

Sustainable Livelihood Generation through Production and Marketing of Oyster Mushroom (*Pleurotus ostreatus*) in Jorhat District of Assam, India

**Hemangee Das, Dipanjan Kashyap, Daizi Durba Saharia,
Kundal Hazarika, D. K. Sarmah**

Received 31 August 2019; Accepted 16 October 2019; Published on 16 November 2019

ABSTRACT

Indian economy is mainly fuelled by its agriculture sector. Mushroom cultivation may be identified as a budding source of income in this sector as it can be cultivated by landless farmers on waste material and is a source for proteineous food. During last decades the world mushroom production has increased at a growth rate of about 10%. *Pleurotus ostreatus*, also known as oyster mushroom, is commercially important edible mushroom due its excellent flavor and taste. Assam produced about 100 metric tones of oyster mushroom in the year 2016. In Assam mushroom is mostly marketed as fresh mushroom packed in polythene bags. Under the present study

60 mushroom bags were purposively selected out of which 6 bags were selected randomly in order to record the average yield of mushroom per bag. Each bag yielded a total of about 2.2–2.4 kg of mushroom. The total amount of mushroom produced from 60 bags was 143.60 kg. It was noted that the yield of mushroom declined gradually after each harvest. The price of oyster mushroom in the retail market ranges from Rs 200/- to Rs 1000/-per kg based on type of the product. Marketing of mushrooms in Assam is not yet organized and hence 46.17% of the produce is sold directly to the consumers and 31.33% is sold through the retailers. Due to the poor marketing strategy farmers fail to make the expected profit from mushroom production. Therefore, their problems are needed to be solved before trying to increase the production of mushroom. Proper government intervention and knowledge dissemination by the relevant institutions will surely encourage the farmers to consider mushroom as one of the key components in their farming system, which will surely help them in improving their livelihood in future.

Hemangee Das, Daizi Durba Saharia, Kundal Hazarika
BSc Scholar, Assam Agricultural University, Jorhat 785013,
Assam, India

Dipanjan Kashyap*
Assistant Professor, Department of MBA-Agricultural Business,
Assam Agricultural University, Jorhat 785013, Assam, India

D. K. Sarmah
Professor, Department of Plant Pathology, Assam Agricultural
University, Jorhat 785013, Assam, India
email: dipankashyap@gmail.com
*Corresponding author

Keywords Mushroom, Marketing, Livelihood generation.

INTRODUCTION

Agriculture is the main strength of Indian economy as it provides employment to almost 65% of the working

population in the country. Around one fourth of India's national income originates from the agriculture sector. The global food and nutritional security of growing population is a great challenge, which looks for new crop as a source of food and nutrition. In this context, mushrooms find a favor which can be grown even by landless people, that too on waste material and could be a source for proteineous food (Ambili and Nithya 2014). References about the mushrooms are available in most ancient literature like Vedas and Bible. Theophrastus (372–287 BC), the great Greek philosopher wrote about food value of mushroom during middle ages when mushroom comprised royal dishes for Greek and Roman emperors. In fact, mushrooms have existed even long before man appeared, as is evident from the fossil records of lower cretaceous period, i.e., about 130 million years ago.

The mushroom cultivation has grown tremendously during last decades ; the world mushroom production achieved a growth rate of about 10%. In India, owing to varied agro-climate and abundance of farm waste, different types of temperate, tropical and sub-tropical mushrooms are cultivated throughout the country (Shah et al. 2004).

Pleurotus ostreatus, also known as oyster mushroom, is commercially important edible mushroom due its excellent flavor and taste. *P. ostreatus* has received increasing attention for applications in bio-bleaching and the catalysis of difficult chemical conversions in the paper industry, textile dye decolorization and detoxification of environmental pollutants (Park et al. 2014). Mushrooms are rich in proteins, contain less fat, less carbohydrates and salt and rich in fibers and have high vitamin B₁₂ and folic acid which are uncommon in vegetables. High availability of lysine and tryptophan and other amino acids usually absent in cereals make them ideal for food for patients suffering from hypertension, diabetes and obesity (Carel et al. 2013).

