Comparison Of Jakaba Growth With The Addition Of Organic Matter In Rice Washing Water

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Abstract
Jakaba (perennial luck mushroom) is a fungus derived from the fermentation of rice laundry water (leri). This fungus has the same physical shape as coral but has a fragile texture. This study aims to find out the growth of jakaba with the addition of organic matter in rice laundry water. The research was conducted in Padang Halaban village, Aek Kuo District, Labuhan Batu Utara Regency, North Sumatra. The research was conducted by mixing 1 liter of leri water with 400 grams of organic ingredients such as bran, banana peel and catfish feed Research was carried out by repeating each treatment as much as 6 repetitions with the parameters of salting, namely aroma, color, growth and diameter of jakaba. Based on observations, it is known that the growth of jakaba fungus occurs on the 12th day to the 15th day with the largest jakaba diameter which is 52.9 mm (P2) and the smallest is 40.25 mm (P1). The addition of other organic matter to leri water gives a different aroma and color of jakaba to each treatment.

Keywords : *Rice Laundry Water, Jakaba, Organic Matter.*

I. INTRODUCTION

Rice is the staple food of most Indonesians containing about 360 kcal of energy, 6.6 grams of protein, 0.58 grams of fat, and 79.34 grams of carbohydrates 100 grams [1]. There are many types of rice in Indonesia. Based on rice varieties are divided into catfish rojo rice, fragrant menthik rice, C-4 rice, IR-64 rice, IR-36 rice, IR-42 rice, cisadane rice and so on[2]. In addition to straw, rice water or residual water from rice laundry also includes waste that can still be used. According to research [3], rice washing water can be used as a plant fertilizer because rice laundry water contains carbohydrates, nutrients, vitamins and other substances. Rice laundry water contains many nutrients including, 80% vitamin B1, 70% vitamin B3, 90% vitamin B6, 50% manganese (Mn), 50% phosphorus (P), 60% iron (Fe), 100% fiber, and essential fatty acids [4]. According to the study[5], white rice laundry water contains N 0.015%, P 16.306%, K 0.02%, Ca 2.944%, Mg 14.2, S 0.027%, Fe 0.0427% and B1 0.043%. One of the other substances contained in rice laundry water is phosphorus. Phosphorus is a macro nutrient needed by plants. The role of phosphorus for plants is to spur root growth and the formation of a good rooting system of seeds and young plants, accelerating the ripening of fruits and seeds [6]. Rice laundry water has many benefits for crops, is easy for farmers and is environmentally friendly to have a low price so that it can be affordable for farmers [7].

According to research [8], the highest nutritional content of rice is found in the skin. When washing rice usually the first laundry water will be cloudy. The turbid color indicates that the outermost layer of rice is eroded. During washing rice, about 80% vitamin B1, 70% vitamin B3, 90% vitamin B6, 50% manganese (Mn), 50% phosphorus (P), 60% iron (Fe), 100% fiber and essential fatty acids dissolved by water, so it can be used in helping fertilize plants. According to research[9], the administration of rice laundry water has a positive effect on the dry weight of plants. [10] It was added that rice laundry water contains a growing regulatory substance. ZPT plays a role in stimulating the formation of roots and stems as well as the formation of branches and root stems by inhibiting apical dominance and the formation of young leaves.Jakaba is a perennial lucky mushroom derived from fermented rice laundry water (leri). Mushrooms whose physical shape is very similar to corals that have a flexible texture when young and long to time harden like corals in the ocean [11]. Elements and content of jakaba mushrooms are carbohydrates in the form of starch, B vitamins, minerals and various proteins.

Carbohydrates in high amounts will help the process of hormone growth in the form of auxins, Gibberine and Alanine. These three types of hormones are tasked with stimulating the growth of leaf shoots, transporting food to the most important cells of the leaves and stems. [12]. Jakaba mushrooms also have the benefit of accelerating the growth of dwarf plants, extending the life of plants, to cope with fusarium wilt disease [13].

