

Original Research Article

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Evaluation of High Yielding Strains of Oyster Mushroom (*Pleurotus spp.*)

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ABSTRACT

Five strains of oyster mushroom were tested for various parameters such as spawn run days, pin head initiation days, days taken for first harvest, fruit body/bag, and average weight of fruit body, yield and biological efficiency. Results indicate that highest biological efficiency was recorded in strain R-13-13-05 (96.6 %) followed by strain R-13-13-07 (75.3 %), R-13-13-03 (74.8 %) and R-51 (66.4 %), respectively, and Lowest BR was observed in strain R-13-13-04 (58.4 %) among all the tested strains. Days required for spawn was minimum in strain R-13-13-05 (only 17 days) followed by R-13-13-04 (only 17.67 days), strains R-13-13-07, R-51 (only 18.67 days) and strain R-13-13-03 (only 19.83 days), respectively. Maximum required days, for spawn run, were recorded in strain R-13-13-3 (total 20.33 days). Pin head initiation was first reported in strain R-13-13-5 (within 20.67 days) followed by strain R-51 (within 23.50 days), strains R-13-13-04 (within 24.17 days) and strain R-13-13-03 (within 24.67 days), respectively. Maximum days, required for pin head initiation, were in strain R-13-13-07 (within 25.0 days). First harvesting was done in strain R-13-13-05 (after 25.33 days of spawning) followed by strains R-13-13-03, R-13-13-07, R-51 and R-13-13-04 (after 27.33, 27.33, 27.50, 29.50 days of spawning, respectively). Among all the strains, tested in the experiment, strain R-13-13-07 recorded highest fruit body weight (per fruit body 26.55 g) followed by R-13-13-04 (25.50 g), strains R-13-13-05, (19.86g) and R-51 (17.33 g), respectively. Lowest weight, per fruit body, was recorded in strain R-13-13-03 (14.52 g). Strain R-13-13-03 yielded maximum fruit body (61.33 fruits/bag) followed by R-51 (60.33 fruit body/bag), strain R-13-13-04 (51.50 fruit body/ bag) and R-13-13-05 (51.33 fruit body/bag), respectively. Minimum fruit body was yielded in strain R-13-13-07 (31.0 fruit body/bag).

Keywords

Pleurotus spp.,
Wheat straw,
Growth, Yield

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Introduction

Mushroom cultivation is a profitable agribusiness world-wide. There are more than 5000 mushroom varieties could be employed for foods and medicines. In the fungal classification system proposed by Ainsworth

and followed by J. Webster (Sharma, 1989), almost edible mushrooms are members of the subdivision Basidiomycotina and Ascomycotina (Dung, 2007). Oyster mushrooms could prevent and reduce several serious diseases, including high blood pressure and cholesterols (Agrawal *et al.*,

2010), and breast cancer, prostate cancer (Jedinak and Sliva, 2008).

With objectives of identification of high yielding varieties or strains the five strains of oyster mushroom collected from the Department of Plant Pathology, College of Agriculture Raipur, IGKV Raipur Chhattisgarh and experiments was conducted in RMD College of Agriculture and Research station, Ajrima, Ambikapur for various yield parameters for such as spawn run days, pin head initiation days, days taken for first harvest, fruit body per bag, average weight of fruit body and yield.

Materials and Methods

Collection of strains

Five strains (R-13-13-03, R-13-13-04, R-13-13-05, R-13-13-07 and R-51) of oyster mushroom (*Pleurotus spp.*) were collected from College of Agriculture, Department of Plant Pathology IGKV Raipur (C.G).

Site of experiment

Experiment was conducted in mushroom hut of Division of Plant Pathology at RMD College of Agriculture and Research station Ajrima, Ambikapur (C.G) during month of January to march 2014.

Experimental details

Experiment was carried out during Rabi season with date of spawning is last week of January 2014 in mushroom hut by using Complete Randomized Block Design (CRD).

Five treatment in three replication and each replication consist of two bags wheat straw is used as substrate (2kg wet wt. of wheat straw) by using 3% of spawn rate (wet wt. of substrate) in poly bag of size (12" x 18").

Data collection and Statistical analysis

The experiment was laid out in Completely Randomized Design (CRD) with five treatments with three replications. The data were recorded on spawn run days, pin head initiation days, days taken for first harvest, number of fruit body/bag, and average weight of fruit body, mean yield and biological efficiency. The data were analyzed by statistical procedure given by Gomez, K.A. and Gomez, A.A. 1984.

Results and Discussion

Spawn run (Days)

Days required for spawn was minimum in strain R-13-13-05 (only 17 days) followed by R-13-13-04 (only 17.67 days), strains R-13-13-07, R-51 (only 18.67 days) and strain R-13-13-03 (only 19.83 days), respectively. Maximum required days, for spawn run, were recorded in strain R-13-13-3 (total 20.33 days). Similar result also found by Shah *et al.*, (2004). Ahmed (1998) stated that *P. ostreatus* completed spawn running in 17-20 days on different substrates He reported that the spawn running took 16-25 days after inoculation. Similar results also reported by Tan (1981)

Pin head initiation (Days)

Pin head initiation was first reported in strain R-13-13-5 (within 20.67 days) followed by strain R-51 (within 23.50 days), strains R-13-13-04 (within 24.17 days) and strain R-13-13-03 (within 24.67 days), respectively. Maximum days, required for pin head initiation, were in strain R-13-13-07 (within 25.0 days). Similar result also found by Shah *et al.*, 2004 found that the spawn heads appeared 6 days after the spawn running. Ahmed (1998) stated that *P. ostreatus* completed spawn running in 17-20 days on

different substrates and time for pinhead formation was noted at 23-27days.

