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Identification of The Addition of Bran and Shallot Extract to the Quantity of Merang Mushroom Production

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Abstract

This study aims to identify the addition of bran and onion extract to the quantity of merang mushroom production. This research was carried out at the mushroom house merang Dusun Repok Tunjang Taman Indah Village, Pringgarata District, Lombok center NTB. This research is a descriptive experiment. The study was conducted with treatment and control design. The treatment medium was given fine bran and onion extract while the control added coarse bran rice milling waste. The data obtained are described in the form of graphs and photos. The researchers' findings show that the quality of merang mushroom production in media needs to be 36.03% higher when compared to control media. This is supported by the growth of mycelium, a faster fine head in the treatment medium. The application of bran and onion extract to the growing medium of merang mushrooms has a positive impact on the productivity and quality of merang mushrooms.

Keywords: Bran, Shallot Extract, Merang Mushroom

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INTRODUCTION

Covid-19 is a virus that can attack the body so it can cause various diseases. This virus is very dangerous for people who have blood sugar disorders and respiratory problems. Immunity is an important factor in fighting this virus. Immunity can be obtained from the intake of foods rich in protein. Protein is needed by the body in forming antibodies that can fight disease attacks that enter the body.

The virus can naturally be resisted by antibody in our body. Antibody is composed of a series of proteins that protect foreign substances that enter the body (Lavelli et al., 2018), , (Jasmina Glamočlija et al, 2015) and foods high in protein become foods that are hunted by the community. One organic food that is high in protein is mushrooms (González et al., 2020) and (Kostić et al., 2017). The findings of several researchers show that mushrooms have the ability as antivirals, antioxidants and cure cancer (Ren et al., 2012) and (Huang & Nie, 2015). (Lavelli et al., 2018) and (Ramsaha et al., 2016) state mushrooms are rich in essential amino acids, low in calories, and contain bioactive compounds. One of the active compounds contained in mushrooms is glucan. The results of the study found glucan has the ability to be an antitumor. Mushrooms are used in many ways, especially the world of health, for example in improving digestion (Kerezoudi et al., 2021).

The literacy study above shows that mushroom cultivation is very much needed and important to do. The high protein content and relatively affordable production costs are one of the basics why mushrooms need to be cultivated. (Kostić et al., 2017) states that fungi are

plants that cannot produce their own food because they do not have chlorophyll. Food is obtained from the medium on which it grows. High media lignin, protein and carbihydrate are the main laden mushrooms grown with maxill. Mushrooms grow optimally at pH 7-8 conditions to maintain this, usually mushroom farmers add CaCO3 to their planting media mixture (Spiteller, 2015), (Riduwan et al., 2013) and (Xu et al., 2020), . The problem found by researchers in mushroom farmers is that merang mushroom farmers have not been able to provide an ideal planting medium and create the right environmental conditions for the maximum growth and development of mushrooms.

Growing mushrooms develop ideally when the growing medium and environment are created based on the needs of the merang mushroom. Merang mushrooms in the early phase of their growth are in dire need of lignin compounds from the group of sterols, amino acids, peptides. This compound is the result of the decomposition of organic matter containing high proteins and nitrogen. This phase is characterized by the formation of mycelium in the form of white threads like spider jarring (HanneL. Kristensen et al, 2012) and (in et al., 2018). The next phase is the formation of fungal fruit ovules. In this phase the fungus absorbs a lot of cellulose compounds, hemicellulose and polysaccharides. This compound is a prombulation of organic matter rich in carbohydrates. Furthermore, the fungus needs water about 92%. As much as 65% is absorbed from the media and the rest from the codication of the mushroom environment through the fogging technique.

The cultivation of merang mushrooms in NTB still uses materials such as straw, sago pulp, bran, lime, urea and water. Mushroom farmers have not tested the use of other planting media that can be used to produce merang mushrooms more effectively. Limited literacy that results in a lack of information on more effective and efficient cultivation techniques (LeDoux & Mann, 2019). If analyzed, the source of the element N is obtained from bran and urea. The element nitrogen is a lignin compound-forming element that is needed by fungi in the early phase of their growth (Feng Chen et al, 2022). This phase really needs to be considered by mushroom growers because it largely determines the quality of merang mushroom production. In this phase the planting medium should be high in nitrogenous elements. The findings of mushroom farmers are less creative in developing mushroom growing media to improve the quality and quantity of merang mushroom production.

