DEMETER: Journal of Farming and Agriculture
Vol 2, Issue 3, November 2024, Page 176-183
ISSN: 2987-5889 (Media Online)
DOI: https://doi.org/10.58905/demeter.v2i3.379

The Effect of Rice Bran Utilization in Planting Media on Increasing Oyster Mushroom Production (Pleurotus Ostreatus) in Konawe District

Leni Saleh[1], S Salahuddin[2], Nurhayu Malik[3]

[1]Faculty of Agriculture, Lakidende University, Konawe, Indonesia
[2]Faculty of Agriculture, Halu Oleo University, Kendari, Indonesia
[3]F-MIPA, Halu Oleo University, Southeast Sulawesi, Kendari, Indonesia

Author Email: salehleni8@gmail.com[1], salahuddin_faperta@uho.ac.id[2], nurhayumalik@uho.ac.id[3]

Orcid : https://orcid.org/0009-0006-1574-86111[1]
Orcid : https://orcid.org/0000-0002-6830-57112[2]
Orcid : https://orcid.org/0000-0002-5835-44723[3]

Abstract. This study aims to determine the effect of using rice bran on the production of white oyster mushrooms with sawdust media used by farmers in oyster mushroom farming in Tongauna District, Konawe Regency. The design used is a Completely Randomized Design (CRD). Data collection by observing and recording the results of observations. To see the effect of using rice bran on the white oyster mushroom planting medium, analysis of variance (ANOVA) was carried out. With linear regression. This stage is the stage for processing the results of data collection in the experiments that have been carried out. The data that has been obtained is presented in table form. with the Oneway ANOVA Test with a confidence level of 5% and to see the effect of using rice bran on the white oyster mushroom planting medium, analysis of variance (ANOVA) was carried out. If the analysis of variance of the treatment is significantly different, then a Further Test is carried out with a Turkey distance at a level of 5%. Based on the results of the study, it showed that the results of the OneWay Anova Test and the Turkey Test had an effect on mycelial growth with the addition of rice bran to the composition of the oyster mushroom planting medium, the concentration of rice bran in the composition of the planting medium that is best used for mycelial growth is a concentration of 40%.

Keywords: Rice Bran, Oyster Mushroom

1 Introduction

In Indonesia and other nations, oyster mushrooms (Pleurotus sp.) are widely recognized in the general public. China has been growing oyster mushrooms for a millennium, according to historical documents. In the meanwhile, oyster mushrooms were first grown in Wonosobo, Indonesia, in 1980. Although there are other types of oyster mushrooms, their cultivation is less frequent than that of the white oyster mushroom (Pleurotus ostreatus), which is the most often used kind [1].

From a business standpoint, white oyster mushrooms are among the fungi with promising development possibilities. Because white oyster mushrooms may be processed into a variety of dishes, including meatballs, nuggets, soups, stir-fries, scrambled eggs, and mushroom satay, there is a huge market demand. White oyster mushrooms also provide a number of health advantages, including as decreasing cholesterol, preventing hypertension, and providing antioxidants that help prevent cancer [2]. The health advantages of oyster mushrooms include reducing diabetes mellitus, preventing blood vessel constriction, decreasing blood cholesterol, boosting energy and endurance, preventing cancer and tumors, preventing goiter, influenza, and promoting bowel motions. Oyster mushrooms can also speed up wound healing and halt bleeding [3].

Oyster mushrooms are one type of mushroom with a high market value and growing demand in the community. This is demonstrated by the demand, which continuously increases each year [4]. Mushrooms depend on the food produced by other species to meet their nutritional needs since they lack the chlorophyll needed to produce their own food. Among the various types of mushrooms found in Indonesia are oyster mushrooms (Pleurotus ostreatus), which are prevalent in the subtropical areas of the nation [5].

DEMETER: Journal of Farming and Agriculture
Vol 2, Issue 3, November 2024, Page 176-183
ISSN: 2987-5889 (Media Online)
DOI: https://doi.org/10.58905/demeter.v2i3.379

Oyster mushrooms can be processed into various types of food. The process of cultivating it is relatively easy and the results are very promising. In the process of cultivating mushrooms, it begins by providing oyster mushroom planting media made from sawdust and sterilized bran, compost, corn flour, lime and water mixed then which has been put into 1 kg plastic and given F3 mushroom seeds for growing oyster mushrooms so that mushrooms can grow on sawdust and after that the sawdust, which is in the plastic is pressed so that the sawdust becomes solid and is called a baglog [6].