Days taken for first harvest (Days)

First harvesting was done in strain R-13-13-05 (after 25.33 days of spawning) followed by strains R-13-13-03, R-13-13-07, R-51 and R-13-13-04 (after 27.33, 27.33, 27.50, 29.50 days of spawning, respectively). similar result also found by Bugarski *et al.*, (1994) who found that the first fruiting occurred on different days depending on types of strains.

Fruit body/ bag

Strain R-13-13-03 yielded maximum fruit body (61.33 fruits/bag) followed by R-51 (60.33 fruit body/bag), strain R-13-13-04 (51.50 fruit body/ bag) and R-13-13-05 (51.33 fruit body/bag), respectively. Minimum fruit body was yielded in strain R-13-13-07 (31.0 fruit body/bag). Higher number of effective fruiting body might happen due to the presence of glucose, fructose and trehalose in the substrate, reported by Kitamoto *et al.*, (1995) (Fig. 1a and Table 1).

Table.1 Evaluation of high yielding varieties/strains of oyster mushroom (*Pleurotus* spp.)

Date of sowing: 30-01-2014

S.N	Treatments	Spawn run(days)	Pin head initiation (days)	Days taken for first harvest	Fruit body/ bag	Average weight of fruit body (g)	Mean yield (kg)	BE (%)
1	R13-13-3	20.33	24.67	27.33	61.33	14.52	0.374	74.8
2	R13-13-4	17.67	24.17	29.50	51.50	25.50	0.292	58.4
3	R13-13-5	17.00	20.67	25.33	51.33	19.86	0.483	96.6
4	R13-13-7	18.67	25.00	27.33	31.00	26.55	0.377	75.3
5	R-51	19.83	23.50	27.50	60.33	17.33	0.332	66.4
	CD	0.743	1.151	1.409	1.879	1.076	0.018	
	CV	6.904	8.368	8.940	6.523	9.011	8.351	

