



Study of growth of *Pleurotus Sajorkaju* (Oyster Mushroom) on different Agricultural substrates

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ABSTRACT

Pleurotus species were cultivated on various agro wastes. The experiments was undertaken to determine total yield obtained during three harvests of *pleurotus sajorkaju*. The yield and biological efficiency for all *pleurotus species* on different agro wastes was compared. Soyabean straw was found to be a potential substrate for cultivation of *pleurotus sajor kaju* and biological efficiency on soyabean 79.037% while black gram 68.913%, sugarcane 63.948%. *Pleurotus sajor kaju* yielded better on substrate soyabean 790.037gm, Black gram 689.13gm, sugarcane 639.48gm respectively. Hence it was concluded that soyabean gives higher yield as compared to black gram and sugarcane. Soyabean is best substrate for growth of *pleurotus sajor kaju*.

Keywords: Oyster mushroom, agricultural substrates, sajor kaju, *Pleurotus*

INTRODUCTION

Oyster mushrooms represent Basidiomycetes fungi characterized by edible fruit bodies with eccentric stalk attached to the Pileups that opens like an oyster shell during morphogenesis. These mushroom namely *Pleurotus* species are described as "food delicacies" because of their characteristic biting texture and flavor.

Cultivation of different species of oyster mushroom around the world represents the commercial, large-scale conversion of lignocelluloses residues into food. These mushrooms are the efficient producers of food protein from worthless plant wastes owing to the degrading ability of lignocelluloses unlike button mushroom, do not require composted substrate for their growth.

In India, there are five mushroom species viz., white button mushroom (*Agaricus bisporus*), Oyster mushroom (*Pleurotus* spp.), paddy straw

(*Volvariella volvacea*), and milky mushroom (*Calocybe indicia*) and (*Lentinula edodus*) are in commercial cultivation.

The present production status revealed that, Maharashtra and Odisha are emerging as the leading states in mushroom production, by considering the present production data, mushroom industry in India recorded an average annual growth rate of 4.3% during this period, and the productivity has risen from 20 % to 24.5 % by the releasing of improved strains in commercial edible mushroom.

The bioconversion of agriculture and industrial wastes into food has attracted worldwide attention in recent years. Mushroom cultivation is highly efficient method of disposing agriculture wastes and simultaneously producing nutritious food. Mushroom can be cultivated on variety of lingo- cellulosic substrate considering its role in degrading agriculture residue and convert them into a good source of protein (Deshmukh and Deshmukh, 2013) The practice of mushroom cultivation not only produces nutritious food, but it also improves the quality of straw. This takes place by degrading lignin, cellulose, hemicelluloses, tannin and crude fiber in the straw and making it as an ideal animal feed. (Patil, 2012). Therefore, cultivation of *pleurotus sajor kaju* on various agricultural residues offers high value products with nutritional and medicinal properties. (Pandey et al., 2008). Hence the main objective of present investigation was to workout agro waste potential for cultivation of *Pleurotus sajorkaju*. (Oyster mushroom).

Mushroom farming in India become successful and also popularized day by day because of its very low input, which can bring a significant change in rural economy. The climatic condition of the region has been found to be ideal for such an attempt. *Pleurotus sajor kaju* was cultivated on various agro wastes. The experiment was done by using three substrate for *Pleurotus sajorkaju*. The yield was compared with three agro waste was. The average period for all the three harvest required for *Pleurotus sajorkaju* was recorded respectively. *Pleurotus sajorkaju*. performed better on all straw. But Soyabean straw was found to be a better than sugarcane and black gram. It was concluded that soyabean is promising substrate for the cultivation.

In this region *Pleurotus sajorkaju* is commonly cultivated on substrate of sugarcane, soyabean, black gram. The main objective of present investigation was

to workout agro waste potential for cultivation of *Pleurotus sajorkaju*. (oyster mushroom).

