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Nagulwar MM
Department of Food Business and Management, College of Food Technology,
Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

More DR
Department of Food Business and Management, College of Food Technology,
Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

Corresponding Author:
Nagulwar MM
Department of Food Business and Management, College of Food Technology,
Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

Studies on chemical and mineral evaluation of oyster mushroom

Nagulwar MM and More DR

Abstract
The present investigation was carried out to study the, chemical and mineral composition of oyster mushrooms. Results obtained indicated that the chemical and mineral composition was reported and results showed that the moisture content 88.80 percent, fat 0.8 percent, carbohydrate 5.1 percent, protein 4.7 percent, and ash 1.6 percent. Potassium content of oyster mushroom was found to be highest 974.67 mg/100gm than rest of other minerals; calcium 24.27 mg/100gm, magnesium 138.57 mg/100gm, zinc 3.67 mg/100gm and iron 18.27 mg/100gm. Finally, it can be concluded from the obtained results that oyster mushroom was high in nutrients that makes it potential source for value addition in food commercialization.

Keywords: Proximate analysis, oyster mushroom, chemical properties, minerals

Introduction
There are about 12000 species of mushroom present in which roughly 2000 species are fit for human consumption and 200 species are used for the medical purposes. Most significant cultivated types of mushrooms includes *Agaricus bisporus* (button mushroom), *Lentinus edodes* (shiitake), *Pleurotus spp* (oyster mushroom), *Auricula auricular* (wood mushroom), *Flamulina velutipes* (winter mushroom) and *Volvariella volvacea* (straw mushroom) (Aida *et al.*, 2009) [6] Due to nutritional value, including high protein and low fat/energy contents, they have important role in diet. (Agahar – Murugkar and Subbulaksmi, 2005) [2]. Mushrooms are used as food from the earliest beginning of man. (Rahi *et al*., 2004) [12].

Necessity of food protein forces one to acquire information about alternative protein sources as like single cell protein. Mushrooms are recognized as oldest of single cell protein food for man. Eatable mushrooms have demand from people since its flavour and nutrient content and so, it indications itself to most new recipes. Crude protein is chiefly found in high levels in palatable mushrooms and range varies among 15.2 g/100 g dried weight in *Lentinus edodes* to 80.93 g/100 g dried weight in *Agaricus bisporus.*(L. Barros, *et al.*, 2008) [10]. White button (Agaricus bisporous), Paddy straw (Volveriella volvacea), Shittake (lentinus edodes) and oyster (Pleurotus species) are well recognized varieties of mushrooms. But mushrooms being highly perishable, it becomes significant to preserve and process it. In many regions of Europe and Asia, mushrooms are directly pickled or salted or dried for their usage in the winter season (Sawaya *et al*., 1985) [13].

Between numerous species of cultivated mushroom, *Pleurotus ostearus,* has been commonly consumed by people worldwide because of their taste, high nutritional and medicinal values (Deepalaskshmi and Mirunalini, 2014) [5] Mushrooms are considered as a rich source of protein (44%), Cabohydrates (18%) crude fiber (7%) and minerals (4%), numerous significant minerals are seen in mushrooms such as Calcium, Manganese, Magnesium and Iron. Adenosine and cordycepin are two most significant bioactive components seen in mushrooms. The range of amino acids content in mushroom is between 35 to 37% from which glutamic acid and asparatic acid are the two most significant amino acids. (Hsu *et. al*., 2002) [8].

The pleurotus genus relates to gilled fungi together with one of the most broadly eaten species generally known as oyster mushroom which is grown-up in together tropical and temperate climate. Oyster mushrooms are in third rankbehind the white button and shittake amongst the world mushroom productions (Gyorfi J, *et al*., 2007; Chang *et. al*., 2004) [7, 3]. Pleurotus mushrooms contain of non-starchy carbohydrates (Croan S. C., 2004) [4]. In mushrooms, the fat value is very low as relatedto nutrients like carbohydrates and proteins. The fats existing in mushroom fruiting bodies exists as unsaturated fatty acids. (Singer, 1961) [14]

The wild mushrooms and the mushrooms cultivated by synthetic methods is food with high nutritional value. Currently mushrooms are available in shops throughout the entire year in each season. But there are certain reasons for preservation and processing of these. The eldest and frequently used also the most common way to develop mushrooms is drying. It is commonly known that, for instance, a right good potato soup is not well cooked lacking the dried mushrooms. Fresh or frozen will never give this soup the right smell and taste. The benefit is that nearly all kinds of mushrooms can be preserved by drying method. Though, some principles also must be esteemed. Mushrooms are very perishable and numerous physiological and morphological variations occur after their harvest, which create these mushrooms intolerable for consumption Drying features of Oyster mushrooms (*Pleurotus ostreatus*) under sun-drying and tunnel drying were studied at the laboratory level. Colour, water activity, moisture content and rehydration ratio were used as the standards for estimating the product excellence. Dehydrated mushroom of needed quality in relations of various factors like colour, water activity, and rehydration ratio characteristics might be acquired. Practical references that should be respected can be found.

