Research Paper



Edible Oyster Mushroom (Pleurotus sp.) cultivation in the Classroom by college students

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ABSTRACT

Growing mushrooms in a commercial way using high-tech facilities is underway. However, visualizing mushroom cultivation as a sustainable entrepreneurship for sub-urban poor is a new challenge. Keeping this in mind, undergraduate Government College students, especially economically-backward students were trained and motivated to grow oyster mushroom (pleurotus sp.) in the classroom laboratory itself with minimum facilities. This small scale trial has given confidence to the students to take up this as a part-time business after completion of their studies.

Keywords : Oyster mushroom, entrepreneurship, sub-urban, students

INTRODUCTION

There are hundreds of identified species of fungi which, since time immemorial, have made a significant global contribution to human food and medicine. Some estimate that the total number of useful fungi – defined as having edible and medicinal value are over 2, 300 species [1]. Mushrooms are the fruiting bodies of macrofungi. They include both edible/medicinal and poisonous species. However, originally, the word "mushroom" was used for the edible members of macrofungi and "toadstools" for poisonous ones of the "gill" macrofungi [2].

Edible mushrooms once called the "food of the gods" and still treated as a garnish or delicacy can be taken regularly as part of the human diet or be treated as healthy food or as functional food. Mushroom is a nutritious vegetarian delicacy and has many varieties [3] of which most of them are edible. It contains many vitamins and minerals but very low on sugar and fat (www.unapcaem.org) and has been used for many years both as food and for medicinal purposes. It is popular to add mushrooms to soups, salads, and sandwiches, or to use them as an appetizer.

Nutritive Value:

Mushrooms contain about 80 to 90 percent water, and are very low in calories (only 100 cal/oz), very little sodium and fat, and 8 to 10 percent of the dry weight is fiber. It has more potassium than a banana or a glass of orange juice and has 20 to 40 percent of the daily value of copper that has cardio protective properties. Hence, they are an ideal food for persons following a weight management program or a diet for hypertensive. Mushrooms are an excellent source of potassium, a mineral that helps lower elevated blood pressure and reduces the risk of stroke. Mushrooms have a rich source of riboflavin, niacin, and selenium. It is rich in Vitamin C and B complex and the protein content varies between 1.6 to 2.5 percent. It has most of the mineral salts required by the human body and the niacin content is about ten times higher than any other vegetables. The folic acid present in oyster mushrooms helps to cure anemia. It is suitable for people with hyper-tension, obesity and diabetes due to its low sodium:potassium ratio, starch, fat and calorific value. Alkaline ash and high fiber content makes them suitable for consumption for those having hyperacidity and constipation. A polycyclic aromatic compound pleurotin has been isolated from Pleurotus griseus which possess antibiotic properties. (http://mushroomkikheti.blogspot.in).

Mushroom cultivation – Early success:

The Romans regarded mushrooms as a gift from God and served them only on festive occasions, while the Chinese treasured them as a health food. Mushroom cultivation has great scope in China, India and in some of other developing countries because of the cheap and easily available raw materials needed for this activity, coupled with faster means of communication and marketing (as a fresh commodity), and better purchasing power of the people. For example, in 1978, China produced 60,000 tonnes of edible mushrooms which increased to 14 million tonnes in 2006. Now there are more than 30 million people directly or indirectly engaged in mushroom production and businesses, and now China has become a leading mushroom producer and consumer in the world [4].

Oyster Mushroom, *Pluerotus sp.* is widely cultivated in Russia, USA and several other countries all over the world. Owing to their nutritional value *P. ostreatues* and *P. pulmonarius* have been long cultivated, and interest has recently increased

in exotic species, in particular, *P. sajor-caju* (Fr.) Singer. The latter species is promising for cultivation for food because of the high protein and vitamin content [5].

Mushroom in India:

Currently, three types of mushrooms are being cultivated in India, namely button mushroom (*Agaricus bisporus*), the paddy-straw mushroom (*Volvariella volvacea*) and the oyster mushroom (*Pleurotus sajor-caju*). Of these, *A. bisporus* is the most popular and economically viableto grow and is extensively cultivated throughout the world. However, due to its low temperature requirement, its cultivation is restricted to the temperate regions mostl hill stations of India. In contrast, cool climatic areas and to the winter in the plains of Northern India. Oyster mushroom can grow at moderate temperature ranging from 22 to 28 °C in the tropical plains and hence it is suitable for most of the places of India. .

