The Appropriate Technology in Cultivating Mushrooms by Street Children In Hafara

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Abstract. The purpose of this study was to determine the application of appropriate technology in mushroom cultivation by street children in Hafara. This research method with a qualitative approach with phenomenological methods. Collecting data by observation, interviews, and documentation. Observations are carried out in a participatory, real, disguised, and unstructured manner to ensure that the object in this study is an informant in the location to be studied. Interviews were carried out by random sampling to obtain data and information that could be used in this study. Information can be obtained from the manager of the Hafara social institution, 2 caregivers / coaches and 4 street children who live in the Hafara social institution to obtain information on appropriate technology in mushroom cultivation by street children in Hafara. The appropriate technology in mushroom cultivation by street children in Hafara is very simple and uses easily obtained raw materials. Spraying leri water (washing rice) is carried out after the fungus appears, it will increase fertility so that the mushroom yield is more, so the money earned from the mushroom harvest is more. It is hoped that the recommendations for mushroom cultivation in Hafara can be widely marketed in collaboration with relevant agencies both nationally and internationally.

1. Introduction

Today, the majority of scholars see the phenomenon of street children as an increasing social problem. This is the Poor children, with or without a family, living in the streets, train stations and other business centers makes up part of studying this phenomenon may prevent the occurrence of social problems[1] Family factor, including extended, populated and stressful families with delinquency and addiction background: Parents lack of awareness of their appropriate needs, etc Individuals[1]

Continued abuse and criminal activity against children in their own homes, as well as in public institutions and spaces, are sufficient evidence that the claim that “adults know best” is often not true[2].

Street children who are victims of sexual violence who experience pregnancy outside of marriage are accommodated by the Hafara social institution. So that victims can continue their life, they are equipped with various skills to be able to live independently, one of which is the cultivation of oyster mushrooms.

The world of street children is a world full of violence and exploitation. A Study Report on Violence Against Children released by the United Nations on 29 August 2006 states that around 150 million boys aged 18 years have experienced forced sexual relations or other forms of violence.
Michaleon (2006) in a study on street children in Greece, Germany and England explained that children on the streets mostly come from social groups and are less fortunate in their families, their parents live in poverty and / or their guardians cannot provide for the children. their children and forced them to go and work on the streets. Gichuru (1993) in Kenya, said that there are some children who come to cities as refugees to get out of poverty in their rural areas and try to increase family income by busking or selling on the streets. Street girls are very vulnerable to becoming victims of commercial sexual exploitation or prostitution and trafficking for sexual purposes and pornography. [3]

Hafara accommodates child victims of sexual violence by providing shelter and training as provisions for the next life in the community, one of which is mushroom cultivation. Mushroom cultivation can be developed by making mushroom houses. Initial preparation by providing mushroom seeds and growing media that must be sterile. Technology in mushroom cultivation can be done simply. Prepare a mushroom growing medium that can be called a mushroom house with wood or bamboo piles as raw material.

There is regularity in daily activities that suggest routines similar to those in a "normal" household made up of poor people. The following is a description of the "aggregate" day in the life of the members of the group.[2]

The Hafara social center has land that can be used for mushroom cultivation. Success in mushroom cultivation is also supported by the planting medium (mushroom house) according to (M. Sumedi Purbo, 2012) with a temperature of 30-32 °C, optimum room temperature 22°C, room humidity, media moisture content between 60%, media pH tends to be acidic. Media in white oyster mushroom cultivation must comply with the requirements the Mycelium growth which contains a sufficient quantity of elements C (carbon) in the form of carbohydrates. The media must also contain elemental N in the form of ammonia nitrate or organic N. These elements will be converted into protein by mushrooms in addition the mushroom growing media must also contain elements of Ca[4]

The location and geographic location of the Hafara Social Institution are very supportive of developing skills for street children in cultivating oyster mushrooms. The hope is that street children who are victims of sexual violence and after marriage can live independently by having skills in mushroom cultivation. This coaching will be able to generate motivation and have a passion for entrepreneurship.

