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Effect of Packet Size and Spawning Method on Yield and Yield Attributes of Oyester Mushroom on Sugarcane Baagasse Based Substrates

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ABSTRACT

The study was conducted at the laboratory, Workshop and culture house of mushroom development Institute (MDI) Sobhanbag,Saver,Dhaka from September to December in 2018, to compare ―The Effect of packet size and spawning method on yield and yield attributes of Oyster mushroom on sugarcane bagasse based substrates' 'The result indicated that different combination of sugarcane bagasse based substrates gave a significant different in yield of fruiting body, number of fruiting body ,Thickness of Pileus, Duration of cropping period, Number of harvest, The highest of fruiting body (1116g) ,The highest number of fruiting body (182) and The highest thickness of Pileus (2.7) were recorded in treatment T5 where used substrate was sugarcane bagasse 28.9%,wheat bran 20%,lime0.2% and water 50% in sterilization method. On the other hand used substrate was sugarcane bagasse 50% and Water 50% in method. The lowest of yield fruiting body (466g) and the lowest thickness of Pileus (1.2cm) were recorded in treatment1 where used substrate sugarcane bagasse 28.9%, wheat bran 20% lime 0.2%, Water 50% and The lowest number of fritting body (142) was recorded treatment 6.The minimum duration of cropping period 50 days recoded in treatment T2 and T3 and maximum duration of cropping period 63 and 69 days obtained in T4and T8.It is also found that average harvest for per treatment recorded three times.

Key word: Nutritive; Oyster mushroom; spawning method; substrate; fruiting bodies; yield

Introduction

Bangladesh is an agricultural country. Rice, wheat, pulses, vegetables, oil seeds, spices, fruits, sugarcane, jute, tobacco etc. are the main crops grown in this country Bangladesh is a large populated country and for this large population requires a large quantity of food. The cultivated land is decreasing day by day by the creation of new accommodation for the vast population. Using conventional agricultural methods it is hard to fulfill the demand of food supply for this increased number of population. Now, it is have to increase intensive use of land to increasing crop production. But it is very difficult in countries like Bangladesh due to weather condition, natural calamities and other barriers. At this time, meet our protein need from fish as well as energy from rice which is two more staple food of Bangladesh. Bangladesh government is trying to increase the yield of crops from the same unit of land. In this situation mushroom cultivation is newly added in the Bangladesh agriculture. It does not require vast cultivable land. It can grow anywhere in the room in the form of vertically racking system. Therefore, its yield as well as benefit per unit area is higher than any other vegetable in our country. The fallow land, unused room can be added into the cultivation.

Mushrooms are large structural edible fungi, which is a highly nutritious, delicious, medicinal and economically potential vegetable. Mushrooms are belongs to the class of Basidiomycetes or Ascomycetes. Approximately 0.3 million varieties of mushrooms are identified. Among them which are fully edible and have no toxic effect are to be considered as edible mushroom. Out of 2000 species of prime edible mushrooms about 80 have been grown experimentally, 20 cultivated commercially and 4-5 produced on industrial scale throughout the world. The vegetative part of mushroom consists of thread like long thin mycelium which under suitable condition forms fruiting body or sporocarps. This fruiting body is used as edible mushroom.

Obodai et al (2002) horse manure was used to sow spores from wild mushrooms in Holland, Italy, China and some Western European countries. With the establishment of laboratories for research on mushroom growing in these countries, improved technologies on use of mushroom growing houses and pure culture spawn have led to increased and rapid production of mushrooms worldwide. Today, China is major producer of mushrooms in the world (Oei, 1996).

Mushroom is totally organic and eco-friendly vegetable because there is no utilization of chemicals. Although several studies have been conducted on mushroom cultivation and storage, but none concerns the marketing of edible mushrooms. Mushrooms are highly rated for being rich in protein, vitamins and minerals. They are said to be low in calories and cholesterol content. On average per 100g oyster mushroom contain protein 23.5g, lipid 2.6g,

carbohydrate 39.4g, fiber 27g and minerals 7.4g. It is also high in thiamin (B1), Riboflavin (B2), Niacin and ascorbic acid (Quality Control lab, NAMDEC). Some varieties are medicinal and known for 16 providing stamina and resistance to disease. Others serve as dyes for fabrics as well as to bioremediate polluted soils or neutralize acidic soils (Grey, 1970). Edible mushroom' principal nutritional function is the supply of protein, vitamins and minerals to the body.

Some factors for which mushroom marketing is affecting. Environmental factors, intermediate chain, various types of cost like production cost, marketing costs such as packing, transporting, weighment charges, loading and unloading charges, losses in the transport, losses due to storage, spoilage, taxes, etc. A good relationship of a farmers and consumers, by making short the market chain and by increasing proper production and marketing knowledge it can be a good result of a successful marketing.

Mushroom Development Institute and some private organizations (Asha, Lal Teer) giving training for mushroom cultivation and they are informing the nutritive and medicinal value of mushroom, also about marketing. Peoples are interestingly coming into this cultivation. With the less capital and easy technique it can be a good opportunity of income source for the landless people. Commercial cultivation can develop different industry like caning industry, powder industry, medicine industry etc. It can be a good source of earning foreign exchange by exporting. Mushroom industry can be a big platform for unemployment people.

