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Physiological studies on *Auricularia delicata* (Fr.) Henn. collected from Manipur

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The effect of different solid and liquid media, pH of medium, temperature and incubation period was studied on the optimum growth of *Auricularia delicata* collected from Manipur State. Among the solid media tested, the maximum mycelial growth of *A.delicata* was recorded in Potato dextrose agar (76.00 mm.) followed by Yeast potato dextrose agar (73.75 mm). In liquid media, potato dextrose medium supported the maximum mycelial growth (49.50 mg) of *A.delicata* followed by Yeast potato dextrose medium (47.25 mg) respectively. The optimum pH for the maximum mycelial growth (49.75 mg) of *A. delicata* was pH 6.5. Decrease in growth was noted as pH changes from 6.5. *A.delicata* attained their maximum mycelial growth (49.25 mg) at 28^{0}C. The biomass production by the test fungus over a period of 40 days of incubation also exhibited differential response with the maximum mycelial growth (161.75 mg) at 25 days of incubation.

Key words : *Auricularia delicata,* mushroom, physiological aspects

INTRODUCTION

Auricularia, an edible jelly fungus grow ubiquitously on any decayed logs or on dead branches of trees in different parts of the country, is collected as a natural resource from hilly regions and consumed by the indigenous people (Singh and Devi, 1986; Verma *et al.,* 1995). The edible fleshy fungus has been known since time immemorial and its cultivation on wheat straw and logs has been reported elsewhere (Cheng and Tu, 1978; Lou,1981; Quimio, 1981; Bhandal and Mehta, 1989). In order to bring this group of edible fungus under controlled cultivation, a study of the physiology of species is a prerequisite.

Out of three *Auricularia* species collected from Manipur state, *Auricularia delicata* (Fr.) Henn. is the most commonly available species. In order to understand the biology of the *Auricularia delicata,* a local strain of *A. delicata* has been selected for this study on physiological aspects so that attempts may be made to explore the possibility of cultivating this mushroom on different substrates. In this paper, effect of different media, pH, temperature and incubation period on its mycelial growth is being reported.

MATERIALS AND METHODS

Sporophores of *A. delicata* collected from the natural resource of Manipur State were brought in the laboratory and pure culture was developed by standard tissue culture technique. The culture was maintained throughout the study period on PDA medium.

The mycelium of *A. delicata* was grown on different natural and synthetic media in order to observe the optimum growth. In solid media, 7 mm diameter mycelial discs cut out aseptically by a sterile cork borer from freshly growing mycelium of *A. delicata* were placed at the centres of the Petriplates containing thirteen different natural and synthetic media and incubated at 25±1^{0}C for 7 days. After the incubation period, the radial growth of each mycelial colony was measured and statistically analysed to calculate the growth rate of the fungus on different solid media. In case of liquid media, twenty five ml of each of the eleven media were taken in 150 ml conical flasks, sterilized and incubated with 7 mm mycelial disc cut out aseptically by a sterile cork borer from the periphery of actively growing culture and incubated at 25±1^{0}C for 10 days. In the studies of pH, temperature and incubation period, potato

dextrose broth was used as basal medium. For pH studies, the initial pH of the basal medium was adjusted at eleven different pH levels between 3.0 and 8.0 with a difference of 0.5 by using 0.1N HCl and 0.1N NaOH solutions before autoclaving at 121°C for 15 minutes. In case of temperature studies, the media adjusted at pH 6.5 were incubated with the fungus and incubated at seven different temperatures viz. 10°C, 15°C, 20°C, 25°C, 28°C, 30°C, and 35°C for 10 days. In the same case, the basal medium used in the studies of the rate of biomass production by the test fungi was also adjusted at pH 6.5 and incubated with mycelial disc of the test fungus. The incubated flasks were subjected to eight different incubation periods i.e. 5, 10, 15, 20, 25, 30, 35 and 40 days. In case of liquid media, pH and temperature, the dry weight of mycelial growth was recorded after 10 days of incubation.

RESULTS AND DISCUSSION

Among the thirteen different solid media tested for the growth of *A. delicata* (Table 1), it was observed that the maximum mycelial growth was recorded in Potato dextrose agar (76.00 mm) followed by Yeast potato dextrose agar (73.75 mm). It was obvious from the results presented in Table 2 that the same medium of Potato dextrose supported the maximum mycelial growth of *A. delicata* (49.50 mg) followed by Yeast potato dextrose (47.25 mg) respectively. The data on the mycelial growth of the test fungus at eleven different pH levels indicated that pH 6.5 supported the maximum mycelial growth of *A. delicata* (49.75 mg), beyond this their growth declined (Table 3). The optimum pH between 6.0 to 7.0 has been reported by previous workers ((Borromeo, 1967; Khan et al., 1991). In the present finding, *A. delicata* could grow mostly in slightly acidic to neutral condition. The growth response of *A. delicata* at seven different incubation temperatures indicated that *A. delicata* attained their maximum mycelial growth (49.25 mg) at 28°C (Table 4). Previous workers also reported *Auricularia* spp. growing between 25°C to 30°C (Borromeo, 1967; Cheng and Tu, 1975, Quimio, 1982; Khan *et al*; 1991). The biomass production by the test fungus over a period of 40 days of incubation also exhibited differential responses and revealed that *A. delicata* continued to increase in their mycelial growth (161.75 mg) till 25 days of incubation period (Table 5).

Table 1 : Effect of different solid media on the mycelial growth of *Auricularia delicata*.

