Amino Acid Composition of Oyster Mushroom as Influenced by Zn, cu, Fe, and Pyrites Treatment

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Abstract: ***Mushroom are nutritious food now a days popular in vegetarian dietary folklore. They are viable alternatives to food crops in millenium. They have been reported containing high nutritional and medicinal value.*** [(1)] ***In the present study two species of oyster mushrooms viz. Pleurotus florida and Pleurotus sajorcaju have been studied for the nutritional parameters as influenced by Zn, Cu, Fe, and pyrites treatment. The substrate and mixture of all the elements gave the maximum amino acid composition in oyster mushroom. Best results for essential amino acid were obtained with substrate and Pyrite treatment. P. florida gave higher value of amino acid composition than that of P. sajorcaju*** [(2)]

Keywords: Essential Amino Acid, Pyrites.

I. INTRODUCTION

Mushrooms have been used since early ages by man as food or medicine. Mushrooms have been put into three categories (i) edible (ii) non-edible or poisonous and (iii) medicinal. The word Mushroom is derived from French Mousseron (Muceron) "Mouse or Moss". The Greek used the word "Mykes" for mushroom. Mushrooms have been known by several names viz., Puffballs, truffles and toadstool In India mushroom known as "Khumbi" "Dhingri", "Bhumi Kavak", "Dharti-Ke-Phool", and "Guchchi" etc. About 20 species brought into commercial cultivation, only three to four of these are popular among growers with a sizeable world production i.e. *Agaricus bisporus* (white button mushroom,) *Volvariella* species (Khumbi or Dharti Ke-Phool), *Lentinus edodes Pleurotus species* (oyster mushroom), white button (*Agaricus*) mushroom contributed about 75% of world production followed by *shiitake* (Lentinus) 14%, Paddy straw (*Volvariella*) mushroom 4% and others 7%.

White button and oyster mushroom is the most important commercial mushroom in the world. Cultivation of oyster mushroom (*Pleurotus spp*.) is cheapest and easiest among all edible mushroom and good source of diatery Protein food.

Mushroom have tremendous scope for developing law cost protein food & fill the huge protein gap". The "Food and Agriculture organization" of united nations[5] has recommended mushrooms as an alternative source of protein. Mushroom provide a high protein and low calorie diet and recommended to heart patients. The nutritive value of mushrooms is suitable for muscle protein build up and suited to supplement diets which lack protein and in the sense they have rightly been called vegetable meat[4]. Cultivation of oyster mushroom having ability to convert lignocelluloses waste material into high quality food material[3].

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II. EXPERIMENTAL FINDINGS

- The pure culture of *pleurotus sajorcaju* and *pleurotus florida* were abtained from the mushroom research laboratory of the department of plant Pathology, C.S. Azad university of Agriculture and Technology, Kanpur.
- The detailed analytical studies were made in laboratories of Agriculture Biochemistry University of Agriculture and Technology Kanpur.

(1) Mushroom species:

V_1 = *Pleurotus sajorcaju*

V_2 = *Pleurotus florida*

(2) Size of bag: 80X40cm

(3) Treatments: T1= Substrate + Fe as Ferrous sulphate (2 PPN)

T2= Substrate + Zn as zinc sulphate (1 PPN)

T3 = Substrate + Cu as copper sulphate Cu = [.05%]

T4 = Substrate+ Pyrite (0.2%)

(4) Experimental design = C.R.D. (Completely randomized design)

(5) Substrate: = Wheat straw

(6) Composition of the pyrites:

Constituent	% composition	Constituent	% composition
Total sulphate	24	Iron	22
Magnesium as Mgo	0.6	Copper	3
Calcium as Cao	0.1	Zinc	0.02
Alumina	8	Carbon	0.05
silica	40	manganese	0.01

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III. CULTIVATION TECHNIQUE OF PLEUROTUS SPECIES

To grow mushrooms, polythene bags measuring 80X40cm in size on chopped wheat straw (2.5cm long). Chopped wheat straw soaked overnight in water. One Polythene bag required 1000gm dry wheat straw upto height of 12cm and spawning was done all over the surface of the substratum. The 2^{nd}, 3^{rd}, 4^{th} & 5^{th} layers of same height of substratum were prepared and spawned. Trace elements applied as based medium at time of spawning. One bag need 135gm of grain spawn. The polythene bags were filled upto the height of 60cm.

