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EFFECT OF SOME PHYSICAL FACTORS ON GROWTH OF *VOLVARIELLA DIPLASIA*

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Necessary expriments have been performed to evaluate the physical environmental conditions necessary for the growth and protein production by *Volvariella diplasia*. The optimum temperature and pH for the growth and protein production by *V. diplasia* are 35°C and 6.5.

INTRODUCTION

Temperature and pH play important roles in the growth and reproduction of fungi. Mushroom can tolerate a wide range of temperature. Rangaswamy (1956) has reported that *Volvariella diplasia* grow well at 35°C. *V. diplasia* has also been found to be able to grow in a wide range of hydrogen-ion concentrations. Jennison et al (1955) have reported that pH 5·0—5·5 is the optimum for the grnwth of forty two species of higher fungi. Several other investigators also have reported on the optimum pH for several other fungi (Reusser et al, 1958 ; Litchfield et al. 1963 ; Varadi and Lumomir, 1968 ; Srivastava and Bano, 1970).

MATERIALS AND METHODS

The basidiocarps of *V. diplasia* were collected from the field, surface sterilized, and several tissue cultures were made and maintained in potato-dextrose agar slants. One of these cultures was used in the present investigation.

Glucose-casein hydrolysate medium (Lilly and Barnett, 1951) supplemented with KCL (0·5 g) and yeast extract 2 percent per litre, were used as basal liquid medium.

50 ml of the liquid synthetic medium was taken in 250 ml Erlenmeyer flask, plugged and sterilized at 15 p.s.i. for 15 min. The pH of the medium was adjusted to 6·0 by 0·2 M phosphate buffer. The flasks were then inoculated with 1 ml of cell suspension of mycelium and incubated on a shaking incubator (120 r.p.m) for 15 days in complete darkness. Several such flasks were inoculated in order to have five replicates for each treatment. The inoculated flasks were incubated at 20°, 25°, 30°, 35° and 40° (± 0·5°) C. In case of hydrogen-ion concentration, the glucose-casein hydrolysate basal medium was prepared with the help of 0·2M phosphate buffer. The different pH used in this experiments were 5·0, 5·5, 6·0, 6·5 and 7·0. The flasks were then properly plugged and sterilized at 15 p.s.i. for 15 minutes. Other experimental procedures were same as in the case of temperature treatment.

After the incubation period, five flasks for each treatment were harvested. The medium and the mycelium were separated by filtration through a tared sintered funnel (Jena IG-3). The filtered mycelium was washed repeatedly with distilled water to make them free from adherent medium and dried to constant weight at 90°C. The dry weight of the mycelium thus obtained was taken as an index of growth.

The total nitrogen content of the dried mycelium was determined by micro-Kjeldahl method (Oser, 1965). The crude protein value was calculated on the basis of 16 percent nitrogen content of protein.

RESULTS AND DISCUSSION

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

Table 1. *Data (mean) showing the effect of different temperature on the mycelial growth (g/l) and yield of protein (%) by the mycelium of* V. dipalsia *at 15 days of submerged growth*

Temperature (0°C)	Dry weight of mycelium (g/l)	Protein content (%)
20	0·616±0·76	13 0±0·92
25	1·270±0·46	15·87+1·12
30	1·572±0·24	17·54±1·40
35	2·310±0·62	23·26±1·60
40	1·316±0·46	19·27±1·24

*Data are average of five separate determinations under identical conditions.

The data in Table 1 indicate that 35°C is the optimum for both the mycelial growth and yield of protein by the mycelium of *V. diplasia*. The fest fungus could grow within a range of 20°—40°C.

Table 2. *Data (mean) showing the effect of hydrogen-ion concentration on the mycelial growth (g/l) and yield of protein (%) by the mycelium of* V. diplasia *at 15 days submerged growth*

pH	Dry weight of mycelium (g/l)	Protein content (%)
5·0	2·108±0·31	20 34+1·20
5·5	2·516+0·40	24·16±1·32
6·0	1·928±0 30	21·20±1·60
6·5	1·206±0·26	18·74±1·40
7·0	0·928±0·36	11·38±1·26

*Data are average of five separate determinations under identical conditions.

The data in Table 2 indicate that though the test fungus could grow within a range of pH 5.0—7·0 yet the optimum pH for both the mycelial growth and yield of protein is 5·5.

The growth and yield of protein by the mycelium of *V. diplasia* are quite good in submerged culture. The optimum temperature for vegetative growth of the fungus is 35°C. Similar observation has been reported by Rangaswami (1956). But the optimum pH of growth of *V. diplasia* has been found to be 5·5. whereas it has been 6·0 according to Rangaswami (1956).

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