Eco-Friendly Production of *Agaricus bisporus* (Lange) Imbach (White Button Mushroom)

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Abstract: For the profitable eco-friendly bioconversion of lingo-cellulosic wastes of agro-industry, the production of mushroom is regarded as the second most commercial microbial technology next to the yeast. With the view point of eco-friendly production of *Agaricus bisporus* (Lange) Imbach, the study conducted upon the yield of different strains of *A. bisporus* in which, strain P1 and NCS 5 were found superior over the other strains. The yield of strains varied from 11.0 kg to 13.75 kg per quintal compost. The strains NCS 5 (13.75 kg) and P1 (13.10 kg) were statistically at par over the check. [Nature and Science. 2009;7(6):57-60]. (ISSN: 1545-0740).

Key words: *Agaricus bisporus*, Eco-friendly production, White Button Mushroom

Introduction:

Mushroom has been defined as a "Macro-fungus with a distinctive fruiting body which can be either epigeous (above ground) or hypogeous (underground) and large enough to be seen with the naked eye and to be picked by hand'' (Chang and Miles, 1993). Mushrooms are non-conventional sources of human food. These are delicious, nutritionally rich and have their own importance as medicines. The widespread use of mushrooms in ancient times is also confirmed by the hypothesis of Wason (1971) that the "Soma" of Rig-Veda was a preparing of mushroom, *Amanita muscaria.* Taxonomically (Alexopoulas et al, 1996) these are species of phylum Basidiomycota and Ascomycota.

The cultivation of white button mushroom is mostly confined to small, seasonal growing units which are mostly unpasteurised compost and producing 10-14 kg mushroom/qt. compost. However, 18-22 kg mushroom/qt. compost had been harvested under controlled conditions using the pasteurised compost by a limited number of commercial growing units but in the developed countries the production is 25-30 kg mushroom/qt. compost (Chaddha and Sharma, 1995). Introduction of better quality strains from other countries cannot solve the problem of better yield in our country due to the altogether different conditions of growing mushrooms than those of Europe and America. Therefore we need to develop better performing strain in terms of yield, quality and wider adaptability under diverse growing conditions.

Jin (1990) studied the yield performance of fluffy and appressed type mycelium of the same strain of *A. bisporus*, he reported that fluffy type tended to give high yield whereas, the appressed type showed good quality. Mehta and Dhar (1991) evaluated 9 strains of *A. bisporus* for yield performance. The strains NCS 14, NCS 5, NCS 11, NCS 6 and NCS 15 were at par in terms of yield and yielded significantly higher than S 1, MS 39, P2 and NCS 12. Singh (1990, 1991) conducted the yield evaluation trials of different strains of *A. bisporus.* He reported that strains S 11 was introduced in sixties while strains RRL 89, S 22 and S 649 were introduced during 1975- 1983. The strain S 11 and S 310 were good yielders, while TM 7 and L 20 were identified as moderate yielders.

In view of the above background, present study was undertaken with the objective of studying the yield of selected strains of *A. bisporus.*

Methodology:

The experiment was conducted at **"**Mushroom Research and Training Centre**",** Centre of Advanced Studies in Plant Pathology, G. B. Pant University of Agriculture and Technology, Pantnagar, district-U.S. Nagar (UK), India.

Selection of the strains:

Four strains of *A. bisporus* namely P1, NCS5, NCS12 and S11 (check) selected based on their yield performance under All India Coordinated Mushroom Improvement Project at G. B. Pant University of Agriculture and Technology, Pantnagar (UK).

The yield of strains was assessed by growing them on pasteurized synthetic compost. The synthetic compost of 2.2% nitrogen level was prepared as per following formulation:

Wheat straw : 1000 kg
Chicken manure : 600 kg
Urea : 14.5 kg
Wheat bran : 100 kg
Gypsum : 50 kg

For compost making, short composting method was employed giving 7 days out and 6 days indoor composting period. Casing mixture (FYM+ soil) 3:1 sterilized with 4 % Formaldehyde was used. 10kg compost was filled in polythene bags of 70 X 45 cm in size and spawning was done using 0.75% grain spawn of compost weight. Each treatment was replicated 3 times and bags were kept in crop room at prevailing temperature of 20 ± 2°C. The 3.5 cm thick casing was done on 17^{th} day from the date of spawning. The yield of strains obtained from 30 days harvesting period were compared with each other.

Statistical analysis:

Statistical analysis of the data was done as per the requirement of the experiment. Critical differences (CD) were calculated at 5% level of significance for comparison of differences between the treatment means.

Results and discussion:

The yield performance of different strains was recorded using pasteurized compost. The experimentation was done on prevailing room temperature during January, 2006 onwards. The humidity in crop room was maintained by sprinkling of water on walls, floor and beds. The yields obtained from different strains are summarized in the table given below.

Yields performance of different strains of *A. bisporus* in 30 days cropping period

S. No.	Strains	Average yield in kg/qt. Compost		
		Number	Weight	Weight / Fruit body (gm)
1.	P1	2280	13.10	5.74
2.	NCS 5	2482	13.75	5.53
3.	NCS 12	2230	12.50	5.60
4.	S 11 (check)	1920	11.00	5.72
	CD at 5 %	263.72	1.140	-

It is evident from the data in the above table that yield of strains varied from 11.00 kg to 13.75kg. The strains P1 (13.10 kg), NCS 5 (13. 75 kg) and NCS 12 (12.50 kg) were statistically at par in terms of yield. The yield obtained from these strains was significantly higher than strain S 11 (check, 11.0 kg).

The number of fruit bodies obtained from the strains NCS5, P1 and NCS 12 were significantly higher as compared to strain S 11(1920, check). It is interesting to record that the maximum weight per fruit body harvested was from the strain S 11 (check) followed by P1, a poor and a moderate yielders, respectively.

The environment, substrate and strain are equally important factors for the mushroom production. Since, the present studies were evaluated for their yield. The rest of the strains NCS12 were at par with that of check (S 11). Earlier workers Mehta and Dhar (1991); Singh (1990, 1991) found NCS 5 to be one of the best yielders.

It may be concluded from the foregoing discussions that the strain NCS 5 and P1 have superiority over the other strains studied in present investigations.

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