



Influence of different organic additives (pulses flour) on mycelium growth (spawn) of Oyster Mushroom (*Pleurotus djamor*)

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ABSTRACT

Spawn is an essential component of mushroom production. The present investigation was conducted with the aim to determine the effect of different organic additive pulses flour (black gram, pigeon pea and lentil) on mycelium growth (spawn) of Oyster mushroom (*Pleurotus djamor*). In the present Study three different pulses flour viz. black gram, pigeon pea and lentil were mixed as a supplement with wheat grain for spawn production. The results obtained during the present investigation, in the spawn production maximum mycelial growth (100.00 mm) was found in 2% pigeon pea flour on 20th days and the mycelium was thick then other pulse flour and minimum growth (72.33 mm) was found in Control (no organic additive) on 20th days. Based on the results obtained, for spawn production of Oyster mushroom (*Pleurotus djamor*) by organic supplementation, Pigeon pea would be recommended most effective organic supplement in Wheat grains.

Keywords: *Pleurotus djamor*, spawn, Pulses Flour, black gram, pigeon pea and lentil.

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INTRODUCTION

The term Mushroom is broadly defined as "Mushroom is a macrofungus with a distinctive fruiting body which can be either epigeous (above ground) or hypogeous (underground) and large enough to be seen with the naked eye and to be picked by hand." [1]. Mushrooms are a good source of protein, vitamins and minerals and are known to have a broad range of uses both as food and medicine. A high nutritional value of oyster mushrooms has been reported with protein (25-50%), fat (2-5%), sugars (17-47%), mycocellulose (7-38%) and minerals (potassium, phosphorus, calcium, sodium) of about 8-12% [2].

Oyster mushrooms are grown from hyphae (threadlike filaments) that become interwoven into mycelium and propagated on a base of steam sterilized cereal grain usually Wheat grains. This mycelium-impregnated cereal grain is called spawn and is used to inoculate mushroom substrate [3,4]. Failure to achieve a satisfactory harvest may often be traced to unsatisfactory spawn used [5].

In other words spawn comprises mycelium of the mushroom and a supporting medium which provides nutrition to the fungus during its growth. The propagating material used by the mushroom growers for planting beds is called spawn. The spawn is equivalent to vegetative seed of higher plants [6]. In mushroom growing technology, the inoculums are known as the 'spawn'. Spawn is a medium that is impregnated with mycelium made from a pure culture of the chosen mushroom strain. Spawn production is a fermentation process in which the mushroom mycelium will be increased by growing through a solid organic matrix under controlled environmental conditions [7,8].

The yield and quality of mushroom produced are determined by three factors: the genetic makeup of the mushroom strain, the environmental conditions in which the mushroom is grown and the physiological and nutritional requirements of different strains. Attempts on the identification of potential strain and cultivation technology have been made till today but further research still needs to be carried out in the area such as, improvement in new hybrid strain, use of organic supplementation in cultivation, evaluation of locally available cheap grains for spawn, morphological characterization etc. Keeping in view the above points of importance and possibilities of cultivating Oyster mushroom in the rural as well as urban areas

of the country, the present investigation was carried out with objectives to evaluate the beneficial effects of different pulses flour supplement for production of spawn of Oyster Mushroom (*Pleurotus djamor*).

MATERIAL AND METHODS

Experimental site

In mushroom production programme the primary concern is preparing an appropriate spawn. The experiments were conducted during 2014-2015 in Mushroom Laboratory Department Plant of Pathology, S. V. P. University of Agriculture and Technology, Meerut, UP, India, which is situated on the Western side of the Delhi-Dehradun high way (NH-58) at a distance of 10.0 km away in the north of Meerut city. The district Meerut is situated between 29° 01'N latitude and 77° 45'E longitude at an altitude of 237 meters above the mean sea level.

Establishment of pure culture

The culture of *Pleurotus djamor* was purified and maintained by single hyphal tip method. For this purpose, the culture was grown in sterilized Petri plates 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 21-24°C for about a week, again subcultured on PDA and then stored in a refrigerator at 5-10°C for further use [8].

Spawn Production and adding pulses flour (organic additive)

In the present study, three different type pulses flour viz. black gram, pigeon pea and lentil were mixed with two different doses @1 and 2% as an organic supplement with wheat grain. For this study, the spawn was prepared in half litre capacity wide-mouthed glass bottles. The grains were cleaned to remove any broken, shrivelled grains either by sieving or winnowing or by handpicking of undesired grains. After this, the grains were soaked overnight in clean water and then washed. They were boiled in water for 15 minutes taking care that grains should not split but remain slightly hard after boiling. The boiled grains were spread in a thin layer over a wire net to remove excess water and enable them to cool about 25-30°C. The cooled grains were then mixed with 1.2 percent commercial grade gypsum (CaSO₄) and 0.3 percent calcium carbonate (CaCO₃). Gypsum prevents the sticking of wheat grains together and calcium carbonate maintains the pH 5.5 - 7.5. The grains were filled up to (100 mm) in the bottle in three replicates. The bottles were plugged with non-absorbent cotton and covered with butter paper. These bottles were then sterilized at 121°C (15 lbs pressure) for 2 hours on two consecutive days. Sterilized bottles were taken out from the autoclave, while still hot and were shaken to avoid clumping of grains. Sterilized bottles were inoculated by 9 mm disc in the individual bottle. Before the inoculation pre-balanced by electric balance and sterilized by autoclave (10 lb pressure for 15 minutes)[9] pulses flour were mixed in a bottle under an aseptic condition in the laminar flow chamber. The spawn bottles were incubated without shaking at 24±1°C in B.O.D incubator and observations were recorded on 5th, 10th, 15th and 20th day till to completely cover by mycelial growth in bottles. [10]

Statistical analysis

The Complete randomized design (CRD) was applied and the data thus obtained were analyzed statistically. Analysis of variance (ANOVA) technique and critical difference (CD) was calculated at five percent level of significance for comparison with other treatment [11].