Currently, many people are starting to cultivate white oyster mushrooms. This is because the raw materials for the growing media are easy to obtain, for example sawdust and rice husks [7]. Oyster mushrooms are in demand by the public because they taste good and also have high nutritional value [8]. In addition, oyster mushrooms also contain high protein and minerals needed by the human body and most importantly, they contain essential amino acids needed by people on a diet. Oyster mushrooms with their very good benefits for human health, so many people consume these oyster mushrooms both for vegetables and as processed foods [9].

Oyster mushroom cultivation efforts, both now and in the future, have very good prospects. Increasing public understanding of the importance of a healthy diet and balanced nutrition and market demand that has not been met properly by producers. Oyster mushroom cultivation is not difficult so it is very possible to be developed both in small and large business scopes [10]. Mushrooms get their food from the media where they grow, and can survive on plant remains or live attached to other organisms. Indonesia's hot climate with quite high humidity is an ideal condition for the growth of various types of mushrooms. One type of mushroom that has been widely known and cultivated in Indonesia is the white oyster mushroom (Pleurotus ostreotus) [11].

Mushroom farmers generally use sengon wood sawdust as a substrate or growing medium because it contains cellulose, hemicellulose and lignin which can accelerate mushroom growth. The consequence will be problems if sawdust is difficult to obtain, even if available the price will be quite expensive. Alternative materials that can be used to replace sawdust include various organic waste (One of the organic wastes used is rice straw. Rice straw can be a cultivation medium because it contains cellulose and hemicellulose as a source of carbon (main nutrients) needed by mushrooms to grow. Agricultural waste in Indonesia that has not been utilized is rice straw [12]. One solution so that the cultivation of white oyster mushrooms continues, it needs to be combined with other organic waste, one of which is rice bran [13].

Rice bran is the largest agricultural waste and has not been fully utilized. Rice straw has a cheap price and is easy to obtain. The xylan content of rice straw is quite high, which is 20%. Rice straw also contains around 34.2% cellulose, 24.5% hemicellulose and 23.4% lignin. In this project, we aim to explore the potential use of agro-byproduct residues such as rice straw, empty fruit bunches, and palm kernel cake for mushroom cultivation. Agribusiness can gain economic benefits by utilizing these residues as valuable resources to produce nutritious mushroom-based products. Mushroom cultivation serves as the most efficient and economical biotechnology for the conversion of lignocellulosic waste materials into high-quality protein foods and this will naturally open up new job opportunities especially in rural areas [14]. The nutritional content of rice bran is Crude Protein (CP) 12.06%; Fat 8.01%; Crude Fiber (CF) 14.20% and EM 1830 Kcal/kg [15]). The high Crude Fiber content in rice bran is caused by rice bran mixed with husks, where the husks are first ground and then mixed with bran. This results in the crude fiber content of the bran being higher because most of the husks have a high crude fiber content [15].

In 100 grams of rice straw contains 29.63% cellulose, 173 hemicellulose paper size 10 cm x 10 cm to cover 17.11% and lignin 12.17% which is a source of nutrition for mushrooms because mushrooms get food in simple forms such as cellulose, glucose, lignin, protein, and starch. The comparison of the composition of sawdust and rice straw as a mixture of 1,000 gram white oyster mushroom planting media is 100 grams to 700 grams [16]. Other basic planting media are bran or bran used as additional planting media that function as nutrients and sources of carbohydrates, carbon and nitrogen. The purpose of the study was to determine the effect of using rice bran on the production of white oyster mushrooms with sawdust media.

2 Method

2.1 Research Design

The true experimental research design is the design used in this study. This design has the character of an effort to reveal the causal relationship between variables by involving control variables as a comparison in addition to the group to be experimented on. In selecting the two groups, the researcher selected them using random techniques. In this design, we obtain the diversity of observed data only through treatment and error. For environmental conditions, media, tools and materials that are homogeneous can be achieved by using controlled spaces such as in the laboratory or in other experimental units. With these conditions, the appropriate design to use is the Completely Randomized Design (CRD) [17].

