



THE PROSPECT AND CHALLENGES OF WHITE OYSTER MUSHROOM MARKETING (*Pleurotus ostreatus*)

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ABSTRACT

This study aimed to determine the prospects and challenges of white oyster mushroom production and marketing in Davao City. This was conducted at Baguio Calinan District, Davao City, from March 2022 to May 2022 for 3 months duration. The mushroom production at Rosit Cacao Farm started in March 2022 as a trial with a 70 square meters (70 m²) house. One thousand fruiting bags (1,000) weighing one kilogram each with three propagules that cost Php 30.00 each were purchased from the small-scale mushroom culture laboratory at Manambulan, Davao City. For the ready-to-fruit fruiting bags used in the start-up business, the sanitation practices are based on technical recommendations from the Bureau of Plant Industry and Department of Agriculture—XI Mushroom Production Division. The mushrooms were harvested once they reached the desired sizes. Fruiting usually takes 2-3 weeks after incubation before the harvestable fruit size emerges, and fruiting bag productivity can last up to six (4) months under favorable conditions.

Observation showed that using packaging materials and chiller, the shelf life of the mushrooms was only 4 days at most. Marketing via an online platform was used by the operators to gain more attention from prospective buyers. Based on inquiries from the local wet markets and restaurants, they are not selling white oyster mushrooms because vendors and customers are not used to buying them and there were no white oyster mushrooms available in supermarkets. For the duration of 3 months, the total volume of fresh oyster mushroom sold was only 107.5 from the 252.5 kilograms total yield. The first and second month have the highest yield per day, averaging to 4.6 kilograms per day, with an average harvest day of 25 days a month and decreased to a once-a-day basis further. The average daily yield was only 2.3 kilograms until the end of the third month.

Mushroom production is indeed a promising opportunity as per previous reports and theory, but based on this study, there is a need to establish a stable market and the management aspects. The technology is factually critical and complex, but due to practical thinking skills, many were able to generate profit without investing in the whole technology itself. Still, mushroom production shows potential aspect to the household women and farmers as additional income.

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INTRODUCTION

There are 600 types of edible mushrooms in the world that are usually consumed by humans. However, 200 types of mushrooms can be consumed, and 35 types of

them have been cultivated commercially (Pratiwi, 2010). The utilization of both wild and cultivated mushrooms from various countries have been reported in many literatures (Amga 2004; Arora and

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Shepard 2008; Chamberlain et al. 1998; Chang 2005; Chang and Quimio 1982; Chang 1999; Chang and Lee 2004; Chen et al. 2005; Dai et al. 2009; Falconer and Koppell 1990; Hasan et al. 2010; Lakhanpal and Rana 2005; Luo 2004; Mandeel et al. 2005; Mello et al. 2006; Mondal et al 2010; Olivier 2000; Poppe 2000; Puspitasari et al. 2011; Shaw et al. 1996; Uddin et al. 2010; www.Mushworld.com Retrieved 2022; www.academia.edu Retrieved 2022).

Edible mushrooms were traditionally harvested from the wild because they were difficult to domesticate and cultivate. Mushrooms could potentially be very important for future food supplies and in new dimensions of sustainable agriculture and forestry. Their medicinal values include wound healing, immunity enhancement, and tumor-retarding effects. Their value has recently been promoted to tremendous levels with medicinal mushroom trials conducted for HIV/AIDS patients in Africa, which have been generating encouraging results. The word "mushroom" means different things to different people in different countries. Since ancient times, man has been interested in mushrooms, which were called "food of the gods" by the Romans. The Greeks regarded them as providing strength for warriors in battle. Mushrooms are mysterious, cultural, traditional, and legendary. Mushrooms have been widely used as foods, often as delicious and nutritious foods. Mushrooms contain a diverse range of nutrients and other natural phytochemicals with numerous nutritional and health benefits. Mushrooms, traditionally collected from forests but now more often cultivated, have recently become the products of the fifth-largest agricultural sector in China. More than 25 million farmers in China are estimated to be involved in mushroom collection, cultivation, processing, and marketing (<http://e-extension.gov.ph/>/mushroom, retrieved 2022).

White oyster mushroom is known to reduce cholesterol content, as an antibacterial, antioxidant, antitumor, anticancer, and antiviral agent due to D-glucans contained in this mushroom. An active component of oyster mushrooms, namely statins, can lower cholesterol. The presence of fiber which is high has made this mushroom a diet food consumed to overcome digestive problems (Umniyat, et al. 2013). Oyster mushrooms whether they are white, brown, red, or ear mushrooms can be made chips for snacks and their taste is delicious. This mushroom contains complete nutritional components that include essential amino acids, fiber, minerals, and vitamins as well as a high content of unsaturated fatty acids. These superior contents of edible mushrooms made them ideal for alternative food ingredients to substitute meat. Some edible mushrooms even contain several active compounds that are used for disease treatments (Khusnul, 2019).

