



ASSESSING HOUSEHOLD CONSUMPTION PATTERNS OF NON-TIMBER FOREST PRODUCT MUSHROOMS IN ABEOKUTA SOUTH, OGUN STATE



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Abstract: This study investigates the consumption characteristics of non-timber forest product (NTFP) mushrooms among households in Abeokuta South Local Government Area of Ogun State, Nigeria. Through purposive sampling, 100 respondents were selected from five communities, and structured questionnaires were administered to gather data on mushroom consumption patterns, socio-economic characteristics, and challenges faced in consumption. Data obtained were analyzed using descriptive statistics, Z-test, and students T- test for inferential statistics at 0.05 level of significance. The results reveal seasonal production as a significant factor influencing mushroom consumption, with households primarily consuming mushrooms for nutritional reasons. Empirical constraints such as inadequate funding for mushroom technologies were identified as major challenges in both production and consumption. Despite these challenges, mushroom consumption was found to offer significant benefits to households, emphasizing its importance for food security and livelihoods. Deforestation emerged as a critical challenge, exploring the need for sustainable forest management practices.

Keywords: Non-timber forest products, mushrooms, consumption characteristics, households, socio-economic factors

Introduction

Non-timber forest products (NTFPs) encompass a diverse array of naturally occurring resources beyond timber, serving various human needs. These resources include nuts, berries, mushrooms, fruits, oils, and medicinal plants, vital to both rural and urban communities (Ahenkan and Boon, 2008). Globally, NTFPs have emerged as pivotal assets for fostering sustainable livelihoods within forest-based communities (Marshall *et al.*, 2003; UNDP, 2004). They play a critical role in ensuring food security and providing income, particularly in many developing nations. Thus, emphasizing their sustainable utilization and accurate valuation is increasingly imperative, given forests' potential to mitigate poverty, enhance livelihoods, and secure food and health (Adejo and Ademu, 2018).

NTFPs significantly augment the livelihoods of forest-dependent communities by bolstering household food security and nutrition (Belcher *et al.*, 2005; Marshall *et al.*, 2005; Ros-Tonen and Wiersum, 2005; FAO, 2006; Ahenkan and Boon, 2008). For instance, mushrooms, identified by Harriet *et al.* (2017), are a prominent NTFP contributing to livelihoods and offering avenues for food access and income generation. Furthermore, NTFPs yield additional employment opportunities, stimulate income growth, foster forest-based enterprises, and can stimulate international trade and development (Marshall *et al.*, 2003).

Among NTFPs, mushrooms are recognized as a complete health food suitable for all age groups. Valued for their superior flavor, texture, and nutritional content by societies worldwide (Muruke *et al.*, 2002), mushrooms serve as an alternative protein source for vegetarians, containing approximately 20-30% protein (about 3% on a fresh weight

basis), a higher proportion than most vegetables (Yehuala, 2012). Mushroom protein stands out for its high digestibility and richness in essential amino acids, alongside various vitamins (e.g., Vitamin A, B complex, C, D, K) and essential minerals (e.g., Phosphorus, Calcium, Zinc, Iron) crucial for human health.

The scarcity of literature addressing the consumption characteristics of NTFPs edible mushrooms among households in Abeokuta South Local Government Area of Ogun State explore the need to fill this gap. This study thus investigates the consumption characteristics of NTFPs edible mushrooms among households in the area, with the main objective of understanding their consumption patterns and implications.

Methodology

Study Area

Abeokuta, the capital of Ogun State, Nigeria, is located in the southwest region. Situated on the eastern bank of the Ogun River, it is approximately 77 kilometers (48 miles) north of Lagos by rail or 130 kilometers (81 miles) by water. With coordinates 7°9'39"N latitude and 3°20'54"E longitude, Abeokuta covers an area of 879 square kilometers (339 square miles) and has an elevation of 66 meters (217 feet) above sea level. As of the 2006 census, its population was 449,088. Abeokuta South Local Government, known for its historic significance as the traditional seat of the local authority in Egba since 1898, is home to the Egba Ake ethnic group. It includes rural communities within its jurisdiction and serves as a key administrative center for the region.

Sample Size and Sampling Technique

The study sample consisted of 100 consumers of non-timber forest product (NTFP) mushrooms from Abeokuta South Local Government Area of Ogun State. Purposive sampling was employed to select participants from five communities: Sapon, Asero, Kuto, Isale-Igbein, and Ijaye. Twenty respondents were chosen from each community, totaling 100 participants for the study. Structured questionnaires were administered to gather data from the selected individuals.