Simple process is sufficient to cultivate oyster mushrooms and do not require huge investments (www. mofpi.nic.in) and instrumentation. The earlier success of mushroom cultivation motivated Department of Botany, Dr Ambedkar Government Arts College to try mushroom production in the classroom laboratory itself by students. This paper will capture this experience which may encourage the youth to start this as a viable microenterprise.

Oyster mushroom, Pleurotus sp. (Class: Basidiomycetes; Family: Agaricaceae) is popularly known as 'dhingri' in India and grows naturally in the temperate and tropical forests on dead and decaying wooden logs or sometimes on dying trunks of deciduous or coniferous woods. It may also grow on decaying organic matter. The fruit bodies of this mushroom are distinctly shell or spatula shaped with different shades of white, cream, grey, yellow, pink or light brown depending upon the species. It is one of the most suitable fungal organisms for producing protein rich food from various agro-wastes or forest wastes without composting [6].

The oyster mushrooms have three distinct parts namely a fleshy shell or spatula shaped cap (*pileus*), a short or long lateral or central stalk called *stipe* and long ridges and furrows underneath the pileus called gills or *lamellae*. The gills stretch from the edge of the cap down to the stalk and bear the spores. The spores are smooth, cylindrical and germinate very easily on any kind of mycological media within 48-96 hrs. The mycelium of *Pleurotus* is pure white in colour [7].

MATERIALS AND METHODS

Source:

Fresh and healthy spawn (Paddy infested with fungal mycelium) was collected from Perunthalaivar Kamaraj Krishi Vigyan Kendra, Pondicherry and used in this investigation.

Substratum preparation:

It can be cultivated on a wide ranging of cellulosic farm wastes or other materials. Cereal straws, banana pseudostems, waste paper, cotton waste are particularly suitable.

The present study used paddy straw and it was chopped into small pieces (3-5 cm long) by hand. It was thoroughly washed under running tap water for an hour followed by soaking in hot water (60-70 °C) for about 10 hours, after which water was squeezed out [8]. Finally the paddy straw material was autoclaved using vertical autoclave under 20 lbs pressure for 20 minutes and dried under shade for 2 hours. The sterilized paddy straw was packed into Polythene bags (40 x 30 cm) and spawn was spread as a layer on the edges of the straw. Straw and spawn was filled alternatively and approximately 2-3 kgs of straw and 100 - 200g of paddy spawn was used per bag. The bag was secured tightly by a nylon thread and punctured with 2 mm diam. holes to provide aeration. The bags were kept on the shelves and sprinkled with water twice a day [9].

RESULTS AND DISCUSSION:

The room temperature was maintained at 29 -33 °C for 15-20 days. The fungus started spreading and in about 10-15 days, the entire bag was covered by white cottony mycelial growth which intertwined throughout the straw. As a result, the straw became compact. At this stage, slits were made throughout the polythene cover and watered twice a day to promote bud initiation. The humidity of the room was maintained by wetting the floor. 12th day after inoculation, the buds were observed (Plate 1 & 2).

Two- three flushes appeared at an interval of about a week. Mushrooms were harvested fresh and sold out immediately for consumption as it will lose its vigour, colour and taste if delayed. At few instances, when it was unable to sell on the same day, it was shade dried under partial sunlight and packed carefully for sales as dried mushrooms.

This is a profitable business as it has a wider marketing scope. It has found a place in restaurants, fast foods, soup shops etc. with a gradual increase in the consumers as it is affordable.

The present study was inspired by the success story of mushroom cultivation by Dalit women Self Help Groups (SHGs) in Ariyankuppam and Veerampattinam, coastal villages of Puducherry Union Territory who were trained and funded by M. S. Swaminathan Research Foundation (MSSRF), Chennai. Such good examples create confidence among rural and suburban youth to start this as a profitable venture.

To conclude, this small initiative by the younger generation will serve as a role-model for others and create awareness among fellow student community.



PLATE 3: a. Dr. G. Sampadhkumur, Head, Laught: about muchroaom cultivation techniques: b. Mr. Murugesans, Lab Ant, showing Saewn of Oxyter Mushroom; c. Students filling paddy atraw into Polythene bags; d. Set-ao of Mashroom cultivation within the class room Inforcatory condition e. AM Size (Scholz) showing mushroom producties; f. Dr. P. Balaji, Asst. Prof. with his student. Mr Size during mushroom harveiting.



PLATE 2: g. Fin head stage (12th day); h. Smouting of Fin head stage (13th day); i. Entre big covered by while cottony mecha growth; j. Finst Link appearance on 10th day of cultivation; h. Ovster mushroom with long stipe (stalk); I. Fully grown Oyster mushroom after harvesting.

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