

**COMPARATIVE YIELD AND YIELD RELATED PARAMETERS OF
TWO STRAINS OF BLUE OYSTER MUSHROOM (*Hypsizygus ulmarius*
IIHR Hu1 and CO2)**

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ABSTRACT

Hypsizygus ulmarius is a popular mushroom due to its excellent consistency of cap and stipe, culinary qualities and longer shelf life. In Tamil Nadu, *Hypsizygus ulmarius* may take position among the consumers, but currently this mushroom is not cultivated in large scale. In the present study the yield efficiency in terms of mycelial colonization, pinhead formation, fruit body formation and biological efficiency were investigated. Results revealed that yield of two strains of *Hypsizygus ulmarius* CO2 and IIHR Hu1 ranged from 693.4 gms to 579.11gms. Biological efficiency was higher in *H. ulmarius* CO2 (46.22±4.98) when compared to *H. ulmarius* IIHR Hu1 (38.61±4.30%), revealing strainal variation.

Keywords: *Hypsizygus ulmarius*, Paddy straw, Yield, Biological efficiency.

INTRODUCTION

Mushroom production represents one of the most commercially important steps towards diversification of agriculture based on microbial technology for large – scale recycling of agro waste in an agricultural country like India. The cultivation of edible mushrooms has become an attractive economic alternative over past few years, mainly due to increase in its demand and market value (Chang, 2006). *Hypsizygus ulmarius* is an edible mushroom, also known as elm oyster mushroom or blue oyster mushroom. *Hypsizygus ulmarius* (Bull.Fr) Red Head belongs to the family Tricholomataceae it growing clusters on living elm trees or elm logs in the forests and thus named as elm oyster. First successful cultivation of *Hypsizygus* was done during 1973. Cultural, physiological and spawn characters of *H. ulmarius* were studied by Wange and Patil (2007). Tom Volk's (2003) reported that *H. ulmarius* was first named as *Pleurotus ulmarius* and later as put under genus *Hypsizygus* as *Pleurotus* species cause white rot and *Hypsizygus* cause

brown rot. *Hypsizygus* was also cultivated both for its culinary and medicinal attributes. Therefore, it was thought worthwhile to undertake the studies on cultivation of blue oyster mushroom in terms of yield and yield related parameters. Two different strains (CO2 and IIHR Hu1) of blue oyster mushrooms were cultivated on paddy straw substrate and yield and biological efficiency were estimated.

MATERIALS AND METHODS

Sample Collection

Hypsizygus ulmarius CO2 strain was obtained from Tamil Nadu Agricultural University Coimbatore, and the *Hypsizygus ulmarius* IIHR Hu1 strain was sourced from Indian Institute of Horticultural Research, Bangalore. It was sub-cultured and maintained on PDA medium at 4°C for further study.

Cultivation methodology

Pure cultures of two strains of *Hypsizygus ulmarius* were maintained on Potato Dextrose Agar (PDA) medium. The inoculated petridishes were incubated in the growth chamber at $25 \pm 2^\circ\text{C}$ in dark for an average of ten days. This culture was used for further preparation of mother culture. Spawn was prepared by using sorghum grains mixed with 2% calcium carbonate. The moisture level of the mixture was maintained at 65%. Polypropylene bags of 25cm \times 11cm size were filled with 250g of the mixture and packed tightly and the neck was plugged with cotton. The packets were sterilized in an autoclave for one hour at 121°C . Fully grown mycelium was inoculated into the sterilized packets and the inoculated packets were placed on a rack in the room at $25 \pm 2^\circ\text{C}$ temperature for incubation. Colonization of mycelium was completed in 15-20 days. It was further used for bed preparation.