Mushroom is generally marketed in three forms ; fresh, dried and processed mushroom. Assam has tropical climatic conditions thus ; fresh marketing is at a premium. The commonly used packaging is the polythene bag. Marketing of fresh mushrooms was mostly done in the nearby areas according to the

local demand. Dry mushroom is generally used by hotels, restaurants and for export purpose. Processed mushroom is basically a canned mushroom for export purpose mostly.

The global mushroom market accounted for 38.13 billion US Dollars in 2017 growing with a CAGR (Compounded Annual Growth Rate) of 7.9% during the forecast period from 2018 to 2026. Assam is having a lot of scope in mushroom marketing because this sector is still untapped. Assam produced about 100 metric tones of oyster mushroom in the year 2016. Hence, in this study, the authors attempt to identify the production and marketing sustainability of *P. ostreatus*.

MATERIALS AND METHODS

The present work was carried out in the Teok area of Jorhat district in Assam during RAWE (Rural Agricultural Work Experience) program conducted by the 4th year students of Assam Agricultural University, Jorhat during July to November, 2018. During this period training and guidance on mushroom production and marketing was thoroughly done to improve the standard of living of the beneficiary farmers.

Preparation of mushroom bags

Rice straw was used as the substrate for the mushroom cultivation. The substrates were soaked in water for 6–8 h to moisten them thoroughly and were boiled for 1.5 h. The substrate was spread on a cemented floor so as to remove the excessive moisture to get 65–75% moisture level. After this calcium carbonate and carbendazim is mixed with the substrates. The bags are then prepared by putting alternate layers of rice straw and spawn of oyster mushroom (*Pleurotus ostreatus*) mushroom cultivation has two important phases viz., spawn running and fructification. For spawn running the bags were kept in a completely dark room for 15–17 days. The humidity of bags was accomplished by spraying of water on them twice a day. Oxygen is essential for mushroom during fructification. The pinholes were also made in the bags with the help of paper pins for exhaust of gases.

Under the study there were 60 mushroom bags

Table 1. Yield details of the selected bags.

Harvest time	Yield (grams)					
	Bag 1	Bag 2	Bag 3	Bag 4	Bag 5	Bag 6
22 days (1 st harvest)	650	680	667	700	692	680
29 days (2 nd harvest)	630	654	650	682	675	661
37 days (3 rd harvest)	580	642	630	660	624	618
48 days (4 th harvest)	400	459	447	380	480	419
Total yield	2,260	2,435	2,394	2,422	2,471	2,378

out of which 6 bags were selected randomly in order to record the average yield of mushroom per bag. Each mushroom bag contains about 1 kg of straw and 100 g of spawn. On an average harvesting of one bag was done four times.

RESULTS AND DISCUSSION

The first harvesting was done after 22 days of bagging and the mushroom yield per bag was 650–700 g. The second harvesting was done after 29 days of bagging and the mushroom yield per bag was 630–682 g. The third harvesting was done after 37 days of bagging and the mushroom yield per bag was 580–660 g. The fourth or final harvesting was done after 48 days of bagging and the mushroom yield per bag was 380–480 g. Each bag yielded a total of about 2.2–2.4 kg of mushroom (Tables 1, 2).

The amount of mushroom yielded from the first harvest was 40.69 kg. The amount of mushroom yielded from the second harvest was 39.52 kg. Similarly, the amount of mushroom harvested from the third and fourth harvests were 37.54 kg and 25.85 kg, respectively. The total amount of mushroom produced from 60 bags was 143.60 kg. Thus, it may be noted

Table 2. Total yield details of all the bags (60 bags) after each harvest.

Harvest time	Yield (kg)
22–25 days (1 st harvest)	40.69
29–32 days (2 nd harvest)	39.52
37–39 days (3 rd harvest)	37.54
48–50 days (4 th harvest)	25.85
Total	143.60

that the yield of mushroom declined gradually after each harvest.