Materials and Methods

The experiment was conducted in the laboratory, and culture-house of National Mushroom Development Institute, Sobhanbag, Savar, and Dhaka. to observe the Effect of packet size and spawning method on yield and yield attributes of Oyster mushroom on sugarcane bagasse based substrates''. Mother of Oyster Mushroom was collected from Mushroom Development Institute (MDI), Savar, and Dhaka. In this experiment, effect, quality, yield and yield-related attributing characters were evaluated with pasteurized and sterilized sugarcane bagasse, wheat bran, lime and water. The materials and methods included the following aspects:

i. Top Spawning method or Sterilization method

ii. Through method or Pasteurization method

Packet size and weight; (7"×10") PP. for 500 gm. Spawn packet. (9"×12") PP. for 750 gm. Spawn packet. (10"×14") PP. for 1 kg Spawn packet. (12"×18") PP. for 1.5 kg Spawn packet.

There were four treatments under the four replication given below (Top method) :

T1: Sugarcane bagasse @149gm (29.8 %) + Wheat bran @100gm (20%) +lime @ 1gm (0.2%) + Water 50%

T2: Sugarcane bagasse @223.5gm (29.8%) + Wheat bran @150gm (20%) +lime@1.5gm (0.2) % +Water 50%

T3: Sugarcane bagasse @298gm (29.8%) + Wheat bran @200gm (20%) +lime @ 2gm (0.2%) +Water 50%

T4 Sugarcane bagasse @447gm (29.8 %) + Wheat bran @300gm (20%) +lime@3gm (0.2%) +Water 50%

Another four treatments under the four replication given below (Through method) :

T5: Sugarcane bagasse @250gm (50%) + Water 50%

T6: Sugarcane bagasse @ 375gm (50%) + Water 50%

T7: Sugarcane bagasse @ 500gm (50%) + Water 50%

T8 Sugarcane bagasse @750gm (50%) + Water 50%

T1: Sugarcane bagasse @596gm (29.8 %) + Wheat bran @400gm (20%) +lime @ 4gm (0.2%) + Water 50%

T2: Sugarcane bagasse @894gm (29.8%) + Wheat bran @600gm (20%) +lime@6gm (0.2) % +Water 50%

T3: Sugarcane bagasse @1192gm (29.8%) + Wheat bran @800gm (20%) +lime @ 8gm (0.2%) +Water 50%

T4 Sugarcane bagasse @1788gm (29.8 %) + Wheat bran @1200gm (20%) +lime@12gm (0.2%) +Water 50%

T5: Sugarcane bagasse @1000gm (50%) + Water 50%

T6: Sugarcane bagasse @ 1500gm (50%) + Water 50%

T7: Sugarcane bagasse @ 2000gm (50%) + Water 50%

T8: Sugarcane bagasse @3000gm (50%) + Water 50%

Results

The biological efficiency was determined by using the following formula:

$$\text{Biological efficiency (\%)} = \frac{\text{Total biological yield (g)}}{\text{Total dry substrate (gm)}} \times 100$$

Table: Biological efficiency (%)

Treatment Biological Efficiency	Treatment Biological Efficiency
T1	192%
T2	160%
T3	122%
T4	111.5%
T5	139%
T6	90%
T7	129.8%
T8	96%

The highest biological efficiency was 192 % recorded in T1. The lowest biological efficiency 90 % was recorded in T6.

Discussion

Table: Average length of stalk, Diameter of pileus, Diameter of stem, Thickness of pileus treatment

Treatment	Average length of stalk(cm)	Average diameter of pileus (cm)	Average diameter of stem	Average thickness of pileus(cm)
T1	2.9	5.1	1.6	1.2
T2	4.6	5.4	2.1	2.3
T3	2.4	6.2	2.5	1.9
T4	6.6	7.2	3	2.2
T5	2.8	5.2	1.7	1.1
T6	3.2	5.6	3.1	1.7
T7	5.6	7.1	2.3	1.9
T8	5.9	6.9	3.1	2.7

Cost benefits analysis

Table: Cost benefits analysis of different treatment used in mushroom cultivation.

Treatment	Production cost/Packet(TK)	Yield per treatment (gm)	Production cost/Treatment (TK)	Total price/treatment (TK)	Profit/treatment (TK)
T1	13	640	52	128	76
T2	15	810	60	162	102
T3	15.5	816	62	163.2	101.2
T4	16.5	1116	66	223.2	157.2
T5	10	466	40	93.2	53.2
T6	12	453	48	90.6	42.6
T7	12.5	867	50	173.4	123.4
T8	14	968	56	193.6	137.6
	Average Production cost/Packet (TK)	Average Yield per treatment	Average Cost/treatment (TK)	Average Price/treatment(TK)	Average Profit per treatment (TK)
Average	13.56 TK	767 gm	54.25 TK	153.4 TK	99.15 TK

Benefits

Benefits were determined by using the following formula:

Benefits= (Total price-Total production cost) = (1227.2-434) Tk. =793.2 Tk.

Source: Mushroom development institute (MDI)

Total production cost is 434 tk. And total yield 6136 gm. from eight treatments and total price is 1227.2tk. Get profit 793.2 tk. from 32 packets. Average production cost per packet 13.56 tk. average yield per treatment 767gm average cost per treatment 54.25 tk. average price per treatment 153.4 tk. average profit per treatment 99.15 tk. get minimum profit 42.6 tk. from T6 and get maximum profit 157.2 tk. from T4.

Conclusion

The effect of 20% wheat bran as supplement with sugarcane bagasse and 50% water were higher on fruiting bodies, Yield of bodies, biological efficiency and benefits of Oyster mushroom that are require shorter days compared to other treatments. It is also proved to be better in terms mycelium growth rate, length of stalk, average yield of fruiting body as well as average number of fruiting body. Sugarcane bagasse 28.9%, with 20% wheat bran as a supplement and Water 50% in Sterilization method. on the other hand sugarcane bagasse 50% and Water 50% which was used in pasteurization method. The effect of packet size 9"×12" for 750 gm. is suitable for high growth and production. In term of oyster mushroom of WS species is recommended for cultivation in term of maximum output.

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