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SHORT COMMUNICATION

Effect of Age and Quantity of Spawn on Milky Mushroom Production

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ABSTRACT

Quality and quantity of spawn play an important role in the successful cultivation of any mushroom species. In the present study, the effect of age of spawn (14, 21, 30, 37, 45 and 60 days after inoculation) and quantity (100, 200, 300, 400 and 500 g per kg dry substrate) on sporophore production of Calocybe indica was investigated. Quickest substrate colonization and primordial initiation as well as highest number and weight of sporophores were recorded in 21 days- old spawn. Mushroom yield decreased with increase in spawn age. A spawn dose of 200 g/ kg of dry substrate was found optimum.

Key Words: *Age, Quantity, Calocybe indica, Mushroom, Spawn*

INTRODUCTION

While mushrooms like *Agaricus, Pleurotus, Volvariella, Lentinulla* and *Auricularia* are well known to the world mushroom growers, milky mushroom (*Calocybe indica*) is a potentially new species for international trade. It is a tropical edible fungus and can be cultivated indoor in high temperature and high humidity areas. It is robust, fleshy, milky white and resembles button mushroom. The mushroom is of Indian origin [1]. It is rich in protein, lipids, fibres, minerals, carbohydrate and contains an abundant amount of essential amino acids [2, 3]. It is an excellent source of thiamine, riboflavin, nicotinic acid, pyridoxine and ascorbic acid [4]. Beginning from its maiden artificial cultivation in 1976 [5] on a mixture of soil, sand and maize meal (12: 6: 1) in soil jars, improved production techniques were developed later on by various workers [6-12]. It is gaining popularity among the potential mushroom growers as well as perspective consumers owing to attractive shape and size, simple growing technique, low capital investment, wide substrate range, sustainable yield, long shelf-life and ability to thrive in a wide range of climatic conditions. Quality and quantity of spawn play an important role in the successful production of any mushroom species. In the present study, the effect of spawn age and quantity on the sporophore production of *C. indica* was investigated as the relevant literatures are almost lacking excepting few [13].

MATERIALS AND METHODS

To determine the optimum age of spawn on the production of *C. indica*, spawn was prepared on wheat grains as per standard procedure [14]. Spawn (200 g/kg of substrate) 14, 21, 30, 37, 45 and 60 days after inoculation were used to raise the mushroom crop. In another study, different doses of grain spawn *viz.* 100, 200, 300, 400 and 500 g per kg of dry substrate were used to inoculate the substrate. Standard method of mushroom cultivation using chopped paddy straw in high density polythene bags (60 X 40 cm, 100 gauges) with layer spawning was followed [9]. Care was taken to maintain optimum temperature of 25-32°C, relative humidity of 80-95 % and light intensity of about 1600 –3200 lux in the cropping room. Proper ventilation was also allowed for gaseous exchange. Beds were kept moist by regular spray of water. Mushrooms were harvested 7 to 8 days after primordial initiation. After obtaining the first harvest, the top surface of the substrate was gently ruffled, slightly compacted back and sprayed regularly with water. Mushrooms were harvested just before flattening from a total of two flushes and fresh weights were immediately recorded. Biological efficiency (BE) was computed as the ratio between the fresh weights of mushroom to the dry weight of substrate and was expressed as a per cent. Data pertaining to weight of fruiting bodies were statistically analyzed.

RESULTS AND DISCUSSION

Quickest substrate colonization (15 days) and primordial initiation (30 days) as well as highest number (6) and weight of sporophores (70.5 % BE) was recorded in 21 days old spawn (Table 1). This finding is in concurrence with the report of Purkayastha and Nayak [13].The average pileus diameter and stipe length were 14.6 and 16.7 cm, respectively. A single sporophore weighed about 117.5 g. The viable and active mycelia of younger spawn ramified faster in the substrate and had better chance of withstanding adverse conditions in comparison to older spawn. The mushroom yields obtained in response to 21 and 30 days spawns were statistically *at par* but significantly higher than other treatments. Increase in spawn age beyond 21 days reduced the number of sporophores which could have been due to apparent loss of vigour and viability of fungal mycelia. Two month old spawn sustained the least weight of sporophores (305.3 g) but supported maximum individual weight of fruiting body (152.6 g).

Table 1: Effect of spawn age on production of *Calocybe indica*

Spawn age (days)	SC (days)	FI (days)	Sph. (No)	Pileus dia. (cm)	Stipe length (cm)	Yield (g)	Avg. wt. of Sph. (g)	BE (%)
14	17	39	4	13.6	16.4	485.3	121.3	48.5
21	15	30	6	14.6	16.7	705.3	117.5	70.5
30	16	32	5	14.0	16.5	691.3	138.2	69.1
37	18	34	4	12.9	15.4	550.0	137.5	55.0
45	20	42	3	12.0	14.6	411.3	137.1	41.1
60	21	42	2	10.8	11.8	305.3	152.6	30.5

CD (0.05) 55.22
Each of the observation was the average of three replications.
SC- Substrate colonization FI- Fruiting initiation Sph.- Sporophore

It was revealed that the yield of mushroom increased with increase in spawn dose in the cultivation substrate (Table 2)
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Table 2: Effect of quantity of spawn on production of *Calocybe indica*

Quantity/ bag (g)	SC (days)	FI (days)	Sph. (No.)	Pileus dia. (cm)	Stipe length (cm)	Yield (g)	Avg. wt. of Sph. (g)	BE (%)
100	18	34	4	13.8	15.4	374.6	93.6	37.4
200	15	30	6	14.5	16.7	701.3	116.8	70.1
300	14	28	6	14.6	16.6	732.0	122.0	73.2
400	13	26	7	12.9	14.7	750.6	107.2	75.0
500	12	26	8	11.2	14.6	755.0	94.3	75.5

CD (0.05) 54.17
Each of the observation was the average of three replications.
SC- Substrate colonization FI- Fruiting initiation Sph- Sporophore

Least weight of sporophore (374.6 g, 37.4 % BE) was recorded in the substrate supplemented with minimum spawn dose (100 g). Spawning of substrate with 200 g spawn resulted in 701.3 g of fresh mushrooms (70.1 % BE) which was significantly superior to the yield obtained with 100 g of spawn. It was observed that there was a steep increase in mushroom yield when the spawn dose increased from 100 g to 200 g. But when the spawn dose was raised from 200 g

to 500 g, there was only a gradual increase in productivity and these resultant yields were not statistically different from each other. It was also observed that there was quicker substrate colonization, earlier pinhead appearance and higher number of sporophores as the amount of spawn increased in the cultivation substrate. Kuforiji and Fasidi [15] similarly observed that high spawning rate led to more rapid colonization of substrate. This prevented other unwanted micro-organisms from becoming established in the substrate. It was noted that the rate of primordial mortality increased with increased spawn doses especially in the range of 400-500 g/bag ostensibly due to fierce competition among the developing primordia for space and nutrition in the cultivation substrate. Higher mycelial load might have also created problems in the proper escape of respiratory gases. As a result the rate of increase in productivity could not keep pace with the rate of increase in spawn quantity. The results are in agreement with earlier findings [16,17].It was concluded from the study that 200 g of 21 days-old wheat grain spawn should be used per kg of dry paddy straw substrate in 60 cm X 40 cm cylindrical polythene bags to get optimum yield of milky mushroom.

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