Arecanut Bunch Waste - A Promising Substrate for *Pleurotus sajor-caju* (Fr.) Singer Cultivation

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PLEUROTUS SAJOR-CAJU (Fr.) Singer was cultivated on naturally dried arecanut (Areca catechu L.) bunch waste during rainy and summer seasons. The mushroom yield, number of flushes and biological efficiency (BE) varied between the two seasons. The average substrate was 717.7 g (BE 77%) and 524g (BE 56%) during rainy and summer seasons respectively. The time taken to produce first flush as well as the total cultivation period did not vary much with the seasons.

Various agricultural waste materials have been tried for *Pleurotus* cultivation[5]. It is mainly cultivated on wheat or paddy straw[3]. As the cost of paddy straw is increasing day by day and is mainly used as a cattle feed, it is of utmost necessity to find out a cheap and alternate substrate for mushroom cultivation in the southern states of India.

Arecanut (*Areca catechu* L.) palm occupies a prominent place among the cultivated crops in the states of Kerala, Karnataka, Assam, Meghalaya, Tamil Nadu and West Bengal and is of considerable economic and socio-religious importance for the entire country. Fallen areca leaves, areca bunch waste and arecanut husk are the major by-products of areca cultivation which are available in large quantity in the areca growing areas of India. Some preliminary studies have been conducted on the utilization of fallen areca leaves and leaf sheath for *Pleurotus sajor-caju* (Fr.) Singer cultivation[2,4]. About 375

Kg of dried arecanut bunch waste are estimated to be available annually from one hectare areca plantation. But it has not been, so far, put into any proper use. Hence, present studies were conducted to find out the feasibility of using arecanut bunch waste as a substrate for *P.sajor-caju* cultivation.

Materials and Methods

Arecanut bunch waste (ABW) was evaluated as substrate for the cultivation of *P.sajor-caju* during favourable (rainy-June to July) and unfavourable (Summer - March to April) seasons for oyster mushroom cultivation in coastal Karnataka. For this, naturally dried ABW was chopped into 4-5 cm bits and filled in gunny bags. The gunny bags containing ABW were soaked in a solution of formalin (formaldehyde solution) 500 ppm + carbendazim 25 ppm. After 18 h of soaking, the gunny bags containing ABW were taken out and excess water was allowed to drain out. The moisture content of ABW at the time of spawning was 73.4%. ABW without any additives was used as a substrate for *P.sajor-caju* cultivation in both the seasons.

Eighteen days old Sorghum (*Sorghum bicolor*) grain spawn was used at the rate of 2% of wet weight of substrate. Multilayered spawning technique was used to inoculate the substrate. The substrate was filled in perforated high density high molecular polythene bags of size 45 x 35 cm keeping the bed weight to be 3.5 Kg at the time of spawning. After filling, the bags were tied at their open ends and transferred to a partially underground permanent mushroom house. Twelve bags were prepared during each season.

After spawn run period of 15 days, the polythene covers were removed. Water was sprayed on the beds twice a day during summer and once in a day during rainy season from 24 h after removing polythene covers. The relative humidity of the mushroom house was maintained above 80%. Maximum and minimum temperatures inside the mushroom house were recorded daily during the period of cultivation.

Number of days from spawning to flushing and fresh weight of mushroom immediately after harvesting were recorded during each season.

Results and Discussion

P. sajor-caju grew well on ABW. The mushroom yield and biological efficiency (BE) varied between the two seasons. The yield was much higher during rainy season. Moorthy (1991) has reported rainy season as the most favourable season for oyster mushroom cultivation on paddy straw in coastal Karnataka. The average yield of mushroom per bag containing 932.75 g dry weight of ABW was 717.7 g with a BE of 77% during rainy season whereas it was 524 g (BE 56%) during summer season (Table 1). The maximum and minimum temparatures inside the mushroom house during the period of cultivation are presented in table 2.

The total yield was obtained in three flushes in rainy season and in four flushes during summer season. The time taken for first flush from the day of spawning was 21 days during rainy season whereas it ranged from 21 to 25 days during summer season. But the cultivation period i.e., number of days from spawning to last flush harvested did not vary much with the seasons. It was 40-42 and 39-47 days during rainy and summer seasons respectively. Though four flushes were obtained during summer season, the total yield obtained in both seasons was good. Thus, arecanut bunch waste, one of the by-products of areca cultivation, which has not been so far put into any proper use, was found to be a suitable substrate for *P.sajor-caju* cultivation.

BE of *P.sajor-caju* in ABW is much higher than that reported earlier in areca leaf sheath[1]. Moorthy (1991) had reported that BE of *P.sajor-caju* in paddy straw was 73% during rainy season in coastal Karnataka. The present studies indicated that BE of *P.sajor-caju* in

ABW was higher than that in paddy straw.Selection of a substrate for mushroom cultivation depends on its availability and cost in each locality. As the area under paddy cultivation is decreasing year by year, paddy straw is becoming a scarce commodity with high cost. On the other hand, the area under areca cultivation is increasing year by year. Currently (1992-93) the area under areca cultivation in India is estimated to be 2,22,300 ha. About 0.0832 million tonnes of dried arecanut bunch waste, 0.1317 million tonnes of dried areca leaf and 0.224 million tonnes of dry husks are estimated to be available annually in India. Looking to the availability, it can safely be said that areca growing tracts of India has vast potential for oyster mushroom cultivaton. By utilizing the areca wastes, which are at present wasted, as substrates for oyster mushroom cultivation, the cost of cultivation can be brought down considerably. In addition, this also fetches additional income for areca growers. With the result, the net income per unit area of areca garden will be very high.

Table 1. **Yield of fresh fruiting bodies of *P.sajor-caju* grown on arecanut bunch waste.**

No. of flushes	No. of days from spawning to flushing		% of bags yielded		Average yield* (g)	
	Rainy season	Summer season	Rainy season	Summer season	Rainy season	Summer season
I	21	21-25	100	100	441.54	113
II	30-34	27-32	100	82	200.77	238
III	40-42	33-38	85	45	75.38	78
IV	-	39-47	-	72	-	95
Total yield	-	-	-	-	717.7	524
BE (%)	-	-	-	-	77.0	56.0

*Average of 12 bags. Dry wt. of substrate : 932.75 g/bag

Table 2. **Temperature recorded inside the mushroom house during the cultivation period.**

Season	Temperature (°C)	
	Minimum	Maximum
Rainy	24.0-26.0	27.0-30.0
Summer	22.0-27.5	28.0-31.5

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