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Evaluation of different varying amount of spawn production on oyster mushroom

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Abstract
Experiments were conducted at Department of Plant Pathology, T.D.P.G. College, Jaunpur in the two consecutive year 2010-2011 and 2011-12. Edible oyster mushroom was evaluation of different varying amount of spawn production on the yield of oyster mushroom. The experiments were laid out in completely randomized block design with six replication and five treatments viz. 60g, 80g, 100g, 120 g and 140 g spawn per bag. In every treatment one bag contain 1 kg paddy straw substrate on dry weight basis. The results are indicated Maximum yield of 402.0 g and 408.0g mushroom were harvested with 140g spawn during first and second year, respectively. It was followed by 120g, 100g, 80g and 60g spawn which gave 394.0g and 399.0g, 375.0g and 388.0g, 360.0g and 371.0g and 302.0g and 298.0g yield, respectively. It is also observed that yield of 140 and 120 g spawn, 120 and 100g spawn and 100 and 80g spawn did not differ significantly among themselves. The minimum yield of 302.0g and 298.0g were recorded from the treatment having 60g spawn.

Keywords: Spawn, yield, oyster mushroom and amount

Introduction
Indian agriculture, as it exists today, has come a long way from its present image of being non-commercial and traditional in its methods of farming. The recent trends in consumer behaviour surges the demand for high quality niche products and forces the agriculture sector to step up and adopt commercially, technically and economically viable agribusiness solutions (Shirur *et al.*, 2016) [1]. Business and investment opportunities in this sector have suddenly jumped manifold. In the present diet conscious era, mushrooms are increasingly considered as a future vegetable owing to its medicinal and nutritional properties and the consumer demand for mushrooms markedly expanded in the recent years. Mushrooms are considered as a potential substitute of muscle protein on account of their high digestibility (Pavel, 2009) [6]. In addition to protein, mushroom is an excellent source of vitamin-D which is not available in other food supplements (Pehrsson *et al.*, 2003) [2]. Mushrooms are low in calories, fat free, cholesterol free, gluten free and very low in sodium. Minerals such as potassium, iron, copper, zinc and manganese are high in fruit. Mushrooms such as Auricularia, Flammulina and Lentinula were most likely cultivated for the first time around the year 600800 AD in China and other Asian countries (Chang and Wasser, 2017) [3]. Presently shiitake, oyster, wood ear and button mushroom contribute 22, 19, 18 and 15%, respectively in terms of total mushroom production in the world (Singh *et al.*, 2017) [4]. Mushroom industry in India is overwhelmingly focused on white button mushroom which is a highly sophisticated and capital-intensive activity. The recent production data (official data of ICAR-DMR, Solan) showing that, the share of button mushroom in India is maximum amounting to 73% followed by oyster mushroom which contributes about 16%. From humble beginnings. As the amount of wild mushrooms shrink from both the degraded environment and nature resources as well as more costly labor, cultivated mushrooms would not only provide food security, but also sustainable and more nutritious diets (Vinceti, B *et al.*, 2013) [5] It is also an excellent example of rural economic development and poverty alleviation as well as typical recycle-economy and sustainable agriculture and forestry. The FAO has been actively promoting mushroom cultivation for rural development and food security in developing countries (Marshall, E *et al.*, 2009) [7]. Bio-innovation is very important for mushroom cultivation and so is the technological dissemination (Rivera, WM *et al.*, 2009) [7]. Technological development can largely increase

Production capabilities and even significantly reduce the costs, but market promotion and nutrition education could be important as well. (Mayett, Y. *et al.* 2006) [8].

