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Proximate Analysis and Mineral Composition of the Fruiting Body of *Pleurotustuber-regium* (Mushroom) Cultivars from South East Nigeria.

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ABSTRACT
The proximate analysis and mineral elements of the fruiting body of *Pleurotus tuber-regium* were investigated to ascertain its nutritional and clinical implications. The protein content, crude-fibre, crude-fat, moisture and ash contents were determined using standard methods, the mineral elements was determined using atomic absorption spectrophotometry. Results indicated that *Pleurotus tuber-regium* contained 84.2% moisture, 19% crude fibre, 28.19% carbohydrate, 5% crude fat, 16.2% ash and 31.52% protein. It contained the following mineral elements (parts/million): calcium, 1.8; copper, 0.2; zinc. 0.l0; potassium, 0.37; sodium, 1.49 and iron, 13.3. This indicates that edible mushroom is a very good source of both macro and micronutrients. These findings were discussed in line with its nutritional and clinical importance.

Key Words: Proximate Analysis, Mineral composition, *Pleurotus tuber-regium*,

INTRODUCTION
Mushroom also called “Elo” in Igbo is a fleshy, spore bearing fruiting body, typically grown above the ground on soil or in its food sources (Ezeibekwe *et al.*, 2009). Most mushrooms belong to the phylum Basidiomycota that have a stem (stipe), a cap (pileus) and gills (Lamellae) on the other side of the cap (Kirk *et al.*, 2008). Various authors have reported that some edible mushrooms contain proteins, carbohydrates, crude fibre, ash, minerals like iron, copper, manganese, potassium, calcium and sodium, and moisture (Clara, 2001, Adejumo and Awosanya, 2005, Ezeibekwe *et al.*, 2009, Adedayo, 2011). The species *Pleurotustuber-regium*(the king tuber mushroom) is predominantly seen in areas with a temperature range of 20^0C - 40^0C and is found to grow well in agricultural waste (Chang, 1996). It requires a moderate rainfall and pH range of 3-10 for growth (Chang and Miles, 1993). The mushroom produces an underground tuber also called mycelium by which it attaches itself to the dead host, as well as the fruiting body called mushroom. Both the mycelium and the mushroom are edible (Edoga and Gomina, 2002). Clara, (2001) reported that *Pleurotustuber-regium*is highly nutritive and rich in protein, vitamins, minerals and that it is also eaten for its flavour and beneficial medicinal effect. The specie *Pleurotustuber-regium*

have been used as food supplementsin various cultures and are cultivated and eaten for their edibility and delicacy and as sources of protein, fats, vitamins and minerals (Bowman and Russell, 2001, Adedayo *et al*. 2010, Bano, 1993).

However, the nutritional and ecological importance of mushroom notwithstanding, not a lot of scientific research work has been carried out on the nutritional contents of some tropical edible mushrooms that are indigenous to South Eastern Nigeria especially *Pleurotus tuber-regium*. The situation infers that the people of South-eastern Nigeria eat edible mushroom without knowing its exact nutritional value and the mineral content. This research was aimed at determining the proximate composition and the mineral profile of *Pleurotustuber-regium* grown in South-Eastern Nigeria. Results would encourage the consumption and commercial cultivation of mushrooms as affordable substitutes to nutrients of plant and animal origins.

MATERIALS AND METHODS

SampleCultivation

The "Elo" used for the generation of the fruiting body was sourced from a local market in Awka, Anambra State South-East Nigeria. It was identified by Prof. Okeke of the Department of Botany, Nnamdi Azikiwe University Awka.

SamplePreparation

The "Elo" was soaked in water for 30 minutes. It was kept in a humid state by daily sprinkling of water until it sprouted at the 22nd day. Maturity of the fruiting body was reached at fourth day after the sprouting. The sprouted fruiting body was harvested, diced and sun dried for fourteen (14) days. A portion of the fresh sample was kept aside before the drying process for moisture content analysis. Dried sample was pulverized and stored in a container for analyses.