Completely Randomized Design (CRD) one factor with 4 treatments and 3 replications was used in this study so that 12 experimental bottle units were obtained. The treatments given with various concentrations can be seen in Table 1.

DEMETER: Journal of Farming and Agriculture
Vol 2, Issue 3, November 2024, Page 176-183
ISSN: 2987-5889 (Media Online)
DOI: https://doi.org/10.58905/demeter.v2i3.379

Table 1. Treatment of Planting Media with Various Concentrations

No.	Code	Treatment	Concentration
1	P0	Control	0 %
2	P1	Rice Bran	20 %
3	P2	Rice Bran	30 %
4	P3	Rice Bran	40 %
5	P4	Rice Bran	60 %

Table 1. shows the concentration of various rice bran treatments that will be added to the composition of the basic planting media for F2 oyster mushrooms (Pleurotus ostreatus). Completely Randomized Design (CRD) in its use has several basic principles. One of the principles that must be met is randomization. Randomization is a process that makes the laws of probability applicable so that data analysis becomes valid. Through randomization, each experimental unit has an equal chance of receiving a treatment. Randomization can be done by drawing lots, software or using a random number table. Based on this, the researcher conducted randomization to avoid subjectivity, because in scientific research logic and objectivity are needed. Through the randomization procedure, the field plan of the completely randomized design can be seen in Figure 1.

Figure 1. Field Plan of Completely Randomized Design (CRD) research: P (Treatment code); Number (Series Number)

1 P3	2 P0	3 P0	4 P2
5 P1	6 P3	7 P2	8 P2
9 P3	10 P0	11 P1	12 P1

2.2 Data Collection Methods

Researchers collected data by observing and recording the results of observations. Observation parameters include:

a. Percentage of mycelium growth (%)
Recording of observation results was carried out in the first week (day 6), second week (day 12) and third week (day 18) with the formula: Percentage of mycelium growth = Height of mycelium growing (cm) x 100% Height of growing media (cm).
b. Time of mycelium spread Days After Inoculation (HSI)
Recording of observation results was carried out after the mycelium filled the planting media/full colony by calculating the length of growth in units of Days After Inoculation (HSI).

2.3 Research Instruments

a. Tools
The tools used in this study were scissors, spatulas, scoops, draining sieves, bunsen burners, PVC rings, transport equipment, sterilization equipment, scales, thermometers, powder soaking drums, handsprayer, rulers, stationery, and documentation tools (cell phone cameras).
b. Materials
The materials used in this study were newspaper, spirits, 17 x 35 cm polypropylene (PP) plastic, bran, sawdust, firewood, rubber bands, dolomite lime, plaster, raffia rope, sawdust, 70% alcohol, and white oyster mushroom seeds.
c. Work Procedures
The design used in this study was a Completely Randomized Design (CRD) with 4 treatments and 3 repetitions for each planting medium, so that there were 12 treatment bottles, as follows:
- P0 = 90% sawdust + 0% rice bran (Control)
- P1 = 80% sawdust + 20% rice bran
- P2 = 70% sawdust + 30% rice bran
- P3 = 60% sawdust + 40% rice bran
- P4 = 50% sawdust + 50% rice bran

DEMETER: Journal of Farming and Agriculture
Vol 2, Issue 3, November 2024, Page 176-183
ISSN: 2987-5889 (Media Online)
DOI: https://doi.org/10.58905/demeter.v2i3.379

2.4 Data Processing and Analysis Techniques

To see the effect of using rice bran on the growing media of white oyster mushrooms, analysis of variance (ANOVA) was carried out. With linear regression. This stage is the stage for processing the results of data collection in the experiments that have been carried out. The data that has been obtained is presented in the form of a table. The data obtained in this study were analyzed using SPSS 20.00 statistical software with the Oneway ANOVA Test with a confidence level of 5% and to see the effect of using rice bran on the growing media of white oyster mushrooms, analysis of variance (ANOVA) was carried out. With linear regression as follows:

Table 2. Variety of Fingerprints

Source Of Diversity (SK)	Degrees of freedom of Squares (DB)	Sum Square (JK)	Middle (KT)	F Count	F Table 0,05	0,01
Treatment	p-1	JKP	KTP	KTP/KTG	-	-
Error	p(r-1)	JKG	KTG	-	-	
Total	pr-1	JKT				

Description:
Correction Factor (FK) = ΣY..2Γμ
Total Sum of Squares (JKT) = Σyij 2 - FK
Treatment Sum of Squares (JKP) = ΣYi.2 Γ
Error sum of squares (JKG) = JKT-JKP.

