International Journal of Latest Trends in Engineering and Technology
Vol.(11)Issue(2), pp.095-097
DOI: http://dx.doi.org/10.21172/1.112.16
e-ISSN:2278-621X

PRODUCTION OF PLEUROTUS FLORIDA (WHITE OYSTER MUSHROOM) USING DIFFERENT SUBSTRATES

Dr.S.Venkatesh Babu[1], Dr.S.Karunakaran[2]

Abstract:The production of oyster mushroom (Pleurotus florida) on wheat straw and rice husk as basal substrate was attempted primarily to determine the possibility of its cultivation under environmentally controlled environment in TamilNadu. Many agricultural wastes have been utilized as substrate for the cultivation. We used paddy straw sorghum husk and sugar cane leaves. The pure culture was prepared by using potato dextrose agar (PDA).the mother spawn and the commercial spawn were prepared using pure culture. Alternative spawn method were used for bed preparation and kept in different temperature and humidity. The optimal productions were determined. The mushroom was considered as the meat by rural people because of its nutrient content.
Key words: oyster mushroom, mycelium, culture, sorghum seed and paddy dust.

1. INTRODUCTION:

The bioconversion of agriculture and agro industrial waste into protein rich food the mushroom cultivation is plays an one of the economically viable process.(Bano et al.,)It can also decrease air pollution and environmental pollution due to utilized agriculture wastes .pleurotus Florida is an edible mushroom of the tropic and sub tropic region having excellent favorable organoleptic , medicinal properties and taste .mushroom contains nine essential amino acids and also rich in proteins , vitamins and minerals .Its popularly called as vegetable meat because its intermediate between animals and vegetables (Syed Abrar et al.,; Hayes et al.,).Due to the low cost production and higher biological efficiency it can be cultivated throughout the world mostly in asia and Europe(mane et al.,).pleurotus flurioda belongs to the family basidomycetes.Lignin degradation recycle carbohydrates by white-rot basidomycetes is achieved through lignolytic enzymes such as laccase,lignin peroxides and magnesium peroxides. After Agaricus bisporus, pleurotus sp. Reaches to the second rate in world mushroom cultivation (erkel, 1992; chang et al.,).Pleurotous species mushroom can grow in 25 to 30˚C and 80 to 90% humidity. Using 25% of cereal straws 317 million metric tons of fresh mushroom can be cultivated per year. There was a need in the search of new substrate which is cheaply available because the costly substrates leads to increases the production cost of mushroom (arya and arya 2003).Various substrates provide different supplements for growth of the mushroom(choi,2004;oei,2003.,). Mushroom cultivation does not require lot of land and significant capital investment .It should be done as large scale and also small scale level as well as attractive activity for both rural farmers (karuppuraj velusamy et al;Mukherjee and Nandi,2002.).

2. MATERIALS AND METHOD:

2.1. Pure Culture:

The pure culture plate was prepared by using 1.8% agar and maintained in 4˚c.

2.2. Spawn Preparation:

Spawn were prepared using different substrate like sorghum seed and paddy dust. The growth of mycelium varies in these substrates. Mother spawn and commercial spawn are types of spawn prepared using pure culture.

2.3. Mother Spawn:

The procedures are more over same for two substrates but there is some changes in the initial stages. The sorghum seeds are half boiled and then air dried in the cotton cloth. Then it was mixed with calcium carbonate (30 grams for 1 kg seeds). It was filled in polypropylene bags and closed with cotton plug. Then sterilized in autoclave 121˚C and kept in UV light radiation for 30 minutes pure culture was inoculated into these bags and kept undisturbed for 18 to 20 days until the mycelium fully covered. The saw dust was sterilized in the pressure cooker and then air dried. Upcoming procedures are as like the sorghum seeds.

2.4. Commercial Spawn:

Spawn bags are prepared as usual step and the mother spawn was inoculated into these bags and kept undisturbed for 20 days until the mycelium fully covered. Using these spawn we can prepare mushroom beds.

