the significance value (sig) > 0.05 then the average is the same, if <0.05 the

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average is different. Based on the anova output above, it is known that the significance value is 0.005 <0.05 so that it can be concluded that all samples are significantly different. In other words, when the straw mushroom pinhead appears, it is not the same . Statistically, it means that all straw mushroom shelves provide a different initial appearance of the pinhead. This is likely due to differences in temperature, humidity , and light received on each shelf.

2. Straw Mushroom Fruit Bodies

The fruiting body appears after the pinhead emerges.

Table 4. Number of Straw Mushroom Fruit Bodies

Ulangan	Panen																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Jumlah	rata-rata
Blok I	18	10	27	20	0	0	0										
Blok II	164	63	51	21	32	0	8										
Blok III	19	38	50	117	87	7	0										
Blok IV	0	0	25	70	122	10	0										
Blok V	0	0	0	6	24	31	1										
Blok VI																	
Blok VII																	
Blok VIII																	
Blok IX																	
Blok X																	
TOTAL JUM	201	111	153	234	265	48	9	0	0	0	0	0	0	0	0	964	

Table 5. Results of ANOVA analysis of the number of straw mushroom fruit bodies

ANOVA

JumlahJamur

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9793.543	4	2448.386	1.644	.189
Within Groups	44665.429	30	1488.848		
Total	54458.971	34			

The results of the *one-way ANOVA* test analysis of the effect of using chicken manure on various shelves showed no significant differences in the number of straw mushroom fruit bodies. Statistically, this means that all straw mushroom shelves provide the same number of fruit bodies.

3. Fruit Body Length

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The difference in the average length of the straw mushroom fruit body. Can be seen in the following table 6:

Table 6. Table of Merang Mushroom Fruit Body Length

Ulangan	Panen														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	2	3.5	4	4.5	3.5	4	4								
2	3	3	5	5	4	4	3								
3	3	3.5	4	3	3	4	3								
4	2	3.5	6	2.3	3.5	3	1.5								
5	3	3	3	5	4	5	2								
6	3	2	3.5	2	3.5	3	3.5								
7	3	4	4.5	4	2	3	1								
8	3	3	2	3	2.5	3	2.5								
9	3	2	4	3.3	2	3	2.8								
10	3	3.5	5	4.5	4	3									
Jumlah	2.8	3.1	4.1	3.66	3.2	3.5	2.59								

Based on the data in table 6 above, it can be concluded that the highest length of the straw mushroom body is 4.1 and the lowest is 2.59.

Table 6. Results of ANOVA analysis of the effect of adding chicken manure to straw mushroom media on the length of the straw mushroom fruit body.

ANOVA

Long mold

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10,492	9	1.166	1,372	.222
Within Groups	50.139	59	.850		
Total	60,631	68			

To test whether the sample groups have the same or different averages, (ANOVA test) was carried out. Based on the results of the analysis of variance test (Table 6) it shows that the effect of giving chicken manure to straw mushroom media is not significantly different from the length of the straw mushroom fruit body.

The basis for decision making in this ANOVA analysis is : if the significance value (sig) > 0.05 then the average is the same, if <0.05 the average is different. Based on the ANOVA output above, the significance value is 0.222 > 0.05 so it can be concluded that all samples are not significantly different. In other words, the average length of the mushroom fruit body is the same .

4. Diameter of Straw Mushroom Fruit Body

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One of the things that determines the high and low quality of straw mushrooms is the diameter of the fruit body. Based on the National Standardization Agency, there are three classifications of straw mushrooms, namely large (diameter> 3 cm), medium (diameter 2-3 cm), small (diameter 1.5 cm).

Table 6. Effect of chicken manure on the diameter of straw mushroom fruit bodies.

Ulangan	Panen																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Jumlah	rata-rata
1	2	2	2.5	3	2.5	3	3.5										
2	3	2	3	2.5	3	2	2.5										
3	4	5	2.5	2.4	2.5	3	3										
4	3	3.5	2.5	2	2	3	1.5										
5	2	3	2	2.8	2	3	1.5										
6	2	2	4	2	2	3	2										
7	4	3	3	1.5	2	2	1										
8	3	2	2	3.5	2.5	2	2.3										
9	2	3.5	2	2.2	2.5	3	1.5										
10	3	4	3.5	2	3.5	3											
JUMLAH T	2.8	3	2.7	2.39	2.45	2.7	2.09										

The average results of the fruit body diameter can be seen in Table 7. The largest fruit body diameter was at the first harvest, while the smallest fruit body diameter was at the last harvest.