2. Method
This research method with a qualitative approach with phenomenological methods. Collecting data by observation, interviews, and documentation. Observations are carried out in a participatory, real, disguised, and unstructured manner to ensure that the object in this study is an informant in the location to be studied. Interviews were carried out by random sampling to obtain data and information that could be used in this study. Information can be obtained from the manager of the Hafara social institution, 2 caregivers / coaches and 4 street children who live in the Hafara social institution to obtain information on appropriate technology in mushroom cultivation by street children in Hafara.

3. Results and Discussion
Mushroom cultivation is different from conventional cultivation. Agriculture on one major issue. The oil in the soil is a substrate for the production of crops, but the mushrooms grow on lignocellulosic agroindustrial waste. Oyster can grow large agricultural waste no matter what agricultural residues are found around us.[5]

Assistance from Hafara in the development of mushroom cultivation which can create good jobs for street children who are victims of sexual violence and motivate them to improve their lives[6]. Mushrooms with their taste, texture, nutritional value and high productivity per unit area have been identified as an excellent food source for alleviation of malnutrition in developing countries [7]

The Law on Juvenile justice (Care and Protection of Children) of 2015 is concerned Children in two broad categories those in need of care and production and those in conflict with the law. Street
children may fall into both categories at the same time as children who are not provided with care and protection may end up in conflict with the legal system[8].

Kananga, et al. (2014) Making kumbung is done after a briefing or counseling about the design of mushroom houses or mushroom kumbung. The materials used include wood, bamboo, babu fence (bedek), spandex, etc. The mushroom kumbung is made by the street children who live at the Hafara Social Home.

Mushroom houses that are prepared are not immediately used, but must be done conditioning, to observe temperature changes in the kumbung, making it easier to condition the kumbung mushrooms if there is a change in temperature that does not match the temperature requirements for mushroom growth. After one week of arranging the oyster mushroom baglog in the kumbung shelves, the arrangement is done in a vertical manner. Widodo, et al (2016) that the vertical arrangement of the baglog can increase the production capacity of mushrooms. Placement of the baglog in the kumbung is not done simultaneously but gradually, to avoid major harvests. This will occur due to the same production time. After placing the baglongs, the street children were given supplies about care during the incubation process in the kumbung until the harvest time arrived Good control of humidity during harvesting is very good. Important for all types of mushrooms.

The moisture content of growing mushroom media is very important factor; therefore, the proper moisture content promotes growth[23], while higher or lower moisture content has a negative effect on growth. It is good to keep the humidity high (80-90%) by spraying water several times a day [10]. No wa however[5] According to Amelia et al (2017): that the ideal temperature for oyster mushroom growth is ± 28ºC-31 oC. Meanwhile, Mahardian and Hunaepi (2014) state that in the mycelium formation phase, oyster mushrooms require a temperature of 22-28º C and a humidity of 60% -80%. In the formation phase of the fruit body requires a temperature of 16-22º C and humidity of 80%-90% with an oxygen content of 10%. Furthermore, Mahadian and Hunaepi (2015) stated that the ideal fungal growth is at stable temperature conditions and to stabilize it requires temperature engineering using the evaporate pad technology. Environmental factors that affect the growth of white oyster mushrooms are temperature, humidity, light, air, water content and pH level.[9]

Maintenance and control is carried out every day by agricultural extension workers, to observe the growth of fungi. Checking the environmental conditions, including temperature and humidity. Air circulation. This is so that it can be known early if there is a fungus whose growth is disturbed or if there is a uniform pest and disease. Maintenance and control is carried out every day by street children, including watering when the room temperature increases, besides watering aims to maintain the humidity of the mushroom room. The control also aims to maintain baglong conditions from pests that can cause failure of the growth of fungal fruit bodies.

