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Growth Response of *Pleurotus* spp. on Different Basal Media and Different pH Levels

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Abstract

Five isolates of *Pleurotus spp*. viz. *Pleurrtus florida. P. sajor-caju, P. eous, P. flabellatus, P. sp*. were cultured on PDA media and maintained on PDA slants. All the isolated species were tested for biomass production in various media viz. Richard's Broth, Asthana Hawker's. Czapecks' Dox, Potato Dextrose and Malt Extract Broth media. The maximum biomass was recorded on Potato dextrose media in *P. florida*, (1.86 g). The minimum biomass was recorded on Asthana Hawker's media in *P.florida* & *P.eous* (1.15g). All the isolated spp. were tested for the effect of pH variations. A pH range between 3 to 8 was recorded. The maximum biomass was recorded at 5.0 pH. The biomass gradually decreased in an acidic environment, similarly higher pH also did not favoured the growth as well as biomass.

Key Words: *Lyophyllum decastes,* Fungal density, Medicinal mushroom, Mycelial growth.

Introduction

Pleurotus species, commonly known as oyster mushroom are a group of higher fleshy fungi belonging to the Basiodiomycetes. They are considered as one of the four major edible mushrooms cultivated in different countries for human consumption. *Pleurotus* with its great variety of species constitute a cost effective means of both supplementing the nutrition to human kind through the production of edible mushrooms and alleviating the suffering caused by certain kinds of illnesses through the use of medicinal mushrooms and their derivatives as nutriceuticals and even as pharmaceuticals.The protein contents of the food stuffs like, vegetables and cereals etc. is low as compared to mushroom (Hayes and Haddad, 1976; Jandaik and Kapoor, 1975. Bano *et. al*. 1980, and vitamins (Kazeli and Dzabaridee, 1994). For overall nutrition mushroom falls between the best vegetables and animal protein sources (Benjamin, 1995). Unlike the animals, most Fungi are stationary and can't pursue their food. (Kendrick 1985; Alexopolus and Mims, 1996). Mushroom has a lot of production potential and due to its rapid growth it gives so large amount of crop which could not be compared with any other crop (Robinson and Davidson, 1959). Suitable temperature and humidity are required for mushroom cultivation (singh, 1981). Mushrooms are good sources of sugars, fiber, protein and minerals (Senatore, 1990; Adewasi *et. al.* 1993), with comparable amino acid with animal protein (Aletor, 1995).

In the present study, five species of *Pleurotus* were cultured on different media i.e., Richard's Broth, Asthana Hawker's, Czapeck's Dox, Potato Dextrose and Malt Extract and their mycelial growth rate was determined. The purpose of present study is to signify a media for the best growth of mushroom.and the effect of pH variation on the growth of *Pleurotus* spp.

Material and Method

Fruiting bodies of *Pleurotus florida, P. sajor-caju, P. eous, P. flabellatus, P. sp*. were isolated and cultured and maintained in pure form on potato dextrose agar (PDA) slants.

Five different media viz. Richard's Broth, Asthana Hawker's, Czapeck's Dox, Potato Dextrose and Malt Extract of pH-5.0 were prepared and inoculated with I cm disc mycelia in triplicate. The flasks were incubated at 28°C +_ for 9 day's. After 9 days of incubation, the mycelial dry weight and pH of culture filtrate was recorded and tabulated (Table - 1). The basal medium with different pH of 3.0, 4.0, 5.0, 6.0, 7.0, 8.0 were inoculate with 1 cm disc mycelia. The flasks were incubated at 28°C± for 9 days. After 9 days incubation, the mycelia dry weight and pH of culture filtrate was recorded and tabulated(Table-2).

Table no. 1:- Mycelial growth of *Pleurotus species* in different broth media

MEDIA											
S.No.	Organism	Richard's Broth		Czapeck's Dox		Ashthana Hawker's		Potato Dextrose		Malt Extract	
		Biomass (g)	Final pH	Biomass (g)	Final pH	Biomass (g)	Final pH	Biomass (g)	Final pH	Biomass (g)	Final pH
1.	P.florida	1.30	4.16	1.20	4.46	1.15	4.36	1.86	5.53	1.40	5.40
2.	P.sajor-caju	1.30	4.63	1.20	5.16	1.18	5.46	1.73	5.49	1.36	4.21
3.	P.eous	1.20	4.56	1.18	4.24	1.15	5.57	1.85	3.25	1.25	5.19
4.	P.flabellatus	1.54	5.35	1.41	5.31	1.38	4.67	1.85	5.63	1.74	4.41
5.	P.sp.	1.51	4.81	1.39	4.44	1.35	4.41	1.81	5.88	1.72	4.86

Note :- Mean value of Triplicates.