Table 7. Results of ANOVA analysis of straw mushroom diameter.

ANOVA

Mushroom diameter

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.106	9	.678	1.292	.260
Within Groups	30,973	59	.525		
Total	37,079	68			

The treatment of the effect of chicken manure on the diameter of straw mushrooms showed no significant difference in the diameter of straw mushrooms at each harvest. However, there is a difference in the diameter values shown. In the first harvest, the diameter is larger than other harvests, this is because the first harvest of straw mushroom nutrient availability is greater than in other periods. This will provide maximum nutrition for the growth of Straw Mushrooms. In addition, the content of compounds found in rice straw media is more easily absorbed by Straw Mushrooms in the early period of availability. Low growth in the final period is due to a decrease in the quality of the media.

Mayun (2007) stated that several factors that affect the fruiting body of straw mushrooms are temperature and oxygen (O2). Temperatures below 300C and the need for O2 is not met, the fruiting body is small and the quality is low. Other factors that also affect the diameter of the fruiting body of straw

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mushrooms are the nutrient content in the media when the seeds are placed and spread (Wirakusuma, 1989). The seeds that are spread must be evenly distributed throughout the growing media, in this study the seeds were only spread at the end of the media pile, while on the surface of the 1st and 2nd media piles, straw mushroom seeds were not spread. Uneven seed distribution causes relatively large competition for fungi to obtain nutrients, so that the formation of the fruiting body is not optimal (Hagutami, 2001).

5. Fresh weight of straw mushroom fruit

The average fresh weight of the fruiting body is the total weight produced divided by the number of fruiting bodies. The average weight of the fruiting body is one of the factors that affects the high and low total production of straw mushrooms (Hagutami, 2001).

Table 8. Fresh weight of straw mushroom fruit body

Ulangan	Panen																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Jumlah	rata-rata
Blok I	0.105	0.095	0.240	0.150	0	0	0										0.084286
Blok II	1.605	0.580	0.635	0.155	0.255	0	0.105										0.476429
Blok III	0.17	0.290	0.600	1.080	0.870	0.06	0										0.438571
Blok IV	0	0.000	0.225	0.515	0.122	0.175	0										0.148143
Blok V	0	0.000	0.000	0.044	1.180	0.395	0.005										0.232
Blok VI																	
Blok VII																	
Blok VIII																	
Blok IX																	
Blok X																	
JUMLAH T	1.880	0.965	1.700	1.944	2.427	0.63	0.11									0.965	

The average weight of the fruit body can be seen in table 6. The largest average weight of the fruit body is on shelves 1, 2 and 3, while the lowest average weight of the fruit body is on shelves 4 and 5.

Table 9. ANOVA Results of Fresh Weight of Straw Mushrooms

ANOVA

Mushroom Weight

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.851	4	.213	1,481	.233
Within Groups	4.312	30	.144		
Total	5.164	34			

To test whether the sample groups have the same or different averages, (ANOVA test) is performed. The basis for decision making in ANOVA analysis: if the significance value (sig) > 0.05 then the average is the same, if <0.05 the average is different. Based on the ANOVA output above, it is known that the

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significance value is 0.233 > 0.05 so that it can be concluded that all samples are not significantly different. In other words, the average fresh weight of the mushroom fruit body is the same.

Although not significantly different, but has a different value, where the average weight of the highest fruit body on shelves 1, 2 and 3 this is due to the diameter of the fruit body produced in the treatment of shelves 2 and 3 is very large. So that the average weight is higher than other growing media treatments. This is in line with the statement of Wirakusuma (1989), which states that the average weight of the fruit body is closely related to the diameter of the fruit body, the larger the diameter of the fruit body, the greater the weight, in addition the average weight of the fruit body is also influenced by the water content in the body of the straw mushroom fruit. Treatments 4 and 5 the average weight produced is very low, this is because the acidity degree of the media (pH) reaches 9.

4. Conclusion And Suggestions

Conclusion

The treatment of chicken manure in the composting process of straw mushroom media had a significant effect on the time of appearance of the pinheads of the straw mushroom fruit bodies, but there was no significant difference in the parameters of the number of fruit bodies, fruit body diameter, fruit body length, and fresh wet weight of the straw mushroom fruit.

Suggestion

Further research is needed related to the combination of rice husk media with sugarcane, sago and cotton pulp. Because based on previous literature, it is said that the three media are the best media for the growth of straw mushrooms.

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