MATERIAL AND METHOD

Experiment was done at Department of Botany, Dr.Babasaheb Ambedkar Marathwada University, and Aurangabad. For cultivation of mushroom the different substrates, viz. soya bean straw, sugarcane, black gram, were selected and they were chopped in 2-3 cm pieces and sterilized by soaking in water for 12 hours to soften the tissues. After soaking, the substrate was chemically sterilized. All these agro waste were chemically sterilized in plastic pots .25 liters of water were taken in plastic pots and slowly dipped all 5kg of agro waste in water. In another plastic bucket, Carbendazim 50% WP (75.ppm) Bavistin 7.5g and 25 ml formaldehyde (37-40%) is dissolved and slowly poured on the already soaked straw. Straw is pressed and covered with a polythene sheet. After 24 hour straw was taken out and excess water was drained. All these procedure was done in fumigated condition by using formalin and $KMnO_4$. The room temperature was 26+ with relative humidity of 70-80%.

The polythene bags of 14x22 cm and the bottom of the bags were tied with a rubber to provide a flat circular bottom to the mushroom beds. Now Dry weight of the substrates was measured and the bags were filled with one kg of substrate. The first layer was filled with the substrate up to 5 cm height. Then the spawn was sprinkled over the substrate. Similarly 4 such layers were filled with the substratum. 10 gm spawn per kg of substrate was inoculated under aseptic condition. Specific amount of spawn were inoculated thoroughly in each bag. Pinning of bags was done for proper aeration. All bags were incubated in in a dark room where the temperature and humidity were maintained around 25 degree C and 80 to 90% humidity respectively with sufficient light and ventilation for 20 days. Until the mycelium has fully penetrated to the bottom of the substrate.

In 20 to 30 days mycelium started to grow and white appearance was shown. After proper growth of mycelium polythene bags were removed. Within 3-4 days fruit bodies were appeared. As soon as the fruiting bodies developed and attained their full size, they were cut just above the surface of the substrate with sharp knife or blade. After three picking at

specific intervals weight of all fruiting bodies were measured. The biological efficiency (yield of mushroom per kg substrate on dry wt. basis) was calculated by the following formula (Chang *et al.*,1981).

$$\text{B.E (\%)} = \frac{\text{Fresh weight of mushroom}}{\text{Dry weight of substrate}} \times 100$$

RESULT AND DISCUSSION

Table 1 shows the result revealed the yield, biological efficiency of the *pleurotus sajor kaju* cultivated on different agro wastes. Significantly maximum yield of *pleurotus sajor kaju* was obtained when it was cultivated on soyabean straw (790.37 gm). This was followed by yield on black gram straw (689.13 gm) and sugarcane straw (639.48gm) (Kumar, 2017).

Table 1 effect of substrate on yield and Biological efficiency on growth of *Pleurotus sajor kaju*

Sr. No.	Substrate	Yield (gm./1kg of dry substrate)			Total Yield	Biological efficiency
		I	II	III		
1	Soybean	372.18gm	288.62gm	129.57gm	790.37gm	79.037%
2	Sugarcane	339.74gm	209.81gm	89.93gm	639.48gm	63.948%
3	black gram	358.56gm	227.19gm	103.38gm	689.13gm	68.913%



A Soybean



B Sugarcane



C Black gram

Similar results were reported with Biological efficiency of *pleurotus sajor kaju*. Soybean substrate shows best biological efficiency (79.03%) followed by Black gram (68.91%) and Sugarcane (63.94%) (Ingle and Ramteke, 2010) (Dehariya and Vyas, 2013).

Photo shows that the three lignocellulose residues as substrates i.e. for the cultivation of *pleurotus sajor kaju* (Photo A, B, and C). It shows that, soyabean straw supported best growth of *pleurotus sajor kaju* and shows heavy colonization of a compact white mass of mycelium within 2 weeks of inoculation. *Pleurotus sajorkaju* was found to utilize all the agricultural waste and were observed suitable for spawn run, yield and biological efficiency.

CONCLUSION

The highest yield of *Pleurotus sajorkaju* on soyabean straw indicated wide scope for mushroom cultivation. This can also be considered as an agribusiness for the people of this region to improve their financial status and health. Mushroom cultivation converts energy stored in the straw and provide protein rich foods for human and animals. The agro waste thus can be used more efficiently instead of burning of them to generate heat energy also may cause air pollution. The Present study explored the possibilities of cultivating *Pleurotus sajor kaju* on different agro waste. Soyabean is one of the major cash crop of this region was found to be the most suitable agro waste for oyster mushroom cultivation.

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Conflicts of Interest: The authors declare no conflict of interest.

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