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## Studies on effect of different organic additives wet weight basis cereal flour on fungal disease incidence and yield of oyster mushroom

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**Abstract**

Mushroom has got important place in religious books. They are the fungi, which lack chlorophyll and therefore, they cannot use solar energy to manufacture their own food (Photosynthesis) as green plants. The experiments for the present investigation were conducted the Culture of *Pleurotus Florida* were purified and maintained by single hyphal tip method. For this purpose, the cultures were grown in sterilized Petri plate on Potato Dextrose Agar Medium (PDA) for 8-10 days. The result indicated that maximum yield (790g/kg of dry substrate with 79% B.E.) was observed in wheat straw + rice flour which was statistically higher than all other treatments. It was followed by wheat straw + maize flour (783.33gm/kg of dry substrate with 78.30% B.E.). The minimum yield was observed in control i.e. only wheat straw (456.67gm/kg of dry substrate with 45.66% B.E.) flowered by wheat straw + wheat flour (590.00gm/kg of dry substrate with 59.00% B.E.), which are significantly higher than control (wheat straw alone) control significantly lower than all other treatments. The highest number of fruiting bodies (139.67) was observed from wheat straw + maize flour which was statistically higher than all other treatments. The minimum number of fruiting body (90.00) was observed from wheat straw + wheat flour which was statistically at par with wheat straw + sorghum flour, wheat straw + oat flour and wheat straw + Rice flour and wheat straw + bajra flour. The maximum days for spawn run (19.67) were observed in control. The minimum days of first harvesting (25.67) was observed at wheat straw + maize flour which was statistically lower than all other flours. Disease incidence the maximum percentage (17.29%) observed at wheat straw + oat flour followed by (16.46%) wheat straw + wheat flour minimum incidence observed (10.95) wheat straw + maize flour.

**Keywords:** substrate, grain flour, straw

**Introduction**

Mushroom has got important place in religious books. Mushrooms are the fungi, which lack chlorophyll and therefore, they cannot use solar energy to manufacture their own food (Photosynthesis) as green plants. However, mushroom can produce a wide range of enzymes, which degrade the complex substrates in to simple form on which they grow and absorb the soluble substrates for their own nutrition. Mushroom has been defined as "a macro fungus with a distinctive fruiting body which can be either epigeous or hypogeous and large enough to be seen with naked eyes and to be picked by hands" (Chang and Miles, 1993) [3]. Vegetative parts mainly consist of thread like long thin, mycelia which under suitable conditions form fruiting body or sporocarps. It is also called 'white vegetables' or 'boneless vegetarian meat' and contain ample amount of proteins, vitamins and fibres apart from having a range of metabolites of intense interest to pharmaceutical (Thakur and Singh 2013) [8]. Taxonomically, *Pleurotus* belongs to the Phylum Basidiomycota, Class Basidiomycetes, Order Agaricales and Family Pleurotaceae (Tricholomataceae) (Kirk, 2001) [7]. Oyster mushroom (*Pleurotus* spp.) also called as "Dhingri" or "Abalone" now ranks second among the important cultivated mushrooms in the world (Chang and Miles, 1992) [2]. This group got the common name "oyster mushroom" because of the tongue shaped pileus with an eccentric lateral stipe. Unlike other mushroom species, this genus shows much diversity in its adaptation to the varying agro climatic condition. This flexible nature of the genus makes it more cultivated species than any other mushroom. Mushroom cultivation (from spawn preparation to harvesting) are affected adversely by a large number of biotic and abiotic stress, Among the biotic stress, fungi, bacteria, viruses, nematodes, insects and mites cause damage to mushrooms directly or indirectly. A number of harmful fungi are encountered in compost and casing soil during the cultivation of white button mushroom. Many of these act as competitor moulds thereby adversely affecting spawn run whereas others attack the fruit bodies at various stages of crop

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growth producing distinct disease symptoms. During the preparation of grain spawn, it was infected by many fungal pathogens. Likes moulds viz., *T. harzianum*, *T. viride*, *A. niger*, *A. flavus*, *Fusarium* sp. and *Penicillium* sp. etc.

