

Artificial cultivation of *Pleurotus sajor-caju* (Fr) Singer in Manipur using certain agrowastes and forest byproducts for sustainable development

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Artificial cultivation of *Pleurotus sajor-caju* (Fr.) Singer on certain agrowastes (paddy straw, maize straw and sugarcane bagasse) and forest byproducts (coir and pine needles) were carried out in Imphal for 2 (two) years. All the substrates were treated with hot water prior to cultivation. It was found that paddy straw substrate gave the maximum yield of 356.66 g/500 g dry wt. of substrate whereas pine needle substrate gave the least yield of 181.7 g/500 g dry wt. of substrate. An attempt has been made for recycling of agricultural wastes and forest byproducts for maintaining eco-balance and generated additional income of growers for sustainable development.

Key words : Artificial cultivation, *Pleurotus sajor-caju*, agrowastes and forest byproduct substrates, sustainable development.

INTRODUCTION

The success in artificial cultivation of oyster mushroom (*Pleurotus sajor-caju*) in any locality depends on the substrate which are cheap and easily available as well as viable technology suitable for the particular agroclimatic region (Madhusudhanan and Chandramohanam, 1997). There are various reports on the use of various agrowastes, wild grasses and others various forest byproducts for the cultivation of *Pleurotus sajor-caju*(Fr) Singer (Bahukhandi and Munjal, 1989 ; Kumar *et al.*, 2002 ; Patra and Pani ; 1997 ; Singh *et al.*, 1993) and also of other *Pleurotus* spp. (Das *et al.*, 2000 ; Justin *et al.*, 1998 ; Singh, 1998 ; Upadhyay and Verma, 2000). The preliminary studies conducted by other workers have revealed the possibility of the use of different agrowaste as substrate for the cultivation of *P. sajor-caju*. Hence the present investigation has been carried out to use different agrowaste and forest byproducts which are easily available in the state of Manipur as a substrate for the cultivation of *P. sajor-caju* as it is the most efficient lignocellulose degrader (Ouseph *et al.*, 2001)

MATERIALS AND METHODS

Diffrent substrates use for the cultivation of

Pleurotus sajor-caju were paddy straw, maize straw (maize stalk along with the leaves), sugarcane bagasse, coir and pine needles. Paddy straw was purchased at the rate of Re. 1/kg. but the other substrates were collected either from the fields, market areas and pine needles from the neighbouring hills. Coir (which is the outer covering of coconut) was first shredded and cut into 3-5 cm long pieces. All the other substrates were also cut into 3-5 cm long pieces and dried properly before using. The substrates were presoaked in water overnight and then partially pasteurised by immersing them for 2-3 hrs in boiling water. Extra water was drained off and then allowed to cool down for some time. The cooled substrate was then mixed with grain spawn and filled in polythene bag. Spawning was done by layer method @ 100 g / 500 g (dry wt) of the substrate. After spawning the mouth of the polythene bag was tied using a rubber band. For every treatment three replicates were taken. It was then placed in the Life Sciences departmental mushroom shed. The bag was then removed after full mycelium run or at the onset of pin-head. Watering was done twice a day and relative humidity of the mushroom house was maintained at 80-90 %. The temperature of the mushroom whed lies between 20-30°C. A total yield of 3-4 flushed can be obtained within 30-45 days.

RESULTS AND DISCUSSION

Maximum yield of *Pleurotus sajor-caju* was obtained from paddy straw substrate, which shows that paddy straw supports maximum sporophore production which is in agreement with report of previous finding (Bahukhandi and Munjal, 1989 ; Bano *et al.*, 1987 ; Block *et al.*, 1958 ; Singh *et al.*, 1993). It was followed by maize straw, coir, bagasse and pine needles in the decreasing order of yield. Pine needle gave the least yield but it was found to be higher than than reported by Singh *et al.*, (1993). Yield of *P. sajor-caju* cultivated on coir substrate was also reported by Quseph *et al.*, (2001) but the present finding was found to show little variation as the yield was heigher than that reported earlier (Quseph *et al.*, 2001). In case of maize straw and sugarcane bagasse used as substrate for cultivation, maize straw was found to give higher yield and sugarcane bagasse gave lower yield than that reported by Bahukhandi and Munjal (1989).

Table 1 : Yield of *P. sajor-caju* in gms/500gm dry wt Substrate (Result is average of 3 replicates for 2 years)

Substrate	Yield
Paddy straw	356.66
Maize straw	259.11
Sugarcane bagasse	209.66
Coir	251.66
Pine needles	181.7

COST BENEFIT ANALYSIS

(i) For paddy straw substrate

Cost of 100g spawn packet – Rs. 5/-
 Cost of Paddy straw @ 1 kg – Re. 1/-
 Miscellaneous charges – Rs. 2/-
 (Fire wood + Polythene bag)
 Total Cost = Rs. (5 + 0.50 + 2) = Rs. 7.50/-
 Cost of *Pleurotus* @ Rs. 50/kg for 356.66 g
 = 17.48/-
 Income generated for 500 g dry wt substrate
 = Rs. 17.48/- – Rs. 7.50/-
 = Rs. 9.98/-

(ii) For maize straw substrate

Cost of 100g spawn packet – Rs. 5/-
 Miscellaneous charges – Rs. 2/-
 Total Cost – Rs. 7/-

Cost of mashroom @ Rs. 50/kg for 256.11 g
 = Rs. 12.98/-
 Income generated for 500 g dry wt substrate
 = Rs. 12.59 – Rs. 7 = Rs. 5.95/-

(iii) For sugarcane bagasse substrate

Cost of 100g spawn packet – Rs. 5/-
 Miscellaneous charges – Rs. 2/-
 Total Cost – Rs. 7/-
 Cost of mashroom for 209.66 g = Rs. 10.48/-
 Income generated = Rs. 10.48 – Rs. 7 = Rs. 3.48/-

(iv) For coir substrate

Cost of 100g spawn packet = Rs. 5/-
 Miscellaneous charges = Rs. 2/-
 Total Cost = Rs. (5+2) = Rs. 7/-
 Cost of mashroom for 252.66 g = Rs. 12.58/-
 Income generated = Rs. 12.58 – Rs. 7 = Rs. 5.58/-

(v) For Pine needle substrate

Cost of 100g spawn packet = Rs. 5/-
 Miscellaneous charges = Rs. 2/-
 Total Cost = Rs. 5 + Rs. 2 = Rs. 7/-
 Cost of mashroom for 181.70 g = Rs. 9.06/-
 Income generated = Rs. 9.06 – Rs. 7 = Rs. 2.06/-

Table 2 : Income generates from the sale of *P. sajor-caju* yield grown on different substrate.

Substrate	Expenditured incurred (in Rs.)	Yield (g)	Amount recovered sale rate @ Rs. 50/kg	Profit Rs.
Paddy straw	7.50	256.6	17.48	9.98
Maize straw	7.00	259.11	12.95	5.95
Sugarcane bagasse	7.00	209.66	10.48	3.48
Coir	7.00	251.66	12.58	5.58
Pine needles	7.00	181.7	9.06	2.06

From the above analysis we can concluded that Rs. 3 – Rs. 9 can be generated per 500 day wt. substrates as an additional income within 30 – 45 days which can uplift the economy up to certain extent. If produce in large scale basis, the technology can be taken up for socio-economic upliftment of the poor people of Manipur.

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