Proximate Analysis

The moisture content, ash content, protein content, crude lipid and crude fibre were determined by the method of the AOAC, 1990. Carbohydrate content was determined by the difference method; subtracting the sum of the percentages of all the fractions from 100 (Ezeibekwe *etal*., 2009).

Determination of Mineral Composition

The mineral elements were determined by the method of AOAC (1990). The test was carried out using the Varian model 220fs Atomic Absorption Spectrophotometer (AAS).

RESULTS AND DISCUSSION

The results of the proximate analysis showed very high moisture content (84.2%) in the fresh sample of *Pleurotustuber-regium*. Of the dried sample, protein content recorded the highest value of 31.52% while crude fat had the lowest value of 5%. The ash content was seen to make up 16.29% of the sample suggesting that an appreciable amount of minerals were present in the sample.

Table 1: Result of the proximate composition of the fruit body of *Pleurotus tuber-regium*

Parameters	Percentage Composition
Moisture content of fresh sample	84.2
Dry matter content	15.8
Protein content of dry weight	31.52
Carbohydrate content of dry weight	28.19
Crude fibre content of dry weight	19
Ash content of dry weight	16.29
Crude fat content of dry weight	5

For the analysis of the mineral composition of the fruit body of *Pleurotustuber-regium,* iron recorded the highest value of 13.3ppm while zinc had the lowest value of 0.1ppm. Appreciable quantities of the minerals calcium and sodium were also recorded.

Table 2: Results of the mineral composition (in parts per million) of the fruit body of *Pleurotus tuber-regium*

Parameter	Concentration (ppm)
Copper	0.20
Zinc	0.10
Calcium	1.80
Potassium	0.37
Iron	13.30
Sodium	1.49

Pleurotus tuber-regium from the south-east region contained 31.52% of protein. Hence it can be eaten as a protein supplement or as an alternative to fish and meat. Vegetarians can also eat mushrooms since it serves as an alternative protein supplement. The high amount of crude fibre indicates that it is a good source of roughages. *P. tuber-regium* has the ability to lower blood cholesterol concentration (Fukushima, 2000), a risk factor of coronary heart disease. Thus it is an ideal food for the prevention of atherosclerosis. The hypocholesterolaemic effect of mushroom may be due to its high fibre content (Cheung, 1998).

The moisture content was 84.2% and similar to the result obtained by Weinheim (2006) who deduced that for different species of mushroom, the moisture content ranged from 81% to 91%. This indicates that mushrooms are highly susceptible to microbial growth and enzyme activity (Adejumo and Awosanya, 2005) and fresh mushrooms should not be kept for a long time. Low crude fat content was observed in agreement with Agrahar-Murugkar and Subbulakshimi (2005) and Ezeibekwe *et al.*, 2009. The low crude fat content is suggestive that both diabetics and non-diabetics can consume *Pleurotus tuber-regium.* The sample contained 28.19% carbohydrate and this may be due to the fact that it is highly tuberous and contains a lot of fibre.

The result of the six mineral elements analyzed showed that zinc is the lowest element (0.l0ppm) while iron is the highest (13.3ppm). This is in agreement with result of similar study on some cultivated mushrooms (Edeoga and Gomina, 2002). Results obtained for sodium and calcium are in agreement with report of similar cultivated mushrooms (Fasidi and Ekuene, 1993). The results recorded for copper, iron and sodium was in tandem with that recorded by Adejumo and Awosanya, 2005. However, the result obtained for copper and potassium differ from results previously reported in similar studies (Fasidi and Ekuene, 1993; Fasidi and kadiri,1995; Jonathan *etal.*, 2006).

CONCLUSION

The result of the study showed appreciable levels of food macronutrients and mineral elements thus establishing that *Pleurotus tuber-regium* as a viable and highly nutritious food which can compete favourably with meat and other food staples predominantly consumed in the South-East. Most importantly, its low fat and high protein content makes it a healthy alternative for diabetic patients and for the geriatric population. Its commercial husbandry and consumption is therefore highly recommended.

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