

Effect of Substrate pH on Yield Performance of Oyster Mushrooms (*Pleurotus ostreatus*)

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Abstract

A research was carried out to investigate optimum pH values for the cultivation of oyster mushrooms (*Pleurotus ostreatus*). Accordingly, initial pH values of the nine different growth substrates were adjusted as 5.4, 5.6, 7.1, 7.3, 7.5, 8.1, 8.2, 8.6, and 8.8 and the final values upon completion of the sterilization procedure was also measured. Sawdust was used as the basal ingredient for substrate preparation with the addition of rice bran, green gram powder, CaCO₃ and MgSO₄ as supplements. Experiment was laid out in completely randomized design with 9 treatments and 10 replicates. Average yield (g), piles diameter (cm), stalk length (cm) and number of flowers per flush were measured. Average yield was highest in the media with pH 5.6. With the decreasing pH in the medium mushroom yield increased and after pH of 5.6 it was decreased/ However, no significant difference was observed between the treatments on piles diameter, stalk length and number of flowers per flush.

Key words: Oyster mushroom, *Pleurotus ostreatus*, Substrates, Yield

Introduction

Mushroom cultivation is a profitable agribusiness and oyster mushroom (*Pleurotus ostreatus*) is an edible mushroom having an excellent taste and flavor and balanced diet. It belongs to the class Basidiomycetes, order Agaricales. The technology of artificial mushroom cultivation is a recent innovation, which an example that the incorporation of non conventional crops in existing agricultural system can help in improving the social as well as economic status of small farmers.

The growth of the oyster mushroom require high humidity (80-90%) and high temperature (25-30°C) for the vegetative growth called spawn running and lower temperature (18-25°C) for fruiting body formation (Viziteu, 2000). Mycelium of mushroom prefers range of 5.5-7.8 pH for optimum growth (Viziteu, 2000). However pH value of 7.5 was observed in the growth

substrate prepared in accordance with Department of Agriculture formulation. Therefore, the purpose of the present study is to signify the effect of pH variation in media for the growth and yield of *Pleurotus ostreatus* and find out the optimum pH value in the media which gives highest yield.

Materials and method

Nine growth substrates were prepared depicting nine different pH values. Five Kg of sawdust, 500 g of rice bran, 50 g of green gram powder and 10 g of MgSO₄ were used for all treatments while the amount of CaCO₃ was changed to adjust pH in the media. pH values of media were measured before and after sterilization. (Table 1)

Table 1. Treatments with pH values and having different compositions of CaCO₃, 5Kg of saw dust

Treatment	pH value		CaCO ₃ /5Kg of saw dust (g)
	Before sterilization	After sterilization	
T1	8.8	7.0	175
T2	8.6	6.9	150
T3	8.2	6.8	140
T4	8.1	6.5	125
T5	7.5	6.3	100
T6	7.3	6.1	75
T7	7.1	5.6	50
T8	5.6	5.1	35
T9	5.4	4.8	25

After substrate preparation, inoculation was done and media were kept in the dark room for spawn running. After the completion of spawn running polypropylene bags were transferred to the cropping room to facilitate fruiting body formation. Fruiting bodies initiated seven

Table 2: pH values and their respective yield under different treatments

pH value	Yield (g/flush)
8.8	51 ^f
8.6	56 ^{ef}
8.2	60 ^e
8.1	64 ^{de}
7.5	70 ^{cd}
7.3	74 ^{bc}
7.1	78 ^b
5.6	90 ^a
5.4	50 ^f

Raws having same letters are not significantly different ($p > 0.05$)

days after opening bags and three flushes were harvested from each treatment. Average yield (g/flush), piles diameter (cm), stalk length (cm) and number of flowers per flush were calculated.

Results and discussion

Mushroom yield obtained at different pH levels are given Table 2. Highest average yield (g/flush) was obtained from bags (T8) with pH of 5.6 in the medium. It is observed that the mushroom preferred more acidic medium for its growth.

However, piles diameter (cm), stalk length (cm) and number of flowers did not differ significantly among different pH levels.

The results of this study reveal that 5.6 pH within the tested pH levels in the medium was the best to obtain high yield with oyster (*Pleurotus ostreatus*) mushroom cultivation.

The highest yield observed in the pH 5.6 and the yield started decreasing in the next level of pH(5.4) tested. However, it is not clear if pH of 5.3 or lower would give higher yield as it was not tested in this experiment. Similarly, pH 6 would have given more yield than pH 5.6. There should be uniformity in tested pH levels in the experiments to conclude precisely.

References

- Viziteu G 2000 Substrate -cereal straw and corn cobs: In mushroom growers handbook Gush,R.(Ed.)P and F publishers, USA pp:86-90