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Contributions of Edible Mushroom (A Non-timber Forest Product of Tropical Forest Ecosystem) to Rural Livelihood in Oyo State, Nigeria

[1]V.A.J. Adekunle and [2]K. Ajao
[1]Department of Forestry and Wood Technology, Federal University of Technology, P.M.B. 704, Akure, Nigeria [2]Department of Forestry and Wildlife, Ministry of Agriculture, Ibadan, Nigeria

Abstract: The contribution of edible mushrooms to rural livelihood was assessed in this study. Data were collected with well-structured questionnaire administered on 150 randomly selected household heads from ten villages distributed among four Local Government Areas of Oyo State, Nigeria. The result reveals that majority of the respondents (95%) were actively involved in collection, consumption and sales of the commodity. Consumption of mushrooms was not affected by educational status, occupation and social background of the respondents. It was also discovered that the consumption substituted for animal proteins usually absent in rural dwellers' diet. The respondents have secured gainful employment and income from the sale of this important non-timber forest product as substantial amount of money was being realized from its sales. The seasonal occurrence of this product is discovered as the major setback to its constant availability. For its potentials to be fully realized, cultivation of the product should be embarked upon so as to make it available throughout the year.

Key words: Animal protein, diversity, Fungi, heterotrophic, consumption

INTRODUCTION

Mushroom is one of the numerous non-timber forest resources available in the tropical rainforest ecosystem of Southwest Nigeria. Mushrooms are usually collected from forest floor and consumed by rural households as delicacy and for their nutritional values. Non-timber Forest Products (NTFPs) have been recognized internationally and nationally as important elements in sustainable forestry and for their contribution to environmental objectives, including the conservation of biological diversity[1]. NTFPs represent the subset of biological diversity actively sought and collected by humans[2]. Eeric *et al.*[3] defined NTFPs (also referred to as special forest products and non-wood forest products) by six broad categories:

1. Foods, such as wild edible mushrooms, fruits and nuts; 2. medicinal plants and fungi; 3. floral greenery and horticultural stocks; 4. fiber and dye plants and lichens; 5. oils, resins and other extracts from plants, lichens and fungi and 6. fuelwood and small diameter wood used for poles, posts and carvings.

Mushrooms belong to the class of living things called fungi. Fungi were formerly considered as a group of organizations in the kingdom planate, but were later placed in a separate kingdom fungi (mycota) distinct from green plants. Fungi unlike green-plants do not possess chlorophyll and are thus heterotrophic.

Many species of mushrooms could be found in tropical rainforest during rainy season but there are few species that are available throughout the year. The seasonal ones are usually seen fruiting abundantly on forest floor at the beginning of rainy season with each species lasting for few days only. The most popular edible mushroom growing in the wild already identified is *Pleurotus tuber-reguim.* Others species of mushroom are *P. squarrosudus* (Mout) *Singer, Schizophyllum commune* Fries, *Tricholoma lobayensisIt*eim, *Termintomyces straintsus* (Belli) Iteim, *T. robusta* (Belli) Iteim, *Volvariella volvacea* (Bull ex Fr.), Singer and *Auricularia sp.*[4-6].

In Nigeria, rural collectors depend on those growing freely in the wild. But in some developed countries, they are grown artificially on large scale through improved technologies. Oei[7] reported that mushroom is a major source of foreign exchange in China and the country is a major exporter of the product. Food materials needed for growth by man include that are rich in animal protein such as meat, milk and egg. The diet of an average Nigerian is majorly cereal and carbohydrate as a result of poverty. These animal products are less available in developing countries like Nigeria. The level of protein intake is of great concern especially in the developing world. FAO[1] reported the caput daily consumption of animal protein in advanced countries as 54 g while the value for developing

Corresponding Author: V.A.J. Adekunle, Department of Forestry and Wood Technology, Federal University of Technology, P.M.B. 704, Akure, Nigeria E-mail: vajadekunle@yahoo.com

countries is very low (11 g). The low level of protein intake does not meet the minimum requirement of 34 g indispensable for normal growth and healthy mental development. Consumption of mushroom, apart from been cultural, is also a good source of protein. Edible mushrooms have been reported by Oyewole[8] to contain adequate nutritional qualities like protein, minerals and vitamins and other health promoting substances. This study assessed the acceptability of mushroom as food by the people of Oyo State and determines its contributions to rural livelihood. This was achieved with the use of structural questionnaire administered on 150 randomly selected household heads in the study area.

