Studies on nutrient analysis of two strains of Blue oyster mushroom
(*Hypsizygus ulmarius* CO2 and IIHR Hul)

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**ABSTRACT**

Mushrooms have great nutritional value because of their high content of protein, essential amino acids, and fiber and low fat content. Analysis of two strains of *H. ulmarius* CO2 and IIHR Hul revealed that protein, carbohydrate and fibre contents were high. Lipid content in two strains of *H. ulmarius* ranges from 3.65 to 5.35% and fat content ranges from 3.55 to 4.80% respectively.

**Key words:** Edible mushroom, Nutrient analysis.

**INTRODUCTION**

Mushrooms have been widely used as an important food item for nutrition and disease prevention (Chang, 1996). Edible mushrooms also provide nutritionally significant contents of vitamins (B1, B2, B12, C, D, and E) (Heleno et al., 2010). Total mushroom on the earth are estimated to be 140,000 species in which 10% are known. Assuming that the proportion of useful mushrooms among the undiscovered mushrooms in 5% would imply that there are 7,000 yet undiscovered species (Hawksworth, 2001). Mushrooms are not only source of nutrients but also have been reported as therapeutic foods, useful in preventing diseases such as hypertension, hypercholesterolemia and cancer (Bobek and Galbavy 1999). Thus, the present study was focused on to evaluate the nutrient compounds in two strains of Blue oyster mushroom *Hypsizygus ulmarius* strain CO2 and IIHR Hul.

**MATERIALS AND METHODS**

**Sample Preparation:** The culture of *Hypsizygus ulmarius* CO2 strain was obtained from Tamil Nadu Agricultural University, Coimbatore and the culture of *Hypsizygus ulmarius* IIHR Hul strain was sourced from Indian Institute of Horticultural Research, Bangalore. Mushroom were first washed thoroughly to free from mud and other extraneous materials, dried on blotting paper, cut into pieces and dried at 60°C. Mushrooms selected are normally harvested for consumption without division into pileus and stipe. Therefore, the entire mushroom were dried, ground to a fine powder and stored under vacuum for further analysis.

**Moisture content:** The moisture content was estimated as per the method of Raghuramulu et al., (2003). The mushroom samples were oven dried at 80°C for 48 hours. The loss in weight obtained after drying was taken as the moisture content.

**Ash content:** The powdered mushroom samples were incinerated in a muffle furnace in previously ignited and cooled crucible of known weight at 550°C for 6 hours. Fairly cooled crucibles were put in desiccators and weighed (Raghuramulu et al., 2003).

**Total carbohydrate:** One gram of the powdered mushroom sample was extracted with 10ml of 80% ethyl alcohol by using soxhlet extractor for 6 hours. The crude extract was diluted to 50ml with 80% ethyl alcohol. The quantity of ethanol soluble sugar in the extract was determined using phenol sulphuric acid method of Dubois et al., (1956).

**Protein content:** Five gram of grinded mushroom sample was taken with 50ml of 0.1N NaOH and boiled for 30 min. The solution was cooled to room temperature and centrifuged at 5000 rpm for 10 min. The supernatant was collected and total protein was measured according to method of Lowry et al., (1951).

**Lipid:** Five gram of grinded mushroom sample was suspended in 50ml of chloroform: methanol (2:1) mixture, mixed thoroughly and allowed to stand for 3 days. The solution was filtered and centrifuged at 1000 rpm for 15 min. The upper layer of methanol was evaporated by heating. The dried extracts were weighed and the total lipids were estimated as per the method of Folch et al., (1957).

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**Crude fat:** Crude fat was determined using Soxhlet extraction apparatus. Petroleum ether (boiling point 40-60°C) was added to two gram finely ground mushroom sample and placed in the extraction apparatus. Extraction was carried out for 6 hours after which the ether was evaporated to dryness. The amount of fat was obtained from the difference between the initial and the final weight (Horowitz et al., 1984).

**Crude fibre:** Crude fibre of the mushroom samples was determined according to Maynard, (1970). A known quantity of mushroom sample was taken in a beaker, to which 200 ml of 1.25% sulphuric acid was added. The content was boiled for exactly 30 min and the volume was kept constant by frequent addition of hot water. The boiled contents were filtered through a muslin cloth and the residue washed with hot water till the filtrate runs were free of acid. Residue was transferred to equable (preweighed dish W1) and dried for 2 hours at 130±2°C, placed desiccator and weighed (W2) in an analytical balance. The crucible was heated in a muffle furnace at 600°C for 6 hours, cooled and weighed again (W3). The difference in the weights (W1, W2, and W3) represents the weight of crude fibre.

