International Journal of Botany Studies
www.botanyjournals.com
ISSN: 2455-541X
Received: 28-06-2021, Accepted: 13-07-2021, Published: 29-07-2021
Volume 6, Issue 4, 2021, Page No. 471-473

Cultivation of mushroom (*Pleurotus sajor-caju)* using rice straw

Laxman R Rathod[1], Sanjay L Gaikwad[2], Gurumeet C Wadhawa[3], Nitin A Sasane[2*]
[1] Department of Botany, Mahatma Phule A S C College, Panvel, Maharashtra, India
[2] Deptartment of Chemistry, Mahatma Phule A S C College, Panvel, Maharashtra, India
[3] Rayat Shikshan Sanstha's, Karmaveer Bhaurao Patil College, Vashi, Navi Mumbai, Maharashtra, India

Abstract
The present investigation in Basidiomycetes fungi is confined to the southern, western part of Maharashtra. Mycelial growth, colonization period, primordial initiation, harvesting time, yield, and mushroom size of *Pleurotus sajor-caju* were assessed on Rice bran and rice straw. In rainy seasons air contains moisture that grows well due to the median temperature, in winter due to low temperature and reduced air moisture, water spraying is needed once a day during winter. Four to five times a day that help to increase mushroom growth is needed, but during summer water spraying is needed. So the growth of the mushroom varies in different seasons. Temperature affects moisture in the air, which affects mushroom growth considerably.

Keywords: spawn, rice straw, *Pleurotus sajor-caju*, climate change, mycelial, growth, and yield

Introduction

Pleurotus sajor-caju (grey oyster mushroom) is a fleshy fungus that can be eaten. It has a lot of nutrients including carbs, proteins, lipids, minerals, and vitamins, and it has fruiting bodies. Pleurotus sp., often known as "oyster mushroom," is an edible mushroom made from rice straw (Mizuno & Zhuang, 1995; Bononi *et al*., 1995) [9]. Grey oyster mushrooms are in high demand due to their strong nutritional value. The mushroom is becoming increasingly popular as a nutritious and delicious dish. It was claimed that combining rice straw and cottonseed in the substrate would increase Sajor-caju yields (Shashirekha *et al*. 2011) [11]. Agaricales are a type of fleshy fungus that thrives during the rainy season. A few are poisonous, whereas the majority are edible. The edible Agaricales are delicious and nutritious, but they are pricey food. As a result, the research of edible mushrooms is crucial. The Egyptians ate mushrooms at feasts and believed that they gave warriors vigor in battle. In the east, mushrooms are revered for their medicinal properties (Chang and Miles 2004) [5]. Artificial mushroom technology is a delicacy that is utilized in the manufacture of many continental dishes (Ayodele and Akpaja 2007) [2]. Sajor-caju has a high protein level and a low-fat content. Vitamins (B1, B2, C, A), minerals (P, Na, Ca), and a high fiber and carbohydrate content are also present (Anonymous 2007) [1]. In Panvel, Raigad District, rice straw is the primary substrate for oyster mushroom cultivation. Many researchers and producers, on the other hand, are working to find a cost-effective and alternate substrate for cultivating oyster mushrooms without sacrificing mushroom quality.

Materials and Methods

Rice bran and rice straw were collected from the local area of Panvel in Raigad District. The spwan or seed of Pleurotus sajor-caju was collected from the Agricultural College of Pune. This experiment was carried out in the Department of Botany, Mahatma Phule A. S. C. College, Panvel Dist. Raigad in 2016. Cut the straw into pieces of 5 cm. long. This can be done by a flywheel type of chaff cutter with a blade. Soak the straw for 15 to 20 hours in a bucket. Place a heavyweight over to prevent the straw from floating. Drain out the water. Sterilize straw in an autoclave at 15lbs pressure for 2 hours. This process aims to eliminate the fungus that breaks down cellulose in the straw quickly and establishes itself fast in sterilized straw. Open the lead after complete cooling.

