

## STUDY OF INCOME GENERATION THROUGH VALUE ADDITION AND SAFE STORAGE OF MUSHROOM

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**Abstract**—In mushroom cultivation enterprise both male and female farmers were engaged in the same manner and even female growers were getting more success. It is easy growing technology, cultivation inside hut, less labour and attracted women farmers also. Farmers were getting high returns from mushroom cultivation but some constraints were reported in its marketing. Due to highly perishability in nature farmers have to sell it within 2-3 days. Male farmers equipped themselves to sell 90% of their product in fresh form and 2% of their produce was sun dried but a total loss of 8% was recorded especially in case of button mushroom as it became black after sun drying. The marketing of fresh mushroom was a major constraint for female farmers as they face problem in going outside for marketing. They were fully dependent on middle men and getting less returns compared to male counterpart. So, they were converting 20-30 % of mushrooms not sold in value added product as dried mushroom, nuggets and pickles. Value added products have long lasting quality so they have to spend more time to sell their product at better price. To extend the freshness time, storage of mushroom in Zero Energy Cool Chamber was also one of the best way, so farmers got extra one or two days to sell their produce and minimize the spoilage.

### INTRODUCTION

Due to simple technology and cheap input requirements for mushroom cultivation, the industry is becoming more well-known. It gains popularity due to its meaty flavour, excellent nutritional content, and additional therapeutic significance. Farmers want to earn more money from mushrooms, but problems occur after harvest because they are highly perishable. So, its Value added product formulation may be one of the ways to reduce its spoilage. Nearly all mushrooms have a relatively shorter lifespan and require ambient conditions soon after harvest in order to keep their freshness for longer period. Mushrooms should be stored at a humidity of 50 to 60 % and temperature of 10-15 °C, to extend their shelf life for two to three days (Ahlawat and Tewari, 2007). They have a short shelf-life of 3-4 days (Lee *et al.*, 1999 and Narayana, 2014) compared to the majority of vegetables at room temperature because they lack a cuticle to

shield them from damage or loss of water from microbial or physical attack (Martine *et al.*, 2000).

Income generation through mushroom cultivation is introduced to the farmers of Muzaffarpur district through different vocational training programs during the last ten years. But after observing increased interest among farmers in mushroom cultivation KVK Agriculture Science Centres Saraiya decided to include mushroom cultivation under various other programmes as sponsored training, Front line demonstration, On Farm Trial, by celebrating Mushroom day etc. As we know that mushroom cultivation needs minimum capital investment, minimum labour, minimum water, minimum land, simple technology and gives more profit, most of the trainees tried to cultivate mushroom. It is grown in hut so women who do not prefer to go outside due to Parda system also started mushroom cultivation on commercial basis and now there is atleast fifty farmers/farm women engaged in oyster, button and dudhiya

mushroom cultivation. However the mushroom growers successfully harvest good yield but it are difficult to sell the entire fresh mushroom at good rate because mushroom is highly perishable in nature among all other vegetables. So observing the problem of marketing KVK Saraiya started to include value addition of mushroom training programme for mushroom growers and safe storage practices to get more profit.

**METHODOLOGY**

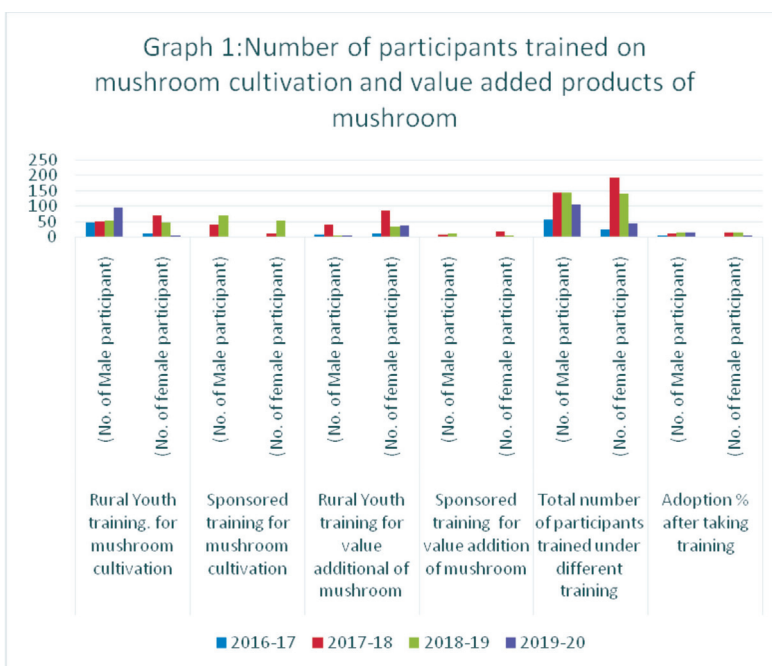
During the year 2016 onwards vocational mushroom cultivation training programme was boosted with value addition of mushroom and different storage ways to keep the mushrooms fresh for longer duration so that farmers may get more profit of their product. Mushroom are very perishable in nature and the farmers have to sell it within 2-3 days, so to increase its storage time 4 OFTS were conducted to increase storage time by storing in Zero Energy Cool Chamber (ZECC) and using polypropylene bag of 100 ppm (Washed and unwashed condition for button mushroom) as included in Action Plan and under Refinement and validation of technology programme. The ZECC is composed of inexpensive indigenous materials including brick, sand, bamboo, dry grass, jute, and cement and operates on the principle of evaporative cooling concept invented by IARI, New Delhi. It has been an efficient and affordable way to raise humidity and lower the temperature in an enclosure

