Nutritional composition of Termitomyces robustus *(Agaricomycetes) and* Lentinus squarrosulus *(Mont.) singer in South East Nigeria*

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Nutritional composition of *Termitomyces robustus* (Agaricomycetes) and *Lentinus squarrosulus* (Mont.) singer in South East Nigeria

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Abstract *Termitomyces robustus* (Agaricomycetes) and *Lentinus squarrosulus* (Mont.) Singer mushrooms are considered as important source of nutrient. They are used as remedy for treatment of various ailments in Southeastern part of Nigeria, yet there is inadequate documentation on the nutritional composition of these mushrooms. This study therefore aimed at evaluating the nutritional composition of the two mushrooms. The assayed phytochemicals were $\leq$ 1.35% in the two mushrooms. Phenols, flavonoids and anthocyanin were greater in amount in *T. robustus* than *L. squarrosulus*. Both mushrooms revealed high amount of carbohydrate and crude protein contents. Highest micronutrient in mg/100 g was recorded in phosphorous (P) in *L. squarrosulus*, while the least elemental was Zn^{2+} in *T. robustus*. All the quantified minerals and vitamins except K^+ and vitamin C were greater in amount in *L. squarrosulus* than *T. robustus* while, vitamin K was not detected in the two mushrooms. The dominant fatty acid in the tested samples was oleic acid (C18:1) with the highest value recorded followed by stearic acid and palmitic acid in *T. robustus*. Essential and non-essential amino acids were all present in the two mushrooms with least value and highest values recorded in cysteine and glutamic acid respectively. Data showed that *T. robustus* and *L. squarrosulus* are nutrient compliant and could ameliorate deficiencies associated with malnutrition.

Keywords Amino acids · Basidiomycetes · *Lentinus squarrosulus* · Nutrient · *Termitomyces robustus*

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Introduction

Nutritional and bioactive profiling from plant derivatives has played unrestrained roles in nutrition and food science. Although, some of these plants belong to diverse autotrophic hierarchical division which lacks chlorophyll and as such, do not photosynthesize. One of such classes is mushrooms. Mushrooms are among the most valuable non-timber forest products that help to meet the needs of communities that depend on forest resources. Mushrooms are unique fleshy fruiting bodies of fungi typically produced above or beneath ground level on soil which possess hypha with an interwoven web of tissue called mycelium (Chang and Mile 1992; Lindequist et al. 2005). Mushroom production depends on abiotic factors like temperature, soil characteristics, relative humility and tree species composition. Also, native forests have a greater and better diversity for growing mushrooms.

Over the past few decades, medicinal, nutritional and functional food qualities of this cosmopolitan class of fungi (mushrooms) have gained grounds in the world (Wasser 2002; Luo et al. 2009). They are being consumed in different countries of the world including Nigeria due to their boundless medicinal and nutritional constituents, providing low calories and rich sources of water soluble Vitamin B complexes and dietary fibers (Kalač 2013). In comparison to first class proteins usually gotten from animal sources like milk, egg and meat; mushrooms have compared well and have been reported to be more nutritionally potent than leafy vegetables (Kirbağ 2010).

Several researchers have asserted that about 22 out of 200 species of mushrooms are cultivable, while the remaining 178 are not cultivated (Deleon et al. 2017; Kirbağ 2010). However, the wild edible *Termitomyces robustus* are not cultivable while *Lentinus squarrosulus* are cultivable. In South Eastern Nigeria, *Termitomyces robustus* and *Lentinus squarrosulus* mushrooms have been included in the human diets long time ago because of their specific taste and flavour. *Termitomyces robustus* is a wild edible and highly nutritious mushroom that belongs to the class of fungi known as basidiomycetes. It is used in ethnomedicine for the treatment of rheumatism, diarrhea, gonorrhea, stomach upset, and hypertension (Ayodele et al. 2013). This mushroom is popularly known as "Ero onyentekam" in Ngwa part of Abia State, South East, Nigeria. When cooked, *T. robustus* serves as food, medicine and to less extent, serves as source of income. The colour of its fruity body is white and has a soft and tender texture. It forms obligate symbiosis with *Macrotermittinae termites* and more often than not referred to as "Termites mushrooms" due to its relationship with termites (Nobre et al. 2011).

