International e-Conference on New Horizons And Multidisciplinary Applications In Science And Technology
In Association withInternational Journal of Scientific Research in Science and Technology
Volume 9 | Issue 6 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

Yield and Proximate Composition of Pleurotus Sajor - Caju

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ABSTRACT

Pleurotus sajor-caju wascultivated on different agro wastes viz. soybean straw, paddy straw, wheat straw, jowar straw, sunflower stalk and bajra strawto study the productivity and proximate composition of fruiting bodies. Soybean straw showed significantly highest yield (with 81.00% B.E.), maximum protein (25.90%), fat (2.80 %), and ash (7.40%) content. Significantly maximum moisture content was found (88.30 %) on wheat straw, carbohydrate content on Jowar (58.20%) straw, crude fiber content (7.90 %) on paddy straw.

Keywords: *P.sajor-caju*, B. E., yield, agro waste, fruiting body.

I. INTRODUCTION

Mushrooms are the reproductive structure of fleshy macro fungi and rich with protein, vitamin and minerals. More than 2000 species of edible mushrooms are known, out of which only few species have been cultivated commercially by preparing beds (Nair, 1994). Among the various edible mushroom types, Pleurotus species have become more popular and widely cultivated throughout the world particularly in Asia and Europe as they have simple and low cost production technology shows higher bio efficiency. Pleurotus species are rich source of vitamin C, Bcomplex (thiamin, riboflavin, folic acid and niacin), minerals (Ca, P, Fe,K and Na) and protein (Sturion and Otterer,1995; Justo et al.,1998; Manzi, et al., 1999; Caglarirmak, 2007). Pleurotus species content high potassium: sodium ratio,(Mandhare, 2000) which makes mushrooms an ideal food for patients suffering from hyper tention and heart diseases .(Rai et al.,1998). The cultivation of edible mushroom offers one of the most feasible and economic method for the bioconversion of agrolignocellulosic wastes Bano et al. 1993; Cohen et al, 2002). The technology can also limit air pollution associated with burning agriculture wastes as well as to decrease environmental pollution due to unutilized agricultural wastes. Aim of this work was to evaluate the substrate for cultivation and nutritional quality of Pleuotus sajor-caju.

II. MATERIAL AND METHODS

2.1. Culture: The pure culture of Pleurotus sajor-caju was obtained from National Collection of Industrial Microorganisms (NCIM) National chemical laboratory (NCL), Pune, India. The cultures were maintained on 2% malt extract agar slants at 4 ºC. Sub culturing was done after every 15 days.

2.2. Spawn Preparation: Spawn was prepared in polythene packets. Sorghum whole grains were boiled in water bath for 10 to 15 min. at the ratio of 1:1 (sorghum grain: water) and mixed with 4% (w/w) CaCo3 and 2 % (w/w) CaSo4. Sorghum grains then packed (250g) in polythene bags (200 x 300mm. size and sterilized in an autoclave at 121 ºC for 30 min. After sterilization, the bags were inoculated with actively growing mycelium of the Pleurotus from the malt extract slants and incubated (at 27 ± 2 ºC) for mycelial growth without any light for 10-15 days until the mycelium fully covered the grains.

2.3. Cultivation: The agro waste , soybean straw, paddy straw, wheat straw, jowar straw, bajra straw and sunflower stalk were collected from local farms and were used as cultivation substrate, following the method prepared by Bano and Shrivastava (1962) with slight modifications. The substrates were chopped to 2-3 cm. pieces and soaked in water over night to moisten it and excess water was drained off.

After soaking, the substrate was steam sterilized at 121 ºC for 20 min. in an autoclave. The polythene bags of the size 35x45 cm were filled with sterilized substrates and multi layered technique was adopted for spawning. Each bag was filled with 1 kg dry substrate and the spawn was added at the rate of 2% of the wet weight basis of substrate. After inoculation, the bags were kept in house where the temperature and humidity were maintained around 25 ºC and 80 to 90 % respectively with sufficient light and ventilation for 20 days. The spawn run was completed within 18 days. The polythene bags were tear-off following the spawn run. Formation of fruit bodies was evident within 3-4 days after removal of poly bags. The beds were maintained up to the harvest of the third flush, which was completed in 35 days after spawning. A small layer of substrate was scrapped off from all the side of the beds after each harvest. Each of the six treatments was replicated three times.