[1,2] Head of the Department, Department of Petroleum Engineering, JCT College of Engineering & Technology, Pichanur, Coimbatore.

3. MUSHROOM BED PREPARATION USING DIFFERENT SUSTRATE:

Paddy straw, sorghum straw and sugar cane leaves are used as the substrate. Mushroom beds were prepared using the polypropylene bags (24*12 inches).Substrates were sterilized and air dried until 40% of water content left. Using the alternate spawning methods the beds were prepared and marked. The days taken by the mycelium for coverage and harvested mushroom fruit body were differs from each substrate to substrates.

4. RESULT AND DISCUSSION:

To enhance production of fruiting bodies of the oyster mushroom the adjustment of environmental conditions should be very important like favorable temperature, relative humidity, moisture content (Fahad Alkoaik et al., 2015; karuppuraj et al., 2014)The current research indicated that the growth and yield of p.florida varied widely depending on the different kind of substrates used p.florida can be easily cultivated on wheat ,paddy straw, sugarcane baggasse, barely, saw dust etc. By utilizing the locally available cellulosic materials p.florida can be easily cultivated(sivrikaya and peker,1999;Philippoussis et al,. 2001).During spawn production .While comparing the sorghum seeds and saw dust . The maximum production of fruiting bodies can be recorded as paddy straw among the three different substrates. The time taken for the mycelium growth differs from each substrate. The pure culture was maintained in 4˚c .In Sorghum seeds it took 18-20 days for complete growth where in the saw dust it took 20-25 days. The spawn should be used with 30 in days for best result and avoid contamination. The mushroom spawn are maintained in 28±29˚c. The hygrometer was kept inside the mushroom shed to monitor the temperature and humidity. Humidity is one of important factor that should be considered during the cultivation. The optimal growth of mycelium and mushroom yield was in 80±5 % humidity because low humidity and high humidity showed major difference in the yield. There was a slow mycelium growth and higher cause of contamination. Comparing the substrate used in bed preparation paddy straw:

Table 1 : Yield of pleurotus florida using sorghum seeds substrate:

SPAWNING METHODS	YIELD(gms) I	II	III	TOTALYIELD(gms)
Paddy straw leaves	1000±20	790±76	260±85	2200
Sorghum husk	650±30	490±17	247±43	1400
Sugar cane leaves	530±70	320±34	234±76	1100
Wheat	950±20	690±45	258±45	1900

