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Proximate and Minerals Composition of 12 Wild Mushrooms from the Noun Division, West Region in Cameroon

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Nutrient Content Of Mushrooms From West Region, Cameroon

Composition Proximale et Minérale de 12 Champignons Sauvages du Département du Noun, Région de l'Ouest -Cameroun

Abstract
Mushrooms are an important source of food mainly in developing countries where the nutritional value of many edible species is still unknown. This study was aimed at screening the nutritional composition of wild edible mushrooms from the Noun Division of Cameroon. Fruit bodies of 12 mushrooms were collected, identified and their macronutrient and micronutrient contents determined using common methods of food composition analysis. The protein content ranged from 45.36 – 61.32 g/100g DW for *Termitomyces umkowaan* and *Schizophyllum commune*, the amount of carbohydrates ranged from 9.10 – 35.04 g/100g DW for *Lactifluus longipes* and *T. umkowaan*, the lipid content ranged from 0.83 – 4.77 g/100g DW for *T. umkowaan* and *Lactifluus longipes*, the fiber content ranged from 7.02 – 30.88 g/100g DW for *Lentinus squarrosulus* and *Lactifluus longipes*, the ash content ranged from 3.27 – 9.89 g/100g DW for *T. umkowaan* and *Lactifluus longipes*. In all species, calcium was the most abundant mineral with content ranging from 389 – 1309 mg/kg DW for *Lactifluus rubroviolascens* and *Lentinus squarrosulus* respectively. This study showed that the studied species have interesting nutritional value with great levels of proteins and minerals and their uses as food can be recommended or encouraged to promote food security in developing countries.
Keywords: Edible mushrooms, nutritional value, West region, Cameroon.

Résumé
Les champignons sont une source importante de nourriture principalement dans les pays en développement où la valeur nutritionnelle de nombreuses espèces comestibles est encore inconnue. Cette étude visait à cribler la composition nutritionnelle des champignons sauvages comestibles du Département du Noun au Cameroun. Les fructifications de 12 champignons ont été collectées et identifiées. Leurs teneurs en macro et micronutriments ont été déterminées au moyen des méthodes courantes d'analyse de la composition des aliments. La teneur en protéines variait respectivement de 45,36 à 61,32 g / 100 g masse sèche (MS) pour *Termitomyces umkowaan* et *Schizophyllum commune;* le taux de glucides oscillait entre 9,10 et 35,04 g / 100 g MS pour *Lactifluus longipes* et *T. umkowaan*; la teneur en lipides variait de 0,83 à 4,77 g / 100g MS pour *T. umkowaan* et *Lactifluus longipes*; la teneur en fibres allait de 7,02 à 30,88 g / 100g MS pour *Lentinus squarrosulus* et *Lactifluus longipes*; et la teneur en cendres variait de 3,27 à 9,89 g / 100g MS pour *Termitomyces umkowaan* et *Lactifluus longipes*. Chez toutes les espèces, le calcium était le minéral le plus abondant avec une teneur allant de 389 à 1 099 mg/kg MS pour *Lactifluus rubroviolascens* et *Lentinus squarrosulus* respectivement. Cette étude a montré que les espèces étudiées ont une valeur nutritionnelle intéressante avec de potentiels élevés en protéines et en minéraux et que leur

utilisation comme aliments peut être recommandée ou encouragée pour promouvoir la sécurité alimentaire dans les pays en développement.
Mots clés: Champignons comestibles, valeur nutritionnelle, région de l'Ouest, Cameroun

Introduction

Mushrooms are macrofungi that produce distinctive hypogeous or epigeous fruiting bodies (Chang & Miles 1992). Taxonomically, they are mainly members of the division of Basidiomycota (class Agaricomycetes) or sometime Ascomycota (Das 2010). Nearly 140 000 species of mushrooms are estimated with only 14 000 (10 %) documented (Lindequist et al. 2005). Many species are of benefit to humans as foods, medicines and source of income. Some are even used in some biotechnological processes like bioremediation (Chang & Miles 1992).