Materials and Methods

Experiments were conducted at Department of Plant Pathology, T.D.P.G. College, Jaunpur in the two consecutive year 2010-2011 and 2011-12.Edible oyster mushroom was evaluation of different varying amount of spawn production on the yield of oyster mushroom. The experiments were laid out in completely randomized block design with six replication and five treatments viz. T1-60g, T2-80g, T3-100g, T4-120 g and T5-140 g spawn per bag. In every treatment one bag contain 1 kg paddy straw substrate on dry weight basis. The observation like average weekly maximum and minimum temperature and relative humidity during experimentation, moisture content of the substrate at the time of spawning, days taken for first harvest and total yield of mushroom of all the harvest were recorded in each experiment. In order to carry out various experiments, wheat grain spawn was prepared by employing. The clean and healthy wheat grains were selected for spawn preparation. The grain were washed 3 times under running waster and then boiled @ 1 ky grain./1.5 litre water for 20 minutes. After boiling grains were put over a wire mesh to drain off excess water. It was then mixed with calcium carbonate @ 3.5 g/kg and calcium sulfate @ 13.5 g/kg on dried grain weight basis. The mixture, thus obtained was filled upto two third volume in 500 ml milk bottle. Bottles were plugged with non-absorbent cotton and then sterilized in an autoclave at 15 lbs pressure per square inch for two hours. The sterilized bottles were cooled down to room temperature and shaken vigorously to avoid clumping of grain. These sterilized bottles were surface sterilized by dipping in two percent formalin solution without wetting the cotton plugs. Bottles were inoculated with approximately equal mycelial bits, obtain from pure culture, under laminar flow in totally aseptic condition. The inoculated bottles were inoculate at 25^0C $\pm$ 1^0C temperature in BOD incubator. After 7 days inoculated bottles were shaken vigorously for through mixing of mycelial threads with grains. Then after these bottles were again kept in BOD incubator at 25^0C $\pm$ 1^0C temperature to obtain full growth of fungal mycelium just to cover the entire bottle. Used to prepare substrate for mushroom cultivation. One hundred litres of tap water was filled in a plastic drum of 200 litre capacity. A stock solution with 125 ml formaldehyde and 7 g Bavistin in water. This solution was stirred properly with a slick for its mixing. Now 10 kg dry straw abstrate was steeped completely in this chemical solution. The mouth of the container was closed with the lid and kept as such for 18 hours. After 18 hours the straw was taken out from the chemical solution and put on a wire sieve for removal of extra solution. The mushroom were grown on Paddy straw in surface sterilized polythene bags measuring 60 x 45 cms in size. These surface sterilized Polythylene bags were taken and two small vents were made on both corners of the bottom side for leaching the excess water of the chemically treated substrate. One third-quantity (approximate 1.3 kg wet straw) of 1 kg dry substrate of above prepared subsrate was filled in these bags and gently pushed down. The fully grown spawn was broad casted over the upper surface of the substrate. The rest of the substrate (approximate 1.4 kg wet straw) was filled in the remaining spaces of the bags and the mouth of the bags were tied with threads, spawned bags were transferred to spawn running room and kept on a flat surface under prevailing room temperature. These bags were watched daily for spawn run. When full growth of mycelium of fungus was seen in the substrate the polythene coverings were removed. The blocks of compact substrate were transferred in the cropping room, which was earlier surface sterilized, under prevailing room temperature. Humidity of cropping room was maintained by sprinkling of top water on the walls, roof, floor and beds with the help of sprayer and automizer frequently. Now 100 g of moist straw was transferred to an empty box as prepared above and weighed. The box, containing moist straw, was kept into hot air oven at 70^0C for eight hours. Then it was cooled down and weighed. The process was repeated thrice to obtain constant weight. The observation like average weekly maximum and minimum temperature and relative humidity during experimentation, moisture content of the substrate at the time of spawning, days taken for first harvest and total yield of mushroom of all the harvest were recorded.

The weight of fresh mushrooms was recorded after harvesting of each flush. The dry weight of mushroom (g) was recorded by keeping the fresh mushroom in hot air oven at 70o C for 48 hours. The total yield was recorded by adding the fresh as well as dry weight of mushrooms of all flushes, while the fresh and dry yield percentage (g) was calculated on substrate dry weight basis using the following formula:= Total yield of all flushes from each replication (g)/ Substrates dry weight of each replicationX100

Results and Discussion

The result presented in the Table-6 depicted that moisture content of the substrate at the time of spawning was 71 percent during 2011 and 70 percent during 2012.The weekly average of maximum temperature on year 2011 of 24^0 c and minimum temperature 12.4^0 c, 2012 maximum temperature of 22.5^0 c and minimum temperature 13.0^0 c. Relative Humidity of 2011 and 2012 was maximum 89.00 & 90.80% and minimum of 58.10 & 55.40% respectively. The amount of 140 g spawn took 20 and 19 days during 2011 and 2012, respectively for spawn run and 24 and 22 days during 2011 and 2012, respectively for first harvest. It was followed by 100g and 120 g of spawn both of which took equal days (21 and 20 days) for spawn run and (25 and 23 days) for days taken for first harvest during both year of study. Maximum days required for spawn run and days taken for first harvest i.e. 23 and 22 days and 28 and 26 days, respectively were recorded in the treatment having 60g spawn. as regards the yield of the year 2011 and 2012 on maximum (402.0g and 408.0g) was harvested with the 120 g spawn followed by 120g spawn (394.0g and 399.0g), 100g spawn (375.0 and 388.0g) and 80g spawn (360.0g and 371.0g). Data showed that the yield of 140.0g spawn and 120g spawn, 120 g and 100g and 100g and 80g spawn were statistically at par to each other, but the yield obtained 140 g spawn was significantly superior than other treatments except 120 g spawn. Yield response of 120g spawn was also significantly higher than 80g and 60g of spawn and 100g spawn significantly superior in yield than 60g of spawn. The lowest yield of 302.0g and 298.0g mushrooms were harvested from the treatment having 60g of spawn during both years which was significantly inferior to all other treatments. The mean number of days taken from pinhead formation to maturation of fruiting bodies exhibited significant difference between different spawn rates (Table 1). The data recorded for total number of bunches (per bag) of oyster mushroom indicates highly significant difference between different spawn rates. The results obtained