**RESULTS AND DISCUSSION**

The results on the nutritional content of two strains of edible mushroom are shown in Table-1. The moisture content of *H. ulmarius* CO2 and IIHR Hu1 strains ranged from 88.3 to 90.6% respectively. According to Hung and Nhi (2012) the moisture content of some selected mushrooms ranged from 66.7 to 90.7%. The fresh mushrooms contained about 90% moisture and dry mushrooms contained about 90% dry matter and 10% moisture (Ragunathan and Swaminathan 2003). Ash content of *H. ulmarius* strains IIHR Hu1 was 4.3% compared to CO2 strain 5.86%. Alam et al., (2008) reported that the ash content of fresh mushrooms ranged from 1.1 to 1.28%. Babita and Narender (2014) reported that the ash content of three strains of *M. procera* was 1.93%, *M. rhacodes* 2.16% and in *M. dolichaula* 7.3%.

A considerable proportion of the carbohydrates occur in the form of polysaccharides with particles of the different size. Fungal polysaccharides are represented by glycogen and such indigestible forms as dietary fibre, cellulose, chitin, mannans and glucans considered important in the proper functioning of the alimentary tract (Manzi and Pizzoferrato 2000; Manzi et al., 2001). Edible mushrooms are highly valued as a good source of carbohydrates and their contents usually range from 40.6 to 53.3% of dry weight (Khanna et al., 1992). In the present study the carbohydrate content in *H. ulmarius* CO2 was 28% and in *H. ulmarius* IIHR Hu1 34%. Khan et al., (2009) indicated that the carbohydrate content of *Hypsizygus ulmarius* was 49.9%, *Agrocybe aegerita* 28.7% and in *Volvariella volvacea* 42%. Hung and Nhi (2012) had reported that total carbohydrate content on dry weight basis in *Pleurotus ostreatus* was 61.3, 52.5 in *Volvariella volvacea* and 65.1% in *Lentinula edodes*.

Protein content in *H. ulmarius* CO2 was 47.59% and in *H. ulmarius* IIHR Hu1 54.7%. Protein content of mushroom was reported to vary according to genetic structure of species and physical and chemical differences in growing medium (Ragunathan and Swaminathan 2003, Murugkar and Subbulakshmi 2005). The protein content of mushroom is known to be highly variable due to strain of some species, tissue type and stage of development, substrate and method of analysis. Pushpa and Purushothama (2010) reported that the protein content of *Calocybe indica* was 21.60%, *Agaricus bisporus* 41.06%, *Pleurotus florida* 27.83% and *Russula delica* 26.25%.

In the present study lipid content in *H. ulmarius* CO2 and IIHR Hu1 mushrooms was 3.65% and 5.35%. Generally, fresh mushrooms contain a relatively high amount of fibre which may be responsible for its relatively high amount of ash (Cheung 1998). The crude fibre content in *H. ulmarius* IIHR Hu1 was 17.45% and in *H. ulmarius* CO2 19.45%. Khan et al., (2008) reported that the fibre content in edible mushroom *Pleurotus spp* ranged from 25.5 to 27%. The fairly high level of fibre in the mushroom was a desirable characteristic since fibre plays an important role in human diet. The fat content was 3.55% in *H. ulmarius* CO2 and 4.8% in *H. ulmarius* IIHR Hu1.

**CONCLUSION**

The present investigation revealed that *Hypsizygus ulmarius* (blue oyster mushroom) CO2 and *H. ulmarius* IIHR Hu1 strains show high amount of protein, fibre and carbohydrate. Among the two strains of *H. ulmarius* CO2 and IIHR Hu1 the latter exhibited the maximum amount of protein, carbohydrate and fat contents. Mushrooms are a promising food that may overcome protein energy malnutrition. These nutrients make mushroom as a low energy and healthy foodstuff.

**TABLE 1: Composition of fruit bodies of mushroom**

<table>
<thead>
<tr>
<th>Parameters (%)</th>
<th>Hypsizygus ulmarius CO2</th>
<th>Hypsizygus ulmarius IIHR Hu1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture</td>
<td>88.3</td>
<td>90.6</td>
</tr>
<tr>
<td>Ash</td>
<td>5.86</td>
<td>4.3</td>
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<tr>
<td>Carbohydrate</td>
<td>28</td>
<td>34</td>
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<tr>
<td>Protein</td>
<td>47.59</td>
<td>54.7</td>
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<tr>
<td>Fat</td>
<td>3.55</td>
<td>4.80</td>
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<tr>
<td>Lipid</td>
<td>5.35</td>
<td>3.65</td>
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<tr>
<td>Crude fibre</td>
<td>19.45</td>
<td>17.45</td>
</tr>
</tbody>
</table>
REFERENCES


