Effectiveness Of Eggshell Nutrition On Oyster Mushroom Productivity In Cv. Lembah Spora

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ABSTRACT

In Oyster Mushroom cultivation, nutrition is one of the factors that affect productivity. Eggshells are known to contain substances that can be used as nutrients in Oyster Mushrooms because they contain 98.2% calcium carbonate. Other nutritional content is 0.9% magnesium and 0.9% phosphorus, the eggshell membrane consists of 69% protein, 2.5% fat, 1.5% water and 27% ash which are substances needed by mushrooms to live. An experiment to study the effect of three dosage levels of eggshell nutrients on the growth of white oyster mushrooms (Pleurotus ostreatus). The experiment was designed in a completely randomised design with 10 treatments and four replications. The treatments were: Control (without eggshell nutrition), P1 25 grams, P2 50 grams, P3 75 grams. Thus, there were 40 experimental sample units. This experiment was conducted from 1 July to 30 July 2024. The experiment was conducted at CV. Lembah Spora, Polokarto Village, Polokarto District, Sukoharjo Regency. The results showed that eggshell nutrition had a significant effect on productivity, and the dose that had the highest effect on Oyster Mushroom productivity was a dose of 75 grams.

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KEYWORDS Oyster Mushroom, Sukoharjo Regency, Baglog Nutrition, Productivity, One Way Anova Test

INTRODUCTION

Oyster mushroom is a mushroom that can be consumed and is widely cultivated in Indonesia because of its fairly easy maintenance. Oyster mushrooms are very useful because they contain nutrients necessary for humans including calories, protein, fat, carbohydrates, thiamine, riboflamin, niacin, calcium, phosphorus, sodium, iron and fibre. Oyster mushrooms also have economic value and nutritional content and have high cultivation prospects.

The first advantage of Oyster Mushrooms lies in the ease of cultivation that can be carried out throughout the year so that the production is very abundant. Oyster mushroom cultivation does not require a large area because the cage model uses shelves that can be arranged to whatever level the farmer wants. It should be noted that oyster mushroom plants do not require much treatment during their growth, after the baglog is ready for planting, it only needs to be watered twice a day without any special treatment. The difficulty of oyster mushroom cultivation is relatively very low because this is evidenced by the many mushroom cultivation trainings among the community, both those held by the government and those held by the entrepreneurs themselves.

Based on data from BPS, Oyster Mushroom production in Indonesia in 2019 of 71.7 tonnes decreased to only 65.5 tonnes in 2020 due to the process of spreading the Covid-19 virus but began to move up significantly to 2021 of 259.3 tonnes and again experienced an increase in 2022 of 270.6 tonnes and until 2023 continued to increase to 275.8 tonnes. Based on this data, it can be concluded that every year the production of Oyster Mushrooms in Indonesia fluctuates. This is caused by the increasingly expensive cost of nutrients and causes farmers' profits to decrease. The input that most affects output is the cost of nutrients so that cheap alternative nutrients are needed, one of the advantages of eggshell nutrition is as an alternative nutrient at low cost. Eggshell-based nutrition needs to know the dosage that is in accordance with the objectives and expectations of the output produced according to the expectations of farmers. Eggshell flour is chicken farm waste that can be used as additional nutrients in baglog media with very easy application. The use of eggshell flour on baglog media is very easy, namely by mixing it with sawdust, agricultural lime, and rice bran.

Eggshells are categorised as waste because they are the result of egg harvesting carried out by broiler or domestic chicken farms at CV. Sari Makmur which is a business entity engaged in chicken farming which focuses on selling chicken eggs. Eggshells are categorised as waste because they have no economic value, there is no innovation in derivative products, and cause problems for the environment around the company related to air pollution and capacity. Eggshell research is expected to overcome this problematic waste and also become an additional benefit for chicken farming companies and mushroom cultivators so that many parties benefit from the results of the research. Eggshells are made of calcium carbonate so that the calcium carbonate content of 98.2% in eggshells is very high. Other nutritional contents are 0.9% magnesium and 0.9% phosphorus, while the eggshell membrane consists of 69% protein, 2.5% fat, 1.5% water and 27% ash. Judging from its content, eggshell flour can be used for fertiliser or nutrition in baglog media and as an acidic baglog media neutraliser (Arum et al., 2020).