The produce is generally sold as fresh mushroom in the nearby areas. Some of it also sent to the nearby towns and cities like Jorhat, Dibrugarh, Tinsukia and Guwahati. The price of fresh oyster mushroom in the retail market ranges from Rs 150/- to Rs 250/- per kg. It was also observed that the price of dried and canned mushroom fetch higher prices ranging from Rs 300/- to Rs 1000/- per kg in different parts of North-Eastern region. But value addition of mushroom was not practiced by most of the farmers in the study area, mainly because of non-availability of sophisticated machineries and up-to-date knowledge of the farmers on the latest technologies.

Five marketing channels were identified in the area out of which the most common was found to be Producer–Consumer which handled about 46.17% of the total mushroom produced in the area. A major portion of the produce was also sent to the retailers of the nearby towns and cities which accounted for about 31.33% of the total produce. It was observed that marketing of mushrooms in Assam is not yet well organized. It is the simple system of producers selling directly to retailer or even to consumer, which has its own limitations (Table 3).

Table 3. Marketing channels with intermediaries and quantity handled in sale of oyster mushroom.

Channels	Intermediaries	Quantity handled (percentage)
Channel I	Producer–Consumer	46.17
Channel II	Producer–Retailer–Consumer	31.33
Channel III	Producer–Wholesaler–Consumer	6.30
Channel IV	Producer–Wholesaler–Retailer–Consumer	13.05
Channel V	Producer–Processor–Consumer	3.15

Majority of the farmers fail to make profits out of their mushroom production activity due to the poor marketing strategy (Shirur et al. 2016). This reinforces that effort to increase the production without solving its marketing problems, would be counter-productive. Thus, it is important to improve the marketing facilities in order to increase the production of mushroom in Assam. This may be done by value addition to increase the shelf-life of the mushrooms by creating processed products and encouraging the farmers to become organized and team up with other producers to bulk up on volume of their production to attract traders regularly to enable reliable sales of the perishable produce.

From the above discussion it can be concluded that the average amount of mushroom that can be produced from one bag (containing 100 g spawn) is 2.2–2.4 kg. It is observed that the yield of mushroom declined after each harvest and it is advisable to use the straw available in the packets as manure after fourth harvest. It also came to the conclusion that marketing of mushrooms in Assam is not yet organized and the producers sell their produce directly to consumer or to the retailer. Proper government intervention and knowledge dissemination by the relevant institutions will surely encourage the farmers to consider mushroom as one of the key components

in their farming system, which will surely help them in improving their livelihood in future.

ACKNOWLEDGEMENT

The authors are grateful to the Assam Agricultural University, Jorhat for providing all sorts of support to carry out the research during Rural Agricultural Work Experience Program.

REFERENCES

- Ambili S, Nithya TP (2014) Oyster mushroom cultivation—A study in Palakkad district, Kerala. *Int J Manag and Soc Sci Res Rev* 1 : 104—105.
- Carel DR, Vinay P, Manasa P, Kumar DV, Babu R (2013) Comparative study of oyster mushroom (*Pleurotus ostreatus*) cultivation by physical and chemical method of sterilization using two different substrates. *Mycol* 3 : 1217.
- Park CH, Lim J, Lee Y, Lee B, Kim S, Lee J, Kim S (2014) Optimization and morphology for decolorization of reactive black 5 by *Funalia troglia* Enzy. *Microb Technol* 40 : 1758—1764.
- Shah ZA, Ashraf M, Ishtiaq M (2004) Comparative study on cultivation and yield performance of oyster mushroom (*Pleurotus ostreatus*) on different substrates (wheat straw, leaves, saw dust). *Pak J Nutr* 3 (3) : 158—160.
- Shirur M, Shivalingegowda NS, Chandregowda MJ, Rana RK (2016) Technological adoption and constraint analysis of mushroom entrepreneurship in Karnataka. *Econ Affairs* 61 (3) : 427—436.