The mushroom cultivation process is also not too complicated, and the market segmentation is also wide because the price is very affordable (Pratiwi, 2010). The economic importance of mushrooms is manifested by the demand for the commodity in the market. The white oyster mushroom business activity was feasible because it could provide greater revenue than the expenditure (Habibi & Fitriani, 2018). Oyster mushroom cultivation is one solution for improving a community's economy. In mushroom cultivation, it is necessary to pay attention to various things that support the success of its production (Khusnul, 2022). Thus, it is important to understand how mushroom production really works. Given the prospects, such as high market demand, low maintenance, and organic production, oyster mushroom production is indeed promising. This paper aims to present the reality of the oyster mushroom production business and presents the validity of the prospect in Davao region.

MATERIALS AND METHODS

Location and Duration

The mushroom production at RCF started last March of 2022 to May 2022, as an initiative of a group of employees at Rosit Cacao Farm, intended mainly to use the unutilized area located on the second lot of the farm. The total land area is one hectare, while the mushroom house is seventy square meters (70m²).

One Thousand fruiting bags (1,000) weighing one kilogram each with three propagules which costs Php 30.00 each were purchased from the small-scale mushroom culture laboratory at Manambulan, Davao City with a total costs of Php. 30,000.00.

Sanitation

For the ready to fruit fruiting bags used in the start-up business, the sanitation practices are based on the required sanitation practices for mushroom houses. These sanitation practices are based on the advice and technical recommendations from the Bureau of Plant Industry and Department of Agriculture-XI Mushroom Production Division. The following sanitation practices applied are the following:

Shading Management around the House

Since the production house is located at the old nursery site in which a cacao plantation is formerly found, the surrounding cacao trees in the house were trimmed / pruned. This was done in order to minimize contaminants such as fungi and insects that can be vectors or carriers. Also, insects consume the mushroom fruits as well, thus, limiting their presence near the production area in a must.

Cleaning of House Perimeter

The perimeter or the nearest surrounding of the house is cleaned, especially the ground. Sweeping and daily weeding was performed regularly.

Cleaning inside the Production House

Cleaning of the mushroom house is performed every day. The cleaning process is performed by sweeping the flooring and the walls, as well as the cobwebs in the ceiling.

Limited Access inside the House

To minimize contamination, the people operating in the mushroom house are limited to two persons per operation. Also, taking a bath before entering is needed. Since the operators / owners of the mushroom house work on a banana tissue culture laboratory, there is an interval of the operations on the house. If the owner/operator works on the laboratory in a day, he is prohibited to visit the mushroom production area.

Harvesting

The harvesting process was done after the fruiting bags produced the first fruits or the mushroom. The mushrooms were harvested once it reached the desirable sizes. The fruiting, after incubation usually takes 2 -3 weeks before the harvestable fruit size emerges, and fruiting bag productivity, under favourable conditions can last up to six (4) months.

Postharvest Processing of Mushroom

The postharvest process starts from harvesting, cleaning, packaging and storage in the chiller before marketing the harvested mushrooms.

Cleaning

Cleaning is done by cutting off the stem of the mushrooms before packaging. The process is simple, using a scissor or a knife where the stalk of the mushrooms is removed, particularly the part on which the debris of the fruiting bag is attached. Since the product offered to the customers was fresh oyster mushroom, washing the commodity isn't performed. Washing the mushrooms before packaging will make the spoilage faster. The packaging material used was transparent plastic bags (0.2 micron in size). By observation, using these packaging materials while storing inside the chiller makes the shelf life of the mushrooms only last for 4 days. After four days, the color and aroma of the mushrooms changed, making them inedible.

Packaging

The packaging is done by weighing first the mushrooms to 200 grams before putting it inside the transparent plastic bags. The plastic bags are then sealed using plastic film sealer, and then stapler due to some issues observed. It is best to use modified atmosphere packaging to preserve the freshness of mushroom.

Marketing

Marketing of the commodity was done via online. Since all people use social media as the main source of

information, marketing via online platforms was used by the operators to gain more attention for prospective buyers. Because the commodity is highly perishable, establishing buyers or market is considered first hand. The fact that personal/physical notification about the products is much laborious and time consuming, they have decided to use social media. More importantly, social media platforms for marketing allow the operators to gain random buyers. The pictures of the processed products are posted on social media, and inquiries and orders were catered accordingly. Also, personal referral was done for marketing as well. The former buyers, clients were the ones that refer the others to the group. Based on inquiry from the local wet markets and restaurants, they are not selling white oyster mushrooms because vendors and customers were not used to selling them. Furthermore, there was no white oyster mushroom available in the supermarkets hence, it is not viable through these channels as of the present.