Paddy straw was chopped into 3-6cm length and placed in hot water for sterilization. After cooling, the straw was removal of excess water. Then the polypropylene bags (30 \times 60cm) were filled with substrate of 1kg and inoculated with 5% spawn. These inoculated bags were incubated at $25 \pm 2^\circ\text{C}$ temperature for mycelia growth. After inoculation, the spawn running was completed in bags. The humidity of bags was accomplished by spraying of water twice a day in bed. Cropping room was maintained with temperature 18°C to 22°C , relative humidity 70-85%, and light intensity 180-250 lux was maintained. Mushrooms were harvested when the mushroom cap surface were flat to slightly rolled up at the cap margins. First flush of mushrooms were collected from each bag was followed by second, third and fourth harvest. The yield and biological efficiency of mushrooms were recorded regularly. Biological efficiency was calculated based on the following formula.

BE= [Weight of fresh mushrooms harvested (g)/substrate weight (g)] × 100

BY= [Weight of fresh mushrooms harvested (g) per substrate weight]

It was expressed in fresh weight of mushroom/kg dry substrate weight.

Statistical Analysis

The results obtained in the present investigation were subjected to statistical analysis Mean (\bar{x}) and Standard Deviation (SD) by Zar (1984).

RESULT AND DISCUSSION

In the present study *Hypsizygyus ulmarius* CO2 and IIHR Hu1 was cultivated on paddy straw. The results in terms of yield and biological efficiency of *Hypsizygyus ulmarius* CO2 and IIHR Hu1. The cultivation processes involves spawn running, pinhead formation, fruit body formation and harvest.

Hypsizygyus ulmarius CO2 strain took 19 - 21 days for spawn running whereas in IIHR Hu1 strain it takes 20 - 22 days. Ram and Deepak (2005) reported that in *Pleurotus florida* spawn running ranged between 10-12 days whereas in *Pleurotus djamore* 11 days. In *Lentinus connatus* the colonization of mycelium takes in 10 days in reported by Atri *et al.*, (2011). In *Ganoderma lucidum* spawn run took nearly 30 days for the colonization of the whole substrate was reported by Mishra *et al.*, (2012), whereas in *Pleurotus sajor-caju* it takes 32 days was indicated by Singh *et al.*, (2011). Jafer *et al.*, (2015) report that the average period of spawn running was 22 days in *Agaricus bisporus*. Soniya *et al.*, (2013) in *Pleurotus ostreatus* mycelial colonization of the substrate was completes in between 22 to 26 days.

In both strains of *Hypsizygyus ulmarius* CO2 and IIHR Hu1 it takes 16 - 19 days for pin head formation. Obodai *et al.*, (2003) reported that pinhead formation took four to six days after the completion of spawn running, with harvest after 10 to 12 days in the case of *Pleurotus ostreatus* on different substrate, in the climatic conditions. According to Geetha *et al.*, (2012) *Ganoderma lucidum* cultivated on rubber sawdust, it takes 48 days for pinhead formation. In *Lentinus squarrosulus* the pinhead arose on 42 days cultivated in paddy straw substrate was reported by Upadhyay *et al.*, (1999).

In *Hypsizygyus ulmarius* CO2 strain takes 38-42 days for fruit body harvest whereas in IIHR Hu1 strain it taken 38-43 days. The Plate - 1 shown in the fruiting bodies of *Hypsizygyus ulmarius* CO2 and IIHR Hu1 strain. Upadhyay (1999) reported that in *Auricularia mesenterica* fruit bodies were developed after 50 days of spawning. In *Pleurotus florida* fruit bodies initiated after 16

days of mycelia colonization, which were ready for harvesting in next 4 days, the total cropping period ranged from 54-60 days was reported by Ram and Deepak (2005).

