

EFFECT OF TEMPERATURE ON THE MYCELIAL GROWTH OF SOME TROPICAL EDIBLE MUSHROOMS

It is a well established fact that temperature plays a key role on the growth, spore germination and indeed all biological activities of the organisms. Here the experiments have been done to determine the effect of temperature on the mycelial growth of two edible mushrooms namely *Lentinus* Sp. and *Collybia maculata*.

In order to determine the effect of temperature and to select the optimum temperature for the mycelial growth of these two test fungi, 6 sets of temperature, such as 15°, 20°, 25°, 30°, 35° and 40°C are tried in 4 consecutive incubation periods such as 5, 10, 15 and 20 days. After preparation of liquid complete mushroom medium, [Yeast extract—2 g, Peptone—2.5 g, $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ —0.5 g, CaNO_3 —0.5 g, $(\text{NH}_4)_2\text{HPO}_4$ —0.25 g, Glucose—30 g, Malt extract—10 g, Thiamine—100 μg , Biotin—50 μg , Folic acid—100 μg , Inositol—50 mg, FeCl_3 —10 mg, CaCl_2 (0.1M)—5 ml, ZnSO_4 —0.1mg, KH_2PO_4 —0.25 g, Distilled water—1 litre] 50 ml was taken in 250 ml Erlenmeyer flasks, plugged and sterilized at 15 p.s.i for 15 minutes. The flasks were then inoculated with a single agar block (5 mm diameter) containing 7 days old mycelium of the test organisms and was incubated separately for 5, 10, 15 and 20 days under static condition in diffused light. The inoculated flasks were incubated at 15°, 20°, 25°, 30°, 35° and 40° ($\pm 0.5^\circ$)C. Each experiment was done with 3 replicates.

Every 5th day, three flasks for each treatment were harvested by filtration through a tared sintered funnel (Jena IG-3). The filtered mycelium was washed repeatedly with distilled water to make it free from the adherent medium and dried at 60°C for 48 hours. After complete drying, they were transferred to dessicator for 4 hours for taking constant weight. The dry weight of the mycelium thus obtained was taken as an index of growth.

The data obtained during the experimental period have been given in Tables 1 and 2.

From the data obtained it reveals that 30°C is the optimum one for the best growth of *Lentinus* Sp. while Brodziak, (1980) reported that *Lentinus edodes* grows best at 35°C. *Lentinus* Sp. almost fails to grow at 15° and 40°C, while at 20° and 35°C it shows moderate growth. Jandaik *et al* (1978) reported *Pleurotus inquinans*, *P. pistillaris* and *P. sajor-caju* shows their best mycelial growth at 40°, 35° and 25° respectively.

TABLE 1. *Effect of different temperatures on the mycelial growth of Lentinus Sp. at different incubation periods*

Temperature (°C)	Dry weight of mycelial yield (mg/50ml)			
	Incubation periods (days)			
	5	10	15	20
15	171.5 ± 6.07	247.0 ± 2.02	309.5 ± 3.70	304.0 ± 6.74
20	201.3 ± 4.20	463.0 ± 6.74	751.0 ± 1.34	735.2 ± 1.68
30	178.0 ± 11.46	676.0 ± 14.50	763.5 ± 5.73	751.5 ± 1.68
35	290.0 ± 8.25	344.5 ± 1.01	572.5 ± 4.38	708.5 ± 6.40
40	213.0 ± 3.29	171.2 ± 2.52	186 ± 2.38	178. ± 2.02

*Mean data of 3 replicates.

TABLE 2. *Effects of different temperatures on the mycelial growth of Collybia maculata at different incubation periods*

Temperature (°C)	Dry weight of mycelial yield (mg/50ml)*			
	Incubation periods (days)			
	5	10	15	20
15	No	42 ± 0	92 ± 5.39	103.0 ± 6.74
20	97.0 ± 2.36	278.0 ± 5.39	403.3 ± 6.07	312.0 ± 6.74
25	104.0 ± 4.04	314.0 ± 2.69	443.6 ± 8.96	337.6 ± 20.28
30	123.0 ± 6.87	333.0 ± 7.45	445.6 ± 19.24	384.6 ± 11.38
35	122.0 ± 9.64	268.0 ± 7.45	450.0 ± 3.37	374.0 ± 13.96
40	82.33 ± 9.12	269.5 ± 18.54	411.5 ± 3.03	324.0 ± 4.72

*Mean data of 3 replicates.

The data give a clear indication that *Collybia maculata* shows its best growth at 35°C at an incubation period of 15 days. The growth of the fungus at 25°C and 30°C are almost similar to 35°C. Fries (1956) has reported that low and high temperature optima in *Coprinus fimetarius* as 35°C and 40°C respectively on the basis of dry weight. At 20°C and 40°C, *Collybia maculata* shows moderate growth which indicates that it can grow well at a wide range of temperatures. Jennison et al (1955) showed that *Merulius americanus* grows at 25°C. Again Litchfield et al (1963) stated that 3 species of *Morchella* grow at maximum at 25°C. But at 15°C *Collybia maculata* shows much reduced growth.

From the above mentioned discussion, it is realized that different mushrooms have their specific optimum temperature for mycelial growth which varies from 20—40°C.

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