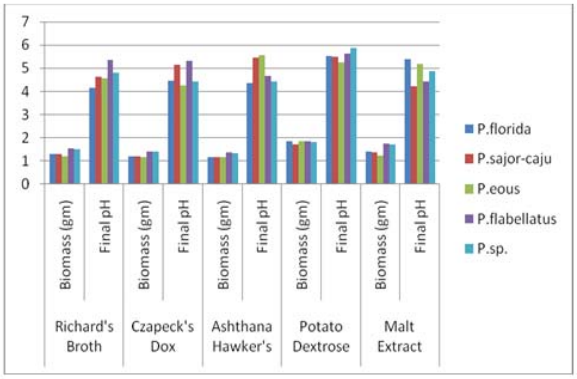

Fig.1 Mycelial growth of *Pleurotus* species in different broth media

Table 2 :- Effect of pH on different *Pleurotus* spp.

pH													
S.No.	Ogranisms	3.0		4.0		5.0		6.0		7.0		8.0	
		Bio-mass (g)	Final pH	Bio-mass (g)	Final pH	Bio-mass (g)	Final pH	Bio-mass (g)	Final pH	Bio-mass (g)	Final pH	Bio-mass (g)	Final pH
1.	P.florida	1.19	4.38	1.35	4.33	1.40	3.64	1.40	4.19	1.20	4.59	1.18	4.33
2.	P.eous	1.15	4.47	1.20	4.48	1.30	5.21	1.19	5.16	1.18	5.11	1.14	6.60
3.	P.sajor caju	1.15	4.58	1.27	4.85	1.42	4.66	1.22	5.38	1.19	5.27	1.17	6.23
4.	P.flabellatus	1.16	4.51	1.23	4.56	1.35	5.36	1.30	5.29	1.18	5.26	1.13	6.50
5.	P. sp.	1.13	4.47	1.26	4.49	1.32	5.26	1.25	5.25	1.23	5.22	1.11	5.16

Note :- Mean value of Triplicates.

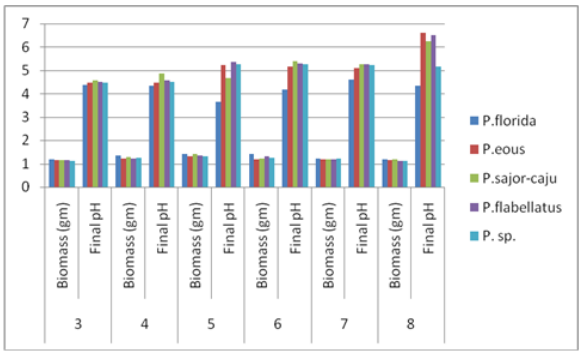

Fig. 2 Effect of pH on different *Pleurotus spp*.

Results and Discussions

The effect of five different culture media on mycelia growth of *Pleurotus* species have been recorded (Tabl-1). The maximum biomass was recorded on potato dextrose media in *P.florida* (1.86g) followed by *P.flabellatus* (1.85g), *P.sp., P.eous* and *P.sajor-caju*. The minimum biomass was recorded on Asthana Hawker's media in *P.florida, P. eous.* (1.15 g) followed by *P.sajor-caju* (1.18g), *P.sp. (*1.38g), and *P.flabellatus (1.38g).*

The growth of species of *Pleurotus* in different broth media has been studied by Pani and Patra (1994). In their work the growth of *Pleurotus* species was compared on ten different broth media. Suharban and Nair (1994) studied different media on growth of P.spp. and reported oat meal and Potao dextrose agar to be superior for mycelia growthSimilar studies were conducted by Kapoor et.al.(1997) and reported Potato dextrose agar to be most suitable media for growth of *P. fossulatus*.

The effects of pH variations on *Pleurotus* spp. Mycelia growth are shown in table 2. A pH range between 3 to 8 was recorded. The maximum biomass was recorded 5.0 pH . The minimum growth was recorded in an acidic pH region with the least mycelia weight observed at pH 3.0 of 4.0 In higher pH 7.0 to 8.0 was found minimum biomass.

Effect of different pH levels on the growth and yield of *Pleurotus ostreatus* (jacquin ex Fr.) kummer studied by Nirod chandra sarker *et. al.* (2007). Singh and Kushwaha (2007) tested 5 levels of pH (4, 5, 6, 7 and 8) and reported pH 7 to be more appropriate for growth of H. ulmarius. Three *Pleurotus spp*. viz. *Pleurotus sajor-caju, Pleurotus flabellatus and Pleurotus ostreatus* grew well at pH 5.5 (Suhorban and Nair, 1994). Karacanci (1997) tried different levels of pH and obtained higher biomass of *P.sajor-caju* at pH 6.5 on the contrary, pH 5.5 to be optimum for P. Fossulatus (Kapoor *et. al*. (1997). Similar studies were also reported by Furlan *et. al*. (1997) who reported that pH 4 gave the maximum mycelial growth of 7 edible fungi.

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