MATERIAL AND METHOD

The study area: This study was carried out in Oyo State, Nigeria. The State came into being when the old Western State of Nigeria was split into three in 1976. This State was further bifurcated in 1986 and Osun State was carved out. Ibadan, her capital city is one of the largest cities in West Africa sub-Sahara. There are two major vegetation zones (Rainforest and Savanna) in the State. The vegetation of the State, especially the rainforest zone, is very adequate for the growth of wild mushroom, industrial timber and several other NTFPs that are indispensable for rural livelihood.

Data collection: The data for this research was collected with well-structured questionnaire, interview schedule and market observation. Oyo State was divided into two (Oyo north and Oyo South) according to the two political divisions in the State. Oyo north lies within the Savanna zone while Oyo south is within the rainforest zone. Multistage random sampling technique was adopted in selection of respondents for questionnaire administration. The first stage involved the random selection of two Local Government Areas (LGA) from each of the vegetation/political zones in the State and the second stage was the random selection of two villages from each of the selected LGAs. Table 1 shows the distribution of the villages randomly selected for the study and their respective Local Government Areas. The total numbers of selected villages from four Local Government Areas were therefore ten and fifteen household heads were randomly selected from each of the villages.

The questionnaires were drawn to obtain information on demographic characteristics of the respondents, utilization pattern of mushroom, preservation methods, economic value of the product and sustainability of trade in mushrooms. This was meant to understand the potentials of mushroom production in the study area (Oyo State). The questionnaires were filled and retrieved on the spot. Some major markets were visited in the study area for on the spot assessment of the market structure of the product.

Table 1: Villages selected for the study

Regions	Local Government Areas	Villages
Oyo North/Savanna	Saki Orire	Oge, Orisunmibare Ekokan and Tewure, Aba-Ibadan and Aba-Ilorin
Vegetation belt /rainforest	Akinyele Lagelu	Oyo South
Vegetation belt		Atan, Farounbi and Apapaodan Iyana-Offa

Method of data analysis: The questionnaire was coded and useful information was extracted from them. The data collected were analyzed with non-parametric statistical methods (descriptive statistics e.g. percentage and frequency). The chi-square was also used to test for the association between mushroom consumption and major occupation and level of education of the respondents. The chi square (χ^2) model used is given as:

$$\chi^2 = \frac{\sum(\text{fe} - \text{fo})^2}{\text{fe}}$$

Where fe=expected frequency and fo=observed frequency

RESULTS AND DISCUSSION

The result of this study reveals that majority of the rural household heads (95%) are involved in the collection, consumption and sales of edible mushrooms in the study area. Five percent of the total respondents regarded the collection and consumption of mushroom as been barbaric, unhygienic as a result of where the product normally grow and as a sign of abject poverty. The respondents were of different major occupations but majority of them were farmers 64%. Other were craftsmen 15%, Traders 11%, Civil Servants 6% and paid labour 4%. The χ^2 value (0.991, n = 150) for the test of association between mushroom consumption and major occupation of respondents was not significant ($p \geq 0.05$). So, mushroom consumption is not associated with the major occupation of the respondents in the study area.

Table 2 shows the family sizes of the respondents in the study area. The most common family size was between 6 and 9 (52%). This is followed by 10-13 (36%). The procession of large family size by the rural sector of the

Table 2: Family sizes (no. of persons) of Respondents in the Study Area

Family	size Frequency	Percentage
>6	11	7
6-9	72	48
10-13	50	33
<14	17	12
Total		100

economy in Nigeria is to provide adequate farm labour[9]. Also the culture of a man having many wives and of extended family is very common among the Yorubas in the southwestern part of Nigeria where this study was conducted. This was also responsible for the respondents' large family size. The large family size is also a major factor to mushroom collection and consumption. It is very obvious also that the more the family size, the more the demand for food and any other forest resources like mushroom. For age distribution of respondents, it was discovered that 9% were under 25 years old, 21% were within the range of 26 to 40 years old, 34% were within 41- 50 years and 30% were between 51-60 years while 6% were over 60 years old (Table 3). The age between 30 and 60 years could be regarded as the active age of Nigerian. Those in this age group are usually household heads and breadwinners. So they are actively involved in locating where mushroom is growing and mobilizing the entire household member including children to gather it.

For educational attainment of the respondents (Table 4), 63% had no formal education, 10% had primary education and 22% had secondary education while 5% had tertiary education. The χ^2 value obtained (not significant $p \geq 0.05$) shows that mushroom consumption does not depend on respondents' education attainment. So mushroom consumption is not limited to those without formal education alone, those with formal education are also involved in the gathering and consumption of mushroom. This is one of the main reasons why mushroom cultivation should be intensified in Nigeria.

