JASEM ISSN 1119-8362

Full-text Available Online at www.bioline.org.br/ja

J. Appl. Sci. Environ. Manage. *March*, 2011

Vol. 15 (1) 9 - 11

Proximate analysis on four edible mushrooms

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ABSTRACT: Proximate study was conducted on four edible mushrooms commonly found in farmlands in West Yagba Local Government Areas of Kogi state of Nigeria to ascertain their nutritional composition. The specimens identified as *Lentinus subnudus, Chlorophyllum molybditis, Marasmus species and Pleurotus tuber-regium* were analysed for protein, carbohydrate, fibre and ash (minerals) content. The result shows that protein level ranged from 3.25mg/g in *Lentinus subnudus* to 10.88mg/g in *Chlorophyllum molybditis,* the carbohydrate level ranged from 1.92mg/g in *Marasmus species* to 3.48mg/g in *Pleurotus tuber- regium* while the ash content is between 85% to 90% and the p H tends toward neutrality in all the specimen. The high fibre content make them a good source of roughages while their low acidity and alkalinity confirms their edibility and the fact that they are not likely to contain poisonous substances which may make them toxic to human and animals after consumption. Their commercial production will be of multiple advantages to the nation. @JASEM

Mushrooms are the fruit bodies of macroscopic, filamentous and epigeal fungi made up of hyphae which form interwoven web of tissue known as mycelium in the substrate upon which the fungus feeds; most often their mycelia are buried in the soil around the root of trees, beneath leaf litters, in the tissue of a tree trunk or in other nourishing substrate (Ramsbottom; (1989), Wilkinson and Buezaeki; 1982). Mushrooms belong to the class basidomycetes in the order Agaricales whose fleshy fruit bodies and hymenia are borne on gills. Their fruit bodies are ephemeral structures whereas their mycelia, living on dead organic matters in the soil may last for years. The fruit bodies are commonly called mushroom or toadstool. Ordinarily the edible species are called mushrooms while the poisonous species are referred to as toadstools. Morphologically, the two groups are indistinguishable but often differing in chemical composition. Mushrooms are of great economic importance to man and their occurrence dated back to the time of the early man. The word "mykes"from which mycology is derived actually meant mushroom to the ancient Greek and thus, etymologically, mycology is the study of mushrooms (Alexopoulus and Mims; 1979).In Nigeria edible mushrooms are highly priced, not only as food but also in traditional medicine(Oso, 1977a). Mushroom appears in traditional Yoruba art work in form of drawings on their" tie and dye" (adire) material of their traditional costume (Adenle, 1985) and mushroom also feature in Yoruba folklore and mythology (Oso, 1977b). Several authors like Fasidi and Kadiri, (1990a and 1993), Zoberi, (1972 and 1973), Kadiri, (1991), Oso, (1975) and Nicholson, (1989) have shown in their various works that edible mushrooms are rich in ascorbic acid, amino acids, protein, minerals, glycogen, sugar and that protein is their most abundant nutrient, and also mushrooms are sought for because of their toughness, meaty taste, desirable flavour and medicinal value. Mushrooms are considered to be healthy food because of their high and qualitatively good protein content, low fat and cholesterol content, minerals and vitamins. Mushrooms are one of the few natural sources of vitamin D**,** which is essential for healthy bones and teeth. Mushrooms are also a good source of the B vitamins, riboflavin (B_2), niacin (B_3) and pantothenic acid (B_5). These vitamins help break down proteins, fats and carbohydrates so they can be used for energy. Mushrooms can be an important source of B-vitamins for people who don't eat meat (Duyff, 2006, USDA, 2006 and USFDA, 1999). This work is therefore aimed at screening some species of mushroom commonly found in abundance in Egbe, Yagba West Local Government Area of Kogi state for their protein, carbohydrate, fibre and ash content.

MATERIALS AND METHODS

Collection of Specimens: specimen were collected from four different locations very early in the morning from farmlands in Egbe, Yagba West L.G.A. of Kogi State. The specimens were carefully uprooted by lifting them up holding the stipe gently but firmly very close to the rhizomorph thus carrying some soil along with it .This is to avoid damaging the tissues of the mushrooms. Each specimen was carefully labelled before transporting them to town.

Preservation of Specimens: the specimens were air dried for 14 days and stored in transparent polythene bags that are loosely tightened to allow for proper aeration of specimens. Each of the specimens was properly labelled.

Identification of Specimen: the specimens were sent to Prof. Fasidi and Prof. Kadiri of College of Nature Studies, University of Agriculture, Abeokuta in Ogun State for identification. The four specimens used were identified by them as; specimen A, *Lentinus subnudus* locally known as Olu oba, specimen B, *Chlorophyllum molybditis* locally known as Ese ediye, specimen C, *Marasmus species,* locally known as Wowo and specimen D,*Pleurotus tuber-regium* locally known as Olumoyi.