One of the successes in breeding jakaba is the availability of organic matter in the media. Organic matter is used as a source of food or energy for its growth and breeding. Some organic waste can be used as an additional ingredient in jakaba growth media. Bran is a byproduct of rice milling plants in producing rice. Bran is used as animal feed because it has a fairly high nutritional content, the price is relatively cheap, easy to obtain. Nutrients found in good quality rice bran include 11.3-14.4% protein, 15.0- 19.7% fat, 7.0-11.4% crude fiber, 28.62% carbohydrates and 6.6-9.9% gray [14]. Pellets are a special food for catfish made directly from the factory. Pellets already contain all the nutrients needed by fish in order to grow large. Usually pellets are made of various flours, soybean meals, coconut meals, minerals, bran, oil, and various vitamins that have been well organized. In catfish feed this time the protein content is 35-40%, carbohydrates 20-30%, fat 9.5-10%, vitamins 0.25-0.40%, and minerals 1% [15]. Likewise with banana peels that produce large amounts of waste. Every 100 g of banana contains 89 kcal of energy, 22.84 g of carbohydrates, 2.6 g of fiber, 0.33 g of fat, 1.09 g of protein [16]. Banana peels also contain 3.63% coarse protein, 2.52% coarse fat, 18.71% coarse fiber, 7.18% calcium, and 2.06% phosphorus [17]. Based on these problems, this study aims to see a comparison of jakaba growth in various additional organic matter such as bran, fish pellets and banana peels in growth media. The content of nutrients, compounds and microorganisms in various organic fertilizers produced by biotechnology varies due to the materials used differently. Theresults from her study [18], reported that the use of POC has the potential to reduce the use of NPK fertilizers by 25%.

II. RESEARCH METHODS

The research was conducted in January 2022 in Padang Halaban Village, Aek Kuo District, Labuhan Batu Utara Regency, North Sumatra. The ingredients needed in this study were rice laundry water, bran, old banana peel, mashed catfish feed, the tools used were 1.5 liters of drinking water, knives, digital funnels, buckets, pens and paper. The research was conducted by putting 1 liter of rice laundry water in a bottle, then putting organic matter into the bottle according to the treatment. Each treatment is repeated 6 times and parameter observations are carried out every 3 days for 15 days. The observed parameters are the color of the jakaba, the diameter of the jakaba, the aroma, and the first day it grows. The results of the next test are analyzed descriptively by comparing between treatments As for the design of the designed experiments are as follows:
P0 = kontrol, P1 = 1 liter of rice laundry water + 400 grams of bran, P2 = 1 liter of rice laundry water + 400 grams of fine catfish feed , P3 = 1 liter of rice laundry water + 400 grams of banana peel

III. RESULTS AND DISCUSSIONS

A. Aroma of Jakaba

Based on the results of observations from each treatment, it can be known that the initial aroma released on the jakaba in general is the smell of nira or the smell of tape, while on entering the 12th day the aroma is lost until the formation of jakaba (Table 1). The process of change in aroma is caused by the passage of anaerobic metabolic processes (fermentation) to produce energy so that microbes can grow and develop. According to research [19], the smell in rice laundry water is caused by the fermentation process that produces acid and lowers the pH to 4.5. Fermentation is a process carried out by microorganisms both aerobic and anaerobic that is able to change complex compounds to be simpler. It aims to accelerate the absorption of nutrients in plants. The principle of this fermentation is that organic matter is destroyed by microbes in a certain temperature range and conditions (20). According to (21), anaerobic fermentation is the process of breaking down carbohydrates and

amino acids without the need for oxygen. In anaerobic fermentation of liquid organic fertilizers, organic matter will be converted into CO_2 and methane, until the source of organic matter has been used up.

Table 1. Scent Parameter Observation Results

Day	P0	P1	P2	P3
Day 3	No smell	No smell	No smell	No smell
Day 6	Nira	Nira	Nira and the smell of pellets	Rotten banana
Day 9	Tape	Nira	Nira and the smell of pellets	Nira & rotten banana peel
Day 12	No smell	No smell	A slight scent of pellets	Slight scent of rotten banana peel
Day 15	No smell	No smell	No smell	No smell