Media	*A. delicata*
	Radial growth (mm)
Potato dextrose agar	76.00
Malt extract agar	68.00
Yeast potato dextrose agar	73.75
Wheat extract agar	71.25
Yeast peptone dextrose agar	22.25
Yeast extract agar	58.25
Sabouraud's agar	43.00
Glucose peptone agar	31.50
Asthna & Hawker modified medium	12.50
Czapek's dox agar	11.00
Brown's agar medium	25.75
Glucose asparagine medium	42.00
Humfeld's modified medium	12.00
± S.E	0.87
C.D at 5%	1.43

Table 2 : Effect of different liquid media on the mycelial growth of *Auricularia delicata*.

Media	*A. delicata*	
	Dry wt. (mg)	Final pH
Potato dextrose	49.50	6.7
Malt extract	38.00	6.3
Yeast potato dextrose	47.25	7.2
Yeast extract	20.00	6.9
Sabouraud's medium	23.50	6.4
Glucose peptone medium	26.25	6.8
Asthna & Hawker's medium	14.00	6.3
Czapek's medium	–	6.3
Brown's medium	32.57	6.4
Humfeld's modified medium	–	6.5
Glucose asparagine medium	T	6.6
± S.E	0.78	
C.D at 5%	1.28	

* Initial pH adjusted at 6.5 ; T = Trace growth; – = No growth.

Table 3 : Effect of different Hydrogen-ion (pH) concentrations on the mycelial growth of *Auricularia delicata*

Initial	*A. delicata*	
pH	Dry wt. (mg)	Final pH
3.0	16.50	3.51
3.5	22.75	4.08
4.0	33.00	4.93
4.5	37.50	5.64
5.0	40.75	6.07
5.5	44.00	6.30
6.0	47.00	6.57
6.5	49.75	6.68
7.0	46.25	6.85
7.5	33.75	6.93
8.0	31.00	6.99
±S.E	1.55	
C.D at 5%	2.56	

* T = Trace growth.

Table 4 : Effect of temperature on mycelial growth of *Auricularia delicata*

Temperature (°C)	*A. delicata*	
	Dry wt. (mg)	Final pH
10	T	6.8
15	17.00	6.7
20	26.00	6.6
25	35.25	6.9
28	49.25	6.7
30	23.50	6.9
35	17.50	7.0
± S.E	1.06	
C. D at 5%	1.75	

Initial pH adjusted at 6.5 ; * T = Trace growth.

Table 5 : Mycelial growth of *Auricularia delicata* at different incubation period.

Incubation period	*A. delicata*	
(in days)	Dry wt. (mg)	Final pH
5	23.75	6.5
10	49.50	6.7
15	92.25	6.6
20	136.25	5.5
25	161.75	5.8
30	149.00	6.2
35	140.50	6.4
40	137.75	6.6
± S.E	1.32	
C.D at 5%	2.18	

* Initial pH adjusted at 6.5

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REFERENCES

Bhandal, M. S. and Mehta, K. B. 1989. Cultivation of *Auricularia polytricha* (Mont.) Sacc. (Jew's ear mushroom) on Wheat straw. *Mushroom Sci.* **12**(2) : 387-393.

Borromeo, J. D. 1967. Some physiological responses and characteristics of *Auricularia polytricha* (Mont.) Sacc. in laboratory culture. *Phill. Agri.* **51** (6): 486-500. (Abstr. *Mush. Res. Stud. Phili.* Edited by T. H. Quimio, 1977).

Cheng, S. and Tu, C. C. 1975. Ontogeny and development of the fruiting body of *Auricularia polytricha. Mush. Sci,* **10**(1): 713 – 722.

Cheng, S. and Tu, C. C. 1978. *Auricularia* spp. In : *The Biology and Cultivation of Edible Mushrooms* (Eds. S. T. Chang and W. A. Hayes). Academic Press, New York. 605-625.

Khan, S. M.; Mirza J. H. and Khan, M. A. 1991. Physiology and Cultivation of wood's ear mushroom *Auricularia polytricha* (Mont.) Sacc. *Science and Cultivation of Edible Fungi,* Maher (ed.), Balkema, Rotterdam. 573-578.

Lou, L. H. 1981. Woodear log cultivation in plastic sheds around Peking. In *"Proc. Eleventh International Scientific Congress on the Cultivation of Edible Fungi.* Australia. *Mush. Sci.* **XI**. 711-716.

Lou, L. H. 1981. *Auricularia* species used for cultivation in China. In *"Proc. Eleventh International Scientific Congress on the Cultivation of Edible Fungi,* Australia. *Mush. Sci.* **XI**. 717-722

Quimio, T. H. 1981. Philippines Auricularia: Taxonomy, Nutrition and Cultivation. In "Proc of the Eleventh International Scientific Congress on the cultivation of Edible Fungi". *Mush. Sci.* **XI**. 685-687.

Quimio, T. H. 1982. Physiological consideration of *Auricularia* spp. In *"Tropical Mushroom-Biological Nature and Cultivation Methods".* Eds. by S. T. Chang and T. H. Quimio. The Chinese University Press, Hongkong. 397-408.

Singh, I and Devi, M. 1986. Mushroom cultivation in Manipur. In *Souvenir on Mushrooms.* Eds. Sohi, H. S.; Bhandal, M. S. and Mehta, K. B., National centre for Mushroom Research and Training, Solan (India). 60– 61.

Verma, R. N.; Singh, Th. G. B. and Singh, S. M. 1995. Mushroom Flora of North Eastern Hills. In: *Advances in Horticulture Mushroom.* (Eds. K. L. Chadha and S. R. Sharma) Malhotra Publishing House, New Delhi. Vol. 13. 329-349.

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