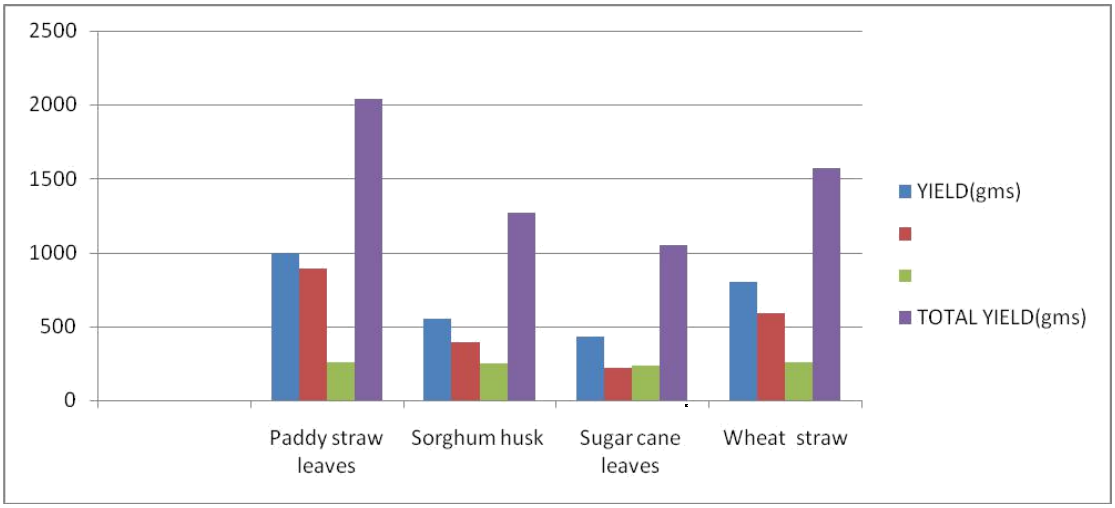

Fig.1: Yield of pleurotus florida using sorghum seeds substrate

Table 2 : Yield of pleurotus florida using rise husk substrate:

SPAWNING METHODS	YIELD(gms) I	II	III	TOTAL YIELD(gms)
Paddy straw leaves	800±20	756±76	250±85	1800
Sorghum husk	550±30	390±17	239±43	1170
Sugar cane leaves	436±70	347±34	227±76	700
Wheat	750±10	400±45	243±45	1300

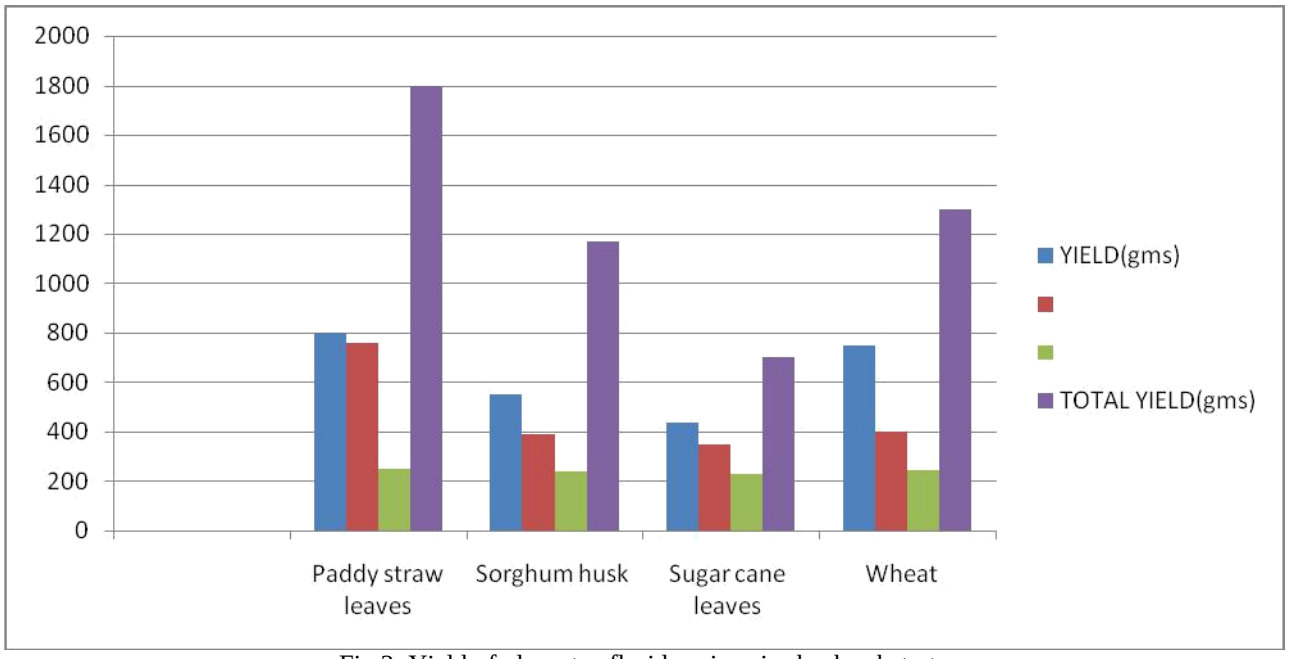

Fig.2: Yield of pleurotus florida using rise husk substrate

5. REFERENCE:

[1] Mane,V.P.,Patil, S., Syed, A. A., and Baig, M. M. V. 2007. Bioconversion of Low Quality Lignocellulosic Agricultural Waste into Edible Protein by Pleurotus Sajor-Caju (Fr) Singer. Journal of Zhejiang University of Science.8(10), 745-751.

