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Comparative efficiency of various substrates and supplements on growth behaviour and yield potential of *Pleurotus djamor*

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ABSTRACT : An experiment was conducted to study the comparative efficiency of various substrates *viz.*, wheat straw (*Triticum aestivum* L.), paddy straw (*Oryza sativa* L.), Sugarcane bagasses (*Saccharum officinarum*) (*Saccharum straw*) and Typha leaves (*Typha angustifolia*) and different supplements such as wheat bran, rice bran, neem cake and fenugreek bran on growth behavior and yield potential of oyster mushroom (*Pleurotus djamor*). In these investigations, higher mushroom yield with biological efficiency (BE) of 85 per cent was obtained from wheat straw followed by paddy straw (62 per cent biological efficiency). Wheat straw was further used as a substrate for different supplements observation. Wheat bran was recorded significantly superior supplement than other supplements and its biological efficiency was 90 percent. The spawn running, primordial initiation, and harvesting of the first flush were also early in wheat bran supplemented substrate where it completed in the 13 days, 17 days, and 21 days respectively.

Key Words: Oyster mushroom (*Pleurotus djamor*), substrates, supplement and yield.

On the surface of our planet, around 200 billion tons per year of organic matter are produced through the photosynthetic process. Many highly developed fungi especially the member of higher basidiomycotina such as edible mushroom, grow and the species of Pleurotus commonly known as the “Oyster mushrooms” are the important cultivated mushroom several high yielding species of Pleurotus are being commercially cultivated in various part of India, *Pleurotus djamor* are fleshy spore-bearing multicultural fungi they are a good source of protein, vitamins, and minerals, *P. djamor* also known as pink oyster mushroom.

The mushroom is a good cash crop in India. Oyster mushroom (*Pleurotus djamor*) a delicious edible mushroom is gaining much importance due to its short cropping period, lowest cost of cultivation, and high potential. They can be grown on a wide variety of low-value lignocelluloses wastes. The large quantity of which is generated annually from agricultural, forestry and food processing activities. The unexploited crop residues or plant wastes are increasing pressure on environmental pollution and create health hazards and surveys as a constant source for the survival of pests and pathogens of important crops. Even if one percent of agricultural wastes are used to produce mushroom, India will become a major mushroom producing country in the world (Tiwari and Pandey, 2002). Mushroom cultivation, therefore, represents a prime example of the direct of low-grade residues into a value-added commodity. The present experiment was conducted at the Varanasi region to comparative efficiency of various locally available plant wastes and supplements for the cultivation of *Pleurotus djamor.*

Materials and Methods

The pure mushroom culture of *Pleurotus djamor* was obtained from NRCM Solan (H.P.) and maintained on PDA which was used for preparing wheat grain spawn. The present study was carried out with different substrates viz. wheat straw (*Triticum aestivum* L.) paddy straw (*Oryza sativa* L.) sugarcane bagasses (*Saccharum officinarum*). And Typha leaves (*Typha angustifolia*) and different supplements wheat bran, rice bran, neem cake and fenugreek bran on growth behavior and yield potential of *Pleurotus djamor* which are easily available in Varanasi region of eastern Uttar Pradesh.

The dried and chopped wheat straw, paddy sugarcane burgesses and Typha leaves we soaked in water for 14 hours and then drain off excess water. These soaked materials and pasteurized by autoclave at 65°C for 45 minutes. Well prepared wheat grain spawn (3 per cent moist weight basis) was mixed with moistened substrates and filled in polythene bags (15"×10"). The mouth of each bag was tied with a rubber band and 8-12 holes made in each bag for proper aeration. The polythene bags were removed gently from the substrate after spawn running and these compact masses of substrate were kept in a glasshouse under the dark condition at seasonal temperature and humidity ranging between 25-31°C and 85-90 per cent respectively during spawn running and formation of fruiting bodies.

Another experiment was conducted to comparative efficiency of different supplements such as wheat bran, rice bran, neem cake, and fenugreek bran on the same mushroom. The sun-dried powered of above supplements were sterilized by autoclave at 15 lb for 45 minutes each supplement @ 1.5 per cent dry weight basis was mixed with moistened substrates and pasteurized

Table-1: Comparative efficiency of various substrates on growth behaviour and yield of *Pleurotus djamor.*

Substrates	SRP (Days)	PIP (Days)	FHP (Days)	Total yield (gms)	SRP Efficiency (%)
Wheat straw	17	21	25	425	85.0
Paddy straw	18	23	27	310	62.0
Sugarcane bagasses	22	27	31	305	61.0
Typha Leaves	25	31	35	300	60.0
C.D. (0.05%)				**380**	

Treatments are means of the five replications,

SRP: Spawn Run Period, **PIP**:Premordia Initiation Period, **FHP**: First Harvesting Period.

Table-2: Comparative efficiency of various substrates on growth behaviour and yield of *Pleurotus djamor.*

Substrates	SRP (Days)	PIP (Days)	FHP (Days)	Total yield (gms)	SRP Biological Efficiency (%)
Wheat bran	13	17	20	450	90
Rice bran	15	19	22	400	80
Neem cake	14	20	33	410	82
Fenugreek bran	15	20	23	340	68
Control	17	21	24	330	**6.39**
C.D. (0.05%)				**66**	

Treatments are means of the five replications.

SRP: Spawn Run Period, **PIP**:Premordia Initiation Period, **FHP**: First Harvesting Period.

wheat straw before spawning. The experiment was conducted in a completely randomized block design (CRBD) with five replications for each treatment. The average value of observation with respect to the period required for spawn running, primordial initiation, harvesting of the first flush, and total yield was recorded. The biological efficiency of mushroom on a fresh weight basis was calculated as per the formula given by Chang and Miles (1989).

Biological efficiency (B.E.)

$$= \frac{\text{Fresh weight of Mushroom/Bag}}{\text{Dry weight of Substrate/Bag}} \times 100$$

Results and Discussion

Results obtained from the present study are shown in Table-1. It is evident that utilized different substrates for growth behavior and yield potential of *Pleurotus djamor.* Wheat straw was produced significantly highest yield of 425 gm/bag than the other substrates and was followed by paddy straw 310 gm/bag. The days required for the spawn run period, primordial initiation period, and harvesting of the first flush were also comparatively less in wheat straw substrate than required by other substrates.

Wheat straw has been found the best substrate for the successful cultivation of oyster mushroom. This result was correlated to other workers, Bano *et al*. (1979), Savalgi *et al*. (1994), Hazarika (1998) Ram (2007) and Singh *et al.* (2010) under different condition.

The result Table-2 indicated that organic supplements increased the yield significantly. Wheat bran was significantly (B.E. 90 percent) superior compared to other supplements. Wheat bran was also significantly reduced spawn run period by 4 days and hastened the primordia initiation and harvesting of the first flush than the control (without supplement). This result conforms with the finding of Hazarika (1998) Ram (2007) and Singh *et al*. (2010). The wheat bran organic supplement has been reported to increase the yield of *Pleurotus djamor.* However wheat bran, a real waste supplement has been reported earlier by Marimuthu *et al.* (1994). The result of the present investigation wheat

straw and wheat bran found to be the best substrate and supplement respectively for the cultivation of oyster mushroom (*Pleurotus djamor*).

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