### Review of Literature

Bhadana (2010) [1] tested the organic nutrient to known their effect on yield attribute of *Pleurotus florida*. The gram powder and rice bran @ 5.0 present (on dry weight basis of substrate) gave higher yield than wheat bran.

Hassan *et al.* (2010) [4] studied the mycelial linear growth, wheat bran supplementation level, incubation period, yield, and chemical composition of fruit bodies. The suitable wheat bran supplementation level for sawdust, soybean straw and rice straw media was 25%, which gave the maximum mycelium linear growth being 8.9, 8.4 and 7.6 mm/day. While, the maximum mycelium linear growth on sugar cane bagasse (6.7 mm/day) was achieved at 30% wheat bran level. Incubation period for the different tested media ranged from 30-41 days, sawdust recorded the shortest period, while sugar cane bagasse recorded the longest one.

Hatvani *et al.*, (2012) [5] reported that, green mould disease, caused by *Trichoderma* species is a severe problem for mushroom growers, worldwide *Trichoderma* strains were isolated from green mould affected *Pleurotus ostreatus* (oyster mushroom) substrate sample the causal agents of green mould disease in the oyster mushroom were *T. pleurotum* and *T. pleuroticola*. The temperature profiles of the isolates and their host overlapped thus no range found that would allow optimal growth of the mushroom without mould contamination. Commercial fungicides prochloraz and carbedazim were effective against disease management.

Jafarpour *et al.* (2012) [6] studied the wheat bran, rice bran and soybean powder as supplements for the growth of *Pleurotus florida* and *Pleurotus ostreatus*. Shorter growth period and higher yield and biological efficiency were obtained for *P. florida* than *P. ostreatus*. Wheat and barley straws which contained high fiber and carbon to nitrogen (C/N) ratio caused the best growth period, fruiting body weight, yield and biological efficiency. Assessment of substrate and complement combinations indicated that the longest growth period was obtained from barley straw enriched with rice bran (27.00 day). However, the highest fruiting body number (36.33), fruiting body weight (31.17 g), yield (939.33 g), and biological efficiency (187.87%) belonged to wheat straw supplements by soybean powder plus rice bran.

### Material and Methods

The experiments for the present investigation were conducted in Mushroom Laboratory of Department, Plant of Pathology S. V. P. University of Agriculture & Technology, Meerut, U.P. Culture of *Pleurotus Florida* were purified and maintained by single hyphal tip method. For this purpose, the cultures were grown in sterilized Petri plate on Potato Dextrose Agar Medium (PDA) for 8-10 days. Single branched hyphae from the periphery of the growing colony were marked under low power (10x) in the compound microscope and transferred to PDA slants. These tubes were incubated at 22°C ± for about a week, again sub cultured on PDA and then stored in a refrigerator at 5-10°C for further use. The culture of *Pleurotus florida* was grown on PDA medium which were used to study their colony characters viz. colony appearance, colour, shape, margins etc. *in vitro*.

$$\text{Biological efficiency} = \frac{\text{Fresh weight of fruit body}}{\text{Dry weight of substrate}} \times 100$$

### Results and Discussion

The data presented in experiment was conducted to find out the effects of different organic additives on wet weight basis with substrate (wheat straw) and cereal flour such as Maize flour (1.0%), Bajra flour (1.0%), Sorghum flour (1.0%), Rice flour (1.0%), and Wheat flour (1.0%), oat flour (1.0%) and control (without additives), observations were recorded for the days for spawn run, days for pinhead formation, days for first harvesting, number of fruiting bodies, total average yield weight/fb and Disease incidence (%) were recorded and data presented in table.

The result indicated that maximum yield (790g/kg of dry substrate with 79% B.E.) was observed in Wheat straw + Rice flour which was statistically higher than all other treatments. It was followed by wheat straw + maize flour (783.33g/kg of dry substrate with 78.30% B.E.). The minimum yield was observed in control i.e. only wheat straw (456.67g/kg of dry substrate with 45.66% B.E.) flowered by wheat straw + wheat flour (590.00g/kg of dry substrate with 59.00% B.E.), which are significantly higher than control (wheat straw alone) control significantly lower than all other treatments.