Oyster mushrooms are very selective in absorbing heavy metals. High absorption of mercury, the concentration of oyster mushrooms up to 140 times the level of this metal into the substrate where it grows (Bressa et al., 1988). In their heavy metal tolerant habitat, Pancreatus does not appear or does not show cadmium hyperaccumulation. So oyster mushrooms can be grown in pollutant environments with complex toxic wastewater. However, it is not recommended to eat oyster mushrooms that grow in this environment until the analysis of the mushroom material or the substrate shows that heavy metals are not present in the mycelia of the oyster mushrooms. [4]

In recent decades, the cultivation of saprotrophic species such as oyster mushrooms and shiitake has grown rapidly.[10] The use of mushroom cultivation plants in the daily diet of local cuisine will attract nutritional scientists, because plants as local products are a new nutraceutical source. In the management of mushroom cultivation, it is necessary to study the system of knowledge and technology so that it becomes a favorite food for many people both in Indonesia and abroad.[11]

Agus (2006 in Mufarrihah 2009) explains that white oyster mushrooms (Pleurotusostreatus) is one type of wood fungus that has good prospects to be developed as food diversification and its nutritional content is equivalent to meet and fish. From a business perspective, white oyster mushrooms are profitable because the price is quite high, per kilogram can reach ten thousand rupiah or more. The demand for local and export markets is wide open, the harvest time is short, about 1-3 months, the
raw material is easy to get, and does not require a large area of land, therefore this type of fungus is widely cultivated (Mufarrihah 2009)[12]

Compared with previous research from Christina et al (2012), the resulting protein content was 19.09%. According to Ohiro (1990), dried oyster mushrooms have a higher protein content than oyster mushrooms that are still wet, which is between 10.5-30.4% compared to the initial protein content of around 7.04%. So that this dry oyster mushroom is better than other protein sources that come from soybeans and nuts [5]

Arianto et al (2009) suggest that oyster mushrooms have a short shelf life or are quickly damaged. Fungal damage can be caused by microbial contamination, the influence of temperature and air, and moisture content. According to Sumoprasitowo (2000), oyster mushrooms are easily damaged if they are kept in the open air for too long, even though they are stored in the refrigerator, they remain easily damaged. The mushrooms will last longer in a dry state and last up to 1 year. According to Achyadi et al (2004), this is due to the fact that oyster mushrooms contain a high water content of 86.6%. High water content can affect food resistance to attack by microorganisms. The higher the free water content contained in foodstuffs, the faster the food spoils due to microorganism activity.[13]

Can therefore make a very important contribution to human nutrition. Based on this theme we presented here a comparative chart of nutritional value between shiitake mushroom (Lentinula edodes) and other foods taken from MushWorld 2005. The caloric value of 100g of dried shiitake is higher than 100g of raw potatoes (66 kcal) and beef loin (224 kcal), but lower than that of whole wheat and brown rice (328 and 350 kcal). The protein content of dried shiitake is comparable to that of chicken and beef but the fat count is much lower and the dietary fiber count is considerably higher than those meats. It contains enough sugar (59 mg) that is the nearest of rice and wheat. In addition to dietary fiber, dried shiitake contains higher contents of calcium (Ca), iron (Fe), vitamins B1 (thiamin), B2 (riboflavin) and B3 (niacin). But it does not contain vitamins A and C.Mushroom is used as delicious item of our food menu containing both nutritive and medicinal values (Agrahar-Murugkar et al., 2005; Cheung and Cheung, 2005).[11]

Technology in mushroom cultivation that is carried out optimally can be environmentally friendly and meet the 3 Rs, namely Recycling, Reuse and Reduce, can meet the adequacy of nutritious food, quality medicinal ingredients and can improve the environment and ecosystem in agriculture and in nature in general. [14]

Environmental controls, the cultivations of mushrooms is limited to months with technological advances have allowed the cultivation of mushrooms to take place under controlled conditions, ensuring production throughout the year. However, without mild temperature (chang & Miles, 2004).[15]

