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THE EFFECT OF KIND OF MEDIA ON F0 AND F1 BUTTON MUSHROOM SPAWN GROWTH

Siska Rahayu Agroindustri , University of Mercu Buana Yogyakarta.

Umul Aiman* Agroindustri , University of Mercu Buana Yogyakarta. *Corresponding Author

Wafit Dinarto Agroindustri, University of Mercu Buana Yogyakarta

ABSTRACT Quality spawns are an important factor to support the success of button mushroom cultivation. The quality of mushroom spawn is influenced by the nutritional composition of the media. The purpose of this study was to determine the best media for the growth of F0 and F1 button mushroom. The research was carried out in March-May 2021 at the Biology Laboratory, Faculty of Agroindustry, University of Mercu Buana Yogyakarta. The study consisted of 2 series of experiments. This study consisted of 2 series of experiments. The first experiment was to test the growth quality of F0 champignon on 3 types media, that is potato dextrose agar (PDA),mung been sprout extract media, and white sweet potato media. The second experiment tested the growth quality of F1 button mushroom grown on three types of media, that is corn, barley and sorghum. Both experiment were single factor trials arranged in a completely randomized design (CRD) with three replications, and each replication consisted of 5 units. The results showed that the growth of F0 button mushroom grown on PDA media and mung bean sprout extract was better than white sweet potato extract media. For the growth of F1 button mushroom, the best media was corn, the second was sorghum and the third was barley.

KEYWORDS : F0 button mushroom, F1 button mushroom, growth medium for fungal mycelium

INTRODUCTION

Button mushrooms (*Agaricus bisporus*) or also known as champignons are the oldest and most widely cultivated mushrooms in the world. This mushroom has a higher price than oyster mushrooms and has a complex nutritional content. This mushroom is also reported to have compounds that are able to fight cancer and metabolic diseases (Tjokrokusumo, 2015). According to Utama et al, (2016), to support success in mushroom cultivation, good quality mushroom seeds are needed, namely the spread of mycelium evenly, thick and white. Seedling media is one of the factors that determine the quality of mushroom seeds because the nutrient content in the media affects the growth of fungal mycelium.

The mushroom nursery media commonly used is PDA (Potato Dextrose Agar) in F0 nurseries. The main ingredient in making PDA media is potatoes which have good nutritional content for the growth of fungal mycelium, namely in 100 grams of potatoes there are 85.6 g carbohydrates, 0.3 g protein, 0.1 g fat (Hartati, 2017). 11 mg calcium, 56 mg phosphorus, 1 mg iron, 0.11 mg vitamin B, and 17 mg Vitamin C (Pertiwi, 2017).

Currently, many other materials that can be used as alternative media for breeding F0 button mushrooms have been studied, namely white sweet potatoes and green bean sprouts. From research that has been done by (Hartati, et al, 2018) media from white sweet potato extract is able to grow mycelium of oyster mushrooms and straw mushrooms. This is because white sweet potatoes contain 1.8 g of protein, 68.50 g of water and 27.90 g of carbohydrates (Directorate of Nutrition, Ministry of Health RI; Soedarsono, 2014; Hartati et al, 2018). According to Kinasih (2015) mushrooms absorb nutrients in the form of cellulose, glucose, lignin, protein and starch compounds. Meanwhile, the use of mung bean sprout extract has also been investigated on the growth of the fungus Rhizopus oryzae by Legistya et al, (2017) which results in better fungal growth on mung bean sprouts media than commercial PDA media.

The media for F1 breeding commonly used comes from seeds. The seeds that are commonly used as a medium for mushroom breeding in Indonesia are corn because they are cheap and contain complete nutrients and are able to grow mushroom mycelium well, which contain 73.07% carbohydrates, 7.53% protein and 5.03% fat. However, competition in the use of corn in Indonesia in several sectors is quite tight. Based on data from the Food Security Agency of the Indonesian Ministry of Agriculture (2018), the largest demand for corn is for the feed industry as much as 8.3 million tons, the need for local animal feed is 2.52 million tons, the need for seeds is 134.2 thousand tons and the food industry needs 4 .76 million tons. The large demand for corn is for feed and only 40% can be supplied from domestic corn production. Thus it is necessary to obtain an alternative F1 mushroom media other than corn.

