ABSTRACT

Oyster mushroom is one of the most popular edible mushroom cultivating throughout the world. Different species of *Pleurotus* are now in cultivation practices and North Bengal is one of the main source of oyster mushroom production. Four species of Pleurotus were selected for the study. *Pleurotus ostreatus, P sajor-caju, P. djamor* and *P florida*. Formerly in North Bengal, only *P ostreatus, P sajor-caju* and *P florida* was commonly cultivated. A new species of oyster mushroom *P djamor* the pink oyster mushroom recently introduced and this species is now being cultivated throughout North Bengal.

Morphological and histopathological characterization was done to assess the differentiation between four species of Pleurotus along with their gill structure as well as the spore characteristics. Mycelial growth pattern of Pleurotus species were also studied using various medium and it was found that the growth rate varies in different medium. Molecular detection of the four fungal isolates IPL/MC/PO-1, IPL/MC/PS-01, IPL/MC/PD-01 and IPL/MC/PF-01 were carried out using 18S rDNA sequencing using ITS1 and ITS 4 primers. The sequences of the identified species were submitted in NCBI GenBank under the accession number KT768095, KT818506, KT 768094 and KT826605 for *P. ostreatus, P sajor-caju, P. djamor* and *P florida* respectively.

Seasonal productivity of all the selected *Pleurotus* species was chased and it was observed that the variable seasonal productivity throughout the year. Depending upon the temperature, relative humidity and rainfall, the productivity was found to be different. In case of *P. ostreatus,* February to September was found to be suitable while in case of *P sajor-caju,* temperature and relative humidity was quite higher and thus it found to be suitable to cultivate during May to September. While in case of *P florida* and *P djamor* it was found to be quite similar depending upon the temperature, relative humidity and rainfall required for the growth and fruiting body initiation. It was observed that at higher temperature, the fruiting initiation required very long time and also the productivity decreased during May to September. Various containers like waste bottles, glassware and boxes were also used to evaluate their effect on yield.

Biochemical constituents such as moisture, total sugar, reducing sugar, protein and lipid content were also estimated of cultivated *Pleurotus* species. All four species cultivated

using paddy straw, wheat straw and saw dust were found to be very high amount of protein, total sugar and reducing sugar content. Results also revealed that mushroom possess very low amount of lipid content. Antioxidant activity of selected *Pleurotus* species were also estimated and it was found that all four species showed very high amount of antioxidant activity such as DPPH scavenging activity, ferric reducing antioxidant power activity as well as flavonoid activity. All the Pleurotus species showed very high DPPH scavenging activity, Ferric reducing antioxidant power activity as well as flavonoid content. In vivo antidiabetic activity were also evaluated and oral treatment of *Pleurotus* species helps in reducing plasma glucose level as well as helps in regaining the body weight.

Spent mushroom substrate is an important by product of *Pleurotus* cultivation and this spent mushroom substrate were applied as fertilizer for crop improvement. *Capsicum chinense, C annuum, Solanum lycopersicum* and *Amaranthus* sp. were tasted successfully and the effect of SMS on different crop plants helps in growth and better yield.

Short term processing of *Pleurotus* species was done which include Packaging of mushroom for sell as well as different recipes were tasted in laboratory like mushroom pakora, soup, curry, scrambled mushroom. Long term processing of *Pleurotus* was also practiced in the form of drying, powder and also preparing mushroom biscuits. Promotion of mushroom cultivation and marketing were also done. Several unemployed youth, post graduate students as well as mushroom growers on North Bengal were trained about the seasonal productivity, spawn preparation as well as post-harvest processing of *Pleurotus* species.

Contaminants were found to be a very serious problem during the cultivation of *Pleurotus* species. Several fungal species like *Coprinus*, *Fusarium* as well as *Trichoderma*; bacterial species like *Pseudomonas* and pastes like Sciarid, phorid and Beetle fly drastically affected the growth and yield of *Pleurotus*. Management strategies like application of bavistin, phenyl, carbandazium and formaldehyde were adopted which reduces the effect of the fungal as well as bacterial genera. Racks of the mushroom production unit were covered with nylon nets which helped in reducing the attack of flies on the substrates.

Promotion of mushroom cultivation and marketing were also done. Several unemployed youth, post graduate students as well as mushroom growers on North Bengal were trained about the seasonal productivity, spawn preparation as well as post-harvest processing of *Pleurotus* species. Promotion of *Pleurotus* cultivation was also done at the Krishi Mela organised by the Department of Agriculture, Govt. of West Bengal. Several unemployed youth, retired persons as well as students of different colleges and women of self-help groups were trained successfully and established their own cultivation unit. They are also very much efficient in spawn production and thus the growers produce their own spawn for cultivation. Economic efficiency of mushroom production and marketing were also studied and it was found that the growers selling mushroom at very high price and the cost benefit ration become very high which results in economic upliftment of different economically weaker people.