3 Results and Discussion

The data obtained in this observation are the results of measuring the percentage of growth and time of mycelium spread Days After Inoculation (HSI) of F2 oyster mushroom (Pleurotus ostreatus) seedlings. Data were taken from all research units, in the form of measurements of the fresh weight of the fruit body (in grams) and the number of fruit bodies in each research unit (baglog). The fresh weight of the fruit body and the number of fruit bodies are measures of the production of white oyster mushrooms (Pleurotus ostreatus) grown on the planting medium. The results of the measurements are as follows:

3.1 Time of mycelium spread on the planting medium/full colony

The results of observations of the time of mycelium spread Days After Inoculation (HSI) of oyster mushrooms (Pleurotus ostreatus) can be seen in the following table:

Table 3. Time of Mycelium Spread Days After Inoculation (HSI)

Treatment (P)	**Test**			**Total**	**Average HSI**
	I	II	III		
	HSI	HSI	HSI		
P0	20	21	22	63	21,00
P1	19	19	20	58	19,33
P2	18	17	16	51	17,00
P3	23	25	25	73	23,33
P4	24	22	25	71	23,03
TOTAL				316	21.42

Description: F Table (5%): 4.07.

Table 3 is the average time of mycelium spread for each treatment where it can be seen that the fastest average time of spread is in P2 with an average of 17.00 and the slowest treatment is in P3 with an average of 23.33. The results of the Anova test show the calculated F value of 31.121> F Table with a significance of 0.000 <0.05, so that further testing of the Turkey test model can be carried out at a confidence level of 5%.

DEMETER: Journal of Farming and Agriculture
Vol 2, Issue 3, November 2024, Page 176-183
ISSN: 2987-5889 (Media Online)
DOI: https://doi.org/10.58905/demeter.v2i3.379

Table 4. ANOVA Test Results for Mycelium Spread Time Data Days After Inoculation (HSI)

Sources of Diversity (SK)	Degrees of Freedom (db)	Sum of Squares (JK)	Middle Square (KT)	F hitung	F tabel (5%)
Treatment	4	85.583	28.528	31.121	3.06
Error	15	7.333	0.917		
Total	19				

The results of the ANOVA analysis in the table above show that the provision of rice bran has a significant effect < 0.05 (0.000 < 0.05) or F count > F table (31.121 > 3.06).

3.2 Observation Data on the Effect of Media on Production

3.2.1 White Oyster Mushroom (Pleurotus ostreatus)

A. Fresh Weight Parameter of Fruit Body (Gram)

The results of the calculation of the analysis of variance for the effect of the length of media incubation time on the production of white oyster mushrooms (Pleurotus ostreatus), based on the length of incubation time, show that the media plants that have been incubated for different lengths of time have a significant effect on the production of white oyster mushrooms. This can be seen in Table 5 below.

Table 5. Average Effect of Planting Media on the Production of White Oyster Mushrooms (Pleurotus ostreatus) Based on Fresh Weight of Fruit Body (grams)

Treatment	Test				Total	Average
	I	II	III	IV		
P0	78,07	41,44	50,78	56,08	226,37	56,34
P1	32,1	68,17	67,78	52,40	220,45	55,36
P2	50,68	42,46	55,06	46,98	195,18	48,56
P3	68,17	105,75	86,97	92,89	353,78	88,45
P4	8,36	60,97	44,75	24,24	138,32	34,58
Total	237,38	317,79	304,34	273,59	1.134,10	283,28

Table 5 data shows that the fresh weight (grams) of the fruit body from the white oyster mushroom production produced varies greatly at each incubation time interval. There is a variation in the average fresh weight of the white oyster mushroom fruit body from the lowest average of 48.56 grams (P2) to the highest data with an average of 88.45 grams (P3).