Lentinus squarrosulus, on the other hand, is natively called "Ero atakata" by the indigenes of South East, Nigeria. Ethnomedicinally, *L. squarrosulus* is employed for the treatment of red blood cell deficiency, sterility problems associated with male and female (Okigbo and Nwatu 2015). It offers remedy for erosion of the gastric mucosa (Omar et al. 2011), treatment of cardiomyopathy and alleviates the risk of acute and chronic deviations from the normal state of health (Oyetayo 2011; Omar et al. 2015). *L. squarrosulus* is employed in ethnomedicine in the treatment of numps and heart diseases (Akpaja et al. 2003; Ayodele et al. 2013). The nutritional assay of *Termitomyces robustus* and *Lentinus squarrosulus* revealed the presence of plant primary and secondary metabolites like glucose, amino acids, phenolic compounds, saponins, flavonoids, tannins, alkaloids, steroids, ascorbic acid and terpenoids (Attarat and Thamisak 2014). These metabolites and bioactive components have been implicated in the amelioration and prevention of diseases. They serve as antibacterial, antimutagenic, antitumoural and antiviral activities (Garcia-Lafuente et al. 2011; Schillac et al. 2013), anti-diabetic and anti-hyperlipidemic (Chen et al. 2014) and antioxidants (Mercan et al. 2006). The proximate and mineral compositions of these mushrooms also showed high content of protein including essential and non-essential amino acids (Omar et al. 2011), and mineral compositions (K^+, Mg^{2+}, Ca^{2+}, Na^+, Fe^{2+}, Zn^{2+} and P).

Nutritional compositions of mushrooms could be extended to agro-industries. This has been correlated by the work carried out by Sarker et al. (2016) who revealed that mushroom straw diet fed to cattle could improve growth performance and plasma metabolites in livestock without any detrimental effect on the animals. However, to ameliorate the scarcity of animal feed and reduction of cost, mushroom concentrates have been resorted. Mushroom is easily digestible and biodegradation of feed with *Pleurotus ostreatus* increased its nutritional value and digestibility in ruminant diets (Silvana et al. 2006). Reports have shown that digestibility of feeds of livestock can reduce the level of methane production from the rumen of ruminants (Hegarty 2002). Also, the work of Fazaeli and Talebian (2006) showed that inclusion of mushroom-straw in the diet of cattles up to 20% did not distort the metabolic activity of the animal suggesting its importance in the maintenance of bowel movement of the livestock.

Environmentally, mushrooms play vital roles in ecosystem. They exhibit positive impact by increasing soil fertility via degrading complex compounds into utilizable simple and useful products. It alleviates environmental pollutants through adsorption of pollution causing agents and acts as bioremediation agents by removing contaminants (Chang 2005; Chang and Mshigeni 2013; Miller 2013). The quality and nutritional components possessed by mushrooms are affected by their geographical origins (Lu et al. 2012).

Despite the tremendous use of mushrooms as a source of nutrients with potential medicinal properties in treatment of various ailments in Africa and other parts of the world, there is little or no scientific information on nutritional composition of *Termitomyces robustus* and *Lentinus squarrosulus* in South East Nigeria. Therefore, the present study was carried out to fill the dearth gap by quantifying the phytochemical, proximate, mineral, vitamin, fatty acids and amino acids of these two wild edible mushrooms.

Materials and methods

Mushroom collection and authentication

Fresh wild edible *Termitomyces robustus* (Agaricomycetes) and *Lentinus squarrosulus* (Mont.) Singer used in this study were collected from Isiala Ngwa South Local Government Area of Abia State, Nigeria in June 2017 and were transported to the Department of Biochemistry, Abia State University Uturu in an airtight polyethylene bag. The samples were authenticated by a Mycologist at African Centre for Mushroom Research and Technology Innovation (ACMRTI). The voucher specimens (*Termitomyces robustus* (ACMRTI00046) and *Lentinus squarrosulus* (ACMRTI00045) were deposited in the herbarium.