Nutritional Analysis: **T**he samples were subjected to various nutritional analyses as follows;

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i) Moisture content of the fresh samples was determined following the method of A.O.A.C., (1980),

ii) Protein content: the specimens were analysed for protein for protein by the method described by Lowry *et al* ;(1951), using bovine serum albumin as the standard. One gram each of the samples was homogenised with 10ml distilled water. The suspension was filtered and the filtrate was used for protein estimation.

iii) Ash content: this was determined following the method described by Pearson, (1976).
iii) Total soluble carbohydrate: this was done following the method of Dubols et al; (1956), using glucose as standard.

iv) Titratable acidity: this was determined following the method prescribed by Pearson, (1976
vi) The p H of samples were read using a Philips p H meter (model 418).

RESULTS AND DISCUSSION

Villagers enjoy eating these mushrooms in their soup because of its taste, flavour and toughness especially specimen A and D. Specimen A usually has the toughness of meat when eaten and was recorded to be popular among local farmers who fondly refer to it as "farmers seasoning" (Oso 1975). Specimen D is a tuberous species which is usually tough and requires sufficient chewing before it could be swallowed and as such people who could not afford meat normally cherish this mushroom. Specimen B and C though are of tiny size are also regarded as special seasoning by the villagers because of their peculiar taste. Specimen A is commonly found on the bark of woody trees commonly located within the same area as well as on dead fallen logs. Specimen B and C are commonly found on farmlands under the shade of big, woody trees, in leaves litters on forest floor, on decaying farm wastes and around growing guinea corn plants while specimen D is restricted to the bark of African Ebony tree (*Daniella oliveri*). It is usually brightly coloured and grows on both living and dead log of the same tree (Okhuoya and Okogbo, 1990).

Table 1: Nutritional and chemical analyses of mushroom samples (TSC total soluble carbohydrate, TTA titratable acid, ASH ash content, PRO protein, MC moisture content, pH)

S/N	SAMPLES	TSC , mg/g	TTA, mg/g	ASH%	PRO, mg/g	MC%	pH
1	*Lentinus subnudus*	3.25	2.80	0.90	3.25	78.0	6.1
2	*Chlorophyllum molybditis*	2.53	4.00	0.85	10.88	94.0	7.2
3	*Marasmus species*	1.92	0.60	0.90	5.14	84.0	6.7
4	*Pleurotus tuber-regium*	3.48	2.40	0.85	3.61	89.0	6.1

The result of the various analyses of the samples showed that all the samples used have high moisture content (Table 1). Mushrooms generally have high moisture content which accounts for their short shelf life as they deteriorate easily after harvest if preservative measures are not employed although when harvested at full maturity they become tough and almost leathery, Fasidi and Kadiri, (1993). The ash contents of the samples were fairly high indicating its relatively high mineral content. The p H and titratable acidity showed the samples to be weakly acidic which further suggest why they may be edible, the values recorded are neither strongly acidic nor basic but tends towards neutral, they are not likely to contain toxins which could be harmful to man or animals after consumption (Fasidi and Kadiri, 1994) although these values support the growth of a wide range of microorganisms, little wonder then why mushrooms generally do not keep long after harvest except where preservative measures are taken immediately. The relatively high sugar and protein content of these samples (Table 1) is a proof of their been highly nutritious and good for human consumption. This result is similar to the result obtained by Fasidi and Kadiri, (1994) after screening seven Nigerian mushrooms. Mushrooms are also known to be of medicinal value, Chang, (1994), Oso, 1977a, Zoberi, (1972), Fasidi and Kadiri, (1994) have confirmed the medical value of these samples in their various reports. The nutritional values of these samples compared favourably with those in single cell proteins which are also of microbial origin but may not be within the rich of the common man who may not be able to afford the cost. Although in consuming mushroom the advice of an expert or a mycologist should be sought rather than depending on experience as some mushroom species could be deadly poisonous and may claim life within few hours to a few days after consumption. Notably among these are some members of the genus *Amanita,* (Alexopoulus, 1962 and Ingold, 1973). The mushroom specimens used in this research are neither

strongly acidic nor basic which suggest that they are not likely to be toxic however Zoberi, (1973) warns that caution must be exercise in eating *Chlorophyllum molybditis* as some form of them could be poisonous if consumed to a lethal dose.

Conclusion: Finally, the nutritional and economic values of these mushrooms to the consumer, the farmers and the nation at large cannot be over emphasized. The fact that mushrooms are generally rich in protein, carbohydrate, vitamins (the only vegetable with vitamin D naturally) low in fat and cholesterol means their consumption will alleviate malnutrition within the masses. With the abundance of lignocellulosic waste, favourable environmental condition and adequate technical knowledge of its production, private and Government farms could be encouraged to go into mass production of these species and other edible species of mushroom. More work should be done on other species of edible mushroom in order to produce them in large quantity so as to make them available for food, medicine, and as a research tool in the nation.

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