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

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Abstract:

In this paper we are using various concentration of nitrogen source, e.g. peptone, few carbon, viz., maltose and lactose, 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 percent concentration.

Key words: Yield, Oyster Mushroom,Biological Efficiency, Chemical.

Introduction:

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*et. al.* 1974, Kumar *et. al.* 2004, Moda*et. al.*2005) and industrial wastes, supplementation of nitrogenous (Rai,*et. al*. 2003, Vijay*et. al.* 1989) and non- nitrogenous substances / chemical, strategy with spawn. (Chauhan*et. al.* 1988, Sharma*et. al.* 2004, Shivaprakasam*et. al.* 1982), methods of cultivation (Shivaprakasam*et. al.* 1982, 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.

Material and methods:

This work was carried out in Research Laboratory, Biodiversity conservation &rural biotechnology centre, Jabalpur. Nitrogen source e.g. peptone, various carbon source, viz., maltose and lactose, 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% 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*et. at.*1971). All the carbon and energy source and inorganicchemicals (0.5-1.0)were supplemented into the substrate just before the spawning. The bags were then incubated in cultivation room at 25 ±2º 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.

Result and Discussion:

The result obtained during the present investigation is presented in the Tables 1-3.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 gm in 1.0% of maltose and lactose respectively. There are evidences that increase in carbohydrate beyond an optimum point result in an obsolute as well as relative decrease in growth of fungus (Reitsam, *et. al.* 1932). .

The yield and biological efficiency was observed maximum 410 gm, 95% and 360 gm, 71% in 0.5% 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 effects was shown by lactose. Al 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% concentration (390 gm, 80.1%). This was due to peptone that serves additional available nitrogen to fungus and thus stimulates 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 sajorcaju*.(Bano*et. al*. 1962)

$MgSO_4$ and $FeSO_4$, 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 gm in 1.0% of aforesaid chemicals. It was maximum 350 gm, 70.0% and 330 gm, 70.3% in 0.5% of these chemicals. These result are similar to finding of Verma (2005) who observed higher yield and biological efficiency in 0.5% concentration while working with *Vorvariellavolvacea*as test fungus. He also started 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 law concentration may intervenetheimportance of in enzymatic reaction. Several authors also used inorganic sources in the supplementation of various substrates, increasing Pleurotus sp. Productivity (Zadrazid, 1980).All the sets took equal time for spawn run and pin initiation (12 and 13 days) as control.

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 (gm)**	**Biological efficiency (%)**
Maltose (0.05 %)	14	19	410 gm	95
Maltose (1.0 %)	14	19	340 gm	64
Lactose (0.5 %)	16	22	360 gm	71
Lactose (1.0%)	16	24	350 gm	69
Control	13	20	330 gm	61.2

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 (gm)	Biological efficiency (%)
Peptone (0.5 %)	12	13	390 gm	80.1
Peptone (1.0 %)	12	13	320 gm	73
Control	13	13	350 gm	72.1

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 (gm)**	**Biological efficiency (%)**
$MgSo_4$ (0.05 %)	15	21	350 gm	70
$MgSo_4$ (1.0 %)	18	21	320 gm	64
$FeSo_4$ (0.5 %)	18	22	330 gm	71.3
$FeSo_4$ (1.0%)	20	23	310 gm	69
Control	13	19	330 gm	66.2

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