B. Beginning of Growth and Diameter of Jakaba

Based on Table 2 , it is known that the growth of the jakaba culprit occurs on the 12th to the 15th day with the largest jakaba diameter of 52.9 mm (P2) and the smallest at 40.25 mm (P1). this is in accordance with the statement [22], that the breeding of jakaba mushrooms in leri water, it takes up to 14 days. The morphology of the jakaba obtained is chewy textured but easily broken or destroyed and the color is greenish at the bottom and speckled red at the top. According to [23] states that the quality of mushroom seedlings will decrease when they are more than 4 weeks old since the inoculation process (planting). This corresponds to the growth patterns of fungi and other microbes, where each undergoes growth phases with different time spans. Research (24) adds that the most important nutrients needed for mycelium growth and fungal fruit body formation are cellulose, hemicellulose, lignin and protein.According to (25) that the most easily absorbed source of carbon by the fungal mycelium is sugar/glucose. In the results of the study (26), stated that the fungus gathers its energy and resources to increase the length of the hyphae which will certainly increase the overall surface area. The results of the study (27) explained that, mushroom seedlings are a determining factor as well as seedlings for other plants, because from superior seedlings will produce a high-quality fruit body and allow it to adapt to the wider environment. The age of seedlings exerts a noticeable influence on the vegetative growth phase of the fungus. But for the next growth, namely the formation of fruit bodies (generative phase) the age of seedlings does not give a significant influence.

Mushroom growth is more influenced by nutrient content, environmental factors or following the ongoing growth phase (28).on rice bran at every storage time showed a change in color in each treatment. rice bran containing a lot of acetic acid will be yellowish, while rice bran containing butyric acid will be brown and good rice bran shows almost the same color as its original color. So that the rice bran obtained in the observation process is good because the color of rice bran is the same as the original color of the bran at the beginning of storage. In addition, the treatment affects the texture of rice bran during storage. So that the texture of rice bran that gets treatment still has a different texture. Research (29) states that the texture of rice bran is influenced by water content. Rice bran with a high moisture content (>80%) will show a slightly brownish texture, soft, and moist.In the content of catfish feed already contains all the nutrients needed by fish in order to grow large. Usually pakan is made from various flours, soybean meals, coconut meals, minerals, bran, oil, and various kinds of vitamins that have been well stocked. Good pellets have a water content below 10% and are not easily destroyed (30).So far many banana peels are just thrown away and left alone, but it turns out that banana peels have many benefits, for example in the field of health, the food industry, and organic fertilizer mixtures. The content on banana peel is very much and good, banana peel has the main nutritional content that can be used, namely carbohydrates, the carbohydrate content in banana peels is quite high. other nutrients found in banana peels are vitamin B6, vitamin B12, fiber, and protein.

Table 2. Observation results of early parameters of growth and diameter of Jakaba

Day	P0	P1	P2	P3

Day 3	Not yet grown	Not yet grown	Not yet grown	Not yet grown
Day 6	Not yet grown	Not yet grown	Not yet grown	Not yet grown
Day 9	Not yet grown	Not yet grown	Not yet grown	Not yet grown
Day 12	Start to grow the culprit	Not yet grown	Start to grow the culprit	Not yet grown
Day 15 (mm)	It's been grown 51,05	It's been grown 40,25	It's been grown 52,9	It's been grown 48.2

C. Color

In table 4 below, the colors produced on the 3rd to 6th day tend to still be the same color, which is the color obtained from each mixture of organic matter in each treatment. Changes occur on the 9th day where the resulting color tends to appear white spots in each treatment, this is what is referred to as a candidate for jakaba fungus, the white spot changes on the 12th to 15th day where the resulting color is red spots and begins to form a collection of coral-like fungi on the 15th day. The resulting color also tends to be the same and evenly distributed, namely the red spot above, yellow on the stem and white on the root. Under normal conditions, the fungus grows well producing biomass, however, under unfavorable conditions especially lack of nutrients, then the fungus will be more dominant in producing secondary metabolites compared to cell growth (31).

Table 3. Jakaba Color Parameter Observation Results

Day	P0	P1	P2	P3
Day 3	Turbid White	Yellow & White	Brown & White	Black
Day 6	Turbid White	Yellow & White	Brown & White	Black
Day 9	Small spots of white color	Yellowish-white	Brown white spot	Black white spot
Day 12	Red spots	Yellow red spot	Brown red spot	Black red spot
Day 15	Red, yellow spots on the stem and white on the roots	Red, yellow spots on the stem and white on the roots	Red, yellow spots on the stem and white on the roots	Red, yellow spots on the stem and white on the roots

IV. CONCLUSION

1. The addition of other organic matter to the water gives a different aroma and color of jakaba to each treatment

2. Jakaba growth occurs on the 12th to 15th day with the largest jakaba diameter being 52.9 mm (P2) and the smallest at 40.25 mm (P1).

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