RESEARCH METHOD

Place and Time of Research

This research was conducted for 1 months in July 2024, the method of taking locations was purposive or deliberate in CV. Lembah Spora Polokarto, District of Sukoharjo Regency**.**

Data Type and Source

The data required in the study is Cross Section data analysis which is research data that only exists at one time, data is seen at a certain time, and has several certain variables. The data are:

1. **Primary data**
   Primary data it is data that is obtained directly by researchers when research is carried out at the research site so that the data is very important because it must be obtained directly and cannot go through intermediaries. Primary data also serves to answer research questions/problem formulations. One of the primary data is production data, data on the evaluation of the type and dosage of nutrient concentrations, data on the quality and quantity of crops.
2. **Secondary data**
   Is data sourced from data sources that are not directly obtained from the object of research so that it can be obtained from existing data in previous studies and data collected by researchers to complement primary data. One of the secondary data used in this study is the productivity data of oyster mushroom commodities for the last 5 years taken from the Central Statistics Agency (BPS) website. Secondary data can also be obtained through books or journals that are in accordance with the research domain. One example of secondary data is complete productivity data and harvest area data in previous studies.

Data Collection Technique

1. Field study is a data collection method that aims to collect as much primary and secondary data as possible to facilitate data processing. Researchers are directly involved in oyster mushroom farming activities to carry out activities to achieve research objectives. Researchers conduct direct or direct practice in various cultivation and production activities in oyster mushroom cultivation farms. Cultivation activities include baglog production, oyster mushroom seedling production, mushroom rearing in cages, and harvesting and post-harvest processing.
2. Observations it is a very simple method of implementation where researchers make direct observations of all forms of cultivation activities. The researcher also records various data needed for the research so that this method makes it easier for the researcher to carry out the research effectively. The main process in the cultivation process that must be observed by researchers is the process of making nutrient concentrations to find out the weaknesses and advantages of previous types and doses of nutrients. The researcher will apply how many doses and treatments and how many repetitions will be done on eggshell nutrition after making observations.
3. Discussion it is an implementation method in the form of interview or question and answer techniques with sources that have been determined based on research needs. The resource person must be someone who really understands everything in Oyster Mushroom cultivation farming, but besides that, researchers can interview anyone who is considered capable of providing information.

Data Analysis Method

The data analysis method used in this study uses the analysis This research method is the Completely Randomised Design (CRD) method, which is a design applied to experiments with a homogeneous environment involving one factor with several levels as treatment. In this study, experiments were conducted in the same place, namely mushroom cages / barns (homogeneous), 4 levels or called the treatment will get 10 repetitions so that 40 experimental units are obtained and randomisation is carried out. In the RAL method, it is necessary to conduct an Homogeneity test to state that the data is homogeneous, namely having the same variance because homogeneous data is a requirement for anova test and further tests. After the data is declared homogeneous, the anova test is carried out to state

that eggshells have an effect on productivity and further post hoc tests are carried out to determine which treatment level (dose) has the highest productivity impact.

RESULT AND DISCUSSION

The data tested in this study are harvest data in the form of oyster mushroom wet weight at the first harvest that has gone through the experimental design. Mushroom productivity can be seen from various parameters, namely very fast mycelium growth, stalk length, mushroom hood size and area, mushroom fruiting body wet weight, growth and productivity of white Oyster Mushrooms are influenced by the composition of the growing medium (Elfandari et al., 2021). The following is data on oyster mushroom yields:

Table 1. Wet weight of first harvested oyster mushroom

	Treatment			
Reply	**Control**	**25 grams**	**50 grams**	**75 grams**
I	84	90	98	115
II	86	89	98	113
III	88	90	97	112
IV	89	91	103	117
V	85	93	108	112
VI	87	92	104	119
VII	86	94	112	118
VIII	90	96	108	112
IX	85	98	106	111
X	89	97	110	110
In Total		40 Experimental Unit		