Based on the study above, the role of mushroom growing media which has a high protein content is very vital in improving the quality and quality of merang mushroom production. Bran is one of the ingredients that has a high protein content. Kapuk seeds become the waste of mattress craftsmen who use kapuk as a material for making mattresses. (Fitra Widya et al. 2018) reported that the use of bran as an additional medium in oyster mushroom compost has a positive impact on the growth and development of merang mushrooms. The use of bran so far has not been carefully studied. The high protein and lipid content in mushrooms is the main reason researchers explore kapuk seeds as one of the main planting media for producing merang mushrooms. (R. M. Saunders, 2009) states that bran is high in protein and macro minerals such as sodium and potassium which are needed by plants in their growth and development. (Khalid Gul, et al., 2015; Sharif et al., 2014) state bran contains a considerable amount of nutrients such as protein, fat, and dietary fiber. In addition, it contains a large amount of minerals such as K, Ca, Mg, and Fe. The presence of antioxidants such as tocopherol, tocoptrienol, and γ-oryzanol also brightens the prospects of bran utilization for humans and plants. The high protein content in bran is needed by fungi in the early days of their growth. (Aktaş & Akın, 2020) states fermented bran contains high antioxidant compounds. Mushrooms in their growth and development require growth stimulants to be able to grow optimally. Growth regulators in onion plants are needed as a stimulant to grow fungi. The content of auxin hormone in shallots is the basis for why onions are very effective in helping the growth and development of plant roots (Lukman et al., 2022)

This research is considered necessary in addition to strengthening and growing the bioenterprenership skills of mushroom farmers so that their lives can be lifted. Furthermore,

this research also produces food products that are rich in protein and low in calories that are needed by the body. This reason is what underlies researchers to continue to develop research on the manufacture of ideal media for the growth and development of merang mushrooms.

METHOD

This research is a descriptive experimental research. The variable measured in this study was the quantity of mushroom production. Variables that affect the quantity of straw mushroom production are the quality of the media and the addition of shallot extract growth regulators. This research was conducted in the mushroom house of Repok Tunjang Hamlet, Taman Indah Village, Pringgarata District, Central Lombok, West Nusa Tenggara. The variables observed in this study were the biological response of straw mushroom growth to the required and control media. Biological response includes volume of mycelium, fine head, and quantity of mushroom production. This research was conducted in a mushroom house. One mushroom kumbung consists of 10 shelves which are divided into two sides so that each side consists of five shelves arranged in stages. Each side is divided into a rack which contains the necessary media and controls. The composition of the media on the shelf needs to consist of 25 kg of soft rice bran, straw, sago dregs from palm tree processing waste, CaCO3 and shallot extract. The composition of the dick media is the same except for rice bran which is coarse waste from the rice milling process and is not given shallot extract. The research was conducted in one house with the aim of treating the growing media the same. The same treatment in question includes the sterilization process, lighting and room temperature in the same treatment and control media. These three components also affect the quantity of mushroom production. If this research was conducted in different kumbung, the three treatments would be difficult to control under the same conditions (Lucca, et al, 2012; Tang et al., 2015)

RESULTS AND DISCUSSION

Analysis of Planting Media and Quantity of Merang Mushroom Production

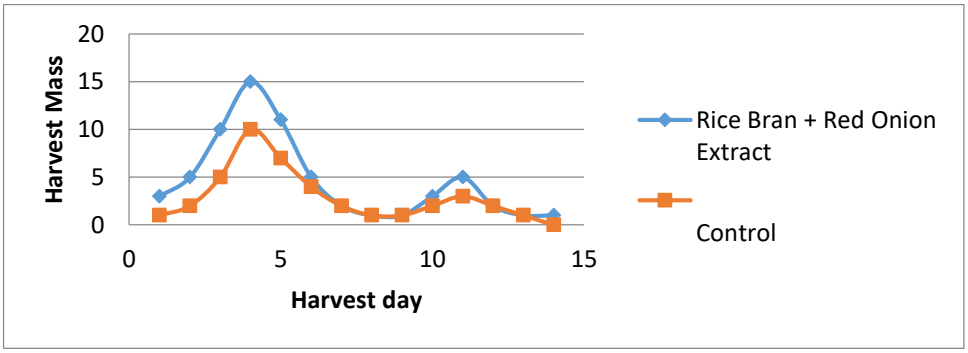
The planting media used in making merang mushrooms is in the form of rice straw, bran, bran, sago pulp, $CaCO_3$, and water. Bran in the growing medium is given as a contributor to carbon and nitogen which are needed by fungi. Straw rich in lignin and potassium minerals is especially needed by fungi in the growth of fungal mycelium. $CaCO_3$ is required as a buffer for the pH of the medium. A good growing medium ranges from a neutral pH. Water is needed as a material that plays an important role in the hydrolysis of organic media into simple components required by fungi. Bran in the treatment media is given excessively to see the real impact of the treatment on the growth and development of merang fungus. Bran, which is rich in nitrogen sourced from the protein it contains, is needed in the early days of the growth and development of merang mushrooms. As a result, rice bran-rich media can increase the amount of merang mushroom production when compared to media that is coarsely bran rice milling waste. The results can be seen in table 1.