Preparation of extract

The mushrooms (*Termitomyces robustus* and *Lentinus squarrosulus*) were cleaned, air-dried, ground and transferred into polythene bags, labelled and sealed to prevent any moisture intake and then stored in a refrigerator at 4 °C until required for analysis.

Phytochemical analysis

Alkaloids, phenolics, saponins, anthocyanins and flavonoids were quantitatively determined by the method of Harborne (1973). Tannin was determined using the Folin-Denis spectrophotometric method as describe by Shabbir et al. (2013).

Proximate analysis

The proximate composition of the mushrooms; moisture, ash, crude lipid, nitrogen content, crude fibre and carbohydrate were determined according to the methods of the Association of Official Analytical chemists (AOAC 2005).

Mineral determination

Mineral constituents comprising of potassium (K^{+}), magnesium (Mg^{2+}), iron (Fe^{2+}), calcium (Ca^{2+}), copper (Cu^{2+}), manganese (Mn^{2+}) and zinc (Zn^{2+}) were determined using Atomic Absorption Spectrophotometry, while phosphorus (P) and sodium (Na^{+}) were determined using a flame photometer (AOAC 2005).

Vitamin determination

Ascorbic acid (vitamin C) was determined by Iodine Titration method of Helmenstine (2018), pantothenic acid (vitamin B_5) by AOAC 2005), and vitamin B_{12} by vitamin B_{12} assay. Vitamin A as β-carotene determined using AOAC Method. Water-soluble vitamins (B_1, B_2, B_3 and B_6) were determined using RIDASCREEN enzyme immunoassay kit in accordance with the manufacturer's instructions.

Bioactive evaluation

Fatty acid compositions of the mushroom were determined using gas chromatography, while the amino acid compositions of the mushrooms were determined using an amino acid analyser as described by Sharma and Gautam (2015).

Statistical analysis

The experimental data were analysed using Microsoft (MS) Excel and GraphPad Prism® statistics software package, version 7.03. All determinations were done in triplicate. Mean and Standard deviations was calculated using Microsoft (MS) Excel program. The experimental data were analyzed for statistical significance by *t* test using the GraphPad Prism® statistics software package, version 7.03.

Results

In Table 1, *T. robustus* had more flavonoid, phenol, anthocyanin than *L. squarrosulus*, while alkaloid, saponin and tannin recorded higher percentage values in *L. squarrosulus* than *T. robustus*.

Regarding the obtained results of the proximate composition, the statistical difference ($P < 0.05$) were observed in the values obtained in crude fibre and crude lipid among the tested mushrooms. However, higher percentage proximate composition in all the tested proximate parameters were recorded in *T. robustus* except crude lipid and ash contents that were more in *L. squarrosulus* than *T. robustus* (Table 2).

The result of mineral compositions showed statistical differences in all the tested minerals except K^+ ($P < 0.05$) with higher mineral contents (Ca^{2+}, Mg^{2+}, Na^+, P, Fe^{2+}, Zn^{2+}) recorded in *L. squarrosulus*, while K^+ was found in higher amount in *T. robustus* than *L. squarrosulus* (Table 3).

The analysed vitamins include: Vitamins A, B_1, B_2, B_3, B_6, B_{12}, C and vitamin K. The result showed statistical differences ($P < 0.05$) in vitamins A, B_1, B_2 and C with higher compositions of Vitamins A, B_1, B_2 and B_3 recorded in *L. squarrosulus* than *T. robustus*, while vitamin C was found more in *T. robustus* than *L. squarrosulus*. However, vitamin K was not detected in the two mushrooms (Table 4).

Table 5 showed the results obtained from the fatty acid profile of oil extracted from *T. robustus* and *L. squarrosulus*. Capric acid, myristic acid, palmitic acid, stearic acids were the saturated fatty acids, while oleic acids, unsaturated fatty acid detected. All the assayed fatty acids were higher in *T. robustus* than *L. squarrosulus*.