Remove the straw from the autoclave and transfer it to the inoculation room. Spread the straw on a clean floor for cooling. There should not be excess water in the straw. When the straw is squeezed into the palm, water should drip. 0.3% garlic extract can be sprayed on straw just before spawning. This is effective against green mould.

Take the polythene bag of 35×25 cm size. Sterilize the bag with 90% alcohol of formalin on all the slides. Put the layer of 10 cm. straw in the bottom of a polythene bag. Press it with palms to the air, and the layer becomes 6 cm in height 25 cm. of spawning and sprinkled over the straw putting more towards the slides. The bag is filled with 4 layers of straw and 4 layers of spawning. The bag is then tied with sterilized thread with 90% alcohol.

The mushroom beds are arranged in a spawning running room under a wire gauze shade. This room does not require light. Mycelium growth is faster in a dark place as compared to a bright one. The best temperature for spawning growth is 250C, and it is completed in 15 days. Additional 4 to 5 days are needed for the maturity of the mycelium. Cream-colored patches on the surface indicate the maturity of beds. 10 to 15 holes should be made on all slides with a drawn pin with 90% alcohol, especially 2 to 4 holes in the bottom to leach excess water. Perforated bags because of accumulation of high CO2 which inhibits the fruiting. Oei (2003) [10] used proper technology for mushroom Mushroom cultivation.

Results

Basidiomycete's fungi mostly grow in the rainy season, i.e., from June to September, spring up in June, flourish well in September. Some mushrooms are also grown in a moist climate in spring. These dry specimens remain up to the winter and summer season too. In the present study, Rice straw and Rice bran substrates were examined without the addition of supplements for the growth and yield of *Pleurotus sajor-caju*. Mycelial growth is an initial step that generates suitable internal conditions for fruiting.

It is commonly called a mushroom. Morphologically the basidiocarp is umbrella-shaped, consisting of a stem (stipe) and a pileus, all made of dikaryotic mycelium. The stipe is negative geotropic and holds the cup. It is a thick fleshy cylindrical structure light pink or white. The stipe is about 6 – 9 cm. in height and the pileus is 5 – 10 cm in diameter. There are 300 - 600 gills on the undersurface of the pileus, arranged radially. It is an umbrella-shaped structure. It is a convex fleshy structure that later becomes flat. Its upper surface is white, purple, or brown. The lower surface bears vertically hanging gills

Thus, in conclusion, the cultivation of oyster mushrooms on agricultural residues offers economic initiatives for agribusiness to examine these residues as valuable resources and use them to produce carbohydrates, proteins, fats, minerals, and multivitamins. Chang and Buswell (2003) [4] reported that mushrooms as a prominent source of nutraceuticals for the 21st century.

Fig 1: Spawn spread on Rice straw for mycelium Growth of Mushroom

Fig 2: Mycelium and fruiting body growth on Rice straw

Fig 3: Final Fruiting stage of Mushroom

Discussion

Under suitable conditions, Maharashtra's Basidiomycete fungi have been seen on dead and decaying organic debris, humus, soil, and deadwood logs. Some fungi are toxic, while others are edible. We chose Pleurotus sajor-caju species from among edible fungi for the creation of mother culture spawn preparation and developing stages. The mushroom's growth was hindered by the cold and dry weather in the winter, and the heat and low humidity in the summer, thus we were unable to culture the mushroom in both summer and winter.

Wasser *et al*. (2000) [14] investigated medicinal mushroom food supplements. Oei (2003) [10] investigated mushroom farming utilizing appropriate technology. Medicinal mushrooms were identified as a major source of nutriceuticals by Chang and Buswell (2003) [4]. Bonatti *et al*. (2004) [3] compared the nutritional properties of Pleurotus ostreatus and Pleurotus sajor-caju grown in various lignocellulosic wastes. Mushroom farming, nutritional value, medical benefit, and environmental impact were all investigated by Chang and Miles (2004) [5]. Ayodele and Akpaja (2004) [2] examined the yield of Lentinus squarosulus on sawdust from various economic tree types. Wani *et al*. (2010) [13] examined mushrooms' nutritional and therapeutic value.

