

## **Prospects and Challenges of Mushroom Production in Kuruwita, Sri Lanka: Comparative Report on Two Consecutive Years**

**Thilakaratna, W.S. and Pathirana, P. B. M.**

*Faculty of Fisheries and Ocean Sciences, Ocean university of Sri Lanka*

**Abstract:** Global mushroom production has expanded rapidly in last few decades with the introduction of new mushroom varieties. However, Sri Lanka mainly relies on Oyster (*Pleurotus ostreatus*) and Abalone (*Pleurotus cystidiosus*) cultivation. It is believed that many of the mushroom farmers in Sri Lanka already gave up the business due to various issues related to production and marketing. Hence, the current study was executed from 03<sup>rd</sup> to 10<sup>th</sup> of April 2017 and 13<sup>th</sup> to 16<sup>th</sup> of February 2018 to identify the problems and challenges faced by the mushroom farmers in Kuruwita division of Sri Lanka. Direct interviews using structured questionnaire were used to collect information from 36 farmers in 2017. The sample contained 56% females and 44% males of different age categories, where, 39% and 33% belonged to age groups (31-40) and (41-50), respectively. Twenty five per cent of the farmers showed fulltime involvement, while, rest involved in mushroom cultivation as a part time job. However, only 19 farmers are still involved in the business (during survey in 2018) out of 36 farmers interviewed in 2017. Monthly average income of the farmers of this area was Rs. 16,777 in 2017 and Rs. 14,210 in 2018. Major problems and challenges faced by the farmers were lack of knowledge in mushroom cultivation and disease management, lack of financial assistance, difficulties in finding proper local market and producing value added mushroom products.

**Keywords:** Kuruwita, Mushroom, *Pleurotus cystidiosus*, *Pleurotus ostreatus*, Sri Lanka

### **Introduction**

Mushroom is a fleshy, macroscopic and spore-bearing fruiting structure of a fungus. It can be classified into three categories such as edible, non-edible and poisonous. Edible mushroom is being cultivated since ancient time, however, only 22 out of 2000 species

can be consumed (Manzi *et al.*, 2001). Mushroom cultivation requires relatively little space and considered as fast growing organisms to give the yield within short time span, hence, mushroom cultivation is a profitable agribusiness for farmers who are interested in an additional income (Sher,

2006). Global mushroom production has steadily increased from 0.3 million tons to 3.4 million tons from 1965 to 2015 (Singh *et al.*, 2017). Mushroom possesses high nutritional and medicinal properties (Manzi *et al.*, 2001). Many studies have revealed that the amino acid compositions of mushrooms are similar to animal proteins (Barros *et al.*, 2007). *Pleurotus* sp. is a perfect diet to prevent hypertension and heart diseases (Patil *et al.*, 2010). Bioactive compounds of many mushroom varieties including oyster mushroom have exhibited antibacterial, antifungal, antiviral, and antimicrobial activities (Neelam and Singh, 2013; Ren *et al.*, 2014).

More than 70% of Sri Lankan population lives in the rural areas of the country and their main income source is agriculture and related activities. Agriculture sector alone provides 12% of GDP to the country's economy (Central Bank of Sri Lanka, 2008). Mushroom is one kind of agricultural products, which became popular among Sri Lankan

as an agribusiness at the later part of 1980. Commercial scale mushroom cultivation was first started in Sri Lanka with the aid of United Nations Development Program (UNDP) in 1985 and spawn laboratories for spawn production was established by the Export Development Board of Sri Lanka. The Sri Lankan government and many other government and non-governmental organizations such as Mushroom Development and Training Center in Ratmalana are encouraging mushroom farming as a self-employment.

However, the problems faced by the mushroom farmers were not addressed in deeper context. Therefore, the present study was carried out to assess the current situation and problems faced by the mushroom farmers in Kuruwita division of Ratnapura district of Sri Lanka.