The wild edible mushrooms (*T. robustus* and *L. squarrosulus*) contained appreciable amount of essential and non-essential amino acids. All the assayed amino acids were in higher amount in *T. robustus* than *L. squarrosulus*. However, least amount in all the evaluated amino acids was recorded in cysteine, while glutamic acid had the highest g/100 g protein (Table 6).

Table 1 Phytochemical composition of *Termitomyces robustus* and *Lentinus squarrosulus*

Parameter	Phytochemical composition (%)	
	Termitomyces robustus	*Lentinus squarrosulus*
Alkaloid	0.36 ± 0.02	0.42 ± 0.02
Saponin	0.91 ± 0.03	1.36 ± 0.02
Tannin	0.29 ± 0.01	0.38 ± 0.02
Flavonoid	1.35 ± 0.03	0.38 ± 0.02*
Phenols	1.32 ± 0.01	1.22 ± 0.01
Anthocyanin	0.16 ± 0.02	0.14 ± 0.02

Values are mean ± SD for triplicate determination

Values marked with superscript asterisk (*) shows significant different at $P < 0.05$

Discussion

Nutritional composition of enriched and balanced food has cost advantage in the maintenance of good health and prevention of diseases. To establish and evaluate this safety assertion in South-East Nigeria, nutritional composition of two delicious wild edible mushrooms (*T. robustus* and *L. squarrosulus*) consumed by South-East Nigerians were evaluated. Phytochemicals are chemicals associated with plants, which are produced from plant secondary metabolism. They promote and offer health benefits to living systems due to their biologically active ingredients (Saxena et al. 2013). The results obtained from the phytochemical compositions of the tested mushrooms (*T. robustus* and *L. squarrosulus*) showed that *T. robustus* had more flavonoids, phenol and anthocyanin than *L. squarrosulus*, while alkaloid, saponin and tannin recorded higher values in *L. squarrosulus* than *T. robustus*. The appreciable number of phytochemicals present in these mushrooms suggested that these mushrooms have antioxidants, anti-cancer and anti-allergic activities (Tapas et al. 2008), fungi-static and fungicidal properties (Georgiev et al. 2014). These results agree with the reports of Attarat and Thamisak (2014) and Obodai et al. (2014) who opined that wild edible mushrooms produce both primary and secondary metabolites.

However, alkaloids are large group of phytocompounds which are nitrogenous in nature. They are more often than not synthesized from primary metabolites like amino acids which are of great influence to animal physiology. Several researchers have reported its antispasmodic, bactericidal and analgesic properties (Mario et al. 2009; Ahmad et al. 2013). Flavonoids are also products gotten from plant secondary metabolism. These

Table 2 Proximate composition of *Termitomyces robustus* and *Lentinus squarrosulus*

Parameter	Proximate composition (%)	
	Termitomyces robustus	*Lentinus squarrosulus*
Crude protein	18.44 ± 0.09	17.59 ± 0.09
Crude fibre	3.61 ± 0.21	1.19 ± 0.03*
Crude lipid	2.88 ± 0.04*	5.91 ± 0.03
Ash	2.66 ± 0.05	3.03 ± 0.08
Moisture content	10.16 ± 0.02	9.85 ± 9.92
Carbohydrate	62.63 ± 0.53	62.53 ± 0.39

Values are mean ± SD for triplicate determination

Values marked with superscript asterisk (*) shows significant different at $P < 0.05$

Table 3 Mineral composition of *Termitomyces robustus* and *Lentinus squarrosulus*

Mineral	Mineral composition (mg/100 g)	
	Termitomyces robustus	*Lentinus squarrosulus*
Ca^{2+}	48.07 ± 0.06	54.19 ± 12.01*
Mg^{2+}	10.53 ± 1.29*	26.57 ± 2.20
K^{+}	42.87 ± 0.25	39.20 ± 0.20
Na^{+}	3.88 ± 0.02*	8.10 ± 0.06
P	33.43 ± 0.32*	74.39 ± 0.01
Fe^{2+}	1.19 ± 0.03*	2.08 ± 0.04
Zn^{2+}	0.20 ± 0.02*	0.86 ± 0.02

