

RESEARCH ARTICLE

Study of biological efficiency and yield of oyster mushroom with chemical treatment

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SUMMARY

Various concentration of nitrogen source, e.g. peptone, few carbon, viz., maltose and lactose and inorganic chemicals, viz., $MgSO_4$ and $FeSO_4$ (0.5 to 1.0) were screened to determine the most suitable concentration for better yield of *Pleurotus sajor-caju*. It was found that all the carbon source and inorganic chemicals gave maximum yield and biological efficiency in 0.5 per cent concentration. On that basis maltose and $MgSO_4$ were proved superior carbon source and inorganic chemical, respectively. Peptone, the semisolid protein as nitrogen source gave maximum yield and biological efficiency in 0.5 per cent concentration.

Key Words : Yield, Oyster mushroom, Biological efficiency, Chemical

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Pleurotus sajor-caju, a well known oyster species, belonging top family Tricholomataceae of order Agaricales is continuously being popularized in western countries due to its nutritional property which makes it an ideal food for human consumption. Different approaches have been done to increase its yield and biological efficiency at different time interval. These included cultivation of this mushroom on various agro (Gupta *et al.*, 1999; Jandaik and Kapoor, 1974; Kumar *et al.*, 2004 and Moda *et al.*, 2005) and industrial wastes,

supplementation of nitrogenous (Vijay and Upadhyay, 1989 and 1991) and non- nitrogenous substances / chemical, strategy with spawn. (Chauhan and Pant, 1988; Sharma and Puttoo, 2004 and Shivaprakasam and Kandasamy, 1982), methods of cultivation (Shivaprakasam and Kandasamy, 1983 and Baskarn *et al.*, 1978) and application of casting soil etc. In present communication, different concentration of nitrogen source e.g. peptone, few carbon and energy source, inorganic chemicals, were screened to determine the most suitable concentration for better yield of mushroom.

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MATERIAL AND METHODS

This work was carried out in Research Laboratory, Biodiversity conservation and rural biotechnology centre, Jabalpur. Nitrogen source e.g. peptone, various carbon source, viz., maltose and lactose and inorganic chemicals, viz., $MgSO_4$, $FeSO_4$, were selected for the purpose.

obtained during threshing of harvested wheat crop was utilized as substrate which was water – soaked overnight in 2 per cent formaldehyde solution. At the following day, the substrate was spread over clean and incline cemented floor to drain off excess of water. The bed was prepared by layer spawning following the procedure adopted by (Bano, 1971). All the carbon and energy source and inorganic chemicals (0.5-1.0) were supplemented into the substrate just before the spawning. The bags were then incubated in cultivation room at 25 ± 2° C for spawn run. After completion of spawn run, time of pin head initiation, yield and biological efficiency were separately recorded for each treatment at the time of each flush.

RESULTS AND DISCUSSION

The result obtained during the present investigation is presented in the Tables 1 to 3. All the sets supplemented with carbon sources, e.g. maltose and lactose took longer time for spawn run and primordial initiation than control. It was also observed for day to harvest. Increasing concentration of carbon source caused adverse effect on yield and biological efficiency of mushroom. With increasing concentration, yield was decreased and recorded minimum *i.e.*, 340 and 350 g in 1.0 per cent of maltose and lactose, respectively. There are evidences that increase in carbohydrate beyond an

optimum point result in an absolute as well as relative decrease in growth of fungus (Reitsam, 1932).

The yield and biological efficiency was observed maximum 410 g, 95 per cent and 360 g, 71 in 0.5 per cent of aforesaid sugars supplemented sets. In comparison to maltose, lactose was proved to be less effective carbon source. The similar findings were also reported by Singh (2005) who stated that dextrose has been found most suitable carbon compound following by maltose and the lowest effect was shown by lactose. All the sets treated with peptone took equal time for spawn run and primordial formation as control. The increasing concentration caused positive effect on yield and biological efficiency within a certain limits. It was observed the maximum in 0.5 per cent concentration (390 g, 80.1%). This was due to peptone that serves additional available nitrogen to fungus and thus, stimulated fungal growth. It also helped in maintaining high callused activity and cell mass that addition of organic source of nitrogen enhances the yield of *Pleurotus sajor caju*. (Bano and Srivastava, 1962). MgSO₄ and FeSO₄, respectively. Increasing concentration of these chemical cause adverse effect on yield and biological efficiency of mushrooms. With increasing concentration, yield was decreased and recorded minimum 320 and 310 g in 1.0 per cent of aforesaid chemicals. It was maximum 350 g, 70.0 per cent and 330 g, 70.3 per cent in 0.5 per cent of

Table 1 : Effect of different concentration of carbon source on yield and biological efficiency of mushroom

Carbon source	Day of required for spawn run	Day of harvest	Yield (g)	Biological efficiency (%)
Maltose (0.05 %)	14	19	410 g	95
Maltose (1.0 %)	14	19	340 g	64
Lactose (0.5 %)	16	22	360 g	71
Lactose (1.0%)	16	24	350 g	69
Control	13	20	330 g	61.2

Table 2 : Effect of different concentration of nitrogen source on yield and biological efficiency of mushroom

Nitrogen source	Day of required for spawn run	Day of harvest	Yield (g)	Biological efficiency (%)
Peptone (0.5 %)	12	13	390 g	80.1
Peptone (1.0 %)	12	13	320 g	73
Control	13	13	350 g	72.1

Table 3 : Effect of different concentration of inorganic chemical on yield and biological efficiency of mushroom

Inorganic chemical	Day of required for spawn run	Day of harvest	Yield (g)	Biological efficiency (%)
MgSO ₄ (0.05 %)	15	21	350 g	70
MgSO ₄ (1.0 %)	18	21	320 g	64
FeSO ₄ (0.5 %)	18	22	330 g	71.3
FeSO ₄ (1.0%)	20	23	310 g	69
Control	13	19	330 g	66.2

these chemicals. These result are similar to finding of Verma (2005) who observed higher yield and biological efficiency in 0.5 per cent concentration while working with *Volvariella volvacea* as test fungus. He also stated that the use of inorganic chemicals capable of interacting with phenolics can protect the side chains of extra cellular enzymes, important during the fruiting process as well as substrate utilization and, therefore, lead to an increase in yield of paddy straw mushrooms. The use of micronutrient at low concentration may intervene the importance of in enzymatic reaction. Several authors also used inorganic sources in the supplementation of various substrates, increasing *Pleurotus* sp. productivity (Zadrazil, 1978 and 1980). All the sets took equal time for spawn run and pin initiation (12 and 13 days) as control.

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