Source: Primary Data Processed 2024

The data was then processed in the SPSS application to conduct homogeneity tests, anova tests, and post hoc tests. The following are the test results of several tests:

a. Homogeneity Test

According to Usmadi (2020), the Homogeneity Test is used to determine whether some population variants are the same or not. Homogeneity test in this study is one of the requirements before conducting Anova and post hoc tests. Homogeneity testing of harvest data aims to ensure that the data group comes from a population that has the same variant (homogeneous). decision-making guidelines in the homogeneity test that the sig value. > 0.05 means that the treatment population has the same variance, then this decision results in a homogeneous data distribution and to continue the Anova test. The following are the results of the homogeneity test:

Table 1.2. Homogenity test

Homogenity Test			
Levene Statistic	**Df1**	**Df2**	**Sig.**
4.153	3	36	0,13*

Source: Primary Data Processed 2024

Based on Table 1.2 the homogeneity test calculation, the significance value is 0.013 which concludes that the data is homogeneous or has the same variant because the sig value is greater than 0.05 and anova test can be carried out.

b. One Way Anova Test

It is a test to state that a factor has a significant effect. The basis for decision making in the anova test is the P value or Sig. value is less than zero point zero five (<0.05) so it can be concluded that there is a significant difference. Significant differences answer the formulation of the first problem whether eggshell nutrition can increase productivity, it can be concluded that the use of eggshell nutrition can significantly increase the productivity of Oyster Mushrooms compared to without the use of eggshell nutrition (Control). The following are the results of Anova testing:

Table 1.3. One Way ANOVA test

Anova

Harvest Results	Sum of Square	df	Mean Square	F	Sig.
Between Groups	4323.700	3	1441.233	109.878	.000
Within Groups	472.200	36	13.117		
In Total	4795.900	39			

Source: Primary Data Processed 2024

Based on Table 3.3 sig. value is 0.000 or less than 0.05 so it can be concluded that eggshells significantly affect productivity. The calculation results are suitable for further post hoc test.

c. Post Hoc Tests

It is a further test on One Way Anova data analysis to test which data groups are significantly different or to answer the second problem formulation, namely what level of nutrition has a significant impact on Oyster Mushroom productivity**.** Here are the results of the analysis:

Multiple Comparisons

Dependent Variable: Wet Oyster Mushroom
Tukey HSD

(I) Rate	(J) Rate	Mean Difference	Std. Error	Sig.	Lower Bound	Upper Bound
Control	25 grams	-6.10000	1.61967	.003	-10.4621	-1.7379
	50 grams	-17.00000	1.61967	.000	-21.8621	-13.1379
	75 grams	-27.00000	1.61967	.000	-31.3621	-22.6379
25 grams	Control	6.10000	1.61967	.003	1.7379	10.4621
	50 grams	-11.40000	1.61967	.000	-15.7621	-7,0379
	75 grams	-20.90000	1.61967	.000	-25.2621	-16.5379
50 grams	Control	17.50000	1.61967	.000	13.1379	21.8621
	25 grams	11.40000	1.61967	.000	7.0379	15.7621
	75 grams	-9.50000	1.61967	.000	-13.8621	-5.1379
75 grams	Control	**27.00000**	1.61967	.000	22.6379	31.3621
	25 grams	20.90000	1.61967	.000	16.5379	25.2621
	50 grams	9.50000	1.61967	.000	5.1379	13.8621

Source: Primary Data Processed 2024

Based on Table 4.4 the results of post hoc further test testing, it can be seen that the highest mean different value is at the level of 75gram nutrition with a value of 27.00000 so that the hypothesis in this study is accepted and answers the second problem formulation that the 75gram treatment level is the level that has an impact on increasing the productivity of Oyster Mushrooms significantly.

CONCLUSION

The results of this research show that Sukoharjo district has four marketing channels. Marketing channel I involves one intermediary, namely the trader. There are four actors in the marketing flow of lempuyang in Sukoharjo Regency, namely farmers, collectors, traders and consumers. This marketing channel involves two intermediary, namely collectors and traders. This marketing channel consists of four actors, namely farmers, collectors, traders and consumers. This channel is a marketing channel that involves three intermediaries, namely collectors, industry and traders. This marketing channel consists of five actors, namely farmers, collectors, industry, traders and consumers. This channel is a marketing channel that involves three intermediaries, namely collectors, industry and traders. This marketing channel consists of four actors, namely farmers, collectors, industry, traders and consumers.

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