when humidity is relatively low (Jain, 2007; Jha, 2008; Jadav *et al.*, 2010). The chamber watered twice a day to accomplish the increase in relative humidity (90 percent or higher) and decrease in temperature (15 °C to 18 °C) from ambient conditions. In this study the total number of Participants benefitted by vocational training programme on mushroom cultivation were calculated. Out of them the number of beneficiaries cultivating mushroom on commercial basis were chosen to know their income in one season from mushroom cultivation.

The quantities of mushroom not sold were also recorded. Generally the left over oyster mushroom is sun dried by the producer but its dried product have intense flavour which is not liked by the consumer. The sun drying practice is not done in case of button mushroom because it turns blackish in colour after drying due to high phenolic substance. So, there was a need for Scientific method of drying for maintaining the colour and to make other value added products. Those trainees who trained in Value added product of Mushroom were asked about their percentage increase in income through the product they made from left over mushrooms. The type of product they prepared and income from fresh mushroom as well as income from value added product were recorded.

**RESULTS AND DISCUSSION**

During the year 2016-2020 a total number of 387 vocational training were conducted by KVK, Saraiya



in which the women participants were 35 percent. A good percentage of women farmers were engaged in Mushroom cultivation, so providing Vocational training in Value added product of Mushroom were a good initiative in which they were 72 percent (Graph 1).

Apart from giving training, Frontline demonstration on mushroom was also conducted for four years since 2016. The result showed (Graph 2) that adoption % has increased year by year which showed that there will be scope of setting mushroom as start-up program for young generation. By getting view of one of the innovative and best farmer in the knowledge of KVK, Saraiya growing oyster and button mushroom from 2013 named Sudhanshu Kumar, S/o Ravindra Nath Mishra, Kishunagar, Kanti block, Muzaffarpur, it was concluded that he was earning a net profit of Rs. 1.2 lakh per year (produces in 5 months from October to February) by selling 1.5 tonnes mushroom. But he was facing problem for left over mushroom not sold as it spoiled within 2-3 days. Nearly 10-15 percent mushroom is spoiled (Table 2) in each season and he got loss of Rs. 12,000.00 to 14,400.00 per season. Same type of views

