



## Original Research Article

### Cultivation of milky mushroom using paddy straw waste

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#### ABSTRACT

##### Keywords

Milky mushroom;  
Paddy straw;  
nutritive values

Indian agriculture will continue to be a main strength of Indian economy. With the variety of agricultural crops grown today. We have achieved food security by producing over 200million tonnes of food grain.Milky mushroom(*Calocybe indica*) India status.This is indigenous tropical mushroom most suitable for tropical regions. At present this variety is being commercially. Cultivated in south India (Tamil Nadu, Andhra Pradesh and Karnataka). *Calocybe indica*, a tropical edible mushroom, is popular because it has good nutritive value and it can be cultivated commercially on a large scale. Paddy straw used as a substrate in milky mushroom. Paddy straw mushroom is a popular variety among people because of its distinct flavour. Pleasant tastes, higher protein content and shorter cropping duration compared to other cultivated mushrooms.

#### Introduction

The mushroom defined as a macro fungus with a distinctive fruiting body,large enough to be seen with the naked eye and to be picked up by hand (Chauge and Miles,1922). Mushroom is now considered as a crucial component for food safety and security.The phytonutrients in mushroom are sought after food items. Micro-economy and community engagement in mushroom cultivation is helping rural economy. Urban and semi urban cultivation is also gaining popularity for various edible plants including mushroom and *Calocybe indica* an edible mushroom. Mushroom is a protein source without cholesterol. On the other

blood cholesterol. At the optimum level. In addition to that these have medicinal values (Nita.B 2002).

Milky mushroom (*C.indica*) is a tropical edible fungus andhas become the third commercially grown mushroom in india after button and oyster it is being cultivated in Karnataka,Tamilnadu and Andhra Pradesh on a large scale(Krishnamoorthy A.S., 2003). Now it has great demand due to robust, fleshy and milky white sporophore. It provides the people with an additional vegetable of high quality and enrich the diet with high quality proteins, minerals and vitamins which can be direct benefit to the

human health and fitness mushroom cultivation is one of the most commercially agriculture. Microbial technology can help in large scale recycling of agro waste in India (Charbey et al 2010).

Paddy straw mushroom is a popular variety among people because of its distinct flavour. Pleasant tastes, higher protein content and shorter cropping duration compared to other cultivated mushrooms. Rich thiamine, riboflavin, nicotinic acid, pyridoxine, biotin and ascorbic acid (Breene W.M 1990). Rice straw is the most common lignocellulosic substrate whose major component is cellulose and it is also the best substrate for cultivating milky white mushrooms. (Mangat et al. 2008).

*Calocybe indica*, a tropical edible mushroom, is popular because it has good nutritive value and it can be cultivated commercially. The current investigation was undertaken to determine a suitable substrate and the appropriate thickness of casing materials for the cultivation of *C.indica* and commonly known as milky white mushroom, grown during the summer in the, gaugetic plain of Bangladesh and west Bengal of *indica*. (Chakravathy et al., 1981). It is becoming more popular, due to its robust size, attractive color, sustainable yield, delicious taste, and unique texture (Purkayatha, Chandra 1974). *C.indica* is rich in protein, lipids, mineral, fiber, carbohydrate and is abundant with essential amino acids (Alam et al., 2008), (Mall vandharri et al., 2006).

*Calocybe indica*, known as milky mushroom grows and cultivated in the sub-tropical and temperate zones of south asia high yielding strain of *Calocybe madica* APK 2. It grows well at room temperature between 24°C-27°C and can be cultivated even on unfermented materials. The advantages of

this mushroom over other mushrooms are easy method of cultivation, less investment very attractive fruiting body. Pleasing milk white color, long shelf life, more nutritious and less time to grow.

Rahul Amine et al., 2010 investigated effect of different substrates and casing materials on the growth and yield of *Calocybe indica*. The number of effective fruiting bodies, the biological economic yield & the biological efficiency were statistically similar all of the casing material used.

The maximum biological efficiency was found in the cow dung & loamy soil (3cm thick) was the best casing material and the rice straw was the best substrate for the commercial cultivation of *Calocybe indica*.