Kurt (2010) [8] investigated the effects of different agricultural wastes on the yields and enzyme activities of Pleurotus spp. (P. ostreatus and P. sajor-caju). Shashirekha *et al*. (2011) [11] investigated how to improve the mushroom's bioconversion efficiency and chemistry.

"Analysis of shiitake environmental performance by life cycle assessment," Tongpool and Pongpat (2013) [12]. Ibrahim, *et al*. (2017) [6] found that several acoustic sound treatments improved the growth and yield of grey oyster mushrooms (Plearotus sajor caju).

Acknowledgments
The authors are grateful to Agricultural College, Pune for providing the mushroom spawn. We are thankful to the honorable Principal, Mahatma Phule A. S. C. College, Panvel for their encouragement and constant support.

References
1. Anonymous *Sajor-caju*. Laboratory Center for Food and Agricultureal Products, 2007.
2. Ayodele SM, EO Akpaja. Yield evaluation of *Lentinus squarosulus* (Mont) Sing. On selected sawdust of economic tree species supplemented with 20% oil palm fruit fibers. Asian J. Plant Science,2007:6:1098-1102.
3. Bonatti M, Karnopp P, Soares HM, Furlan SA. Evaluation of *Pleurotus ostreatus* and *Pleurotus sajor-caju* nutritional characteristics when cultivated in different lignocellulosic wastes, Food Chem,2004:88:425-428.
4. Chang ST, JA Buswell. Medicinal mushrooms—a prominent source of nutriceuticals for the 21st century. Current Topics in Nutraceutical Res,2003:1:257-280.
5. Chang ST, PG Miles. Mushroom: cultivation, nutritional value, medicinal effect, and environmental impact. CRC Press, Boca Raton, 2004, 415.
6. Ibrahim R, Mohd Jamil AAI, Hasan SMZ, Mat Arshad A, Zakaria Z. Enhancing Growth and Yield of Grey Oyster Mushroom (Plearotussajorcaju) Using Different Acoustic Sound Treatments. MATEC Web Conf,2017:97:01054.
7. Kaul TN, BL Dhar. Biology and Cultivation of Edible Mushrooms. Westville Publishing House. New Delhi, 2007, 240.
8. Kurt S, Buyukalaca S. Yield Performances changes in enzyme activities of *Pleurotus spp*. (*P. ostreatus* and *P. sajor-caju*) cultivated on different agricultural wastes. Biores. Technol,2010:101:3164-3169.
9. Maziero R, Bononi VL, Capelari M. Cultivo e produtividade de *Pleurotus ostreatus* var. “Flórida” em Mogi das Cruzes, S.P., Brasil. Hoehnea,1992:(19)1-7.
10. Oei P. Mushroom cultivation. Appropriate Technology for mushroom growers. Leiden, Netherlands: Backhuys Publisher, 2003, (3).
11. Shashirekha MN, Rajaratham S, Z Bano. “Enhancement of bioconversion efficiency and chemistry of the mushroom, Pleurotus sajor-caju (Berk and Br.) Sacc. Produced on spent rice straw substrate, supplemented with oilseed cakes,” Food Chemistry,2011:76:27-31.
12. Tongpool R, P Pongpat. “Analysis of shiitake environmental performance via life cycle assessment,” presented at the ICGES, Hong Kong, 2013, 6-7.
13. Wani BA, Bodha RH, Wani AH. Nutritional and medicinal importance of mushrooms. J. Med. Plants Res,2010:4(24):2598-2604.
14. Wasser PS, E Nevo, D Sokolov, S Reshetnikov, M Timor-Tismenetsky. Dietary supplements from medicinal mushrooms: diversity of types and variety of regulations. Intl. J. Medi. Mushrooms,2000:2:1-19.