They are generally eaten boiled in various types of sauces and dishes and, contain fibers, proteins, polyunsaturated fatty acids, phenolic compounds, prebiotics, and probiotics (El-Sohaimy et al. 2019). In general, the fruiting bodies of mushrooms contain about 56.8% carbohydrate, 5.7% fat and 12.5% ash on a dry weight basis (Ouzouni et al. 2009). In addition, protein content normally ranges between 20% and 40% of dried matter, which is better than many legume sources like soybeans, cowpea seeds, lima beans and peanuts, and protein-yielding vegetable foods (Ghogomou et al. 1989, Jonathan 2002). With the revelation of their nutritional potentialities and the evolution of life style that have given rise to important changes in eating habits of humans, the consumption of mushrooms is more and more relevant due to their high content in functional component.

In Cameroon, the number of fungal species is estimated at about 50 000 species, of which only 1,050 are known including many species of mushrooms (Douanla-Meli 2007). Here, their uses have been reported from many areas including forest and savannah zones (Dijk et al. 2003, Njouonkou et al. 2016, Onguene et al. 2019). These studies, mentioned the use of more than one hundred species of mushrooms as food or medicine including saprotrophic, ectomycorrhizal, and termite associated taxa. The genera *Termitomyces*, *Lactifluus*, *Russula*; *Cantharellus*, *Pleurotus*, and *Lentinus* being among the most popularly known.

Very few studies have been carried out to investigate the nutritional properties of macrofungi growing in Cameroon. The main work in this scope is that of Kansci et al. (2003) who studied the nutrient content of 6 species of the genus *Termitomyces* including *Termitomyces letestui*, *T. aurantiacus*, *T. schimperi*, *T. mammformis*, *T. mboudaeïna* and *T. subclypeatus* f. *bisporus* from the Centre and West regions in Cameroun. Njouonkou et al. (2016) listed 40 species of mushrooms used by the Bamoun people from the Noun division, West region of Cameroon for either food or medicine. According to Ijioma et al. (2015), knowledge on the nutritive value is essential to encourage consumption, cultivation and subsequent industrial production of mushroom species. Hence, the aim of the present study was to evaluate the nutritional composition of some of the wild mushrooms consumed by the population of the western highlands of Cameroon, especially in the Noun-Division.

Materials and methods

Mushroom species sampling and processing

Fruit bodies of wild mushrooms were collected from gallery forests, savannas and farmlands in the Foumban and Koutaba subdivisions during the months of March and August 2016. Species (figure 1) were identified according to their features using documentation on African mushrooms including Pegler (1977), Verbeken & Walleyn (2010), Eyi Ndong et al. (2011), and Mossebo et al. (2002). Then each sample was washed carefully to remove soil particles and other external elements and then dried between 42 and 45°C using a DomoClip fruit and vegetable dryer for 24 to 48 hours. Samples of each species were dried, milled and the powder obtained were weight and stored at -20°C until analysis.

Proximate and mineral analysis

To determine the moisture content of the dried powder, each sample was dried in an oven at 105ºC for 24 h until a constant weight was obtained (AOAC 1990). The crude protein content of the samples was measured using the Kjeldahl method with some modifications as previously described by Devani et al. (1989). The total lipid content was determined by Soxhlet as described by Bourely (1982). Crude fibre content was estimated according to AOAC (1990). The ash content was determined by incineration of samples at 500°C for 3 hours in muffle furnace according to AOAC (1980). The content of Carbohydrate was calculated using the following formula:

Total carbohydrates (g/100g dry weight) =100 - [g protein+ g fat + g ash +g fiber]

Mineral analysis

For mineral analysis, all the samples were digested with 25 mL of concentrated nitric acid, sulphuric acid and hydrogen peroxidase. The mineralized samples were kept in glass bottles until analysis. Minerals were determined by employing AOAC (1989) method. Phosphorus, iron, calcium and magnesium were determined by using standard procedures of Pawels et al. (1992). Potassium and sodium were determined by flame technique. All experiments were performed in triplicates. Results are expressed as mean ± standard deviation. Data were statistically analysed using Excel (version 2010) statistical software.