Values are mean ± SD for triplicate determination

Values marked with superscript asterisk (*) shows significant different at $P < 0.05$

many plant species. They have detergent-like properties which elicit fungi-static and fungicidal properties by disrupting the cell membrane of invading fungal pathogens (Georgiev et al. 2014), and also play biosynthetic role in the production of steroid hormone (Okwu 2003). Tannins are known for their stringent characteristics and exhibition. They show affinity for imino group of amino acid called proline and molecules with protein rich centres and also interfere with protein synthesis (Shimad 2006). Phenolic compounds are the most evenly distributed and largest group of plant secondary metabolites. They have complex chemical components present in plants and are divided into flavonoids, phenolic acids and polyphenols based on their dietary phenolic classification (Devi et al. 2014). Anthocyanins are aqueous phytochemicals

Table 4 Vitamin content of *Termitomyces robustus* and *Lentinus squarrosulus*

Parameters	*Termitomyces robustus*	*Lentinus squarrosulus*
Vit A (Iμ/100 g)	8.56 ± 0.24*	38.37 ± 0.85
Vit B_1 (mg/100 g)	0.06 ± 0.01*	0.13 ± 0.02
Vit B_2 (mg/100 g)	0.11 ± 0.01*	0.29 ± 0.02
Vit B_3 (mg/100 g)	3.70 ± 0.20	4.21 ± 0.04
Vit B_6 (mg/100 g)	0.14 ± 0.02	0.14 ± 0.02
Vit B_{12} (mg/100 g)	0.01 ± 0.00	0.01 ± 0.00
Vit C (mg/100 g)	3.10 ± 0.15	2.11 ± 0.25*
Vit K (Iμ/100 g)	ND	ND

Values are mean ± SD for triplicate determination

Values marked with superscript asterisk (*) shows significant different at $P < 0.05$

ND not detected

metabolites have been reported for their anti-inflammatory response, antioxidants, anti-cancer and anti-allergic activities (Tapas et al. 2008). Saponins are glycosylated triterpenoids found in with a characteristic red to blue colour. They occur mainly as glycosides of anthocyanidins like malvidin, cyanidins, delphinidin, petunidin, peonidin and pelargonidin. Like other plant secondary

Table 5 Fatty acid profile of oil extracted from *Termitomyces robustus* and *Lentinus squarrosulus*

Fatty acid	Percentage composition (%)	
	Termitomyces robustus	*Lentinus squarrosulus*
Capric acid (C10:0)	3.04	2.87
Myristic acid (C14:0)	5.45	4.44
Palmitic acid (C16:0)	8.15	8.05
Stearic acid (18:0)	11.39	11.28
Oleic acid (18:1)	12.48	12.45

Table 6 Amino acid composition of *Termitomyces robustus* and *Lentinus squarrosulus* mushroom in g/100 g protein

Parameter	*Termitomyces robustus*	*Lentinus squarrosulus*
Leucine	7.51 ± 1.21	5.18 ± 0.19*
Lysine	3.83 ± 0.43	3.09 ± 0.07
Isoleucine	3.50 ± 0.30*	3.03 ± 0.03
Phenylalanine	4.04 ± 0.05	3.22 ± 0.03
Tryptophan	0.87 ± 0.05	0.73 ± 0.03
Valine	3.36 ± 0.21	3.34 ± 0.07
Methionine	1.09 ± 0.21	0.76 ± 0.05
Proline	2.96 ± 0.11	2.84 ± 0.04
Arginine	5.21 ± 0.07	4.75 ± 0.03
Tyrosine	2.77 ± 0.03	2.10 ± 0.05
Histidne	2.09 ± 0.07	1.91 ± 0.05
Cysteine	0.80 ± 0.18	0.77 ± 0.03
Alanine	3.75 ± 0.37	3.17 ± 0.03*
Glutamic acid	11.88 ± 0.68	10.32 ± 0.03*
Glycine	3.44 ± 0.08	3.11 ± 0.02
Threonine	3.14 ± 0.14	2.70 ± 0.02*
Serine	3.50 ± 0.10	3.04 ± 0.02
Aspartic acid	7.86 ± 0.46	6.91 ± 0.09

Values are mean ± SD for triplicate determination

metabolites, anthocyanins possess anti-cancer, anti-inflammatory and cardiovascular health advantaged properties (He and Giusti 2010).