Results revealed that yield of two strains of *Hypsizygus ulmarius* CO2 and IIHR Hu1 ranged from 693.4 gms to 579.11gms. In the present study *Hypsizygus ulmarius* CO2 has 46.22±4.98 of biological efficiency whereas *Hypsizygus ulmarius* IIHR Hu1 shows 38.61±4.30% of biological efficiency (Fig – 1). Raina *et al.*, (2009) revealed that in *Hypsizygus ulmarius* biological efficiency of mushroom in different substrate namely, in wheat straw 83.65% and paddy straw 76.6%. Mishra *et al.*, (2012) indicated that in *Ganoderma lucidum* the yield and biological efficiency on wheat straw supplemented with rice bran gave only 20%. Mishra *et al.*, (2012) indicated that in *Flammulina velutipes* cultivated on saw dust substrate supplemented with rice bran gave only 21.3% biological efficiency where as in wheat straw supplemented with wheat bran 5% produces 89% biological efficiency.

Figure – 1. Biological efficiency of fruit bodies of *Hypsizygus ulmarius* CO2 and IIHR Hu1 strain

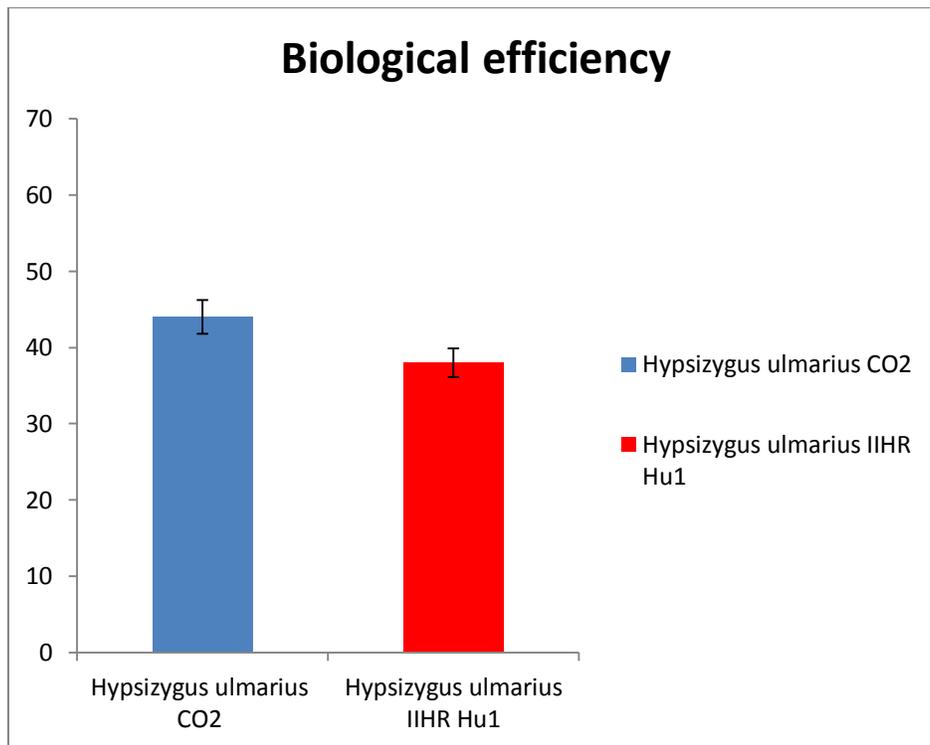


Plate - 1. Fruiting bodies of *Hypsizygus ulmarius* CO2 and IIHR Hu1 strain



Hypsizygus ulmarius IIHR Hu1

Hypsizygus ulmarius CO2\

CONCLUSION

The blue oyster is an edible mushroom which is prepared by the various agro-based products such as sawdust, cotton waste, paddy straw, wheat straw etc. In this study, paddy straw has been used as a substrate. The *Hypsizygus ulmarius* CO2 strain shows the higher biological efficiency (46.22 ± 4.98) as compared to *Hypsizygus ulmarius* IIHR Hu1 strain. In both strains was taken for the total harvesting period in 38-43 days. Mushroom is a crop which is cultivated in many countries using different agricultural wastes. This cultivation techniques are very simple for mushroom growers and are safe to human consumptions and do not cause any environmental pollution.

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