for percentage yield of oyster mushroom on fresh (wet) and dry weight basis are highly significant at LSD 0.05

The fungus, *P. sajor caju* when grown on a fixed amount (1.0 kg dry matter) of Paddy straw and spawned with varying amount of spawn i.e. 60g, 80g, 100g, 120g and 140g, the maximum yield of mushroom was obtained with 140g of spawn followed by 120g, 100g, 80g, 60g. However yields of substrate spawned with 140g and 120g spawn, 120g and 100g, and 100g and 80g spawn did not differ significantly to each other. Substrate, spawned with 60g spawn gave minimum and significantly less yield than all other treatments, during both the years.

No significant difference in yield from lower to higher doses (0.5, 1, 2, 3 and 5 percent) of spawn have also been reported by Sohi (1986) [9] and Tiwari (1991) [10].

Table 1: Effect of varying amount of spawn on production of *P. sajor caju*

Weekly average max. and min. temperature and R.H. during 2011 24.0^{0}C – 12.4^{0}C and 89.0-58.10% Weekly average max. and min. temperature and R.H. during 2012 22.50^{0}C – 13.0^{0}C and 90.80-55.40%										
Amount of spawn	**Moisture content of the substrate at spawning %**		**Days taken for spawn run**		**Days taken for first harvest**		**Mushroom yield (g/kg dry substrate) in 30 days**		**Biological efficiency %**	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
60g	71	70	23	22	28	26	302.00	298.00	30.20	29.80
80g	71	70	22	21	26	24	360.00	371.00	36.00	31.10
100g	71	70	21	20	25	23	375.00	388.00	37.50	38.80
120g	71	70	21	20	25	23	394.00	399.00	39.40	39.90
140g	71	70	20	19	24	20	402.00	408.00	40.3	40.90
CD at 5%	-	-	-	-	-	-	17.22	18.26	-	-

References

1. Shirur M, Shivalingegowda NS, Chandregowda MJ, Rana RK. Technological adoption and constraint analysis of mushroom entrepreneurship in Karnataka. Economic Affairs. 2016; 61(3):427-436.
2. Pehrsson PR, Haytowitz DB, Holden JM. The USDA's National Food and Nutrient Analysis Program: Update 2002. Journal of Food Composition and Analysis. 2003; 16:331-341.
3. Chang ST, Wasser SP. The cultivation and Environmental impact of mushrooms. Printed from the oxford Research Encyclopaedia, Environmental Science (c) Oxford University Press, USA, 2017, 43.
4. Singh, Manjit, Shwet Kamal, Sharma VP. Status and trends in world mushroom production-I. Mushroom Research. 2017; 26(1):1-20.
5. Vinceti B, Termote C, Ickowitz A, Powell B, Kehlenbeck K, Hunter D. The contribution of forests and trees to sustainable diets. Sustainability 2013; 5:4797-4824
6. Pavel K. Chemical composition and nutritional value of European species of wild growing mushrooms: A review. Food Chemistry. 2009; 113(1):9-16.
7. Marshall E, Nair N. Make Money by Growing Mushrooms; Food and Agriculture Organization of the United Nations (FAO): Roma, Italy, 2009. Rivera, W.M.; Rasheed Sulaiman, V. Extension: Object of reform, engine for innovation. Outlook Agric. 2009; 38:267-273.
8. Mayett Y, Martinez-Carrera D, Sinchez M, Macías A, Moraaf S, Estrada-Torres A. Consumption trends of edible mushrooms in developing countries: The case of Mexico. J Int. Food Agribus. Mark. 2006; 18:151-176.
9. Sohi HS, Upadhyay RC. Effect of temperature on mycelial growth of *Pleurotus* spp. and their yield performance on selected substrate. Mush. Sci. 1985; 2(1):49-56.
10. Tiwari RP. Effects of soaking period and spawn dose on oyster mushroom (*Pleurotus sajor caju*) production paper presented at National symp. on mush., held at Thiruvananthapuram, Jan. 22-24, 1991.