### Materials and Methods

The Kuruwita village community involved in the mushroom cultivation in the Ratnapura District of Sri Lanka was selected for this



Figure 1: Map of study area (Source-Google map)

Age	Gender	Full/Part time	Monthly Income	Scale		Threats
37	F	part	12000	small		abcde
49	F	Part	18000	small		abcde
32	M	part	16000	small		bc
35	F	full	48000	medium		cde
48	M	part	16000	small		cde
56	M	full	12000	small		abcde

  

Idea on post harvesting technology	Allergic reactions	Involvement in years	Seeds	Training
no	yes	more than 1 year	Gov	Private
no	yes	more than 1 year	Gov	Gov
no	yes	more than 1 year	Friend	Private
yes	yes	more than 1 year	Ratmalana	Ratmalana

  

High cost fertilizer	Labour cost	Pest and disease	Lack of storing	Inadequate knowledge in packing	Lack of buyers
yes	no	yes	yes	no	yes
no	no	yes	no	no	yes
no	no	no	no	yes	No
yes	yes	yes	no	no	No

  

Used Saw dust	Types	High investment	Less availability of seed	Low sow dust
yes	Oyster	yes	no	no
yes	Oyster	yes	no	yes

**Figure 2:** Sample data sheet

study. Direct interviews and structured questionnaire were employed to gather data during the period from 03<sup>rd</sup> to 10<sup>th</sup> of April 2017 by selecting 36 mushroom farmers. The sample contained 56% females and 44% males of different age categories. Where, 39% belonged to age groups (31-40), 33% to the age group (41-50), 11% to the age group (51-60), 11% to (61-70) and 6% to (21-30) However, only 19 farmers out of 36 were involved in the business during the data gathered from 13<sup>th</sup> to 16<sup>th</sup> of February 2018. The qualitative and quantitative data gathered were then analyzed by using Microsoft excel 2010 to understand the current situation to evaluate the results.

## Results and Discussion

According to the results obtained in 2017, Oyster mushroom (*Pleurotus ostreatus*) (Figure 3) was cultivated by all the farmers, while 11% were involved in Abalone (*Pleurotus cystidiosus*) (Figure 4) cultivation as well. Most of the farmers still in the process of

getting established where, 69% was involved in the business for more than one year while 31% had been involved for less than 1 year. Twenty five per cent of farmers showed fulltime involvement, while rest (75%) involved in mushroom cultivation as a part time job. About 31% of farmers bought seeds from sales outlets while 25%, 22%, 16% and 6% from Government Agriculture Centers in Ratnapura, friends, neighbors and Mushroom Training and Development center in Ratmalana, respectively.

Monthly income of mushroom farmers varied from Rs. 8,000 to 48,000 in which, monthly average income of the farmers of this area was Rs. 16,777. All the farmers carried out this industry as a family business where 100% of labor was shared within the family. The main sources of capital were gained from family income and loans obtained from the government, private banks or personal loans from friends and money lenders. Seventy five per cent of the farmers received training from



**Figure 3:** Oyster mushroom (*Pleurotus ostreatus*)



**Figure 4:** Abalone (*Pleurotus cystidiosus*)



**Figure 5:** Sawdust used as substrate for mushroom



**Figure 6:** Mushroom bags before autoclaving

government departments, centers or through the projects conducted by non-government organizations such as Ratmalana Mushroom Training and Development Center. All (100%) farmers were used the saw dust (Figures 5 and 6) as mushroom growing substrate. Saw dust was bought from saw mills located in the village.

None of the farmers interviewed were involved in export business due to lack of knowledge in export activities or experience in providing continuous supply of mushroom harvest. Only 3% of the farmers involved in the production of value added products of mushroom such as fried mushroom (Figure

8). The final product was packed in polythene bags as 200g packets (Figure 9) and driven to market through middle persons who were visiting the farmers' premises by Lorries. Only 19 farmers, out of 36 farmers interviewed in 2017, were involved in the mushroom cultivation according to the data gathered in February 2018. Monthly average income of the farmers of this area was dropped from Rs. 16,777 in 2017 to Rs. 14,210 in 2018.

According to the results obtained in both years, absence of quality spawn was the problem for approximately 29% of farmers due to lack of spawn production centers in the village. Nearly 74% of farmers in

both years mentioned that they do not have proper knowledge about disease control and almost 13% of farmers stated that they do not have proper knowledge on packaging since they have received minimal level of training by working in other farms. Nearly, 55% of farmers in both years mentioned that high initial investment is needed to start up the mushroom cultivation and this could be sorted out by providing relevant loan scheme at lower rates.



**Figure 8:** Fried Mushroom available at Kuruwita retailers

The farmers are offered Rs. 40 per packet by the intermediate buyers even though the price of mushroom in the local market is Rs. 80. Therefore the profit obtained from one packet is nearly Rs. 25-30 after considering the expenses of saw dust, spawn, polythene, chemicals and other raw materials. Further, most of the intermediate buyers suddenly stopped the purchasing and returned most of the packs which are not sold out.