The proximate compositions of *Termitomyces robustus* and *Lentinus squarrosulus* revealed a higher concentration of crude protein, crude fiber, moisture content and carbohydrate in *T. robustus*, while crude lipid and ash contents were more in *L. squarrosulus* than *T. robustus*. The result also showed the highest proximate content in carbohydrate in *T. robustus* and *L. squarrosulus* when compared to other parameters. The high carbohydrate content obtained in the present study affirms the assertion that large amounts of total carbohydrates are found in the dry state of wild mushrooms and this further supports the results reported by other researchers on wild edible mushrooms (Gbolagade et al. 2006; Saiga et al. 2008). Moreover, the presence of chitin, polysaccharides (β-glucans) and sugar alcohols contained in wild edible mushrooms may be strong evidence for the increased carbohydrate contents (Mattila et al. 2001). However, the possessed sugar alcohol by these mushrooms may be a good replacement for high calorific sugar in diabetic patients (Hamano 1997).

The observed slight percentage differences in protein found in the examined mushrooms may be attributed to difference in the following factors; species, strains, time of harvest, the growth of the substrate and the amount of available nitrogen present in the growth substrate (Bernas et al. 2006). It has been reported that mushrooms are good sources of quality protein comprising all the essential amino acids needed for the metabolic processes in the human diet (Mattila et al. 2002; Colak et al. 2009). The moisture content of food acts as a measurable tool for food stability and its susceptibility to microbial contamination (Uriah and Izugbe 1990). This implies that moisture content in mushrooms may be attributed to their rapid deterioration and spoilage when improperly preserved due to their vulnerability to microbial attack (Uriah and Izugbe 1990). Therefore, variation in moisture content is environment-dependent and is also influenced by the amount of water produced during metabolic processes involved in their growth and storage (Mattila et al. 2001).

The presence of crude fiber was found in greater proportion in *T. robustus* than *L. squarrosulus*. This suggests that tested wild edible mushrooms could favour the digestive enzymes activity in eliciting their digestive functions. Reports have it that dietary fibers help in digestion and also prevent bowel movement, constipation, gastrointestinal disorder, diabetes, breast cancer and pile (Rao and Newmark 1998; Ishida et al. 2000). Therefore, adequate consumption of these mushrooms could offer preventive measures of the enlisted ill-health.

The result revealed higher mineral contents in *L. squarrosulus* except K^+ that was found in higher amount in *T. robustus* than *L. squarrosulus*. The predominant mineral was Ca^{2+}. This is in contrast with the work done by Nakalembe et al. (2015) who reported that wild edible mushrooms are deficient in Na^+, Ca^{2+} and Mg^{2+}. However, Calcium helps in growth and maintenance of bones, healthy teeth and muscles (Taran et al. 2003). The content of K^+ was higher compared to Na^+ in the two tested mushrooms, while the decreased Na^+ concentrations are of nutritional benefit especially in patients with hypertension. Na^+ and K^+ are important electrolyte and crucial positive ions of the cell that aids in signal transduction (Nakalembe et al. 2015). Furthermore, zinc and iron concentrations were low in the two mushrooms when compared to other minerals. Zinc is important in a living system due to its tremendous role in cellular metabolism. Some metabolic processes like: immune function, wound healing, protein synthesis, DNA biosynthesis and cell division requires the element, zinc (Heyneman 1996). Iron, on the other hand helps oxygen binding with the haemoglobin (Hb), thus offering essential catalytic site for the cytochrome oxidase which promotes erythropoiesis and prevents erythrocyte deficiency (Geissler and Powers 2005). Some other minerals like calcium, phosphorous and potassium are known for their cardiac rhythmic management, bone, teeth, muscular maintenance and transductions (Nakalembe et al. 2015). Magnesium prevents muscle degeneration, alopecia, gonadal atrophy, congenital malfunctions and impaired spermatogenesis (Chaturvedi et al. 2004).