RESULTS

PRODUCTION CONSTRAINTS

The production of oyster mushrooms at RCF was from March of 2022 to May of 2022 for 3-month duration. Also, the records of sales and expenses for oyster mushroom production are based on the actual costs and sales taken. Failures such as spoilage and contaminated harvested mushrooms were not accounted but was recorded. The production of mushrooms for the 3 month period is increasing everyday. This is based on the harvest data that the owners/operators provided. However, at the end of the 3rd month, production decreased drastically due to several reasons:

Contamination in the Area

Contamination in the area, by observation is caused by some fungi which is suspected to be purplish fungi. Most fruiting bags have fungal growth on either both ends of the bags. The possible reason is the continuous rain periods during April and May since fungal infestation is more likely to happen during wet seasons / period. There were also cockroaches infestation causing damages to the mushroom. No control measures were done since no chemical control is advised at the moment.

Decrease in the Production per Fruiting Bag

Not all fruiting bags have the same characteristics or productivity level. The capacity of a fruiting bag to bear fruit depends on the amount of colonized seeds incubated on the growing media. As per observation, there are fruiting bags that are less productive than others because of unequal colony growths of the white oyster mycelium in the fruiting bags. This is in effect to the light distribution as recorded, there were more growths on bags exposed to dim sunlight. Aside from

this, unequal water distribution from watering is one of the reasons for the decreased fruiting capacity of each fruiting bags. Some fruiting bags are much prone to dehydration, and this was manifested by observing that some bags are drier than others.

Mismanagement due to:

Accessibility

Accessibility is a problem since the mushroom house is too far from the farm lot in which the operators/owners are working. The mushroom house was located 700 meters from the tissue culture laboratory. Also, water sources and electricity are not accessible in the area.

Availability of Time and Personnel

The mushroom house should be monitored and watered every morning and afternoon and sometimes noon when the temperature is high. Thus, it requires full time labor yet minimal pay due to less work load. Hence, hiring a full time laborer would require part time work or project to complement the cost. This is therefore possible for household wives or husbands and retired persons.

Postharvest Handling

Postharvest handling of mushrooms is composed of cleaning, packaging, and storage. Since the commodity is highly perishable, the shelflife of oyster mushrooms under room temperatures is only 2 days. On the third day, the mushroom will undergo a state of

deterioration and dehydration / drying. The farm has a fridge for their frozen products and other sorts of things that require lower temperature for storage, however, mushrooms have to be stored on chillers only, and storing them on fridges with lower temperature range will damage the commodity. Aside from this, the packaging technique used is by sealing the fresh oyster mushrooms with 0.2 micron transparent plastic bag (6x12). By observation, the mushrooms packed using this technique lasts only for 3-4 days, making the unsold packaged mushrooms inedible and wasted. These are the common reasons for the constraints in mushroom production which reflects the status of the marketing constraints. Due to these problems, yield had decreased from April to May, the problem also traces back to the lack of market segments and clients. Most clients just want to try tasting the product, and do not want to buy again.

MARKETING OF OYSTER MUSHROOM AT ROSIT CACAO FARMS

Market Demand

Based on personal experience, there is low market demand for white oyster mushrooms in the Davao and General Santos area. As per marketing period, there are only 72 buyers which only consumed up to 10 kg of mushroom (Table 1). Though mushroom harvests are done on a daily basis yet some buyers do not repeat buying or only buy once a week. Hence, production should only target these numbers of buyers based on personal experience.

Table 1: List of Buyers of White Oyster Mushrooms in Davao and General Santos areas.

Area	No. of Buyers	Range (kg) sold per Buyer	Frequency per Week
Davao City	40	1-10	1
Marilog	30	1-10	1
General Santos	5	10	1
Total	72		

Production Costs

The mushroom business started last March of 2022, since fruiting bags are used instead of establishing an inoculation laboratory, it is much affordable. Aside from this, the renovation of the kiosk or mushroom house was made prior hand. The following table shows the cost of production from the first month up to the 3rd month for a total of Php 50,390.00. Manpower is not included in the expenses since the owners/operators did not hire anyone for the work alone, doing the operations by themselves as a pass time during the day.

Yield and Sales of Mushrooms

For the duration of 3 months, the total volume of fresh oyster mushroom produced was 252.5 kg which only sold 107.5 kilograms with unsold amount of 145 kgs (Table 2). During the three month period, the first and second month have the highest yield per day, averaging to 4.6 kilograms per day, with an average harvest of 25 days a month. However, as time passes by, the interval of twice a day harvest decreased to a once-a-day basis at the middle of the second month, which is April. From this period, the average daily yield was only 2.3 kilograms or more until the end of the third month.

Table 2: Total Expenditures of White Oyster Mushrooms in RCF Davao.