Results and Discussion

Proximate composition

The results of proximate analysis of 12 wild edible mushroom species are presented in table 1. It is observed that *T. aurantiacus* and *Lactifluus rubroviolascens* have lower and higher moisture contents (90.48% - 93.89%), respectively. The range of moisture content obtained in this study is similar to those of other studies of these organisms. Concerning specifically *Termitomyces*, results are similar to those of Kansci et al. (2003) and Ashagrie et al. (2015) on *T. aurantiacus, T. letestui* and *T. mammiformis* from Cameroon and Ethiopia. However, it should be noticed in accordance with Guillamón et al. (2010) and Degreef et al. (1997) that the moisture content also depends on mushroom species and varies according to parameters like growth stage, storage and climatic conditions. The high amount of moisture in mushroom induces its rapid degradation, reason why it needs to be dried for a long period before storage (Brock et al. 1986).

The protein content varies from 45.36 g/100g DW in *T. umkowaan* (Henn.) Singert to 61.32 g/100g DW in *Schizophyllum commune*. The protein content varies greatly with the range being similar to those of species from Turkey (Bofaris & Alzand 2019). Protein was the dominant nutrient in all screened species. This tendency was also observed with many other species (Egwim et al. 2011, Roy et al. 2015); but it is in opposition with the results of Gulati et al. (2011) and Manjunathan & Kaviyarasan (2011) for *Lentinus* and *Pleurotus tuber-regium* where carbohydrate is dominant. These values are higher than those found in previous works especially concerning *Termitomyces* spp. (Kansci et al. 2003). It is interesting to observe that this content reaches a remarkably very high level (61.32 g/100 g Dw) in *S. commune*. This high protein content suggests that edible mushrooms are a good proteins supplement for the local communities.

The lipids analysis showed that *T. umkowaan* had the lowest content (0.83 g/100g DW) and *L. longipes* the highest (4.77 g/100g DW). These results imply that lipids are the lowest macronutrients in mushrooms. This is in accordance with general observation on mushroom nutrients and their values for our species are comprised within the range of those of European species (Kalač 2009, Kalač 2013). Hence, edible mushroom including those growing in the Noun Division is part of low-fat diet required by patients with cardiovascular diseases, obesity etc. (Gropper et al. 2009).

From the fibres content analysis, *Lentinus squarrosulus* recorded the lowest quantity while *L. longipes* recorded the highest with 7.02 and 30.88 g/100g DW, respectively. The great value of crude fibre obtained shows that the studied species could play a useful role in providing roughage that aids digestion and reduces the risk of cardiovascular diseases. Also, as mentioned by Verma & Benerjee (2010), fibre consumption also softens stool and lowers plasma cholesterol level in the body.

The quantities of carbohydrates varied from 9.10 g/100g DW to 35.04 g/100g DW *L. longipes* and *T. umkowaan* respectively. Carbohydrate is the second abundant macronutrient in all its amounts in this study. For *Termitomyces*, it is more or less similar to that obtained by Kansci et al. (2003). For *L. squarrosulus*, the value is low compared to those of Gulati et al. (2011) who obtained 87.42% of carbohydrate for this species, respectively. Globally the values are relatively low compared to that of cereals and make those mushrooms a good diet for diabetics and people suffering from obesity.

Finally, it was observed from ash analysis that *T. umkowaan* and *L. longipes* have the lower and the higher contents (3.27 - 10.83 g/100g DW), respectively. All the mushroom species in this study had high proportions of ashes; with content ranging within the interval of 3.20- 25.10% of dry matter, corroborating with the results of Okechukwu et al. (2011). This showed that the mushrooms are also an important source of minerals that are required for metabolic reactions and other functional regulations of animal organisms.