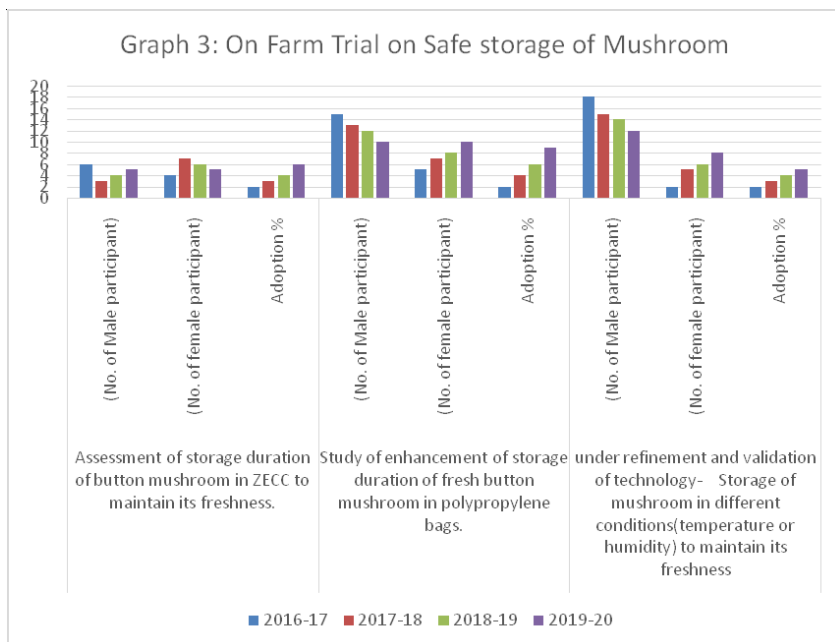
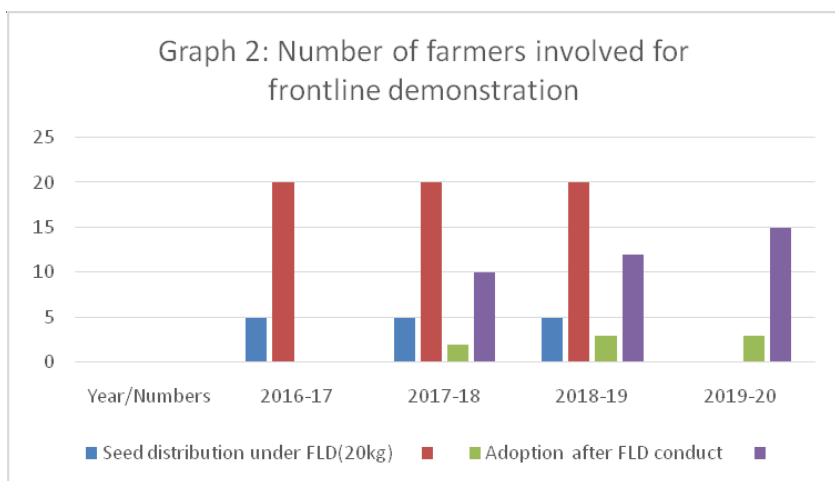


Table 2.

Gender of Farmer	Cost of production per KG (in Rs)	Percent of fresh mushroom sold	Rate per KG (in Rs)		Percent of fresh mushroom not sold	Percent of type of value added product prepared		Rate of value added product	Percent loss
			Oyster	Button		Dried	Pickle		
Male farmer	22	90	80	120	10-15	2	-	Dried product - Rs. 800/kg	8-13
Female farmer	22	70	75	110	30	5	7	Dried product - Rs. 800/kg, Pickle - Rs. 350/kg and Nugget - Rs. 275/kg	1

were also recorded by asking other trainees engaged in mushroom cultivation. Another woman farmer named Preeti Kumari, village Mungaulli under Saraiya block has also engaged in mushroom cultivation since 2016 and cultivating oyster mushroom in small scale area. Each year she produced nearly 1.75 quintal mushroom. Being a lady she faced problem in selling fresh mushroom so after getting training in Value added product of mushroom she decided to prepare dried mushroom powder, mushroom nugget and mushroom pickle from left over mushroom which was sold in market. So she has been getting 99 – 100% income from the mushroom she produced. Same type of view was also recorded by other women farmers engaged in mushroom cultivation. They also faced problem in selling 99-100% fresh mushroom because they are also engaged in other household activities. Nearly 20-30% of mushroom which is not sold in market is converted in value added product & they were getting more profit from value added products.

As value added products are not much common in local market presently they were not converting 100 percent of their produce in value added product

Storage of mushroom in ZECC was also introduced under OFT programme and the shelf life of mushroom increased by extra 1-2 days (Graph 2). The result showed that Oyster mushroom can be well stored for three days in Zero energy cool chamber (ZECC), due to differences in temperature and humidity inside the ZECC as compared to normal room condition. It was recorded that mushroom, get spoiled after 2 days and nearly 8-12 % mushroom is spoiled due to its perishability in nature. Keeping this new 3 OFT was conducted on enhancing the storage duration through storing in ZECC and use of polypropylene bag of 100 ppm thickness. It was recorded that in ZECC the humidity is maintained up to 90% RH and temperature is minimized to 8-10°C. The mushroom is stored for three days in ZECC. So farmers get one extra day to sell their product. The finding was in accordance of Dash *et al.*, (2016) and Devi and Singh (2015) report of paddy straw mushroom storage of mushroom under ZECC in different form.

## CONCLUSION

In mushroom cultivation major constraint was in its



Vocational training on value added product of oyster and button mushroom.



Storage of fresh mushroom under OFT programme in ZECC and polypropylene bag

marketing as it is highly perishable in nature. Processing and Value addition along with storing in ZECC is one of the important way to minimize the spoilage loss. As female farmers were more engaged in this enterprise it will be very useful way to get more income because traditionally rural women are engaged in value addition of fruits and vegetables in the form of pickle, nuggets, dried products etc.

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