2.4. Yield and Biological efficiency: Total weight of all the fruiting bodies harvested from all the three pickings were measured as total yield of mushroom. The biological efficiency (yield of mushroom per kg substrate on dry wt. basis) was calculated by the following formula Chang et al. (1981)

2.5. Proximate analysis: Analysis of moisture, protein, fat, crude fibre, total carbohydrates, ash of samples were done by standard methods (AOAC, 1995). The recorded data in the present work was subjected to statistical analysis as per the procedure given by Panse and Sukhatme (1978).

III. RESULT AND DISCUSSICON

3.1 Yield Performance and Biological Efficiency of *P. sajor-caju*:

Effect of different substrates on the yield performance of mushroom varied significantly (Table 1)

Soybean straw showed significantly maximum yield (810.00 gm/kg straw, with 81.00 % B.E) followed by paddy straw (779.33 gm/kg straw with 77.93 % B.E.) and least yield was recorded (640 gm/kg straw, with 64 % B.E. on sunflower stalk. Patil *et al* (2010) also reported the maximum yield on soybean straw followed by paddy straw and wheat straw with *Pleurotus ostreatus*.

Table 1: Effect of different substrate on yield of *P. sajor-caju*

Substrate	Yield (gm) / Kg dry straw			Total	B.E.(%)
	Ist Picking	IInd Picking	IIIrd Picking		
Soybean straw	340.00	290.00	180.00	810.00	81.00
Paddy straw	360.00	308.33	111.00	779.33	77.93
Wheat straw	320.33	255.33	153.00	728.66	72.86

Jowar straw	315.00	222.33	135.00	672.33	67.23
Sunflower stalk	308.00	232.00	100.00	640.00	64.00
Bajra straw	285.00	238.00	158.33	681.33	68.13
S.E.+-	14.80	7.18	3.48		
C.D. at 5%	53.30	23.35	14.25		

Table 2: Effect of different substrates on Nutritional content of *P.sajor-caju*.

Substrate	Moisture (%)	Total carbohydrate (%)	Protein (%)	Fat (%	Crude fibre (%	Ash (%)
Soybean straw	87.30	53.80	25.90	2.80	6.60	7.40
Paddy straw	87.80	55.30	23.50	2.40	7.95	6.80
Wheat straw	88.30	56.20	23.20	2.58	7.00	6.60
Jowar straw	85.70	58.20	23.10	2.60	7.50	7.20
Sunflower stalk	86.50	50.70	21.00	2.70	7.60	6.80
Bajra straw	85.10	50.20	24.10	2.42	7.70	6.90
S.E.+-	0.44	0.66	0.59	0.11	0.11	0.15
C.D. at 5%	0.85	2.34	1.66	0.18	0.26	0.46

3.2 Proximate Composition of P. sajor-caju:

Different substrates affected the nutritional composition of mushroom (Table 2).

Different substrates affected the nutritional composition of mushroom (Table 2). Soybean straw showed maximum protein (25.90 %), fat (2.82%) and ash (7.30 %) content of P. sajor-caju. The protein content of mushroom on dry weight basis varied from 21.00 % to 25.90 %. Similar results were reported with P. sajor-caju by Dias et. al, (2003). Kortei and WiafeKwagyan (2015) reported that the protein content of P. eous was 24.10% .The fat content on dry wt basis ranged between 2.40 % to 2.80 %. The ash content of mushroom ranged from 6.60 to 7.40 %. Superiority of soybean straw over paddy, wheat, jowar straw in terms of yield, protein, ash was reported earlier by Patil and Jadhav, (1999).Comparing the six lignocellulosic residues as substrates for the cultivation of P. sajor-caju shows that, soybean straw supported best growth of P. sajor-caju as evidenced by completed and heavy colonization of substrates forming a compact white mass of mycelium within 2 weeks of inoculation.

Maximum moisture content was 88.30 % when *P. sajor-caju* was grown on wheat straw. Carbohydrate content of *P. sajor-caju* was 58.20 % grown on Jowar straw being the highest followed by on (55.30 %) paddy straw. These results are confirmed with the findings of Patil et. al (2008). The crude fibre content of mushroom varied from 6.60 to 7.95 % on different substrates. Observed values of crude fiber and ash content in present study are similar with the previous studies Khydagiet. al (1997) and Bonatti et. al (2004).The % content of moisture, carbohydrates, protein, fat, crude fibre and ash were found in accordance with earlier studies (Syed Abrar et.al, 2009, Patil and Baig, 2020). The variation in these nutrients content might be due to the quality and quantity of nutrients available in substrates Patil, (2012).

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