Materials and Methods

Oyster mushroom was obtained from local village market, Parbhani. The proposed research was carried out in Department of Food Business and Management, College of Food Technology, VNMKV, Parbhani.

Proximate composition of Oyster mushroom:

Proximate Analysis

Different chemical properties of samples were analysed for moisture content, ash, fat, protein and total carbohydrate. All the determinations were done in triplicate and the results were expressed as the average value.

Moisture content

Moisture content was determined adopting AOAC (2005) [1] method as following:

$$\% \text{ Moisture content} = \frac{\text{Loss in weight}}{\text{Weight of sample}} \times 100$$

Fat

AOAC (2005) [1] method using Soxhlet apparatus was used to determined crude fat content of the sample. The percent of crude fat was expressed as follows:

$$\% \text{ Crude Fat} = \frac{\text{Weight of dried ether soluble material}}{\text{Weight of sample}} \times 100$$

Protein

Protein content was determined using AOAC (2005) [1] method. Percentage of nitrogen and protein calculated by the following equation:

$$\% \text{ Nitrogen} = \frac{\text{TS - TB} \times \text{Normality of acid} \times 0.014}{\text{Weight of sample}} \times 100$$

Where, Ts = Titre volume of the sample (ml), TB = Titre volume of Blank (ml), 0.014= M eq. wt. of N_2.

% Protein = Nitrogen × 6.25

Total carbohydrate

Total carbohydrate content of the samples was determined as total carbohydrate by difference that is by subtracting the measured protein, fat, ash and moisture from 100 phenol sulphuric acid method as given by AOAC (2005) [1].

Ash

Drying the sample at 100 ^{0}C and charned over an electric heater. It was then ash in muffle furnace at 550 ^{0}C for 5 hrs. By AOAC (2005) [1]. It was calculated using the following formula:

$$\% \text{ Ash content} = \frac{\text{AW}}{\text{IW}} \times 100$$

Where, AW = Weight of Ash and IW= Initial weight of dry matter

Result and Discussion

Chemical properties of Oyster mushroom

Data pertaining to various chemical properties like moisture, fat, carbohydrates, protein, ash, and crude fiber were investigated and results obtained are depicted in Table 2

Table 1: Chemical composition of Oyster Mushroom

Chemical Parameters	Mean Value*
Moisture (%)	88.80 ± 0.03
Total Fat (%)	0.8± 0.03
Total carbohydrates	5.1± 0.1
Total Protein (%)	4.7 ±0.04
Ash	1.6 ± 0.01

*Each value represents the average of three determinations

The data in the above table showed that the moisture content 88.80 per cent, fat 0.8 per cent carbohydrate 5.1 per cent, protein 4.7 percent and ash 1.6 percent respectively. These results were in close agreements with the findings of Karuna Singh (2016).

Mineral composition of flaxseed

The results given with respect to various minerals such as Ca, P, Mg, Fe, Cu and Zn were determined and accordingly results presented in Table 2.

Table 2: Mineral content in Oyster mushroom

Minerals	Average value (mg/100g)
Calcium	24.27
Phosphorus	20.08
Magnesium	138.57
Iron	18.27
Sodium	129.96
Zinc	3.67
Potassium	974.67

*Each value is an average of three determinations

The mineral content of Oyster mushroom was evaluated and found that the potassium content of Oyster mushroom found to be highest (mg) than the rest of other minerals. From the results obtained it was clearly seen that Oyster mushroom is potent source of potassium. The study showed that oyster mushroom was good sources phosphorus, calcium, iron, zinc and calcium. Results are in line with those reported by Karuna Singh (2006).

Conclusion

Oyster mushroom contain important quantities of compounds with functional and bioactive properties whose effects on the prevention of certain non-transmissible chronic diseases have been tested. These characteristics make oyster mushroom an attractive source of functional ingredients for the value addition of food stuffs. Oyster mushrooms can be processed into various value added products such as mathari, rava idli, ladoo, biscuits and breads, also in jam and squash.

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