Determination of Nutrient and Phytochemical Compositions of Wild Edible *Lentinus squarrosulus* (Mont.) Singer Found in Rivers State

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ABSTRACT

Study on the nutrient and phytochemical composition of Lentinus squarrosulus was carried out in the Department of Plant science and Biotechnology, Rivers State University. Nutrient assessment revealed the presence of proximate, mineral and vitamin constituents. Highest proximate composition value was recorded for moisture (36.45±0.05%) while lipid recorded lowest content (1.00±0.00%). Phosphorus recorded highest concentration (500±0.00mg/100g) for mineral investigation while iron gave the lowest value for mineral (0.5±0.00mg/100g). Vitamins A and Thaimin were the two vitamins recorded with 20±0.00mg/100g and 1.02±0.01 values respectively. Anti-nutrient screening showed the availability of glycoside, oxalate, saponin, tanmin, canotenoid, polyphenol, flavonoid and lignant in minimal concentrations. Although, highest (28.45±0.00mg/100g) and lowest (0.002±0.00mg/100g) values were recorded for lignant and tannin respectively. Generally, L.squarrosulus is endowed with nutrient and anti-nutrient that are useful for healthy living.

Keywords: *Lentinus squarrosulus, nutrient and phytochemical*

INTRODUCTION

Edible mushrooms play vital role in the present global world food security as some are easily domesticated for commercial cultivation and production with some other species mostly found growing in the wild (Adesina *etal*., 2011; Agbagwa *et al*., 2020a). *Lentinus squarrosulus* (Mont.) Singer is an important member of the Agaricales taxon and has a wide range of distribution around the world including Pacific Island, Australia, Equatorial Africa and South-East Asia (Neda and Doi, 1998).The mushroom is a cherished commodity within the Southern and Eastern part of Nigeria because of its taste and is locally called 'Atakatelu' by Ikwerre and 'Ero atakata' by the Igbo speaking regions of the country due to its tough and hard texture (Petcharat, 1995; Akpaja *et al*., 2003).

L. squarrosulus also grow and develop on dead and decaying woods in the wild(De Leon *et al.,* 2017). The mushroom is morphologically characterised by a tough funnel-shaped white pileus with slight dark brown scales that run down the stipe (Njouonkou *et al.,* 2013). Conspicuous squamules are also found on the surface of the basidiocarp (Mortimer *et al.*,2014). Literatures have shown the cultivation of the mushroom on different substrate materials such as sawdust, rice husk, corn cobs and different dried plant leaves which serve

as sources of nutrient and energy during the mushroom growth (Alabi, 1991; Gbolagade *et al.*, 2006a; Oghenekaro *et al*., 2009). However, the cultivation of *L. squarrosulus* within the country still faces challenges which include poor biotechnology knowledge, temperature, finance, contamination and fabrication of preferred habitat (Morais *et al.*, 2000; Philippousis *et al*., 2001; Labarere and Menini, 2000).

Lentinus squarrosulus is also valued because of its nutritional quality likeother edible mushrooms (Pleurotus, Agricus and Auricularia) (Elmastas *et al*., 2007; Agbagwa *etal*., 2020b&c). Early researchers have shown the mushroom to contain carbohydrate, protein, fibre, lipid, calcium, phosphorus, magnesium, potassium, sodium as well as vitamins A, B and C(Upadhyay and Rai, 1999;Sharma and Atri, 2014; Omar*et al.*, 2011). In addition, L. squarrosulus has been reported to have vital medicinal and pharmaceutical relevance due to the availability of different phytochemicals it possesses which include saponin, tannin, alkaloid, polyphenol, flavonoid, glycosides and many more (Pascua *et al.*, 2016; Ghate and Sridhar, 2017). Generally, *Lentinus squarrosulus* serves enormous purposes as it is a source of food to the locals, income to grower and traders as well fodder to different animals (Akpaja et al., 2003).

It is based on this literatures that the present study was conducted to assess the nutrient and phytochemical compositions of *Lentinus squarrosulus* obtained in the wild.

MATERIALS AND METHODS

Sample Collection

Healthy samples of *Lentinus sqarrosulus* were collected from Rumuji community in Emohua Local Government Area, Rivers State. They were immediately transported to the Department of Plant Science and Biotechnology, Rivers State University for further studies.

Determination of nutrient and phytochemical components *Lentinus squarrosulus*

Healthy fruiting bodies of the mushroom were sent to the Plant Science and Biotechnology Laboratory for the determination of nutrient composition. The methods of AOAC, (2005) was used for the determination of proximate (moisture, ash, fibre, protein, carbohydrate and lipid), mineral (calcium, phosphorus, potassium, sodium, magnesium and iron), vitamin (thaimin) and anti-nutrients (glycoside, oxalate, saponin, tannin, carotenoid, polyphenol, flavonoid, and lignan) compositions. All analysis were done in triplicate.

Statistical Analysis

Data obtained were subjected to mean and standard deviation analysis with the aid of SPSS software version 25.

RESULTS AND DISCUSSION

Table 1: Proximate composition of *Lentinus squarrosulus*.

Parameter	Composition (%)
Moisture	36.45 ± 0.05
Ash	2.5 ± 0.00
Lipid	1 ± 0.00
Fiber	6.75 ± 0.25
Carbohydrate	28 ± 0.00
Protein	32 ± 0.00

Table 2: Mineral and Vitamin Compositions of *Lentinus Squarrosulus*.

