CHAPTER IX

FIBRE AND ASH CONTENTS AND DIGESTIBILITY OF DRIED
A. CAMPESTRIS S12 MYCELIUM

Digestibility of mushroom proteins was determined by animal feeding experiments by different groups of workers (70, 90, 93). However all these experiments are related to cultivated mushroom. No detail investigation was carried out to find the digestibility of mushroom mycelia obtained by submerged culture.

Ash and fibre contents of mushroom were determined by several workers. Sporophores of Agaricus campestris contain 10.38% fibre and 12% ash (83, 85), whereas Humfeld and Sugihara (35) have shown that mycelium of A. campestris (white variety) grown in submerged culture contains 6.92% fibre, 4.59% ash, 0.12% calcium, 1.28% phosphorus and traces of iron, whereas brown variety of the same species contains 5.24% ash, 1.06% calcium, 1.24% phosphorus and traces of iron. Ash contents of different Morchella species grown in submerged culture have been determined by Litchfield, Vely and Overbeck (76) who showed that M. crassipes contains about 18.2% ash. Maggioni et al. (57) have shown that ash content of cultivated mushroom A. bisporus was high when urea was used as nitrogen source.
Experimental

Growth medium and cultivation

*A. campestris* S₁₂ was grown under submerged condition in mannitol-peptone-yeast extract medium as described previously.

Trypsin and Pancreatin digestibility

Dried and defatted mycelia (0.3 gm) was incubated with 30 ml of 0.2% (weight/volume) enzyme solutions (either trypsin or pancreatin) individually in Sörensen phosphate buffer of pH 7.6 for 16 hours at 37°C under constant shaking. The incubation mixture was centrifuged, and the residue was washed consecutively with water and alcohol and dried in oven at 110°C for 30 minutes and weighed.

Determination of crude fibre content

Fibre content of the mycelia was determined (124) by digestion of dry, powdered, fat free mycelia consecutively with boiling 1.25% (w/v) *H₂SO₄* and 1.25% (w/v) *NaOH* solution. The residue was washed thrice with 50 ml portions of water and 25 ml alcohol and dried to constant weight. The values so obtained were corrected for mineral contents of the samples.

Determination of ash content

A measured amount of dried mycelia was taken in a pre-weighed silica crucible and ignited in muffle furnace at
about 550°C for 5 hours (125). The crucible was cooled in desiccator and weighed. The residue was digested with 5 ml portion of conc. HCl in a steam bath till the acid was boiled off. The digested residue was dissolved in a definite volume of dil. HCl for the estimation of minerals.

**Estimation of calcium, magnesium and iron**

Calcium was determined titrimetrically with EDTA solution in KOH-KCN and hydroxylammonium chloride medium using Patton and Reeder's "HHSNA" indicator (126). Similarly Mg was titrated in NH₄Cl-NH₄OH buffered medium using Eriochrome Black T indicator (126). Iron was estimated colorimetrically (127).

**Results**

Table 13 shows that fibre content of *A. campestris* mycelia is high (average, 8.15%). The mycelia from older culture are more fibrous.

Ash content of 7 days old mycelia was found to be 6.8%. The present results are comparable to those obtained by Humfeld and Sugihara (35). The mineral contents of mycelia grown submerged are lower than those of sporophores of *A. campestris* (83, 85) and mycelia of *Morchella* species (76).

The indigestable residues left over after pancreatin digestion is less than those left over trypsin treatment of dried mycelial material (Table 13).
**Table 13**

Fibre, ash and mineral content and digestibility of *A. campestris* S12 mycelia

<table>
<thead>
<tr>
<th>Mycelial age (days)</th>
<th>1+</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibre content g/100 gm dry wt. of mycelium</td>
<td>4.9 ± 0.1</td>
<td>7.3 ± 0.05</td>
<td>9.6 ± 0.1</td>
<td>10.8±0.15</td>
</tr>
<tr>
<td>Ash content g/100 gm dry wt. of mycelium</td>
<td>*</td>
<td>*</td>
<td>6.8 ± 0.1</td>
<td>*</td>
</tr>
<tr>
<td>Mg (mg/100 gm dry wt. of mycelium)</td>
<td>*</td>
<td>*</td>
<td>37.8 ± 0.2</td>
<td>*</td>
</tr>
<tr>
<td>Ca (mg/100 gm dry wt. of mycelium)</td>
<td>*</td>
<td>*</td>
<td>Trace</td>
<td>*</td>
</tr>
<tr>
<td>Fe (mg/100 g dry wt. of mycelium)</td>
<td>*</td>
<td>*</td>
<td>5 ± 0.05</td>
<td>*</td>
</tr>
<tr>
<td>Trypsin indigestable residue (%)</td>
<td>*</td>
<td>*</td>
<td>47 ± 0.5</td>
<td>*</td>
</tr>
<tr>
<td>Pancreatin indigestable residue (%)</td>
<td>*</td>
<td>*</td>
<td>30.6 ± 0.2</td>
<td>*</td>
</tr>
</tbody>
</table>