Table 1. Effect of Bran Feeding on the Amount of Merang Mushroom Production

Treatment	Number of Production Day													
						6	7	8	9	10	11	12	13	14
Bran and Shallot Extract			0	5	1	5	2	1	1	3	5	2	1	1
control	1	2	5	10	7	4	2	1	1	2	3	2	1	0

Based on the findings, the addition of bran and onion extract has a positive impact on the growth of merang fungus. The high protein content in bran is the scientific basis for the positive response of merang mushrooms in the growth and development process. (Nunes et

al., 2012) stated that nitrogen supplementation through bran and urea increases the productivity of fungi and is able to increase the compounds of natural ingredients contained in mushrooms. Natural matter compounds are organic compounds produced by plants through secondary metabolic processes. This compound is commonly a drug for the body. (Assan & Mpofu, 2014; Biswas & Decent, 2014; Mahbuba Moonmoon. et al., 2011) reported substrates high in C/N composites were able to increase mushroom production. Carbon elements are obtained through the decomposition of organic materials high in cellulose and nitrogen obtained from the decomposition of protein macromolecules. (Maurya, 2016) found from a variety of substrate variations that have been studied substrates with the composition of rice straw and bran proved to be the most effective in increasing the productivity of merang mushrooms. The findings of several previous researchers are in line with the findings of researchers where the addition of bran and onion extract has an effect on increasing the productivity of merang mushrooms as depicted in chart 1.



Biological Growth Response of Merang Mushrooms to the Addition of Bran and Shallot Extract.

Tamam media in the study were given two different treatments. The first planting medium is additionally given bran at the beginning of composting. The control planting medium uses coarse bran with the same mass of 25 kg on each planting medium. Next the planting medium is composted for 9 days. The subsequent planting medium is equally included in the same kumbung. The planting medium is further arranged in mushroom coils on each shelf. The right shelf is the treatment rack and the left shelf is the control rack. After all the planting media is compiled, sterilization is carried out for 9 hours. On the next day sprayed onion extract on the treatment rack. After it is carried out sowing of seedlings. On day 7 spraying is carried out on both shelves. The treatment rack was given a solution of brown sugar and onion extract while in the control only brown sugar solution was given. The provision of a variety of nutrients and growth hormones is carried out in the hope that merang mushrooms can grow more optimally.

The biological growth response of merang mushrooms is one of the indicators of the quality of the growing media of merang mushrooms. Biological responses include the growth of mycelium, *find head* and body quality of merang fungi. The rapid growth of mycelium becomes an indicator of the nutrients provided by the growing medium quickly absorbed and preferred by fungi. Nutrients are quickly absorbed if the growing medium has provided elements in simple organic compounds (Putra et al., 2022).. (Siskawati. et. al, 2013) states faster growth of castor roots after soaking in onion extract. Auxin and ryzokalin hormones contained in shallots play an important role in the growth of roots and plant cells. The nutritional collaboration of bran and onion extract is evident from the faster growth of merang mushrooms and better mushroom quality. The indicators can be seen in figures 2 and 3. Merang mushrooms with bran medium and sprayed onions have better growth.

Figure 2. Addition of Bran+ Onion extract and Figure 3 addition of coarse bran

Based on figures 2 and 3 above, the application of bran and onion extract gave a positive response to the growth and development of merang mushrooms. The researchers' findings showed that the amount of merang production increased by 25-35% in the treatment media. The availability of adequate nutrition and the presence of growth stimulants from shallot extract are factors that greatly determine the increasing production and quality of merang mushrooms. The merang fungus is a semi-black type of merang longer storage if the fruit body is harder and whiter. Merang with this quality lasts sam 3 days in the open air. If the fruit body is slightly flabby and black usually lasts only 1-2 days. This long shelf life is beneficial for merang mushroom farmers because if the production is excessive, the market is usually also constrained. If the shelf life is longer, farmers can sell the rest the next day. The effect of giving ekatul and onion extract on the quality of the body of the semi-black merang mushroom fruit can be seen in figures 3 and 4.

(Galavi et al., 2013) stated that the administration of auxin hormone in grape planting can stimulate faster root growth. Root growth and development is the key to the beginning of plant growth and development. The researchers' findings on the mycelium treatment rack, the fine head of the fungus grows faster. The indicator is the volume of mycelium and the harvest of mushrooms faster. Giving twice the onion extract on days 1 and 7 has a positive impact on the growth of fungal roots. (Kim et al., 2020; Nadia Bouain, et al., 2019) report on roots that play a role in absorbing nutrients from the growing medium needed by plants. If root growth and development are disturbed, planting nutrients will be disturbed. Macronutrients such as nitrogen, potassium, posfor, and karborn are needed by plants. The ability of farmers to choose and sort out planting media is very deep in providing optimal nutrition for the growth and development of mushrooms. Bran and straw that are high in protein and potassium are expected to be able to contribute macroelements that are needed by merang mushrooms.

CONCLUSION

The addition of bran and onion extract to the garden medium of merang mushrooms has a positive impact. The productivity and biological response of merang fungi become the most noticeable indicators. The combination of root growth and nutrition is the basis for a positive response to the growth and development of fungi to be better than control media.

RECOMMENDATION

It is worth researching other substrates rich in macroelements needed by plants. In this study, researchers have not analyzed the pH of the media and the room temperature of the mushroom beetle which is optimal for the growth of merang fungus. It is necessary to conduct further research because the growth and development of mushrooms is not only determined by nutrients and growth regulators. Many things affect the growth of fungi such as the environmental engineering of the mold coil and the pH of the medium.

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