RESULT AND DISCUSSION

In the present investigation of different pulses flour supplementation for spawn production results shows that:

Effect of different organic additive on spawn's production

In the present study three different pulses flour mixed in wheat grain viz. black gram, pigeon pea and lentil flour. The results revealed that among all the three pulses flour, maximum mycelial growth (100.00 mm) was found in 2% pigeon pea flour on 20th days which was significantly higher to all other treatments and it was followed by black gram 2% (87.67 mm). The least mycelial growth of the *P. djamor* was recorded in control (72.33 mm) which was significantly lower than all other treatments and it was followed by 1% black gram (75.00 mm) on 20th days. Results are shown in Table 1 and Fig.1.

These results were found in proximity with the research findings of Ramabadrhan [12] the various substrates tried for spawn production, partially-filled paddy grains (PFPg) and sorghum grains were rapidly colonised by *P. eous* Horse gram flour 3% was found to be highly favourable. Fallal [13] evaluated the effect of carbon source from sugars (glucose, fructose, maltose, lactose, galactose, raffinose, and inositol) on the growth of *P. columbines* and *P. pulmonarius*. The best carbon was obtained from sucrose and glucose for *P. pulmonarius* and *P. columbines*. The least growth of *P. pulmonarius* and *P. columbinus* was found in the presence of lactose and galactose, respectively. Saurabh [14] determined that, the species of *P. flabellatus* were grown in five sugar mix in wheat grain viz. Fructose, Maltose, Sucrose, Starch

and Glucose. The results revealed that among all the five sugar, maximum mycelial growth was found in glucose followed by maltose. Bhadana [15] determined that, the effect of different sugars on two species of *Pleurotus* spp. (i.e. *P. florida* and *P. djamor*,). The results revealed that, the maximum mycelial growth of *P. florida* and *P. djamor* was found in glucose.

Table-01: Effect of different organic additive (pulses flour) on spawn growth (mm) of oyster

| Organic additive | Dose (%) | 5 th day | | 10 th day | | 15 th day | | 20 th day | |
|-------------------------------|----------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | | spawn growth (mm) | growth rate (mm/day) | spawn growth (mm) | growth rate (mm/day) | spawn growth (mm) | growth rate (mm/day) | spawn growth (mm) | growth rate (mm/day) |
| Lentil | 1% | 9.00 | 1.80 | 25.00 | 2.50 | 36.00 | 2.40 | 76.33 | 3.81 |
| Lentil | 2% | 8.33 | 1.67 | 18.00 | 1.80 | 39.67 | 2.64 | 82.67 | 4.13 |
| Pigeon pea | 1% | 6.67 | 1.33 | 21.33 | 2.13 | 39.00 | 2.60 | 81.67 | 4.08 |
| Pigeon pea | 2% | 8.00 | 1.60 | 24.67 | 2.46 | 46.33 | 3.08 | 100.00 | 5.00 |
| Black gram | 1% | 6.00 | 1.20 | 22.00 | 2.20 | 35.67 | 2.37 | 75.00 | 3.75 |
| Black gram | 2% | 5.67 | 1.13 | 21.00 | 2.10 | 45.00 | 3.00 | 87.67 | 4.38 |
| Control (no organic additive) | - | 4.67 | 0.93 | 18.00 | 1.80 | 37.67 | 2.51 | 72.33 | 3.61 |
| SE | - | 1.08 | - | 1.76 | - | 1.28 | - | 1.40 | - |
| CD at 5% | - | 2.34 | - | 3.82 | - | 2.78 | - | 3.03 | - |

Mushroom (*P. djamor*); Average of three replications

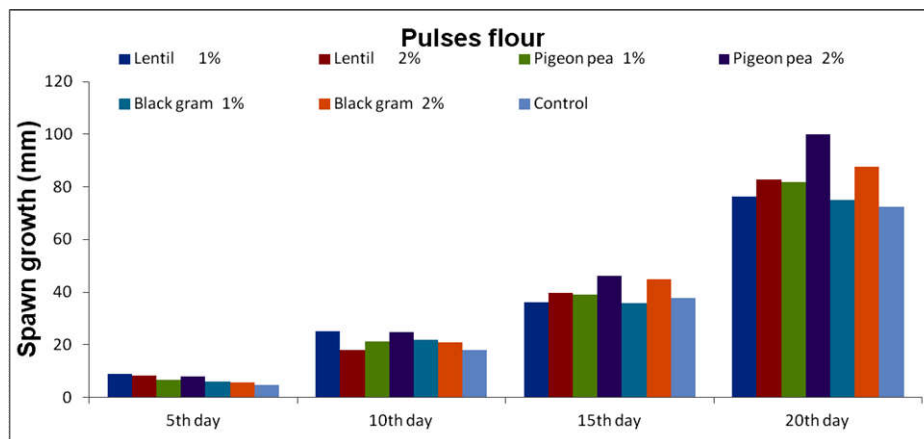


Figure: 01: Effect of different organic additive (pulses flour) on spawn growth (mm) of oyster mushroom (*P. djamor*).

CONCLUSION

Spawn is an essential component for the mushroom growers which effect to yield of mushroom hence a study was carried out to check the effect of different pulses flour (Organic additive) on mycelial growth in spawn and enhance the yield and growth of Oyster mushroom. The maximum mycelial growth (100.00 mm) was found in wheat grain added with 2% pigeon pea flour on 20th days and thus it's recommended for spawn production of *Pleurotus djamor* as an Organic additive in Wheat grain to be used.

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