Uses of Mushroom: The result shows that 68% of respondents were collecting mushroom for consumption only, 8% for sales only and 24% for consumption and sales (Table 5). Other uses of mushrooms as indicated by the respondents include medicinal and industrial uses. Those eating mushroom were using it as a cheap source of proteins to augment other sources of animal protein like pock, beef, chicken and fish which is more expensive. Mushrooms are very rich in protein and other essential nutrients require for proper functioning of the body. Ekpo and Aluko[5] reported on the nutrients status of the most consumed species of mushroom (*Lentinus tuber-regium* Fries) while Kurzman[10] recorded high amount of calcium very useful for man in another specie of mushroom, *Agaricus bisporus*. Mushroom consumption in the developing countries has potentials to reduce malnutrition, marasmus and kwashiorkor in children.

Table 3: Age (years) distribution of respondents in the study area

Age (years)	Frequency	Percentage
Under 18	15	10
18 – 40	30	20
41 – 50	51	34
51 – 60	23	15
Over 60	31	21
Total	150	100

χ^2 value = 0.895, n = 150 (not significant, $p \geq 0.05$).

Table 4: Educational level distribution of respondents

Education	Frequency	Percentage
Non formal education	95	63
Primary education	15	10
Secondary education	33	22
Tertiary education	7	5
Total	150	100

χ^2 value = 0.958, n = 150 (not significant, $p \geq 0.05$).

Table 5: Uses of mushroom collected

Uses	Frequency	Percentage
Consumption only	102	68
Sales only	12	8
Consumption and sales	36	24
Total	150	100

Mushroom Prevention: The two ways of preventing mushroom from damage indicated by the respondents in the study area are prompt harvesting and adequate care after collection. The respondents also claimed that they preserved the mushrooms collected by sun drying, soaking in water or boiling with salt before sun drying (Table 6). But majority (49%) claimed to always boil with salt before sun drying. Those that drying in the sun was 44% of the respondents in the study area. Sun drying general will reduce the moisture content of the commodity thereby making it difficult for biodegradating agents to act on it. The form at which sellers brought some species of mushrooms to the market was observed during visitation to the markets. Majority of the sellers brought fresh mushrooms to the market for sale while very few sellers came with dry mushrooms. All the species of edible mushroom offered for sale were among those already identified by Oso[4] and Ekpo and Aluko[5].

Revenue accruing to respondents from sales of mushroom: Those involved in the sale of the commodity when it was available claimed to be realizing substantial amount of money from the trade and the money realized serve as additional income to the family per capita income. This is used to meet family needs and contribute to the socio-economics life of the people. Highest percentage of the respondents 27% sold between 11-15 kg the previous mushroom season and realized the sum of ten thousand four hundred Naira only (N10, 400). The average sale of

Table 6: Methods of mushroom preservation

Methods	Frequency	Percentage
Sun drying only	66	44
Soaking in water only	11	7
Boiling with salt and sun drying	73	49
Total	150	100

Table 7: Annual income generated (n) from mushroom collected by respondents

Sales (kg)	Number of sales	Percentage of sellers X	Total sales N
<10	6	13	2200
11-15	13	27	10,400
16-20	2	4	12,000
21-25	10	21	18,200
26-30	6	13	13,200
31-35	8	17	21,200
36-40	2	4	16,200
> 40	1	2	2,800
Total	48	100	96,200.00

Average annual sales by respondents = 45.36 kg. Average annual amount of money realized = N2004.16

mushroom was estimated as 45.36 kg annually and the average amount of money realized was two thousand and four Naira, sixteen kobo (N2004.16). Two percent of the respondents collect above 40 kg of mushroom Table 7. This shows that trade in mushroom is very lucrative in the study area. The income realized from mushroom was not evenly distributed among the sellers (imperfect market structure). This could be as a result of the seasonal occurrence of mushroom and the fact that sellers rely solely on those growing naturally in the forest. The discovery of those growing naturally is by chance as mushroom has no permanent place of growth. Availability of mushroom throughout the year will create a stable source of food (protein source), income and employment opportunity for rural dwellers that is about 70% of Nigerian population. This could be achieved through artificial cultivation on large scale and home gardening. The keen interest expressed by the respondents in the cultivation of mushroom and the availability of buyers call for more research in mushroom and cultivation of the product in large scale should be embarked upon.

CONCLUSION AND RECOMMENDATION

This study examined the economics and consumption pattern of edible mushrooms in Oyo State. Majority of the respondents regardless of education attainment, age and occupation were involved in collection and consumption of the commodity. Few people were involved in its sales only. Those involved in its sale are generating wealth from the trade and it serves as source of employment opportunity to rural dwellers. In view of the socio-economic importance of mushroom to rural livelihood, artificial production should be encouraged as against the total dependence on those occurring naturally in the forest during the rainy season. More research is needed in the area of mushroom cultivation, preservation and packaging to enhance consumption.

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