Fig.1a

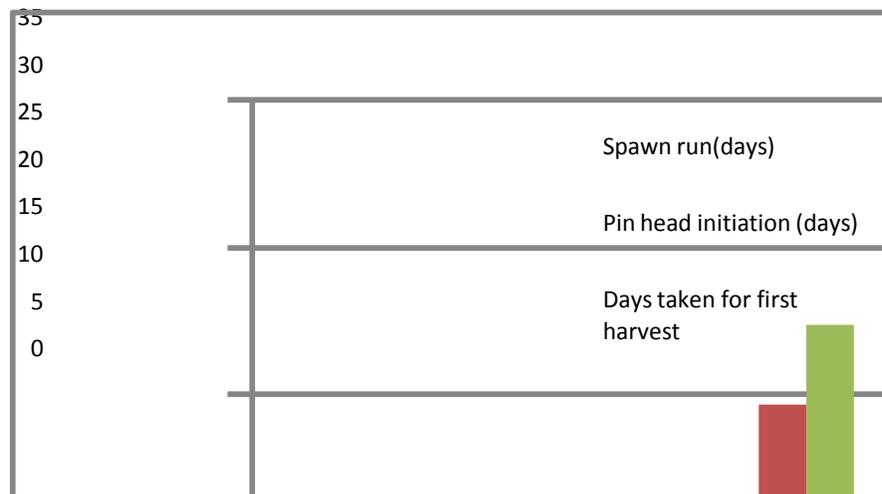


Fig.1b

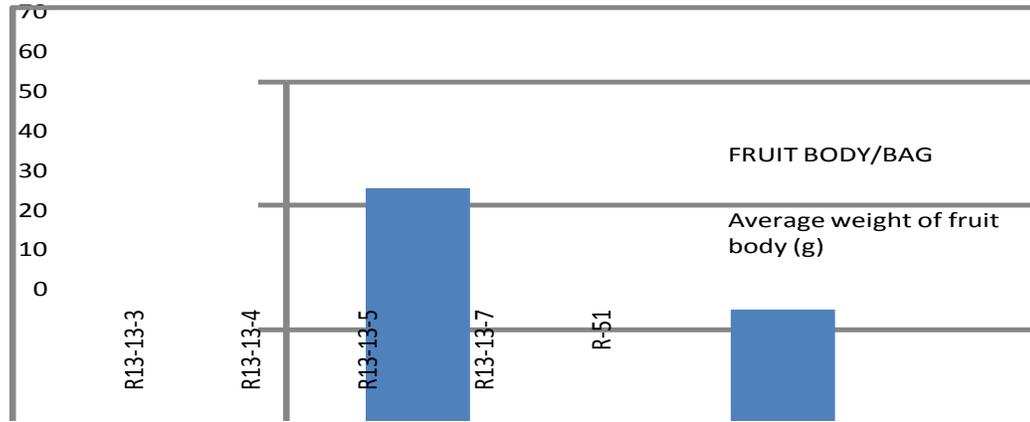


Fig.1c

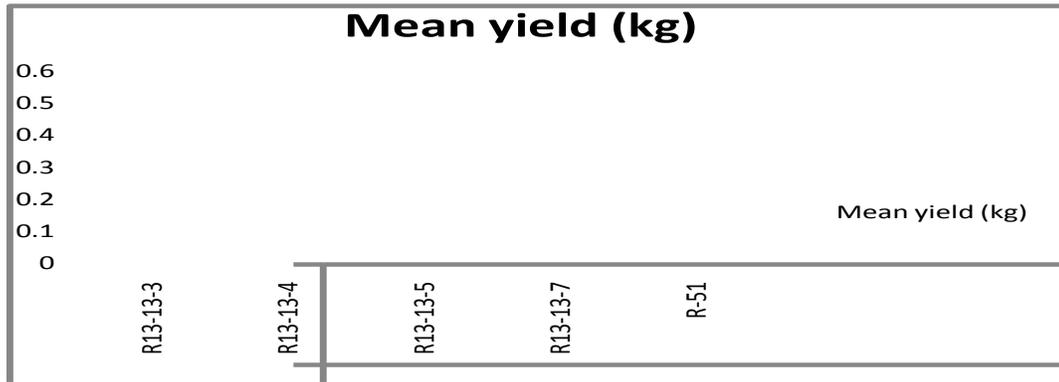
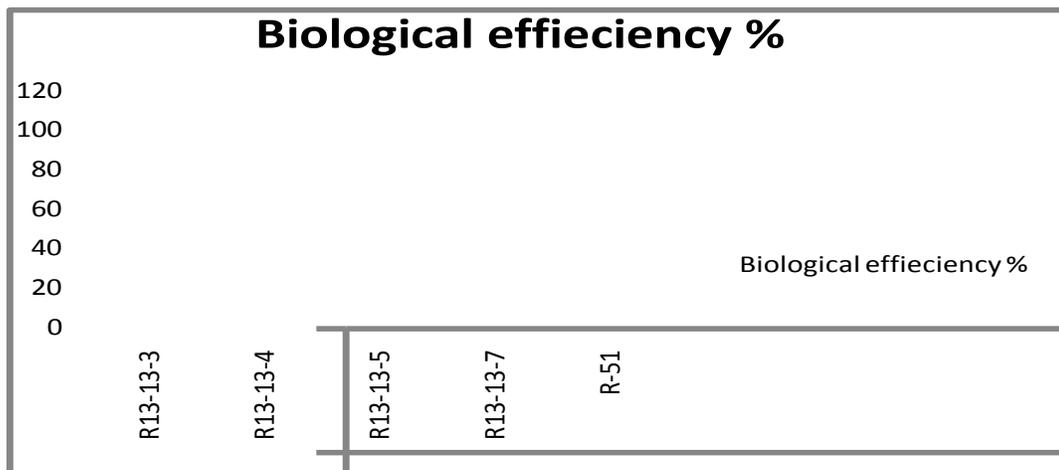


Fig.1d



Phytoplates



R13-13-03



R13-13-04



R13-13-05



R13-13-07



R13-13-07



R13-13-51

Poppe (1973) found that Indole Acetic Acid (IAA) increased the number of fruiting body of mushroom.

Average weight of fruit body (G)

Among all the strains, tested in the experiment, strain R-13-13-07 recorded highest fruit body weight (per fruit body 26.55 g) followed by R-13-13-04 (25.50 g), strains R-13-13-05, (19.86g) and R-51 (17.33 g), respectively. Lowest weight, per fruit body, was recorded in strain R-13-13-03 (14.52 g).

Biological yield

Highest biological efficiency was recorded in strain R-13-13-05 (96.6 %) followed by strain R-13-13-07 (75.3 %), R-13-13-03 (74.8 %) and R-51 (66.4 %), respectively (Fig. 1b and c).

Lowest BR was observed in strain R-13-13-04 (58.4 %) among all the tested strains. Kausar & Iqbal (1994) reported that yield varied from 18.6 to 83.5% on the basis of different nitrogen supplements amended with straw. Kausar & Zafar (1995) reported that average yield varied from 57.17- 73.39%.

Jiskani *et al.*, (1999) obtained 24 and 7.6% fresh and dry yield on the basis of substrate dry weight, in case of using wheat straw. Jiskani (1999) reported that 100% of substrate dry weight means one kg of fresh mushroom can be obtained from one kg of dry substrate (before soaking and boiling).

According to Bughio (2001) the maximum fresh (wet) and dry yield percentage on substrate dry weight basis (29.61 to 77.91 and 5.91 to 21.70) were obtained from wheat straw using in combination with cotton boll locules, paddy straw, sugarcane and sorghum leaves at 1:1 ratio in case of using sorghum grain spawn @ 30 g per bag.

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