Mineral composition

The results of the analyses of valuable minerals are presented in table 2. According to these, calcium, magnesium, phosphorus, potassium and sodium were present in all species while iron was absent in 7 species (*L. gymnocarpus, L. longipes; L. rubroviolascens, Lentinus squarrosulus, T. umkowaan* and *Tylopilus* sp.). In general, phosphorus, potassium and calcium had the highest contents while iron yielded the lowest. The iron ranged from 0.0182 mg/kg DW in *L. rubroviolascens, L. longipes, Lentinus squarrosulus*, and *T. umkowaan* to 46.901 mg/kg DW in *Schizophyllum commune* and *T. aurantiacus* respectively. *T. aurantiacus*, *T. mboudaeina* and *S. commune* have the lowest (93.631 mg/kg DW) and *Chamaemyces fracidus* have the highest phosphorus content (372.613 mg/kg DW). The calcium content analysis shows that *L. rubroviolascens* and *Lentinus squarrosulus* have the lower and the higher quantities (389 – 1309 mg/kg DW), respectively. The magnesium content was 62g/kg DW in *L. gymnocarpus* and *T. umkowaan* and 136 mg/kg DW in *T. letestui*. It was observed that the potassium content was lower in *S. commune* and higher in *T. schimperi* with respectively 93.278 mg/1kg DW and 497.534 mg/kg DW. The same trend was observed with sodium that was lower in *S. commune* (11.586 mg/kg DW) and higher in *T. schimperi* (69.249 mg/kg DW).

The mineral analysis showed that the mineral elements studied can globally be classified in order of importance as follow: potassium, phosphorus, magnesium, calcium, sodium and iron respectively. This is in accordance with observations of Kalač (2009) and Bofaris & Alzand (2019) showing that, potassium, phosphorus, Magnesium, and Calcium are among the major minerals in mushrooms, whereas iron is part of minor minerals. The contents of these minerals in species screened in the present work are seemed to be superior to that of European species. Also, apart from *S. commune* and *T. umkowaan*, potassium was the dominant mineral in all other species. The preponderance of this element in mushrooms was observed by Kalač (2009) in European mushrooms, Egwim et al. (2011) in Nigerian samples, Manjunathan & Kaviyarasan (2011) in *Lentinus tuber-regium* (Synonym of *Pleurotus tuber-regium*) from India and Bofaris & Alzand (2019) with Turkish species. In contrary, Gulati et al. (2011) found Magnesium to be the dominant mineral in some *Lentinus* from India with potassium recording the lowest value.

In general, it is known that the mineral proportions of mushroom vary according to many factors including species, age and diameter of the fruiting body, type of the substratum and other environmental factors (Demirbas 2001). The amounts of iron and potassium obtained in *Lentinus squarrosulus* is higher than those obtained by Gulati et al. (2011) on the same species from India. For *S. commune*, the phosphorus, calcium, sodium and iron obtained in this work is higher than that found in a collection from India (Hrudayanath & Sameer 2014). The quantities of calcium, iron and magnesium were higher in *Termitomyces letestui* from the Noun Division than that obtained by Masamba & Kazombo-Mwale (2010) in the same species from central Malawi.

Conclusion

The present study is a contribution to the nutritional valorisation of wild mushroom in Cameroon and shows that some wild edible mushrooms from Noun Division have a good Proximate and mineral values. These species have high nutritional value and are good sources of additional food that can greatly contribute to the improvement of the health of consumers.

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Conflict of Interest

The authors declare that they have no conflict of interest.

References

AOAC (1980) Official Methods of Analysis. William Horwitz 13th edn. Association of Official Analytical Chemists, Washington D C USA.

AOAC (1989) Official Methods of Analysis. 13th edn.. Association of Official Analytical Chemists, Washington D C, USA.

AOAC (1990) Official Methods of Analysis. *15* Edn., Association of Official Analytical Chemists, Arlington, USA.

Ashagri Z, Woldegiorgis A D, Haki G D and Ziegker GR (2015). Proximate and Amino Composition of Wild and Cultivated Edible Mushrooms Collected from Ethiopia. *Journal of food and nutritional Science* 3, 48–55.

Bofaris M S M and Alzand K I (2019). Chemical composition and nutritional value in turkey species of wild growing edible mushrooms, a review. *World Journal of Pharmaceutical Research* 3, 63–75.

