

# Determination of Protein Content of Some Different Types of Species of Mushroom in Owo Local Government Area of Ondo State, Nigeria

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## Abstract

The wild edible mushrooms are one of the most important non-timber forest products. Due to its vigorous growth in the rainy season, delicious taste and nutritional value, the protein content of three species of mushrooms, namely *Termitomyces robustus*, *Lentinus squarrosulus* Mont and *Lentimula edodes*, was determined. The highest amount of protein was found in *Lentinus squarrosulus* Mont (37.80mg/ml), followed by *Termitomyces robustus* (33.00mg/ml) and least found in *Lentimula edodes* (17.00mg/ml).

**Key words:** Protein contents, Mushrooms, Owo region, Nigeria.

## Introduction

Over the last decade, mushrooms have been studied as a novel functional food in Japan, Korea, China and Taiwan. Mushrooms, which have been used as food from time immemorial for their taste and flavour, have in recent times been found to be highly nutritious and medicinal. They are rich in high quality protein, minerals and vitamins such as folic acid but low in fat content.

In Nigeria, wild edible mushrooms are one of the important minor forest products, which are locally traded in local market of the country. Due to their high content of protein, vitamins and minerals, mushrooms are considered as “poor man’s protein” (Pandey, 2004). Previous studies had asserted that the maximum protein content, and the best amino acid balance are found in mushrooms just before the caps expand. It has also been established that the major food value of mushroom lies in their protein components.

Consequent on the above, the study being reported aimed at the determination of the protein content of some wild mushroom species growing in Owo Local Government areas of Ondo State,

Nigeria.

## Materials and Methods

Three mushroom species, *Termitomyces robustus* (Vernacularly known as *Ewe*), *Lentinus squarrosulus* Mont (Vernacularly known as *Tifa*) and *Lentimula edodes* (Vernacularly known as *Sheshe-Ope*), used in this study were purchased from Oja-Ikoko and Sadibo markets, both located in Owo, the headquarters of Owo Local Government, Ondo-State, Nigeria. The identification of the different collected samples was based on mushroom characters and techniques that included habit and habitat and morphological structures, (according to Adhikari, 2000, Chaube, 1995; Pandey, 2004).

The protein content in the extracted sample was determined in three stages as follow:

### *Stage I.*

In each mushroom species, 2g wet samples was weighed into 50ml Kjeldahl flask and 20ml conc. Sulphuric acid ( $H_2SO_4$ ) with a Kjeldahl catalyst tablet were added. Then, 0.5g dried sample was weighed out, and together with 5ml conc.  $H_2SO_4$  and half kjeldahl catalyst tablet, were added into the micro Kjeldahl flask. This was then heated on a heater. The heating was done by initially heating with low heat for 15 minutes after which the heating was increased to medium heat for 30minutes and later to high heat until the mixture was digested. The flask was rotated at intervals until complete digestion was attained. The flask was then allowed to cool and the sample residue was washed and the digest was made up to 100ml.

### *Stage II.*

5ml of 2% boric acid ( $H_3BO_3$ ) were placed into 100ml conical flask (as receiving flask). The  $H_3BO_3$  was expected to trap down the ammonia vapour from the digest. The 2% was 2g made up to 100ml, 3 drops of mix indicator was added. The Mix indicator consisted of 0.198g bromocresol green and 0.132g methyl red in 200ml alcohol. Receiving flask was placed so that the tip of the condenser tube was below the surface of the boric acid. 5ml of the sample was pipette out into the Markham distiller, and 10ml of 40% NaOH was added, the joints tightened.

### *Stage III*

Distillate was titrated with standard mineral acid (0.01M HCl or 0.025M  $H_2SO_4$ ) and the blank was also titrated with acid and the Nitrogen content (%N) was calculated from the data obtained. The multiplication of this value by a factor of 6.25 gives the protein content in the species.

## Results and Discussion

Table 1 below shows the protein contents obtained from samples of each species of mushroom sampled in this study. These values compared favourably well the protein contents of these same

species obtained elsewhere in the previous studies.

The highest amount of protein was found in *Lentinus squarrosulus* Mont(37.80mg/ml), followed by *Termitomyces robustus* (33.00mg/ml) and least found in *Lentimula edodes* (17.00mg/ml). The results of this study revealed that these mushrooms are nutritiously good for consumption. In fact previous studies had revealed that edible mushrooms contained all the essential amino acids as well as most commonly occurring non-essential amino acids and amides. Mushrooms are low in calories, have no cholesterol and are virtually free of fat and sodium. Mushrooms also contain other essential minerals like selenium, which works with vitamin E to produce antioxidants that neutralize “free radicals” which can cause cell damage. Studies have suggested that selenium may reduce the risk of cancer, cardiovascular disease, it may slow the progress of HIV disease and may aid in symptoms of rheumatoid arthritis, pancreatitis and asthma. Studies show men who eat selenium rich foods may lower their risk of prostate cancer.

Potassium, which is widely reputed for being good for the heart, is also found in mushrooms. It has been suggested that a diet with potassium may help to reduce the risk of high blood pressure and stroke. Copper is another essential mineral found in mushrooms. Copper aids iron, which is also known for making red blood cells and delivers oxygen to the body. Mushrooms also contain three B-Complex vitamins; riboflavin for healthy skin and vision, niacin that aids the digestive and nervous systems, and pantothenic acid which helps the nervous system and hormone productions

## References

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**Table 1.** Protein content of mushroom species obtained in Owo, Ondo State, Nigeria.

| <b>Sample</b>                | <b>Local Name</b> | <b>Place of Collection</b> | <b>Protein mg/ml</b> |
|------------------------------|-------------------|----------------------------|----------------------|
| <i>Termitomyces robustus</i> | Ewe               | Ikoko Market               | 33.00                |

|   |              |               |       |
|---|--------------|---------------|-------|
| <i>Lentinus squarrosulus</i><br><i>Mont</i> | Tifa         | Ikoko Market  | 37.80 |
| <i>Lentimula edodes</i>                     | Sheshe – Ope | Sadibo Market | 17.60 |