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YIELD PERFORMANCE OF *PLEUROTUS FLORIDA* ON VARIOUS SIZES OF PADDY AND WHEAT STRAW

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ABSTRACT

The oyster mushroom *Pleurotus florida* cultivated on various sizes of paddy and wheat straw revealed that yield performance of the mushroom was the best on powdered form. Paddy straw outyielded wheat straw and powdered substrates gave uniform and more flushes than full size and normal size straws. However, the limitation with powdered substrates was that it had high water holding capacity and less aeration which sometimes led to failure of mushroom crop due to luxuriant growth of other microorganisms. Mushroom cultivation is getting momentum in recent years. The expansion of mushroom production is national priority (Nisal *et al.*, 2003). With the earth's agricultural land dwindling to population explosion, urbanization and overuse of chemical fertilizers, monoculture practices impelled by market economy and consumerism, the need for more food, fuel, fodder and fertilizer than present production has forced to look for alternative sources to fight the starvation and malnutrition without putting further pressure on existing cultivable/agricultural land. In this context oyster mushroom can be better alternative food because of its delicacy, high nutritive value, relative ease to grow on wide variety of agrowastes and capability to enrich spent compost with nitrogen. They are botanically the species of *Pleurotus* which grow naturally in the temperate or tropical forest on dead and decaying wooden logs or sometimes on the outer bark of living trees (Singh *et al*, 2006). Most of the known species of *Pleurotus* are edible and several have been successfully brought under artificial culture, which can effectively degrade lignocellulosic wastes due to extracellular release of cellulolytic, hemicellulolytic and lignolytic enzymes and provide nutritious food (Singh, 2000; Singh and Kaushal, 2001; Singh and Sharma, 2002; Singh and Gautam, 2004 and Singh *et al.*, 2007a & b).

Key words: Biological efficiency, *Pleurotus florida*, substrate, yield performance

INTRODUCTION

Nutritional attributes of the oyster mushroom are being increasingly realized in recent times. Low in calories and high in protein (19-35 % on dry weight basis) as compared to 7.3 % in rice, 13.2 % in wheat, 7.6 % in potato, 18.4 % in cabbage and 25.2 % in milk, they are good source of several vitamins including thiamine, niacin, biotin and ascorbic acid.

Oyster mushroom can be cultivated on a wide variety of lignocellulosic wastes which are available in plenty in our country. The present investigation was taken up with the aim to get an enhanced production of protein rich food to catter the need of growing population and better lignocellulosic wastes management.

MATERIALS AND METHODS

Two lignocellulosic subtrates viz. paddy straw (*Oryza sativa*) and wheat straw (*Triticum aestivum*) along with the oyster mushroom *Pleurotus florida* was selected in the present investigation. In order to determine optimum size of straws in production trial three sizes of paddy straw i.e. full size, normal size (3-5 inches) and powered form and two sizes of wheat straw i.e. normal size (3-5 inches) and powered form were used as substrates for cultivation. Due to unavailability, full size wheat straw was not included in the experiment.

The pure culture of the oyster mushroom *Pleurotus florida* was procured from NRCM, Solan, Himanchal Pradesh and maintained on MEA medium having 2.5% of malt extract and 2.0 % of agar powder.

Preparation of Spawn

Spawn is referred to as the vegetative mycelium of the fungus. It was prepared by soaking of wheat grain in water followed by mixing of buffers, sterilizations and inoculation with pure culture of *Pleurotus florida,* under aseptic condition. The spawn was prepared in 500 ml of dextrose bottles or in polypropylene bags (Singh, 1997).

Preparation of Substrates for cultivation

Various sizes of paddy and wheat straw were chemically sterilized by soaking in water with 50 ppm each of nuvan and bavistin. Substrates were allowed to stay in water for 20 hrs and then 50 ppm formalin was added to them. After four hours of formalin treatment excessive water was drained out and the substrate was spread on clean platform for 30 minutes for further removal of water.

Spawning, cropping and harvesting

Process of mixing spawn in the sterilized substrate is known as spawning. 3% (wet weight) spawn grain was mixed with the substrate and filled in polythene bags@ 2000gm per bag. The size of polythene bags used for filling up 2000 gm of spawned powdered substrate was 8x12 inches and other than powdered form was 12x14 inches. Twenty bags of each spawned substrate were filled for cultivation and production. 500 gm of dried powdered substrate on soaking with water and after spawning weighed 2000 gm. 571 gm of dried full and normal sized paddy straw and 661 gm of normal wheat straw on soaking and subsequently spawning weighed 2000 gm. The polythene

substrates. Decrease in subsequent flushes was observed. Block *et al.* (1959) also reported higher yield of *Pleurotus ostreatus* in first flush while, yield of second flush was two-third of first flush and that of third flush was two-third of second flush. However, Chang *et al.* (1981) observed uniform distribution of fruit bodied of *Pleurotus sajor-caju* in all the four flushes on cotton waste. Bisaria (1987) recoded the yield of first flush of *P. sajor-caju* more than 60% of total yield. In the present investigation powdered form of substrates without any supplement supported better production and bioefficiency of *Pleurotus florida* than other sizes of substrates.

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