

Minerals, fibre content and enzymatic digestibility of the biomass of three tropical edible mushrooms

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The data in the present investigation revealed that the test-organisms contained significant quantities of Mg and Ca but lesser amount of Fe in their mycelia. There were found to have a marked increase in elementary constituents of the mycelia obtained from respective optimal media comparable to those of basal medium. The data of crude fibre content showed that all the test-fungi contained comparatively lesser amount of fibre when they were grown in respective optimal media than that of basal medium. The mycelia obtained from optimal media showed a higher value of enzymatic (pepsin and pancreatin) digestibility in comparison with that of basal medium. Among the fungi tested, *C. maculata* was relatively rich in mycelial crude fibre content with simultaneous decrease in enzymatic digestibility.

Key words : Minerals, Fibre content, Pepsin and Pancreation digestion, Biomass, Tropical edible mushrooms

INTRODUCTION

Mushrooms are supposed to be one of the choiced dietary items in the present day. Several scientists have provided the estimated value of minerals content in different mushrooms (Anderson and Fellers, 1942 ; Humfeld and Sugihara, 1949 ; Jennison *et al.* 1957 ; Chang, 1964 ; Altamura *et al.*, 1967 ; Zhuk *et al.*, 1974).

Dry mushrooms in general contain more minerals than fresh one as revealed from the studies of Crisan and Sands (1978) in *L. edodes* and several mushroom species. Surinrut *et al.* (1988) have estimated mineral elements in *Tremella fuciformis*, *Volvariella volvacea* and *Lentinus edodes* which contain more calcium than other two species.

From the available literature, it is evident that mushrooms contain a considerable amount of fibre which perhaps provides indigestibility to human consumption.

Worgan (1968) has reported two species of *Lentinus* eg. *L. lepideus* and *L. tigrinus* are found to contain 8.4 and 7.4% fibre respectively. *Lentinus trigrinus* and *L. trabea* have been reported to contain 7.6% and 11.8% crude mycelial fibre when they are grown in optimal synthetic media as revealed from the studies of Jennison *et al.*, (1957). Crisan and Sands (1978) have evaluated the fibre content of several species of *Lentinus*, *Collybia*, and *Tricholoma*. Kikuchi *et al.* (1983) have estimated 0.4—1.7% fibre content in several species of edible mushrooms.

MATERIALS AND METHODS

Cultural methods and preparation of inoculum were done following the procedures described by Roy and Samajpati (1984).

Analytical procedures

The chemical methods of A.O.A.C. (1960) were followed. Mineral contents namely calcium and magnesium were evaluated quantitatively by complexometry (Vogel, 1961) and iron by colorimetric thiocyanate method of Vogel (1961) from ash samples. The fibre content and the enzymatic digestibility of submerged biomass were evaluated following the methods of A.O.A.C. (1960) and of Horowitz (1970) respectively.

RESULTS

The data in Table 1 indicate that the test fungi contain considerably higher amount of Ca^{++} and Mg^{++} but lesser amount of Fe^{++} . Significant superiority in minerals content in the mycelia obtained from respective optimum medium in comparison to that of basal medium is revealed from the present studies. A considerable quantitative variation in minerals amongst the test fungi is also noticed. The data also reveal that *Lentinus cladopus* is rich in the Fe while *L. squarrosulus* and *Collybia maculata* are rich in Mg and Ca content respectively.

The data in Table 2 indicate a noticeable variation in fibre content among the test fungi. It is also revealed that a considerable decrease in mycelial fibre content occurs when the fungi are grown in their respective optimum medium. *C. maculata* is observed to contain higher amount of fibre in comparison to other fungi tested. The *in vitro* enzymatic digestibility both of pepsin and pancreatin is observed to be highest in *L. cladopus* followed by *L. squarrosulus* and *C. maculata*. No such remarkable increase in digestibility is noticed at their respective optimum media treatments. It is indicable that the digestibility in pepsin is somewhat higher than that of pancreatin.

Table 1. Data (mean)* showing the mineral content of mycelia of the test fungi growing in basal and optimum media under submerged conditions

Test fungi	Minerals content (mg 100g dry wt.)					
	Ca		Mg		Fe	
	Basal medium	Optimum medium	Basal medium	Optimum medium	Basal medium	Optimum medium
<i>Lentinus</i>	60.9	1035	621	1872	21.83	33.27
<i>cladopus</i>	±.03	±.08	±.06	±.091	±.04	±.03
<i>Lentinus</i>	1157	2279	1141	1740	19.9	22.75
<i>squarrosulus</i>	±.07	±.04	±.015	±.03	±.03	±.06
<i>Collybia</i>	1598	2294	441	615	21.25	22.43
<i>maculata</i>	±.033	±.09	±.07	±.018	±.018	±.02

* Mean data of three replicates under identical conditions.

Table 2. Data (mean)* showing the fibre content and enzymatic digestibility of the mycelia of the test fungi grown under submerged conditions

Test fungi	Fibre content (g/100g dry wt)		Enzyme digestibility of dried mycelium			
			Pepsin digestibility		Pancreation digestibility	
	Basal medium	Optimum medium	Basal medium	Optimum medium	Basal medium	Optimum medium
<i>Lentinus</i>	9.6	6.0	55.6	62.6	54.7	61.8
<i>cladopus</i>	±.04	±.07	±.03	±.041	±.11	±.097
<i>Lentinus</i>	12.4	9.86	53.7	54.2	52.2	52.2
<i>squarrosulus</i>	±.06	±.01	±.015	±.033	±.06	±.083
<i>Collybia</i>	17.7	12.8	52.0	52.2	49.9	50.9
<i>maculata</i>	±.09	±.12	±.13	±.07	±.10	±.046

* Mean data of three replicants under identical conditions.

DISCUSSION

The findings of Guha and Banerjee (1973) on *A. campestris* S₁₂ does not agree with the present observations which indicate that Fe is present in lesser amount than Ca and Mg, but the observations provided by Thitasut *et al.* (1980) resemble the present findings. A comparatively lesser amount of minerals is revealed by Wehmeyer (1981) in *Macrolepota zeyheri*, *Agaricus brunnescens*. Kikuchi *et al.* (1984) have informed that mushrooms are no longer inferior in

mineral concentrations to that of standard vegetables. Calcium content as 118 mg, magnesium as 247 mg and iron as 30 mg/100 g dry weight of *Lentinus edodes* is revealed from the studies of FAO (1972). Besides, significant quantitative variations in minerals amongst the test fungi under the present study is also noticed. These quantitative differences in minerals provided by different authors might be due to geographical race variation and species type which supports the findings of Lasota *et al.* (1984).

The present observations on fibre content have a close similarity with the data presented by Crisan and Sands (1978) particularly with the findings of that of FAO (1972) as 8.0% and 7.3% fibre content in *L. edodes*. A considerable higher amount of fibre content in *L. exilis* as 32.5% and in *L. squarrosulus* as 21.7% have observed.

The findings on *in vitro* enzymatic digestibility put forward a probable suggestions that there might be inverse relation between the fibre content and percentage of digestibility.

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(Accepted for publication 8 September 1993)