Other grains that can be used as a medium for breeding button mushrooms are barley or millet seeds and sorghum seeds. According to Miswarti et al, (2017) barley contains 63.2% carbohydrates, 11.2% protein, 4% fat, and 6.7% fiber. Meanwhile, sorghum seeds contain 70.7% carbohydrates, 10.4% protein, 3.1% fat and 1% fiber. The nutritional content of barley and sorghum which is almost the same as corn makes these two grains potential as alternative media for breeding F1 button mushrooms. Sorghum was able to produce 11.3 cm of oyster mushroom and straw mushroom mycelium growth (Ananda dan Karunia 2017), while barley seeds could grow 9.87 cm of oyster mushroom mycelium (Utama et al, 2013).

In addition to the high nutritional content, the use of sorghum and barley seeds in Indonesia is still limited at the research level and as bird feed. As a food ingredient, sorghum is only consumed by the people of Rote Ndao and Sumba, East Nusa Tenggara (Subagio and Aqil, 2015). By using sorghum and barley as alternative media for mushroom breeding, it will increase the utilization of these cereals in Indonesia. In Khusnul's research (2019) the growth of oyster mushroom F1 seeds on corn and millet media was not significantly different and the growth of mushroom seeds on sorghum media was lower than on corn and millet media.

Based on the description above, the researchers aimed to obtain the best media for the growth of F0 and F1 button mushrooms.

Case Study

In this study, the growth of F0 and F1 button mushrooms was tested. For F0 seedlings, the media used consisted of PDA media, bean sprouts extract media and sweet potato extract media. From the three media, it is known that each provides growth that is not different. The mycelium growth of F0 button mushroom seeds on sprout extract media was as good as the

mycelium growing on PDA media and sweet potato extract. In their growth and development, fungi absorb nutrients from the media directly in the form of ions and simple molecules. Carbon is the basic element for forming cells and a source of energy for fungi obtained from carbohydrates (Nugroho, 2016). All carbon compounds can be utilized by fungi, both monosaccharides, disaccharides and polysaccharides. This is because button mushrooms have extracellular enzymes that are able to break down nutrients in the form of disaccharides and polysaccharides so that these nutrients can be absorbed. One of the extracellular enzymes produced by button mushrooms is laccase (Reksohadiwinoto et al., 2017). All of the main compounds needed for the growth of F0 button mushroom seedlings were quite well available in the three test media.

The growth of F1 button mushroom seedlings was tested on different grain media. The treatments given in the growth test of button mushroom F1 seeds were media from corn, barley and sorghum seeds. From the observations that have been made, it is known that all the growth variables of the mycelium F1 button mushroom have significant differences between treatments. The best growth of mycelium F1 button mushroom was on corn media, the second best was on sorghum media and the lowest was on barley media.

Fig 1. Growth of mycelium F0 button fungus on PDA media, white sweet potato, green been sprouts (L-R)

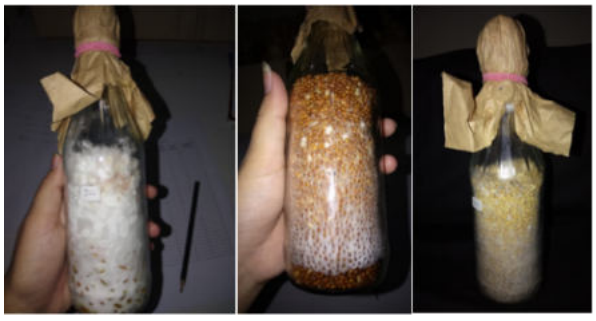

Fig 1. Growth of mycelium F1 button fungus on on day 18 on corn (a), barley (b) and sorghum (c) media (L-R)

CONCLUSIONS

Based on the research that has been done, it can be concluded that:

1. The growth of F0 button mushrooms on PDA media and mung bean sprout extract was better than white sweet potato extract media.
2. The best growth of button mushroom F1 seeds was on corn media, second on sorghum media and third on barley media.

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