Table 6. Results of ANOVA Test for the Effect of Media on the Production of White Oyster Mushrooms (Pleurotus ostreatus) Based on Fresh Weight of Fruit Body (Grams)

Sources of Diversity (SK)	Degrees of Freedom (db)	Sum of Squares (JK)	Middle Square (KT)	F hitung	Sig.	F tabel (5%)
Treatment	4	6723.300	1680.825	6.297**	0.004	3.06
Error	15	4003.933	266.929			
Total	19	10727.233				

Description:
** = Very Significantly Different
* = Significantly Different
T_n = Not Significantly Different

This means that the treatment of the length of incubation time of the planting media on the production of white oyster mushrooms on the fresh weight parameter (grams) has a very significant effect. with the Fcount value of 6.297 which is greater than the Ftable of 5% (3.06). Observations of white oyster mushroom production have a significance value of 0.004 supporting the Fcount value (6.297) which is greater than the Ftable value of 5% (3.06) which indicates that there is a variation in data that falls within the requirements for diversity at the 5% level.

B. Parameter of Number of Fruiting Bodies

The results of the calculation of variance analysis for the effect of the length of media incubation time on the production of white oyster mushrooms (Pleurotus ostreatus), based on the length of incubation time, show that the planting media that has been incubated for different lengths of time has a significant effect on the number of fruiting bodies in the production of white oyster mushrooms. This can be seen in Table 7 below.

Table 7. Average Effect of Planting Media on White Oyster Mushroom (Pleurotus ostreatus) Production Based on the Number of Fruit Bodies

No	Treatment	Test				Total	Average
		I	II	III	IV		
1.	P0	3	3	3	4	13	3,3
2.	P1	3	4	4	5	16	4
3.	P2	4	4	5	6	19	4,8
4.	P3	4	5	6	6	21	5,3
5.	P4	7	8	8	8	31	7,8
Total		21	24	26	29	100	25,2

The data in Table 7 shows that the treatment of the length of incubation time of the planting media has an effect on the production of white oyster mushrooms.

Table 8. Results of Variance Analysis Test for the Effect of Planting Media on White Oyster Mushroom (Pleurotus ostreatus) Production Based on the Number of Fruit Bodies

Sources of Diversity (SK)	Degrees of Freedom (db)	Sum of Squares (JK)	Middle Square (KT)	F hitung	Sig.	F tabel (5%)
Treatment	4	50.700	12.675	18.549	0.000	3.06
error	15	10.250	0.683			
Total	19	60.950				

Description:
** = Very Significantly Different
* = Significantly Different
T_n = Not Significantly Different

This means that the treatment of the length of incubation time of the planting media on the production of white oyster mushrooms on the parameter of the number of fruit bodies has a very significant effect. The Fcount value (18.549) is greater than Ftable 5% (3.06). Observations of white oyster mushroom production have a significant value of 0.000 supporting the Fcount value (18.549) which is greater than the Ftable value of 5% (3.06) which indicates that there is a variation in data that falls within the diversity requirements of the 5% level.

C. Width of the Mushroom Cap Diameter

The results of the calculation of the analysis of variance for the effect of the length of incubation time of the media on the production of white oyster mushrooms (Pleurotus ostreatus), based on the length of incubation time, show that the planting media that has been incubated for different lengths of time has a significant effect on the production of white titarm mushrooms. This can be seen in Table 8 below.

Table 8. Average Effect of Planting Media on White Oyster Mushroom Pleurotus ostreatus) Production Based on Mushroom Cap Diameter Width

Treatment	Test				Total	Average
	I	II	III	IV		
P0	68.81	25.02	30.14	48.78	172.75	43.19
P1	44.55	66.51	60.05	62.96	234.07	58.52
P2	38.95	62.15	48.5	36.55	186.15	46.53
P3	45.75	88.15	67.75	66.75	268.4	67.10
P4	3.95	35.85	40.95	21.35	102.1	25.53
TOTAL	202.01	277.68	247.39	236.39	963.47	240.87

DEMETER: Journal of Farming and Agriculture
Vol 2, Issue 3, November 2024, Page 176-183
ISSN: 2987-5889 (Media Online)
DOI: https://doi.org/10.58905/demeter.v2i3.379

Table 8 data shows that the fresh weight (grams) of the fruit body from the white oyster mushroom production produced varies greatly at each incubation time interval. The data in Table 9 above shows the variation in the average diameter of the white oyster mushroom fruit cap from the lowest average of 25.53 cm (P4) to the highest data with an average of 67.10 cm (P3).