Method of Data Analysis

The collected data underwent sorting and analysis utilizing inferential statistical methods, including the Z-test, independent Student's t-test, and F-test. These statistical tests were employed to examine the research hypotheses formulated at a significance level of 0.05.

$$T \text{ test statistics} = \frac{x_1 - x_2}{\sqrt{\left[\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right]}}$$

Where: \bar{X}_1 = mean value for male, \bar{X}_2 = mean value for female, s_1^2 = variance value for male, s_2^2 = variance value for female, N_1 = total number of male, N_2 = total number of female, df = degree of freedom, S stands for Standard deviation

$$Z \text{ test statistics} = \frac{x - \mu}{s/\sqrt{n}}$$

Where \bar{x} = mean score of the sample or selected data, μ = mean score of the population, s = standard deviation of the sample, n = total number of scores in the sample, s/\sqrt{n} = the

standard error of the sample or selected data, Degree of freedom = $n-1$ where n = total number of scores in the sample, Alpha level (α) = 0.05.

Results and Discussion

Socio-economic Characteristics of the Respondents

The socio-economic characteristics of the mushroom consumption in Abeokuta South Local Government Area of Ogun State reveal in Table with a predominantly female demographic (68%), with the majority falling within the age range of 20 to 40 years (53%), indicating a significant representation of younger individuals. Married individuals constitute a substantial portion (55%) of mushroom business actors, while varied marital statuses, including single (23%), divorced (15%), and widowed (8%), highlight the diversity within the sector. Traditional religious worshippers form the largest religious group (45%), followed by Islamic practitioners (26%), Christians (20%), and Freethinkers (9%), demonstrating a range of religious affiliations among participants. Educational backgrounds vary, with 41% having primary education, 28% lacking formal schooling, 19% with secondary education, and 12% with tertiary education, suggesting potential implications for skill development and capacity building. The majority (65%) are engaged solely in farming, while others supplement their incomes through trading (21%) or civil service (9%). Household sizes vary, with 60% having 4 to 6 members, 25% with 1 to 3 members, and 15% with more than 6 members, indicating potential implications for resource allocation and economic stability within mushroom farming households.

Table 1: Socio-economic characteristics of respondents

Variables	Frequency N =100	Percentage (%)	Mode
Sex			
Male	32	32	Female
Female	68	68	
Age			
20 - 40 Years	53	53	20 - 40 years
41 - 60 Years	36	36	
Above 60 Years	11	11	
Educational Status			
None educated	28	28	Primary education
Primary education	41	41	
Secondary education	19	19	
Tertiary education	12	12	
Marital Status			
Single	23	23	Married
Married	55	55	
Divorced	15	15	
Widow(er)	8	8	
Major Occupation			

Farming	65	65	
Business	21	21	
Civil Servant	9	9	Farming
Others	5	5	
Religion			
Christianity	20	20	
Islam	26	26	
Traditional	45	45	Traditional
Freethinker	9	9	
Household size			
1-3	25	25	
4-6	60	60	4-6
Above 6	15	15	

Source: Research's Field work, 2022

Mushroom Consumption Pattern

Mushroom consumption among the respondents is present in Table 2. All respondents were aware of the existence of mushrooms, with 53% obtaining information through farming practices, while 29%, 12%, and 6% acquired knowledge from family members, the internet, and media, respectively. All respondents reported engaging in mushroom consumption, with 70% consuming wild mushrooms and 30% consuming cultivated varieties. The majority (50%) consumed mushrooms often, with 35% doing so very often, and 15% not often. None reported consuming mushrooms not very often. Consumption motives varied, with 45% consuming mushrooms for medicinal purposes, 30% for edibility, 12% as a meat or fish substitute, 9% for nutritional reasons, and 4% due to personal preference.

Regarding years of NTFP mushroom consumption, 63% of respondents had consumed mushrooms for 8 to 15 years, 25% for 1 to 7 years, and 12% for over 15 years. Factors affecting mushroom consumption (Table 3) included seasonality of production (40%), problems identifying

edible species (25%), allergy concerns (15%), and knowledge of preservation (10%), poor shelf-life (7%), and market proximity (3%). Edible mushrooms serve as vital food sources for rural communities, particularly during the rainy season. Availability peaks from April to October, coinciding with the rainy season in the study area. This result highlights the widespread awareness and acceptance of mushrooms as a food source among respondents, with implications for dietary diversity and nutritional intake (Cheung, 2010). Individuals knowledgeable about mushroom cultivation demonstrate a willingness to participate in its production. This trend is observed among consumers as well, who are cognizant of the mushroom market dynamics in their locale, notably where current supply falls short of meeting demand (Ongoch *et al.*, 2017; Boin and Nunes, 2018; Oguntoye *et al.*, 2022; Okuda, 2022; Oso *et al.*, 2022). With adequate understanding of consumption patterns and factors influencing mushroom utilization can inform strategies for promoting sustainable harvesting practices and enhancing access to nutritious foods within rural communities reliant on non-timber forest products.