Parameter	Composition (Mag 100g)
Calcium	230.5 ± 0.05
Iron	0.5 ± 0.00
Magnesium	250 ± 0.00
Phosphorus	500 ± 0.00
Potassium	125 ± 0.00
Sodium	50 ± 0.00
Vitamin A	20.00 ± 0.00
Thaimin	1.02 ± 0.01

Table 3: Phytochemical Composition of *Lentinus Squarrosulus*

Parameter	Composition (%)
Glycoside	0.004± 0.001
Oxalate	0.015± 0.005
Saponin	0.52± 0.01
Tannin	0.002± 0.00
Carotenoid	0.05± 0.00
Polyphenol	3.3± 0.00
Flavonoid	2.3± 0.00
Lignant	28.45± 0.05

The result of proximate composition presented in table 1 shows moisture, ash, lipid, fiber, carbohydrate and protein to be present in *Lentinus squarrosulus*. The present study profiled several proximate parameters and the investigation revealed moisture with the highest value (36.45±000) and lipid recording the lowest value (1.00 ±0.00). Research have been targeted to study mushroom because of their composition which has little or no health implication as regards high cholesterol buildup (Xu *et al*, 2019). The report of the current study support the findings of Bernas *et al.*(2006) about mushrooms being a valuable nutritive source. More so, the current study agrees with the report of Mridu and Atri, (2017) as they also reported lower content of lipid.

The findings of the present study is in line with the earlier report of Okoro and Achuba, (2012) as they also indicated highest and lowest contents of moisture and lipid respectively for *Lentinus squarrosulus*. Literatures have shown the lentinus genus to contain appreciable amounts of protein, carbohydrate, ash, fibre and very low content of lipid and *Lentinus squarrosulus*in this study was neither an exemption (Manjunathan and kaviyarasan, 2011, Nwanze *etal,* 2006a).
The varying nutrient concentrations between the present study and previous findings could be as a result of location, time and species (Nwanze *et al*,2006 b, Sharmaand Antri, 2014). The role of good nutrition quality in man's daily activity cannot be over emphasized as Large amount of energy is provided by Carbohydrate, and Lipid while the building element of the body system (Amino acids) is supplied by protein (Pascua *et al*, 2016; Adebayo,2011).

The result of mineral and vitamin composition of *Lentinus squarrosulus* presented in table 2. reveals the presence of calcium, iron magnesium, phosphorus, potassium, sodium, vitamin A and thaimin. *Lentinus sqarrosulus* has appreciable amounts of varying mineral element as indicated in present study. Although, highest occurring mineral element was recorded forphosphorus(500±0.00) whereas iron recorded lowest value (0.5±0.00). Mineral element are important and earlier researches have also implicated similar elements in *L.squarrosulus*as well as other edible mushrooms (Okhuoya, 1997;Mau *et al.*, 2004). The mineral result of the present study agrees with the report of Okoro and Achuba, (2012) as they also reported phosphorus as highest mineral element in *L.squarrosulus*. The result of the current study disagrees with report of Obodai *et al*, (2014) as they reported higher mineral elements than recorded in the present study.

The mineral element values in the present study are higher than those Manjunathan and Kaviyarasan, (2011) reported for *L.squarrosulus* tubenegium. Generally, mineral element are very important as they contribute to several biological process, make up part of some body component (blood) and aid bone strengthening (Gbolagade *et al.*, 2006b;Manzi *et al.* 2001). Vitamin A and Thaimin were the vitamins recorded in the present study. Literatures have also shown that *L.squarrosulus* contain the minerals of the present study alongside vitamin C (Sharma and Atri, 2014).
Omar *et al.*(2011) reported lower value of vitamin A for the *L.squarrosulus* compared to the result in the current study. Early researchers have also shown similar vitamins for mushrooms of the *Lentinus*genus as well as other edible mushrooms (Bernas *etal*,2006). In addition, the relevance of vitamin A for proper vision is an added advantage for the consumption *L. squarrosulus* (Kalac and Svoboda, 2000;Vetter, 2003).

The result of phytochemical composition of *Lentinus squarrosulus* presented in table 3 show glycoside, oxalate, saponin, tanin, carotenoid, flavonoid and lignant to be present *L.squarrosulus* contains different phytochemicals as revealed by the present study and highest ant-nutrient was recorded for lignant 28.45 ± 0.05 while lowest anti-nutrient was seen for tannin (0.002±0.00). The anti-nutrient result of the current study agrees with report of

Pascua *et al.* (2016) as they implicated all tested anti-nutrient of the present study in *Lentinus squarrosulus*.

Ghate and Sridhar, (2017) reported higher values of tannin, flavonoid and phenol than those of the present study. The tested anti-nutrients of the current study are relevant as they have important applications in the pharmaceutical industry. Obodai *et al*, (2014) revealed the antioxidant properties of *L*. squarrosulus.

Anti-nutrient have been reported to possess anti -microbial potential. The study of Mossebo *et al.*(2020) showed the anti-fungaland anti-bacterial organisms. The anti-nutrient in the present study havealso been implicatedas bioactive compounds with bioactive potential (Ghate and Sridhar, 2017). Omar *et al.* (2011) also revealed the ability of *L.squarrosulus* extract to control ulcer as a result of anti-nutrient present. *L.squarrosulus* promote healthy living as anti-nutrient supports the function of the immune system (Mridu and Atri,2017).

CONCLUSION

Lentinus squarrosulus is an edible mushroom found in the wild and the present study has revealed it contain several proximate, mineral and vitamin nutrients. The mushroom also contain appreciable amount of phytochemical.

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