Table 9. ANOVA Test Results for the Effect of Media on the Production of White Oyster Mushrooms (Pleurotus ostreatus) Based on the Diameter of the Oyster Mushroom Cap (cm)

Sources of Diversity (SK)	Degrees of Freedom (db)	Sum of Squares (JK)	Middle Square (KT)	F hitung	Sig.	F tabel (5%)
Treatment	4	4022.808	1005.702	4.189	0.0018	3.06
Error	15	3600.979	240.065			
Total	19	7623.787				

Description:
** = Very Significantly Different
* = Significantly Different
T_n = Not Significantly Different

This means that the treatment of the length of incubation time of the planting media on the production of white oyster mushrooms on the parameter of the number of fruit bodies has a very significant effect. The Fcount value (4.189) is greater than Ftable 5% (3.06). Observations of white oyster mushroom production have a significant value of 0.0018 supporting the Fcount value (4.189) which is greater than the Ftable value of 5% (3.06) which indicates that there is a variation in the data that falls within the requirements of the 5% level of diversity.

D. Oyster Mushroom Stalk Length

The stalk length (cm) of white oyster mushrooms (Pleurotus ostreatus) and its variance (Analysis of Variance) can be seen in tables 13 and 14. The variance analysis shows that the composition of the rice bran and powder planting media has a significant effect on the stalk length (cm) of white oyster mushrooms (Pleurotus ostreatus).

Table 10. Average Effect of Planting Media on White Oyster Mushroom (Pleurotus ostreatus) Production Based on Oyster Mushroom Stem Length (cm)

Treatment	Test				Total	Average
	I	II	III	IV		
P0	45.95	20.3	24.1	40.95	131.3	32.83
P1	28.75	46.35	38.8	26.05	139.95	34.98
P2	20.15	34.45	32.85	30.65	118.1	29.53
P3	25.85	55.8	50.05	52.4	184.1	46.03
P4	8.65	18.95	44.55	44.55	116.7	23.25
TOTAL	129.35	175.85	190.35	194.6	690.15	166.62

Table 10 data shows that the stalk length (cm) of the white oyster mushroom production produced varies greatly at each incubation time interval. There is a variation in the average length of the white oyster mushroom stalk from the lowest average of 23.25 cm (P4) to the highest data with an average of 46.03 cm (P3).

Table 11. Results of Anova Test for the Effect of Media on the Production of White Oyster Mushrooms (Pleurotus ostreatus) Based on the Length of the Oyster Mushroom Stem (cm)

Sources of Diversity (SK)	Degrees of Freedom (db)	Sum of Squares (JK)	Middle Square (KT)	F hitung	Sig.	F tabel (5%)
Treatment	4	755.900	188.975	1.173	0.036	3.06
Error	15	2416.207	161.080			
Total	19	3172,107				

Description:
** = Very Significantly Different

DEMETER: Journal of Farming and Agriculture
Vol 2, Issue 3, November 2024, Page 176-183
ISSN: 2987-5889 (Media Online)
DOI: https://doi.org/10.58905/demeter.v2i3.379

* = Significantly Different
T_n = Not Significantly Different

This means that the treatment of the length of incubation time of the planting media on the production of white oyster mushrooms on the parameter of the number of fruit bodies has a very significant effect. The Fcount value (1.173) is greater than Ftable 5% (3.06). Observations of white oyster mushroom production have a significant value of 0.0018 supporting the Fcount value (1.173) which is greater than the Ftable value of 5% (3.06) which indicates that there is a variation in data that falls within the requirements of the 5% level of diversity.

4 Conclusion

Based on the results of the analysis, it can be concluded that there is an effect on the growth and production of mushrooms with the addition of rice bran to the composition of oyster mushroom planting media based on the results of the ANOVA test. The concentration of rice bran in the composition of the planting media that is best used for mycelium growth is a concentration of 40% (P3).

