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EFFECT OF CARBON AND NITROGEN NUTRITION ON THE GROWTH OF SOME EDIBLE BASIDIOMYCETES IN SUBMERGED CULTURE

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Effect of different carbon and nitrogen nutrition sources on the vegetative growth of three cultivated edible mushroom species viz., *Pleurotus sajor-caju, P. sapidus* and *P. citrinopileatus* in submerged culture was worked out. Studies revealed that all the three fungi preferred dextrose as source of carbon showing maximum dry mycelial weight (175.3 mg) sandwitched in Sabouraud's medium. Glucose was the next best choice for carbon nutrition. Peptone was proved to be the best source for nitrogen nutrition followed by urea for vegetative development.

Keywords: Carbon, Nitrogen, Dry weight, *Pleurouts.*

Fungi being heterotrophs depend on external supply of nutrition for their growth and development. Carbon and nitrogen are the most important elements of fungal nutrition. Several workers have studied the growth response of oyster mushroon (*Pleurotus* spp.) to different sources of carbon[1,2] and nitrogen[1,3,4]. In the present study, effect of various sources of carbon and nitrogen on the vegetative growth of some selected species of *Pleurotus* in submerged culture ws taken up which could be much useful in cultivation process.

Pure cultures of three species of *Pleurotus* viz., *P. sajor-caju* (Fr.) Singer, *P. sapidus* (Schulzer) Kalch and *P. citrinopileatus* Singer were included in the study. The cultures were maintained on potato dextrose agar (PDA) at 15°C and subcultured at periodic intervals of 30 days. The carbon compounds used were glucose, dextrose, maltose, fructose, lactose, sucrose, mannitol and sorbitol. The nitrogen sources included ammonium chloride, ammonium sulphate, ammonium nitrate, sodium nitrate, potassium nitrate, peptone and urea. Sabouraud's medium (maltose-30g, peptone - 10g, water-1 litre) was used as the basal medium.

To study the effect of carbon sources on mycelial growth, maltose from the basal medium was replaced by different carbon sources so as to substitute equivalent amount of carbon present in the compound. Similarly different nitrogen sources were used to replace equivalent amount of nitrogen provided by peptone in the basal medium. The medium containing different carbon and nitrogen sources was poured into 250 ml conical flasks separately @ 100 ml/flask, sterilized in autoclave at 121°C for 20 minutes and allowed to cool. The media were inoculated with 5 mm mycelial disc of each test fungus and incubated at room temperature (20-28°C) for 21 days. The basal medium devoid of either carbon or nitrogen sources served as control. The mycelial mats were harvested by filtering through Whatman No. 1 filter paper, dried in hot air oven at 60° C for 48 hours and weighed till constant weights were recorded.

It was observed that growth was significantly higher in all the three species of *Pleurotus* tested for their relative ability to utilize different carbon sources (Table 1). All the fungi recorded their highest mycelial dry weights in the basal medium supplemented with dextrose. Among the *Pleurotus* spp., *P. citrinopileatus* responded most favourably to dextrose than the other two species. Glucose also sustained higher mycelial dry weights of fungi only next to dextrose. Mycelial dry weights of *P. sajor-caju* obtained in response to dextrose and glucose were statistically *at par*. Mannitol and maltose also supported

Table 1. Mycelial dry weights of three *Pleurotus* species in different sources of carbon.

Carbon Source	Mycelial dry weight (mg)			
	P. sajor-caju	*P. sapidus*	*P. citrinopileatus*	*Mean*
Glucose	160.3	150.4	170.9	160.3
Dextrose	171.4	169.3	185.3	175.3
Maltose	131.5	116.2	140.4	129.3
Fructose	121.4	108.3	129.8	119.8
Lactose	99.8	83.4	100.1	94.4
Sucrose	107.3	91.3	110.3	102.9
Mannitol	139.4	130.4	149.6	139.8
Sorbitol	100.6	90.4	99.4	96.8
Control	51.7	52.7	59.4	54.6
S.E. ±	5.1	6.0	4.0	
C.D. at 5%	15.3	17.9	12.1	

Table 2. Mycelial dry weights of three *Pleurotus* species in different sources of nitrogen.

Nitrogen Source	Mycelial dry weight (mg)			
	P. sajor-caju	*P. sapidus*	*P. citrinopileatus*	*Mean*
Ammonium chloride	138.7	126.3	121.5	128.8
Ammonium sulphate	139.4	116.3	131.6	129.1
Ammonium nitrate	120.5	146.3	101.5	122.7
Sodium nitrate	107.1	100.8	98.3	102.0
Potassium nitrate	131.6	151.3	130.6	137.8
Peptone	170.6	157.6	198.1	175.4
Urea	161.5	152.4	189.9	167.9
Control	75.6	74.4	70.4	73.4
S.E. ±	0.5	2.2	0.7	
C.D. at 5%	1.5	6.9	2.3	

Each observation is the average of three replications.

satisfactory growth of mushroom fungi. Among the carbon sources, lactose induced least mycelial dry weights of all the species. This is in contradiction with the results of Suharban and Nair[2] who reported lactose as superior to other carbon sources for the growth of *Pleurotus* spp.

The average dry weights of mycelium in different nitrogen sources were presented in Table 2. It was revealed that all the nitrogen sources sustained significantly higher mycelial growth of all the test fungi as compared to control. Highest dry weight of *Pleurotus* spp. was recorded with peptone followed by urea. Peptone, urea and potassium nitrate did not differ much and were statistically *at par* with each other in inducing mycelial growth of *P. sapidus*. Organic nitrogen sources supported better growth of *Pleurotus* in comparison to inorganic sources. This is in concurrence with that of Volz[4] who reported maximum growth of *P. ostreatus* in peptone and urea. Sodium nitrate appeared to be the poorest nitrogen source for all the species of *Pleurotus* tested as evidenced by least mycelial growth.

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