Mushrooms are high in fiber, low in fat and low in starch, edible mushrooms have been considered an ideal food for obese and diabetics to prevent hyperglycemia and have promising antioxidant, cardiovascular, hypercholesterolemic, antimicrobial, hepato-protective and anticancer effects.[16]

Table 1. Oyster Mushroom Nutritional and Mineral Content per 100 Gram Serving is taken from Paul Stamel in Donowati Tjokrookusumo, 2008.

| Nutrient content | Total          |
|------------------|----------------|
| Protein          | 27.25 g        |
| Fat              | 2.75 g         |
| Unsaturated fat  | 1.32 g         |
| saturated fat    | 0.20 g         |
| carbohydrate     | 56.33 g        |
| sugar            | 18.10 g        |
| fiber            | 33.40 g        |
| Cholesterol      | 0 g            |
| Vitamin                      | A0 IU |
|------------------------------|-------|
| Thiamin (Vit B1)             | 0 IU  |
| Pantothenic acid (Vit B5)    | 12.30 g |
| Vitamin C                    | 0 mg  |
| Vitamin D                    | 116 IU |
| Iron (Fe)                    | 9.1 mg |
| Calsium (Ca)                 | 20 mg |
| Sodium (Na)                  | 48 mg |
| Selenium (Se)                | 0.035 mg |
| Niacin                       | 54.30 mg |
| Riboflavin                   | 2.04 mg |
| Ash                          | 6.74 g |

Fig 1. Kumbung media mushroom and process
4. Conclusion
According to research the effectiveness of presenting leri water on the growth and yield of white oyster mushrooms (U. Kalsum, Fatimah et al, 2011) Giving 40 ml of leri water every 2 days resulted in the highest number of fruit bodies in oyster mushrooms. This was followed by street children in Hafara and the result was that the growth of white oyster mushrooms could develop better. Rice is a source of energy and protein, various mineral and vitamin elements. Leri water is water used for washing rice that can be used to flush mushrooms and has not been widely used by the community. Because many people do not know the benefits of this rice water, the utilization of cherry water has not been implemented optimally, even though it still contains many vitamins, minerals and other elements. Rice contains elements of N, P, K, C and other elements. Kinds of vitamins indispensable for the growth of white oyster mushrooms are thiamin (vitamin B1), nicotinic acid (vitamin B3), amino acid pantothenic (vitamin B5), biotin (vitamin B7), pyrodoxin, and inositol (Winarni, 2002). The addition of nutrients consisting of a mixture of molasses, yeast, vitamins and protein with a concentration of 1% as much as 20 ml is able to produce mushroom fruiting bodies 15 days faster so that the harvest period is earlier and the number of mushrooms being harvested is higher (Anonimus, 2010). [3]

The appropriate technology in mushroom cultivation by street children in Hafara is very simple and uses easily available raw materials. How to cultivate oyster mushrooms is the first time to prepare kumbung. The term Kumbung is a building or a house for storing bag logs, which is a growing medium for oyster mushrooms, made from bamboo booths. After that, bag logs are a medium for growing mushrooms in the form of bagasse and powder saw 10.5 kg, 0.6 kg corn flour, 21 kg fine bran, 1 kg TSP fertilizer, 3 kg lime, organic fertilizer and enough water. All the ingredients are mixed until evenly put in clear plastic and compacted then the bottom part is pricked with a finger so that it can be placed upright / not tilted. At the rest of the plastic tip is folded out and the plastic mouth is tied with heat-resistant rubber. Steam the prepared logs for 12 hours at a temperature between 90-110 oC, then remove the log bag and let it stand for 8 hours in a closed room. Filled mushroom seeds into a cool planting medium. The incubation temperature is approximately 22-28 oC and filling the shelves horizontally and alternating with a bamboo insulation. For 40-60 days the mycelium has grown evenly. If the mycelium has filled the poly bag, open the cotton cap and the humidity is approximately It is hoped that the recommendations for mushroom cultivation in Hafara can be widely marketed in collaboration with related organizations or agencies such as UKM or culinary places that serve mushroom menus nationally and internationally.

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