Bourely J (1982). Observation sur le dosage de l'huile des graines de cotonnier. *Coton et Fibres Tropicales* 37 (2), 183–196.

Brock O T, Thomas K, Brock M, David M W (1986). Basic Microbiology with Applications, *3rd edition Prentice-Hall, Inc* (Ed.). Englewood Cliffs, NJ, USA, 557 p.

Chang S T and Miles P G (1992). Mushrooms biology a new discipline. *Mycologist* 6, 64–65.

Das K (2010). Diversity and conservation of wild mushrooms in Sikkim with special reference to Barsey Rhododendron Sanctuary. *NeBIO* 1, 1–13.

Degreef J, Malaisse F, Rammeloo J and Baudart E (1997). Edible mushrooms of the Zambezian woodland area, a nutritional and ecological approach. *Biotechnology, Agronomy, Society and Environment* 1, 221–231.

Demirbas A (2001). Concentrations of 21 metals in 18 species of mushrooms growing in the east Black Sea region. *Food Chemistry* 75, 453–457.

Devani M D, Shishoo J C, Shal S A, and Suhagia B N (1989). Spectrophotometric methods for microdetermination of nitrogen in Kjedahl digest.

Journal - Association of Official Analytical Chemists 72, 953–956.

Douanla-Meli C (2007). Fungi of Cameroon, Ecological Diversity; Taxonomy of Non-gilled Hymenomycetes, Mbalmayo Forest Reserve. *J. Cramer* (Ed.), Berlin-Stuttgart, Germany, 410 p.

Egwim E C, Elem R C, and Egwuche R U (2011). Proximate composition, phytochemical screening and antioxidant activity of ten selected wild edible Nigerian mushrooms. *American Journal of Food and Nutrition* 1, 89–94.

El-Sohaimy S A, Shehata M G, Mehany T and Zeitoun MR (2019). Nutritional, Physicochemical, and Sensorial Evaluation of Flat Bread Supplement with Quinoa Flour. *International Journal of Food Science*, https://doi.org/10.1155/2019/4686727.

Eyi Ndong H C, Degreef J and De Kessel A (2011).Champignons comestibles des forêts denses d'Afrique centrale Taxonomie et Identification. *Abc Taxa* 10 (Ed.), Meise, Belgique 262 p.

Ghogomu R T, Sondengam B L, Martin M T and Bodo B (1989). Lophirones D and E: Two new cleaved bioflavonoids from *Lophira lanceolata*. *Journal of Natural Product* 52 (2), 284–288.

Gropper S S, Smith J L and Groff J L (2009).Advanced Nutrition and Human Metabolism (5th Ed.). Belmont, CA: Wadsworth Cengage Learning.

Guillamón E, García-Lafuente A, Lozano M, D´Arrigo M, Rostagno M A, Villares A and Martínez JA (2010). Edible mushrooms: Role in the prevention of cardiovascular diseases. *Fitoterapia* 81, 715–723**.**

Gulati A, Atri N S, Sharma S K and Sharma B M (2011). Nutritional Studies on Five Wild *Lentinus* Species North-West India. *World Journal of Dairy & Food Sciences* 6, 140–145.

Hrudayanath T, and Sameer K S (2014). Diversity, nutrition composition and medicinal potential of Indian mushrooms, A review. *African Journal of Biotechnol* 13, 523–545.

Ijioma B C, Ihediohanma N C, Onuegbu N C, and Okafor D C (2015). Nutritional Composition and some anti-nutritional factors of three edible mushroom species in South Eastern Nigeria. *European Journal of Food Science* and *Technology* 3 (2) 57–63.

Jonathan S G (2002). Vegetable growth requirements and antimicrobial activities of some higher fungi in Nigeria. *PhD thesis*, Dept of Botany and microbiology, University of Ibadan, Nigeria, 280 p.

Kalač P (2009). Chemical composition and nutritional value of European species of wild growing mushrooms, A review. *Food chemistry* 113, 9–16.

Kalač P (2013). A review of chemical composition and nutritional value of wild growing and cultivated mushrooms. *Journal of the Science of Food and Agriculture* 93, 209–218.