The mouth of bags was closed by pins and 6 small vents were made for aeration on all the length and breadth sides of the bags and bags were kept in a well ventilated room temperature between 20-25ºC. During spawn the humidity should be 70-80% dates after 18 days, polythene bags were cut off, humidity was built up. The pins started appearing 20 days from spawning.

IV. SAMPLING

Mushroom sample is harvested when cap began to fold and attained a diameter 8-10cm. Picking was done by twisting the fruit bodies. First sampling was done 25 days from days of spawning. The second and third sampling taken after 8 days intervals.

Fresh Yields:

Was obtained by harvesting each treatment and weighing the same.

Dry Yield:

Was recorded after removing the moisture from fresh yield of each treatment.

Determination of Bio-chemical constituents

Samples were selected for studies of nutritive value

1. Minerals: by using laboratory techniques given by Kanwar and chopra. Various elements were determined by using atomic absorption spectrophotometer.

2. Determination of Nutritive value Parameter Amino Acids:

a) Methionine
b) Lysine
c) Tryphtophan

Biochemical Constituents

Mature fruit bodies (sporophores) selected for studies of biochemical composition and nutritive value [6]

Table - 1 -	variations in zinc content of Edible mushrooms due to variety and mineral nutritions (mg/100g on dry wt.) basis :-			
Treatment :	T_1= 3.45	T_2= 5.64	T_3= 3.61	T_4= 6.80
Variety :	V_1= 4.64	V_2= 4.60		
Table - 2 -	variations in copper content of edible mushroom due to variety and mineral nutritions (mg/ 100g on dry wt.)			
Treatment :	T_1= 21.70	T_2= 27.55	T_3= 29.37	T_4= 30.03
Variety :	V_1= 24.31	V_2= 26.88		
Table - 3 -	variations in Iron content of edible mushroom due to variety and mineral nutritions (mg/ 100g on dry wt.)			
Treatment :	T_1= 19.07	T_2= 15.94	T_3= 15.23	T_4= 18.00
Variety :	V_1= 12.53	V_2= 19.27		
Table - 4 -	variations in methionine content of edible mushroom due to variety and mineral nutritions (mg/ 100g on dry wt.)			
Treatment :	T_1= 1.52	T_2= 1.47	T_3= 1.46	T_4= 1.47
Variety :	V_1= 1.34	V_2= 2.29		
Table - 5 -	variations in Lysine content of edible mushroom due to variety and mineral nutritions (mg/ 100g on dry wt.)			
Treatment :	T_1= 6.12	T_2= 5.75	T_3= 5.71	T_4= 7.74
Variety :	V_1= 4.40	V_2= 7.41		
Table - 6 -	variations in Tryptophan content of edible mushroom due to variety and mineral nutritions (mg/ 100g on dry wt.)			
Treatment :	T_1= 3.11	T_2= 2.37	T_3= 2.98	T_4= 3.52
Variety :	V_1= 2.32	V_2= 2.25		

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As regards higher value of Zn, cu, Fe, the best treatment, showed by substrate +pyrite gave significantly higher value of essential amino acid in *P. sajorcaju and P. florida species.*

V. CONCLUSION

- Cultivation of mushroom has been attempted but was abandoned due to unsuitability of strain for our tropical climate.
- Development of a cultivation package should be provided for farmers cultivators.
- Use of potential locally available materials for cultivation[7].
- The present day scenario of limited land availability suggests that they will be a viable alternatives to food crops in coming millenium.
- Nevertheless, there is a wide information gap in the area of micro nutrient of mushrooms aiming at highest yield and upgradation in the nutritional quality.

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