Vitamins are micronutrients that contribute very small fraction of food in our daily meal, but essential in the prevention of ailments and increases longevity. This study revealed the presence of vitamin A, vitamin B_1, vitamin B_2, vitamin B_3, vitamin B_6, vitamin B_{12} and vitamin C, while vitamin K was not detected in the two mushrooms. Other studies have shown that wild edible mushrooms possess appreciable vitamin profile especially vitamin B_1, B_2, C and folic acids. Vitamin A is a good promoter of vision needed for the maintenance of healthy skin, immune system and reproduction (Musa and Ogbadoyi 2012). Vitamins B_1, B_2, B_3, B_5, B_6 and B_{12} are water soluble vitamins. Vitamin B complex helps in the maintenance of good health in humans and animals (Ball 2006). Riboflavin (B_2) helps in oxidation–reduction reactions, while pyridoxine (vitamin B_6) helps in erythropoietic processes and aids in metabolism, healthy teeth and gums (Harper 1999). Vitamin C is a valuable food component that has antioxidant and therapeutic properties (Bernas et al. 2006). The presence of Vitamin B_{12} in mushrooms is essential in the maintenance of good health and needed as panacea for pernicious anemia (Refsum et al. 1998).

The tight feedback regulatory mechanism in dietary fats has made them a major constituent of a normal diet. Lipids are group of heterogenous compounds that are hydrophobic, but may dissolve in other organic solvents. They are being transported in the blood to their targeted locations by lipoproteins, a type of conjugated proteins (Nwanjo et al. 2006). Fatty acid composition of *T. robustus* and *L. squarrosulus* are shown in Table 5. The carbon chain lengths of fatty acids were from 10 to 18. Capric acid, myristic acid, palmitic acid, stearic acids were the saturated fatty acids present, while oleic acid, an unsaturated type of fatty acid was present in the two mushrooms. The result of the fatty acids was higher in *T. robustus* than *L. squarrosulus*. However, oleic acid was the highest dominant fatty acid recorded in the two mushrooms. This agrees with the findings of other researchers that unsaturated fatty acids predominate over saturated ones in wild edible mushrooms (Diez and Alvarez 2002; Saiga et al. 2008). Anti-hyperlipidemic activity has been attributed to the dominance of unsaturated fatty acids over saturated fatty acids as seen in the present study. High unsaturated fatty acids show medicinal importance as they increase the high density lipoprotein cholesterol and decreases low density lipoprotein cholesterol, triacyglycerol, lipid oxidation and low density lipoprotein susceptibility to oxidation (Kanu et al. 2007).

Comparatively, amino acid contents of *T. robustus* were greater than *L. squarrosulus*. These mushrooms showed varying levels of amino acids with the highest amount recorded in glutamic acid followed by aspartic acid and leucine. The present result is in consonance with the findings of other researchers who reported glutamic acid as the most prevalent amino acids in mushrooms (Mdachi et al. 2004; Agrahar-Murugkar and Sabbulakshmi 2005). The varying recorded amino acids values seen in this study may have been owed to differences in the size of the pilei, growth substrate, strain or species of mushroom (Bernas et al. 2006).

Conclusion

The present assays have indicated the nutritional potentials of *T. robustus* and *Lentinus squarrosulus*, wild edible and delicious mushrooms consumed by South-East Nigerians.

The result showed that the fatty acids and amino acids profiles of *T. robustus* were relatively greater than those of *L. squarrosulus*. However, the presence of unsaturated fatty acids (oleic acid) found in these mushrooms made them good hypolipidemic agents and their richness in proteins also credit them to be used as supplement to problems that may arise due to protein energy malnutrition.

Therefore, the obtained results serve as strong ground to encourage South-East Nigerians and other members of other communities to exploit the nutritional wallop and active ingredients found in these mushrooms (*T. robustus* and *L. squarrosulus*) in order to alleviate problems associated with not meeting the required daily allowance and malnutrition.

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