[2] Erkel, L.,1992. Effects of Different Growing Medium on Yield of Pleurotus Ostreatus and Pleurotus Florida cultivation,Fourth Congress of Edible Mushroom of Turkey, Vol. L, Pp.8., Yalova.

[3] Bano, Z., Srivastava, H.C. Studies in the Cultivation of Pleurotus Sp. on paddy straw . Food Science 1962; 12:363-368

[4] Arya, C., Arya, A. 2003. Effect of Acid Hydrolysis of Substrate on Yield of Oyster Mushroom Pleurotus Sajor-Caju (Fr)Singer. Mushroom Res. 12, 35-38.

[5] Philioppoussis,A.,Zervakis,G. andDiamantopoulou, P.2001.Bioconversion of Agricultural Lignocellulosic Wastes through the Cultivation of the edible Mushrooms Agrocybe Aegerita, Volvariella Volvacea And Pleurotous Spp.World J. Microbial.Biotechnol.172:191-200.

[6] Sivrikaya, H. and Peker, H. 199. Cultivation of Pleurtous Flurioda on Forest and Wood Waste. Turk J. Agr. Forest 23:585-596.

[7] Karuppuraj Velusamy, Chandra Sekarenthiran Subramanian, Perumal Karuppan ,2014.Continuous Production of Pleurotus Florida and Calocybe Indica by Utilizing Loclly Available Lignocellulosic Substrates for Additional Income Generation in Rural Area.Pages:196-199.

[8] Fahad Aikoaik,Ahmed Khalil, Runnel Fulleros and Renato G.Reyes.2015 Cultivation of Oyster Mushroom (Pleurotus Florida) on Date Palm Residues in an Environmentally Controlled Conditions in Saudi Arabia .AENSI Journals ISSN-1995-0756,Pages:955-962.

[9] Chang,S.T.,MilesP.G.,1991.Recent Trendsin World Production of CultivatedEdible Mushroom.Mushr.Jour, 503;15-18.

[10] Mukherjee,R., Nandi,B.2002. Role of Nutrient Supplementation on Productivity of Pleurotus Spp. on two Lignocellulosic Biomass and dry matter digestibility of the Spent Substrate,in:Samajpati,N.(Ed.), Tropical Mycology.Proc. of Third Nat. Symposium,Indian Mycol.Soc.Kolkata.Pp.180-188.

[11] Syed Abrar Ahmed,J.A.Kadam V.P.Mane,S.S.Patil and M.M.V. Baig 2009.Biological Efficiency and Nutritional Contents of Pleurotus Florida Singer Cultivated on Different Agro-Wastes.Nature and Science,2009;7(1),ISSN 1545-0740.

[12] Hayes, W.A. and Haddad, S.P. The Nutritive Value of Mushrooms. Mushroom.J.1976; 30:204.

[13] V.Karuppuraj, S.Chandra Sekarenthiran and k.Perumal, 2014 Yield Improvement of Pleurotus Florida Fruting Bodies from Locally Available Unexplored Lignocellulosic Substrates,International Journal of Current Microbiology and Applied Sciences ISSN:2319-7706 V(3),Pages.985-990.

[14] Choi, K.W.2004.Shelf cultivation of oyster mushroom. http:/www.mushworld.com:1508/service/handbook/2004/chapter-7-2.pdf

[15] Oei, p.2003. Mushroom cultivation. Appropriate Technology for Mushroom Growers,3rd ed.Backhuys pub., Leiden,Netherlands,426 p.