Kauta Bokaria et al., 2014 found commercial production of milky mushroom (*Calocybe indica*). Commercial production techniques for milky mushroom *Calocybe indica* recorded yield 350.5 to 375.0g of mushrooms per 250g of paddy straw (dry weight). Which accounts to 142.6 to 150.0 percent bioefficiency. Substrates like maize stalks, sorghum stalks, vetiver grass and straw were also found to be suitable for growing *Calocybe indica*.

Nuhu Alam et al., 2010 investigated influence of different supplements on the commercial cultivation of milky white mushroom. The result indicates that increasing the supplement level resulted in less biological efficiency and that 30% maize powder was the best supplement level for rice straw substrate to cultivate milky white mushrooms.

Kamugiska and Sunanda shaan 2005 investigated nutritional composition of milky mushroom *Calocybe indica* cultivated on paddy straw & mixed with Raqi flour.

The findings reaffirmed the findings of others that mushroom in general and milky mushroom in particular is a high protein and low fat product.

The production and marketing potential of the milky white mushroom in Bangladesh is promising. Because of the high local demand for and export potential of this mushroom, many private entrepreneurs are interested in its commercial cultivation. Which is conducive to the environmental conditions of Bangladesh (Krishnamoorthy As et al.,2000)

### **Materials and Methods**

**The study was using the paddy straw substrate for the cultivation of milky mushroom.**

#### **Spawn Preparation**

Selected good quality sorghum grains free from pest and moulds. Boil the grains submerged in clean water for 20 – 30 minutes. When the grains become soft, it was removed and was spread evenly on a cotton cloth to drain out the water and to cool the grains. Mixed 3 % chalk powder (30g / kg of grain) for adjusting the pH and to keep the grains loose. Filled 250 gms of grain in cleaned and dried glucose bottle of 500ml capacity polypropylene bags and plugged the mouth of the bottle tightly with non absorbent cotton. Sterilize the bottles in an autoclave by exposing to 121°C and 15lbs pressure / sq inch for 20 minutes. After cooling transferred the bottles to inoculation chamber.

#### **Substrate Preparation**

The paddy straw were chopped into 2-3inch pieces and soaked in water containing Carbendazin (75ppm) and formalin

(500ppm) for 2-3 hrs. After that, the substrate was taken out from the solution and excess water was drained out for 2-3hrs. Moisture content of about 60% was maintained in the wet substrate prior to spawning. Spawning was done @5% by wet weight of the prepared substrate cultivation was done in high density polypropylene bags 60X40cm with 100 gauge.

#### **Harvesting**

It takes about 10 days for mycelium to reach on top of casing layer when fresh air is introduced to maintain the temperature and (19°C -25°C). Light should be provided in long time. The changes thus made in environment, resulted in the initiation of fruiting bodies within 3-5 days in the form of needle shape which mature in about a week. Mushrooms 7-8cm diam. are harvested by twisting. It was cleaned and packed in perforated polythene bags for marketing.

#### **Results and Discussion**

The days required for spawn run on paddy straw substrate ranged from 15days to 19days. It takes about 10days for mycelium to reach on top of casing layer when fresh air is introduced while maintaining temperature. Light should be provided throughout continuously. This local climatic micro environment result in the initiation of fruiting bodies with in 3-5days in the form of needle shape which mature in about a week. Temperature above 30°C decrease the spawn running period

The present study revealed that Coimbatore, Tamilnadu, India very suitable for cultivation of milky mushroom. The temperature falls 20°C – 35°C and availability of substrates help in the cultivation of milky mushroom in Tamil

Nadu. In paddy straw substrates it took 14days for spawn run, 7days for pin head formation, 7days for first harvest and

harvested 500gms yield/1500gm substrate. Kanta Bokaxia et al (2014) also reported the same result in milky mushroom

**Table- Stages and yield of milky mushroom cultivation**

Weight of the substrate(in gms)	Yield (in gms)	Days for Spawn Run	Days of pin head formation	Days for first Harvest
1500	500	14	7	7

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