Particulars	Months				
	February	March	April	May	
Renovation	18680.00				18680
Fruiting Bags	30000.00				30000
Packaging Materials		300.00	170.00	340.00	810.00
Transportation (Fuel)		300.00	300.00	300.00	900.00
Total					50390.00

Table 3: Total Yield and Sales of White Oyster Mushrooms in Davao for three months duration.

	Average Daily Yield	Monthly Yield (Total)	Total (Sold)	Total (Unsold)
February				
March	3.6	90	45.8	44.2
April	4.2	105	44.3	60.7
May	2.3	57.5	17.4	40.1
Total		252.5 kgs..	107.5 kgs.	145 kgs.

Income of Mushrooms

Based on a 3-month period, the income and yield, along with the sales had decreased significantly resulted to a deficit of 12,765 pesos from the total sales of 37,625 which incurred a total expenses of 50,390 (Table 3). However, considering that all mushrooms yield were sold out it is projected to double the income excluding labor costs. In theory, it would be a very feasible business as reported by Habibi & Fitriani (2018) and Khusnul (2022) if the market is established soon. Since along the drastic decrease in the yield, the

buyers were also lesser due to the fact that oyster mushrooms are not commonly consumed and they only buy for curiosity. Also, some buyers are much keener to the price of the product, which is 350 pesos per pack for 200 grams, according to them, is quite expensive and unaffordable. Yet, mushroom production shows potential aspect to the household women and farmers as additional income. Moreover, a stable market has to be established first before venturing a large commercial scale in Davao.

Table 4: Total Income of White Oyster Mushrooms in Davao for three months duration.

	Volume	Price	Sales	Expenses	Income
February				18680.00	--
March	45.8	350	16030	30600.00	-14570.00
April	44.3	350	15505	470.00	15035.00
May	17.4	350	6090	640.00	5450.00
	107.5 Kls	Total	37625	50390	-12765

CONCLUSION

Mushroom production indeed brings a promising opportunity as per previous report and theory but based on personal experience, there is a need to establish the market and the management. The

technology is factually critical and complex, but due to practical thinking skills, many were able to generate profit without investing in the whole technology itself. For this, as per observation and analysis was concerned, the following implications were drawn:

- a. The fast growth of the trend pertaining to oyster mushroom production was affected by its uniqueness in terms of its way of cultivation since it does not require much space.
- b. In connection to marketing, oyster mushroom production has a lot of downfalls. Despite the promising prospect of mushroom production such as low maintenance requirement, and a higher price, challenges are always on the way, such as high supply with low demand – especially for highly perishable commodities. As an alternative solution for this problem, processing can be done, like making pickles or chips from mushrooms. Also, securing a stable market first before engaging into mushrooms should be taken into consideration.
- c. Constraints in the adoption of a technology is normal, thus, in the oyster mushroom production difficulties in the adoption of the technology is affected by the following:
 1. High production yield with low market segment.
 2. Postharvest mishandling
 3. Mismanagement of the production area because of:
 - a. Accessibility due to the distance of the workplace from the mushroom house.
 - b. Availability of time and personnel since the operators are full time employees of the farm.
 - c. Weather related problems, particularly during rainy days, in which the road / passage is

difficult to access usually curiosity-driven. Also, some buyers are much keener to the price of the product, which, according to them, is quite expensive to afford.

RECOMMENDATION

Mushroom business has a lot of opportunities; however, it is dependent on the current market status, consumer preference, and availability of customers in the locality. Apart from these, management practices should be considered as well. Given the 3-month experience on mushroom production at Rosit Cacao Farm, the following recommendations were drawn:

- A. Before engaging into the oyster mushroom production business, establishment of secure and regular buyers has to be established first. More importantly, one must carefully choose what service or specific product will be offered – either fresh oyster mushroom, or processed by-product.
- B. It is normal to lose in business, particularly on the mushroom business in which the commodity is highly perishable. For this before engaging, postharvest handling skills and techniques have to be secured first.
- C. Mushroom production, considering it needs limited space only, is indeed advantageous for those who have a smaller land area. However, with a small area means smaller productivity rate, thus, for mushroom growers or soon to be growers that aim to produce processed mushroom products, a larger production area is advisable.

APPENDIX FIGURES



Figure 1: The mushroom house. The mushroom house is maintained clean from inside and outside at RCF Davao City.



Figure 2: Inside the mushroom house at RCF Davao City.



Figure 3: Fungal contamination and cockroach damage at the mushroom house of RCF Davao City.



Figure 4: Harvested fresh oyster mushrooms at RCF Davao City.



Figure 5: Cleaning and packaging of fresh oyster mushrooms at RCF Davao City.



Figure 6: Cleaned and ready to be packed oyster mushrooms at RCF Davao City. Each pack weighs 200 grams.



Figure 7: Packed oyster mushrooms ready for sale at RCF Davao City. Each pack contains 200 grams at 70 pesos each.

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