Kansci G, Massebo D C, Selatsa A B and Fotso M (2003). Nutrient content of some mushrooms consumed in Cameroun. *Nahrung/ Food* 47, 213–216.

Lindequist U, Niedermeyer T H J and Julich W D (2005). The pharmacological potential of mushrooms. *eCAM* 2 (3), 285–299.

Manjunathan J and Kaviyarasan V (2011). Nutrient composition in wild and cultivated edible mushroom, *Lentinus tuberregium* (Fr.) Tamil Nadu., India. *International Food Research Journal* 18, 809–811.

Masamba K G, and Kazombo-Mwale R (2010). Determination and comparison of nutrient and mineral contents between cultivated and indigenous edible mushrooms in Central Malawi. *African Journal of Food Science* 4,176–179.

Mossebo D C, Amougou A, Atangana R E (2002). Contribution à l'étude du genre *Termitomyces* (Basidiomycètes) au Cameroun, écologie et systématique. *Bulletin de la Société Mycologique de France* 118, 195–249.

Njouonkou A L, De Crop E, Mbenmoun A M, Kinge T R, Biyé E H and Verbeken A (2016). Diversity of Edible and Medicinal Mushrooms Used in the Noun Division of the West Region of Cameroon. *International Journal of Medicinal Mushrooms* 18, 387–96.

Okechukwu R I, Okereke J N, Onyedineke N E, and obi R K (2011). Microbial and Nutritional qualities of mushroom. *Asian Journal* of *experimental* and *biology science* 2, 746–749.

Onguene A N, Tchudjo T A N and Kuyper T W (2019). Biodiversité des macrochampignons sauvages comestibles de la forêt humide du Sud-Cameroun. *Bois et Forêts des Tropiques* 338, 87–99.

Ouzouni P K, Petridis D, Koller W D, and Riganakos K A (2009). Nutritional value and metal content of wild edible mushrooms collected from West Macedonia and Epirus, Greece. *Food Chemistry* 115, 1575–1580.

Pauwels J M, Van R E, Verlo M, and Mvondo Z A (1992). Manuel de Laboratoire de Pédologie - méthodes d'analyses de sols et de plantes; equipment et gestion des stocks de verrerie et de produits chimiques. *Publications Agricoles* (numero 28), A.G.C.D., Bruxelles, Belgium, 180 p.

Pegler D N (1977). A preliminary agaric flora of East Africa. *Kew Bulletin Additional Series 6* (Ed.), Kew, England, 615p.

Roy D N, Azad A K, Sultana F, Anisuzzaman A S M and Khondkar P (2015). Nutritional profile and mineral composition of twoedible mushroom varieties consumed and cultivated in Bangladesh. *Journal of Phytopharmacology* 4, 217–220.

Van Dijk H, Onguene N A and Kuyper T W (2003). Knowledge and utilization of edible mushrooms by local populations of the rain forest of South Cameroon. *Ambio* 32, 15–23.

Verbeken A, and Walleyn R (2010). Monograph of *Lactarius* in tropical Africa. *Fungus Flora of Tropical Africa* (Ed.), Meise, Belgium, 161p.

Verma A K and Banerjee R (2010). Dietary fibre as functional ingredient in meat products, a novel approach for healthy living a review. *Journal of Food Science and Technology* 47, 247–257.

Fig. 1. Photos of mushroom species involved in the study: **a.** *Chamaemyces fracidus* (Fr.) Donk., **b.** *Lactifluus gymnocarpus* (R. Heim ex Singer) Verbeken, **c.** *L. longipes* (Verbeken) Verbeken, **d.** *L. rubroviolascens* (R. Heim) Verbeken, **e.** *Lentinus squarrosulus* Mont., **f.** *Pleurotus pulmonarius* (Fr.) Quél., **g.** *Schizophyllum commune* Fr., **h.** *Termitomyces aurantiacus* (R. Heim) R. Heim, **i.** *T. letestui* (Pat.) R. Heim, **j.** *T. mboudaeina* Mossebo, **k.** *T. chimperi* (Pat.) R. Heim, *T. umkowaan* (Cooke & Massee) D.A. Reid.

