



Effect of various casing material on yield performance of *Tricholoma giganteum* (TGSLM)

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Abstract

Tricholoma giganteum Masee (*Syn-Macrocybe gigantea*), another edible summer mushroom is widely distributed in tropics of Asia and Africa. In India it is mostly seen in Hooghly, West Bengal. It is pure white in colour and resembling the morphology of *Calocybe indica*. An experiment was carried out during the summer season, 2018-2019 to study the effect of various casing mixtures on yield performance of *T. giganteum* (TGSLM). The casing soil affects not only initiation of fruiting bodies, number of pinhead formation but also duration of mushroom, yield and biological efficiency. To overcome this issue casing soil were tested with various parameters for the cultivation of milky mushroom. Among different casing mixtures, red soil + sand (1:2) recorded minimum days for pinhead formation (13.32 days), number of pin head initiation (102.13), number of fruiting bodies (31.29), yield (1698.82 g/bed) and biological efficiency of 169.88 per cent and showed the better performance for the production of *T. giganteum* (TGSLM).

Keywords: *Tricholoma giganteum* (TGSLM); casing; yield

Introduction

Among the plenty of edible mushrooms in India, only *Pleurotus* spp., *Agaricus bisporus*, *Volvariella volvacea* and *Calocybe indica* are being cultivated by the growers ^[1]. The oyster mushrooms and milky mushrooms can be easily grown under natural condition. Whereas, button mushrooms require huge inputs and highly controlled conditions. But the milky mushroom can be cultivated in the plain regions of India at 28-35°C temperature ^[5]. Because of this, milky mushroom cultivation was easily attracted and accepted by the mushroom cultivars. The major advantage is, it can be best fitted in relay cropping when no other mushroom can be grown at higher temperature ^[2]. *Tricholoma giganteum* Masee (*Syn - Macrocybe gigantea*), another edible summer mushroom is widely distributed in tropics of Asia and Africa. In India it is mostly seen in Hooghly, West Bengal. It is pure white in colour and resembling the morphology of milky mushroom *C. indica* ^[1].

In the milky mushroom production casing is important operation after complete spawn run days. Casing is done when the fungal mycelium has completely impregnated the substrate after spawning. Quality of casing material affects the yield of mushroom as it stimulates the fruiting body initiation and regulates the moisture, temperature and certain other factors of substrate i.e. physical, chemical, micro-biological and nutritional, which determine the suitability of casing material for the cultivation of milky mushrooms. Thus, the evaluation of casing mixture is necessary for the production of mushroom with maximum yield performance.

Materials and method

The study was carried out during the year 2018-19 in the Department of Plant Pathology Laboratory, Annamalai University, Chidambaram. It is located at the 11°24'N latitude and 79°44'E longitude at an altitude of +5.79 m above MSL.

Isolation and maintenance of culture

The mushroom *Tricholoma* was collected from Yercaud hills of Salem districts in Tamil Nadu. The mushrooms were pure cultured from the cap using tissue culture method and maintained on Potato Agar slants and used for further studies. Then the new isolate was named as *T. giganteum* (TGSLM).

Meteorology of cropping house

Temperature (30-35°C) and relative humidity (90 to 95 %) in the cropping house was maintained by spraying with water on the walls of cropping house covered with gunny bags.

Casing

The casing soil was prepared with mixing of the selected substrates in the proper proportion and sterilized with 2% formalin. The casing was done after 20 to 25 days of spawning and 1 – 1.5 cm thick casing layer was

applied. Various types of casing materials viz., red soil alone, red soil + sand (1:1), red soil + sand (1:2), tea waste + red soil (1:2), tea waste + red soil + sand (1:1:1), were used for casing. The observations viz., days for pin head formation, number of pin head initiation, number of fruiting body, yield and biological efficiency were assessed and recorded. Three replications were maintained for each treatment

Harvesting

Harvesting was done by slight twisting and pulling of sporophores before colour change of the sporophores. Three harvests were taken from the same bed at an interval of 6-7 days.

Weight of sporophore

The freshly harvested sporophore was immediately weighed and recorded.

Yield of mushroom

The cumulative yield in each replication was recorded by summing up the fresh weight and the number of picking, and recorded as weight (kg) per kg of the substrate.

Biological efficiency

The biological efficiency was calculated using the formula (Chang *et al.*, 1981).

$$\text{Biological efficiency \%} = \frac{\text{Fresh weight of mushroom}}{\text{Dry weight of substrate}} \times 100$$

Result and discussion

Effect of different casing material on yield of *T. giganteum* (TGSLM)

Among the different casing materials tested, the combination of red soil + sand (1:1) took minimum days for pinhead formation (13.32 days), maximum number of pin head formation (102.13), number of fruiting bodies (31.29) and recorded maximum yield (1698.82 g/bed). This was followed by red soil + sand (1:2), red soil alone, tea waste + red soil + sand (1: 1: 1), tea waste + red soil (1: 2) in the decreasing order of merit. Tea waste + red soil (1: 2) recorded with lowest yield (481.53 g/bed) (Table 1). Similar to the present study, Ashrafi *et al* [3], reported that SMC + Sand (3:1) as the best casing mixture in increasing the yield. Whereas, Yadav and Kumari (2018) found, a mixture of spent compost + FYM + Sand + Garden soil (1: 1: 1: 1) recorded the maximum yield (1703.75 g mushroom / 5 kg wet substrate) with 47.66 average numbers of fruiting bodies. These earlier reports lend support to the present findings.

Casing provides physical support, moisture and allows gases to escape from the substrates [8]. The casing mixture of red soil + sand (1:1) would have provided adequate physical support and moisture which could have enhanced the yield components of *T. giganteum* as observed by Akhtar *et al.* [1]. Kumari and Kudada [5] opined that 2 cm thickness of casing layer was the best as compared to other casing soil thickness. Thickness of casing layer beyond 2.0 cm gradually decreased the mushroom yield and delayed the appearance of sporocarps.

Table 1: Effect of different casing materials on yield of *T. giganteum* (TGSLM)

Treatment No.	Casing materials	DFPF	NOPI	NOFB	Yield (g/bed)	Bio-efficiency (%)
1.	Red soil	21.99 ^a	29.92 ^c	19.08 ^d	992.16 ^c	99.21
2.	Red soil + sand (1:1)	13.32 ^d	102.13 ^a	31.29 ^a	1698.82 ^a	169.78
3.	Red soil + sand (1:2)	16.39 ^c	93.11 ^b	24.32 ^b	1240.32 ^b	124.03
4.	Tea waste + red soil (1:2)	19.89 ^b	23.43 ^c	10.43 ^e	481.53 ^d	48.15
5.	Tea waste + red soil + sand (1:1:1)	18.99 ^b	89.22 ^b	21.32 ^c	1066.63 ^c	106.66

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