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PERFORMANCE OF EXOTIC AND LOCAL STRAINS OF CHINESE MUSHROOM *VOLVARIELLA VOLVACEA* (BULL. EX. FR.) ON DIFFERENT SUBSTRATES

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An experiment was conducted during May-Aug., 1988 at National Agricultural Research Centre (NARC), Islamabad to determine the relative yield performance of local and exotic strains of Chinese mushroom, *Volvariella volvacea* (Bull. ex. fr.) Sing. with two different substrates: paddy straw and cotton waste. Significant strain differences were observed. Both local as well as exotic strains of Chinese mushroom performed better when paddy straw was used as substrate as compared to cotton waste. The local strain of Chinese mushroom gave significantly higher yield over exotic strain of Chinese mushroom "V 559".

Key words: Mushroom strains, Substrates, Performance.

Introduction

Volvariella volvacea (Bull. ex. fr.) Sing. is a popular edible fungus of the tropic and subtropics. It can be cultivated during summer months under favourable temperature ranging from 30 to 45°. Recently, Chinese mushroom have been successfully grown on water hyacinth, bunch of oilplam and leaves of banana but the yield of the mushroom is lower on these substrates when compared with cotton waste and rice straw. Moreover, its production has been reported to be less than that of *Agaricus* (with mushroom) (Veddor, 4) and *Lentirus supp* (Sheiitake mushroom) [1].

Efforts have been carried out to increase yield of this mushroom by means of better monitoring of environmental factors like temperature, substrates etc, a very few studies have been carried out to evaluate the performance of various strains of Chinese mushroom found in nature so far. Antonio and Peerally [2] studied 22 strain of *Agaricus bitorquis*. In their studies, Hungaranian strain "D 13" gave the best and even crop independently under cave conditions. This strain also gave the similar yield under room condition in polythene bags. Iqbal *et al.* [3] studied the yield potential of local strains of Chinese mushroom using blow gutter cotton waste and paddy straw as the substrates. They found that old spawn of local strains gave higher yield on various substrates as compared with fresh spawn. The present studies were conducted to explore the spawning ability and yield potential of local and exotic strains of Chinese mushroom on paddy straw and blow gutter cotton waste.

Materials and Methods

The isolates of local strain of Chinese mushroom were initially derived from the fruiting bodies of mushroom collected from paddy straw field of NARC, Islamabad. Inside tissue of the young fruiting body was cut with sterilized scalpel and was inoculated on PDA medium aseptically and incubated at 32°. Pure dikaryotic culture of this fungus was ready for marter culture at seven days after incubation.

Exotic strain of Chinese mushroom V 559 used in this study was provided by Prof. T.H. Quimio, Department of Plant Pathology, University of Philippines maintained on PDA medium, kept at 25-30° and was subcultured every third month.

Spawn preparation. Rice straw was cut into small pieces 3-5 cm long and soaked overnight in normal water. Excessive moisture was drained off. One percent $CaCO_3$ and 1% rice bran was added to the chopped paddy straw. Bottles were filled with this mixture and autoclaved. On cooling the autoclaved bottles were inoculated with the cultures of local and exotic strains of Chinese mushroom separately. The inoculated bottles with lids were incubated at 32° for spawn production.

Paddy straw substrate. The bundles of rice straw were prepared and tied at two places i.e. at cut and tip ends to make it firm. These bundles were soaked overnight in fresh water. Bundles were placed on wooden stack to remove excessive moisture. Beds were arranged by placing the bundles on a base side by side and perpendicular to the width of the base to have bed size 65 x 75cm, 65 x 75 x 60-90cm with uniform top surface. Four layers of bundles were placed one upon the other to complete the beds. As much as 350-400 g straw spawn was inoculated for spawning in 1 bed. Spawn was inoculated 10-15cm inside from the periphery on each layer 2-3g chickpea powder was also dusted at the point of inoculation. Similarly all the layers were inoculated. Top layer was covered with 3cm thin layer of well soaked paddy straw. Beds were covered with polythene sheet for a week.

Blow gutter cotton waste. Blow gutter cotton waste is the by-product of the textile industry and can be divided into many grades according to the size and quality. Blow gutter cotton

waste was soaked overnight in fresh water. Excessive water was drenched out and the moistend cotton waste was placed in a heap. The heap was covered with plastic sheet and kept for 4 days under sunshine. After 4 days, wheat bran at the rate of 2% of the cotton waste dry weight was mixed thoroughly and heap was again covered with plastic sheet for another 2 days. The heap was turned upside down after every 2 days and process was continued for 9 days. Prepared cotton compost was then transferred to mushroom growing house for spawning. As much as 350-400 g straw spawn was inoculated for spawning in one bed to have bed size 65 x 75cm 65 x 75 x 60 x 90cm with uniform to surface spawn was inoculated in the beds 10-15 cm inside from the periphery by placing a bit of spawn. Then 2-3 g of chick powder was dusted at the point of inoculation. Upper surface of the compost, beds were covered with polythene sheet.

Cropping and picking. The experiment was conducted in thatched type growing house (0.55m x 3.66m). Yield of each treatment was weighed and recorded in grams. On 10th days after spawning the plastic sheet was removed from the bed as pinheads start appearing. After 12-15 days of bed preparation it took 3-4 days when they attain egg size. Mushroom appeared in flushes at an interval of 9-12 days, crop continued for two and half months. During cropping period, temperature of growing house was maintained from 32-38° and relative humidity from 80 to 90% watering on floor. During this period fresh air was provided through cross ventilation and indoor air was exhausted by exhaust fan. Mushroom was harvested at egg stage, when volva was about to rupture.

The data were statistically analysed and treatment means with ISD procedure at 1% probability.

Results and Discussion

Analysis of variance of the yield was carried out to isolate mean difference between various treatment if any. The computed value of F ratio came to 4.45 which was statistically significant at 5% probability. With a view to compare the treatment means, orthagonal contrasts were also computed. The F ratio for local versus exotic strain with paddy straw as substrate was 73.92 which was statistically significant at 1% level of probability. Similarly the F value for local versus exotic strain with blow gutter cotton waste as substrate was 8.95, being statistically.

The overall comparison between local versus exotic strain was found to be highly significant with an F ratio of 175.77. This implies that there are significant differences regardless of the type of substrate used. Local strain on paddy straw gave significantly higher yield (2319 g) than exotic strain on the same substrate (1677 g). Moreover, local strain on paddy straw gave significantly higher yield, 2319 g than on blow gutter cotton waste which was 1410 g. The exotic strain gave significantly higher yield on paddy straw (1677 g) than on blow gutter cotton waste (1187 g). From the data it is concluded that the local strain of the Chinese mushroom grown on paddy straw is better than the exotic strain and therefore, should be developed further. Moreover, it is concluded that paddy straw substrate is better and cheaper source for the cultivation of Chinese mushroom.

TABLE 1. COMPARATIVE YIELD PERFORMANCE OF LOCAL AND EXOTIC STRAINS OF CHINESE MUSHROOM ON PADDY STRAW AND COTTON WASTE SUBSTRATES.

Treatment		Yield (g-2)
Strains	Substrates	
Local	Paddy straw	2319 a
Exotic V. 559	Paddy straw	1677 b
Local	Cotton waste	1410 bc
Exotic V.559	Cotton waste	1187 c

* Treatment means not sharing a letter in common differ significantly at 1% level of probability with LSD procedure.

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