**Figure 9:** Final Product packed in polythene bag

**Table 1:** Constrains faced by mushroom farmers in 2017 and 2018

Constraints	Farmer response in % in 2017	Farmer response in % in 2018
High initial Investment	58	52
Low quality and less availability of seeds	31	26
Low availability of saw dust	50	52
High cost of fertilizer and other chemicals	19	26
Labor cost involved	6	10
Allergic to the mushroom spores	31	31
Pest and disease problem	81	68
Lack of proper storing facilities	25	15
Inadequate knowledge in packaging	17	10
Lack of buyers	55	84



### Conclusion and Recommendation

Problems encountered in marketing were the biggest challenge faced by majority (84%) of farmers in 2018. This problem can be minimized by providing direct transport facilities to the island wide supermarket, local traders, intermediaries, regional wholesalers, local restaurants or becoming organized with farmer cooperatives with the government involvement. Returned packs could be used to make value added products such as dried, pickled or fried mushroom to increase the shelf life of mushroom for domestic and local consumptions. Farmers stated that that they need additional training in disease management, packaging and storing methods and also need a support in terms of finance to expand their business.

This study expressed the significance of empowering the mushroom production in Sri Lanka as small and medium entrepreneur because it aids the rural farmers to improve their livelihood. High quality seeds should be continuously provided to all the farmers to obtain high quality yield at a reasonable price by targeting the foreign market as well. To achieve this target, availability of better and low cost substrates, approaches of maintaining hygienic conditions in the culturing sheds, effective disease controlling techniques, introduction of new varieties of edible mushroom to the farmers are essential. Finally, the research and development aspects relevant to above issues need to be promoted to have a sustainable mushroom cultivation in Sri Lanka.

### Acknowledgements

We would like to thank Mrs. Sanjeeva Nandani (Grama sewaka –Lassakanda), Mr. Benett (Grama sewaka – Sudagala) and Mrs. P. Abegunawardena (Divisional secretariat office – Kuruwita) for giving us the opportunity to list out and interview the mushroom farmers in Lassakanda and Sudagala areas in Kuruwita division and all the mushroom farmers in the Erathna, Sudagala and Lassakanda areas for helping us out during their busy schedule.

### References

- Barros, L., Baptista, P., Correia, D.M., Casal, S., Oliveira, B. and Ferreira, I.C.F.R. 2007. Fatty acid and sugar compositions and nutritional value of five wild edible mushrooms from Northeast Portugal. *Food Chemistry*. 105:140–145. <http://dx.doi.org/10.1016/j.foodchem.2007.03.052>
- Central Bank of Sri Lanka. 2008. Annual Report, Central Bank of Sri Lanka, Janadhipathi Mawatha, Colombo 01, Sri Lanka.
- Manzi, P. Aguzzi, A. and Pizzoferrato, L. 2001. Nutritional value of mushrooms widely consumed in Italy. *Food Chemistry*, 73:321–325. [http://dx.doi.org/10.1016/S0308-146\(00\)00304-6](http://dx.doi.org/10.1016/S0308-146(00)00304-6)
- Neelam, S. and Singh, S. 2013. Comparative in vitro studies on phytochemical and antibacterial Properties of ethanolic Extracts of *Pleurotus florida* and *Pleurotus*

- ostreatus*. International Journal of Pharma and Bio Sciences, 4(3):(B)396–400.
- Patil, S.S., Ahmed, S.A., Telang, S.M. and Baig, M.M.V. 2010. The nutritional value of *Pleurotus ostreatus* (jacq. fr.) Kumm cultivated on different lingo cellulosic agro wastes. Innovative Romanian Food Biotechnology, 7:66-70.
- Ren, L., Hemar, Y., Perera, C. O., Lewis, G., Krissansen, G.W. and Buchanan, P.K. 2014. Antibacterial and antioxidant activities of aqueous extracts of eight edible mushrooms. Bioactive Carbohydrates and Dietary Fiber, 3:41–51.  
<http://dx.doi.org/10.1016/j.bcdf.2014.01.003>
- Sher, H. 2006. Ecological and economic evaluation of some Morels Mushroom (*Morchella* Spp.). Wild Mush, 33:23–44.
- Singh, M., Shwet, K. and Sharma, V.P. 2017. Status and trends in world mushroom production-I. Mushroom Research, 26(1):1-20.