The highest number of fruiting bodies (139.67) was observed from Wheat straw + Maize flour which was statistically higher than all other treatments. The minimum number of fruiting body (90.00) was observed from wheat straw + wheat flour which was statistically at par with Wheat straw + Sorghum flour, Wheat straw + Oat flour and Wheat straw + Rice flour and Wheat straw + Bajra flour. The highest number of pinhead formation (22.0) was observed at Wheat straw + Rice flour which was statistically similar to Wheat + Sorghum flour, Wheat straw + Oat flour, Wheat straw + Bajra flour, Wheat straw + Wheat flour. The minimum days of pinhead formation Wheat straw + Maize flour (21.33) which are statistically lower than all other treatments. The minimum days for spawn run (15.67) observed at Wheat straw + Maize flour which was statistically similar to all other treatment except control which are significantly higher other treatments. The maximum days for spawn run (19.67) were observed in control. The minimum days of first harvesting (25.67) was observed at Wheat straw + Maize flour which was statistically lower than all other flours. Disease incidence the maximum percentage (17.29%) observed at Wheat straw + Oat flour followed by (16.46%). Wheat straw + Wheat flour minimum incidence observed (10.95) Wheat straw + Maize flour. The control i.e. without organic additive which was statistically higher disease incidence than all other flours.

Similar Jafarpour *et al.* (2012) [6] found on wheat bran, rice bran and soybean powder as supplements for the growth of *Pleurotus florida* and *Pleurotus ostreatus*. Shorter growth period and higher yield and biological efficiency were obtained for *P. florida* than *P. ostreatus*. Wheat and barley straws which contained high fiber and carbon to nitrogen (C/N) ratio caused the best growth period, fruiting body weight, yield and biological efficiency. Assessment of substrate and complement combinations indicated that the longest growth period was obtained from barley straw enriched with rice bran (27.00 day). However, the highest fruiting body number (36.33), fruiting body weight (31.17 g), yield (939.33 g), and biological efficiency (187.87%) belonged to wheat straw supplements by soybean powder plus rice bran.

**Table 1:** Effect of different organic additives (cereal flour) wet weight basis on fungal disease incidence and yield of oyster mushroom.

S. No.	Organic Additive	Dose (%)	DFSR	DFPF	DFFH	NOFB	Yield (g/kg dry substrate)	Average weight/FB	Biological Efficiency (%)	Disease Incidence (%)
1.	Wheat+ Maize flour	1	15.67	21.33	25.67	139.67	783.33	100.67	78.30	10.95
2.	Wheat+ Bajra flour	1	16.00	22.00	26.00	97.33	703.33	67.33	70.33	14.54
3.	Wheat+ Sorghum flour	1	16.00	22.00	26.00	91.67	613.33	50.00	61.33	15.38
4.	Wheat+ Rice flour	1	16.00	22.00	26.00	145.00	790.00	85.00	79.00	14.74
5.	Wheat+ wheat flour	1	16.00	22.00	26.00	90.00	590.00	51.67	59.00	16.46
6.	Wheat+ Oat flour	1	16.00	22.00	26.00	114.00	673.33	60.00	67.33	17.29
7.	Control	-	19.67	25.67	30.00	138.00	456.67	55.00	45.66	36.47
	CD at 5%	-	1.591	0.546	2.701	2.530	89.080	-	-	-
	SE (m)	-	0.519	0.178	0.882	1.228	29.087	-	-	-

Average of four replications

DFSR= Days for spawn run, DFPF= Days for pin head formation, DFFH= Days for first harvesting,

NOFB= Number of fruiting body.

### Conclusion

The study was conducted to check the different organic additives wet weight basis cereal flour on fungal disease incidence and yield of oyster mushroom (*Pleurotus florida*). It can be concluded that organic additives (cereal flour) were recommended most suitable additives (cereal flour) the production of oyster mushroom (*Pleurotus florida*).

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