Table 1 Proximate composition values of wild Mushroom samples

	Nutrients (g/100g Dry weight)						
Species	Protein	Lipid	Carbohydrate	Dry Mater	Moisture	Fiber	Ash
Chamaemyces fracidus	56.62 ± 3.01	1.46 ± 0.03	17.70 ± 3.89	7.60 ± 0.13	92.40 ± 0.13	21.69 ± 1.38	3.97 ± 0.01
Lactifluusgymnocarpus	50.91 ± 0.50	1.49 ± 0.03	15.11 ±0.50	6.49 ±0.28	93.51 ± 0.28	24.99 ± 3.16	7.75 ± 0.01
L.longipes	46.71 ± 2.54	4.77 ± 0.96	9.10 ± 1.29	7.98 ± 0.23	92.02 ± 0.23	30.88 ± 1.21	9.89 ± 0.13
L.rubroviolascens	50.40 ± 4.48	2.63 ± 0.06	20.52 ± 1.22	6.11 ±0.03	93.89 ± 0.03	22.68 ± 0.11	6.27 ± 0.17
Lentinus squarrosulus	50.91 ± 1.82	1.17 ± 0.01	34.42 ± 0.40	6.79 ± 0.12	93.21 ± 0.12	7.02 ± 0.14	5.47 ± 0.16
Pleurotus pulmonarius	57.12 ± 2.77	1.24 ± 0.42	27.51 ± 1.86	7.78 ± 0.06	92.22 ± 0.06	10.47 ± 0.19	5.09 ± 0.16
Schizophyllum commune	61.32 ± 1.27	1.06 ± 0.21	25.16 ± 0.89	7.49 ± 0.33	92.51 ± 0.33	8.2 ± 0.12	3.59 ± 0.27
Termitomycesaurantiacus	60.48± 2.14	2.11 ± 0.05	15.96 ± 1.70	9.2 ± 0.13	90.48 ± 0.13	10.22 ± 0.36	9.71 ± 0.12
T.letestui	58.13 ± 1.62	1.90 ± 0.19	22.35 ± 0.76	6.92 ± 0.02	93.08 ± 0.02	10.9 ± 1.01	7.65 ± 0.09
T.mboudaeina	54.25 ± 3.35	1.67 ± 0.04	24.31 ± 1.42	7.94 ± 0.29	92.06 ± 0.29	13.06 ± 0.37	8.53 ± 0.33
T.schimperi	54.44 ± 4.86	2.08 ± 0.17	14.96 ± 0.32	9.41 ± 0.09	90.59 ± 0.09	22.83 ± 0.11	8.47 ± 0.47
T.umkowaan	45.36 ± 2.81	0.83 ± 0.05	35.04 ± 2.51	8.86 ± 0.01	91.14 ± 0.01	16.75 ± 0.21	3.27 ±0.14

Table 2. Mineral composition values of wild Mushroom samples

	Nutrients (mg/kg Dry weight)					
Species	Fe	P	K	Na	Ca	Mg
Chamaemyces fracidus	16.842	372.613	201.333	27.437	639	88
Lactifluus gymnocarpus	0.358	302.868	446.296	57.532	622	62
Lactifluus longipes	0.018	209.874	480.187	57.532	629	87
Lactifluus rubroviolascens	0.018	209.874	397.460	46.658	389	70
Lentinus squarrosulus	0.018	140.128	351.018	46.658	1309	128
Pleurotus pulmonarius	2.297	140.128	292.856	46.658	1294	99
Schizophyllum commune	46.901	93.631	93.278	11.586	738	72
Termitomyces aurantiacus	46.901	93.631	366.239	57.532	1218	115
Termitomyces letestui	19.751	140.128	381.761	57.532	490	136
Termitomyces mboudaeina	35.265	93.631	397.461	57.532	1149	119
Termitomyces schimperi	13.933	186.625	497.534	69.249	575	74
Termitomyces umkowaan	0.0182	186.625	166.113	19.090	726	62