References

[1] Rahmat, Suryani, Nurhidayat. Untung Besar Dari Bisnis Jamur Tiram. Jakarta: *PT Agro Media Pustaka.* 2011.

[2] Suharjo, Enjo. Bertanam Jamur Merang di Media Kardus, Limbah Kapas, dan Limbah Pertanian. Jakarta: *PT Agro Media Pustaka*. 2015.

[3,] Suparti dan Marfuah. Produktivitas jamur tiram putih (Pleurotus ostreatus) pada media limbah sekam padi dan daun pisang kering sebagai media alternatif. *Jurnal Bioeksperimen.* 1(2), halaman 37-44. 2015.

[4] Zulfarina dkk. Budidaya Jamur Tiram dan Olahannya untuk Kemandirian Masyarakat Desa. Jurnal Pengabdian Kepada Masyrakat (*Indonesia Journal Of Community Engagement*). Vol.5, No.3, Desember 2019. Hal 359.

[5] Suparti dan Marfuah. Produktivitas jamur tiram putih (Pleurotus ostreatus) pada media limbah sekam padi dan daun pisang kering sebagai media alternatif. *Jurnal Bioeksperimen*. 1(2), halaman 37-44. 2015

[6] Hernawati, H., Jamili, A., & Saputra, D. H. Pengembangan Usaha Produksi Jamur Tiram Kelompok Wanita Tani Berbasis Wilayah. SELAPARANG: *Jurnal Pengabdian Masyarakat Berkemajuan* Volume 3(1), halaman 124 134. 2019.

[7] Rosmiah, R., Aminah, I. S., Hawalid, H., & Dasir, D. Budidaya Jamur Tiram Putih (Pluoretus ostreatus) Sebagai Upaya Perbaikan Gizi Dan Meningkatkan Pendapatan Keluarga. *Altifani: International Journal of Community Engagement*, 1(1), 31–35. 2020.

[8] Lamadjido, S. R., Umrah, U., & Jamaluddin, J. Formulasi dan analisis nilai gizi bakso kotak dari jamur tiram putih (Pleurotus ostreatus). *Jurnal Farmasi Galenika (Galenika Journal of Pharmacy)*, 5(2), hal.166-174. 2019.

[9] Maulana Eri Sy. 2012. Panen Jamur Tiap Musim Panduan Lengkap Bisnis dan Budi Daya Jamur Tiram, Yogyakarta: *Lily Publisher*. 2012.

[10] Triono, Edy. Budidaya Jamur Tiram dan Pengolahannya Sebagai Upaya Meningkatkan Ekonomi Kreatif Desa Kaulon. *Jurnal Karinov*, Volume 3(2): halaman 64-68. 2020

[11] Hartini. Pemanfaatan Batang Jagung (Zea mays) sebagai Campuran Media Tanam pada Budidaya Jamur Merang. UKDW. Yogyakarta. 2012.

[12] Khairul, A. K. Transfer Teknologi untuk Wirausahawan Generasi Muda melalui MARDI Youth Agropreneur Programme. FTCC-MARDI 2015 : *Seminar Internasional Budidaya Generasi Muda Petani dengan Implikasi Kebijakan Lahan Pertanian*. 2015.

[13] Hartadi, H., Reksohadiprodjo, S., Tillman, A.D. 2017. Hidayat, C., Sumiati, & S Iskandar. Kualitas Fisik dan Kimiawi Dedak Padi yang Dijual di Toko Bahan Pakan di Sekitar Wilayah Bogor. *Prosiding Seminar Nasional Teknologi Peternakan Dan Veteriner*, 669– 674. 2015.

[14] Agri Suwandi dkk. Perancangan konsep mesin felling pres pada budidaya jamur tiram. *Journal Teknik Mesin Untirta*. Vol.3 no.1 tahun 2017 hal.1.

[15] Saelan. Aplikasi Teknogi Pengukusan Ransum Bentuk Mash Sebagai Upaya Memperbaiki Lingkungan Kandang dan Performa Produksi Itik Petelur. *Disertasi Universitas Padjadjaran*. 2017.

[16] Piryadi, Triono Untung. Bisnis Jamur Tiram. Jakarta: *Agromedia Pustaka*. 2013.