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Short Communication

Cultivation of *Pleurotus* Species on Different Substrates

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Mushrooms are gaining popularity due to their health benefits such as good source of most of the essential amino acids, B- complex vitamins, folic acid, potassium, available iron, no cholesterol, high fiber content etc. In India 14 species of *Pleurotus*, commonly referred as oyster mushroom, have been cultivated on wheat and paddy straw (Sharma, 1994). Some of these species have been cultivated all over the world on a variety of cellulose containing substrates. The desirable attributes like rapid mycelial growth, high saprophytic colonization ability, simple and cheap cultivation techniques and easy post harvest storage have contributed to its popularity (Bhandal and Mehta, 1993). In the present study these species have been evaluated on locally available substrates.

Cultures of *Pleurotus* species viz., *P. sajor-caju* (P-10 and P- 130), *P. flabellatus* (P-50), *P. florida* (P-70), *P. memberaneous* (P-90), *P. citrinopileatus* (P-100), *P. eryngii* (P-110), and *P. cornucopie* (P-120) were procured from National Center for mushroom Research and Training, Solan. Spawn of these species was prepared on wheat grains using standard procedure. Initial screening of these species was done on wheat and pearl millet straw. In the subsequent evaluation trials, straw of clusterbean, sorghum and sesame, leaves of *Prosopis cineraria* (*khejri*) and seed husk of watermelon were used. As this fungus has been reported to growth well in the temperature range of 20-30°C (Mehta and Bhandal, 1988), cultivation was initiated during the month of October-November and continued up to March. Dry substrate was chopped (1.0 to 2.0 cm long), soaked overnight in water, and the excess water was drained out. There was about four times increase in the weight of substrate as water content in the wet substrates ranged from 74 to 80%. The excess water was drained and substrates were spawned @ 3% and filled in polythene bags (18"x24") having holes all around. The bags were kept in a room for spawn run for about two weeks. After complete colonization of the substrate, polythene bags were removed, and the substrate blocks were sprayed with water thrice in a day. Diffused light and fresh air for 2 to 3 hours was also provided daily. In the cropping rooms, over 60% humidity was maintained by placing wet gunny bags on the walls. These conditions were maintained for a month and during this period three flushes were obtained. Small pin heads appeared within 4-5 days all around the block and developed into complete mushrooms in 3-4 days. When over mature, the margins of mushrooms started turning wavy. Yields were recorded up to three flushes. After harvest mushrooms were sun dried.

Initial screening of different species done on the basis of time taken for spawn run, production of pinheads and yield showed that *Pleurotus sajor-caju* followed by *Pleurotus florida* were the most promising species. There was no marked difference in the yield potential on wheat and pearl millet straw. Of the locally

Table 1. Yield of Pleurotus sajor-caju on different substrates during February-March

Substrates	% of water in wet straw	Days for complete spawn run	Fresh mushrooms (kg per 10 kg dry substrate)			Total yield (kg per 10 kg dry substrate)
			I flush	II flush	III flush	
Clusterbean straw	76.3	8-10	4.14	2.34	0.30	6.78
Pearl millet straw	80.0	11-12	4.56	1.24	0.55	6.35
Sorghum straw	74.3	10-11	3.50	0.32	0.15	3.97
Sesame straw	76.4	13-14	–	–	–	2.80
P. cineraria leaves	79.3	>25	0.12	0.04	0.02	0.18
Wheat straw	74.6	11-12	–	–	–	6.56

available substrates clusterbean and pearl millet straw are the most promising where as sorghum and sesame straw gave average yields. Yield on leaves of *Prosopis cineraria* was very poor and hence it is not a suitable substrate (Table 1).

Adequate diffused light and aeration were necessary for the production of normal fruit bodies. Lower amount of any or both of these resulted in abnormal fruit bodies with long slender stipes and poorly developed pileus. This phenomenon was conspicuously observed at one of the farmer's field where oyster mushroom was being cultivated in rooms having no provision for light and aeration. In *P. sajor-caju* excessive light led to darkening of fruit bodies on upper surface. The mushrooms could be easily sun dried after initial drying of fruit bodies in the shade. 100 g sun dried mushroom was obtained from 1 kg. The sun dried mushroom had no change in colour or flavour and regained a weight of 960 g when soaked in hot water for 30 minutes.

Up to 1985, button mushroom was the main type being cultivated in India. In the last decade, however, cultivation of oyster mushroom has picked up both in India as well as in other parts of the world. In Rajasthan many mushrooms like *Podaxis pistillaris* and *Phellorina* spp. are collected and consumed by the local inhabitants (Jandaik, 1974). Doshi *et al.* (1994) reported 94 species of fleshy fungi from Rajasthan, of which 12 are known for their edibility. Only limited efforts have so far been made to commercially cultivate mushrooms, especially in the drier parts. Present study demonstrates that during November-March it may be possible to grow oyster mushroom using very simple technology and locally available materials. This will provide employment during winter months and quality food at low cost to the rural masses.

References

Bhandal, M.S. and Mehta, K.B. 1993. Genetic improvement of *Pleurotus* species. In *Advances in Mushroom Biotechnology* (Ed. M.C. Nair), pp. 127-133. Scientific Publishers, Jodhpur.

Doshi, A., Trivedi, A. and Sharma, S.S. 1994. Fleshy fungi from Rajasthan. *Mushroom Research* 3: 39.

Jandaik, C.L. 1974. Studies on some edible fungi. *Ph.D. Thesis*, IARI, New Delhi.

Mehta, K.B. and Bhandal, M.S. 1988. Mycelial growth variation of six *Pleurotus* species at different temperatures. *Indian Journal of Mushrooms* 14: 64-65.

Sharma, S.R. 1994. A decade of National Centre for Mushroom Research and Training, Chambaghat, Solan: Aims, objectives and accomplishments. In *Souvenir: National Symposium on Mushrooms*, pp. 35-49. Solan.