Table 2: Consumption of mushrooms by the participants in the study area

Variables	Frequency N =100	Percentage (%)	Mode
Awareness about existence of mushrooms			
Yes	100	100	Yes
No			
If yes what is your mode of information?			
Internet	12	12	Farming
Family	29	29	
Farming	53	53	
Media	6	6	
Do you consume mushroom?			
Yes	100	100	Yes
No			
What kind of mushroom do you consume?			
Wild	70	70	Wild
Cultivated	30	30	
Others	0	0	
How often do you consume mushroom?			
Very often	35	35	Often
Often	50	50	
Not often	15	15	
Not very often			
Reasons for consumption of mushroom			
Nutritional reason	9	9	Medicinal reason
Medicinal reason	45	45	
As preference	4	4	
As a close substitute to meat or fish	12	12	
For its edibility/palatability	30	30	
Year of NTFP mushroom consumption			
1-7 years	25	25	8-15 years
8-15 years	63	63	
Above 15 years	12	12	

Source: Research's Field work, 2022

Table 3: Factors affecting mushroom consumption

Factors affecting mushroom consumption	Frequency N =100	Percentage (%)
Market proximity	3	3
Seasonal production	40	40
Problem of identifying edible species	25	25
Allergy in consumption.	15	15
Knowledge on preservative.	10	10
Poor shelf-life	7	7

Source: Research's Field work, 2022

Benefits of Mushroom Consumption for Households

The consumption of mushrooms has significant benefits for households in the study area (Table 4). The T-Test computed resulted in an absolute value of 14.87 (significant 0.000) at a 0.05 level of significance, indicating that non-timber forest products (NTFPs) contribute significantly to the benefits of households in the study area ($T = 14.87$ at $p < 0.05$). This suggests that NTFPs play a crucial role in enhancing household well-being in the study area. This finding is supported by

Ros-Tonen and Wiersum (2005) who maintain that NTFPs sustain the livelihoods of millions of people in forest-dependent communities and significantly contribute to their energy, food security, and health needs. Additionally, Odediran *et al.*, (2020) assert that non-timber forest products are critical for food security and serve as an important source of income for the poor in many developing countries. However, The mushroom species among Non-timber forest products (NTFPs) hold promise

for being transformed into functional foods due to their notable nutritional richness and the presence of biologically active compounds with medicinal significance (Roncero-Ramos and Delgado-Andrade, 2017).

Furthermore, multiple authors, including Cheung (2010), Elsayed *et al.* (2014), Roncero-Ramos and Delgado-Andrade (2017), Singh (2017), Meneses *et al.* (2020), and Lesa *et al.* (2022), underscore the nutritional significance of mushrooms. They accentuate mushrooms' status as a wholesome food source abundant in minerals and biologically active compounds, which possess anticancer and antiviral properties. Odediran (2020a&b) further supports these benefits, noting that mushrooms offer numerous health benefits such as strong bone formation, dietary fiber, and increased income for households. Boa (2004) adds that wild edible fungi are valuable sources of income for communities and national economies, particularly in rural areas of developing countries.

Table 4: Summary of Z-test statistics on mushroom consumption and its benefits

Variables	N	Mean score	St Dev	df	Z-cal	Z-crit	Sig	Decision
Sample Population	100	3.24	0.4976	99	14.87	1.96	0	Reject Ho

Significant at $P < 0.05$

Challenges Faced by Mushroom Production and Consumption

The challenges encountered in mushroom production and consumption is reveal in Table 5, along with their respective mean scores and standard deviations. These challenges include lack of adequate funding (mean score: 3.62, standard deviation: 0.8525), insufficient storage facilities (mean score: 3.31, standard deviation: 0.6023), deforestation (mean score: 3.85, standard deviation: 0.7541), poor transportation infrastructure (mean score: 3.10, standard deviation: 0.7587), disease outbreaks (mean score: 2.96, standard deviation: 0.6980), pilferage and theft of products (mean score: 3.05, standard deviation: 0.4839), limited availability of market outlets (mean score: 2.85, standard deviation: 0.7120), and fire outbreaks (mean score: 3.65, standard deviation: 0.5072). These challenges highlight various obstacles faced by stakeholders in the

mushroom consumption, ranging from resource constraints to environmental and logistical concerns. Addressing these challenges is essential for enhancing the sustainability and resilience of mushroom production and consumption systems. Additionally, understanding the socio-economic characteristics and consumption patterns of mushroom consumers provides valuable insights into the demographic makeup and preferences within the industry. Sharma and Kanbid (1994) highlighted several challenges faced by farmers in marketing their fruit produce, including the absence of sales outlets in local or nearby markets, inadequate transportation infrastructure, insufficient storage facilities, and the absence of fair pricing mechanisms for high-quality produce. Similarly, Kumari *et al.* (2018) identified the absence of proper marketing channels as a significant hindrance to the adoption of mushroom production enterprises. Additionally, Singh *et al.* (2008)

emphasized the lack of cold storage facilities as a major obstacle in addressing storage constraints.

However, deforestation poses a significant challenge to the production and consumption of mushrooms in the study area (Table 6). The T-Test statistic computed was 7.96 (significant 0.000) at a 0.05 level of significance, indicating that deforestation greatly impacts mushroom production and consumption, particularly affecting food security (T = 7.96, p < 0.05) (Table 6). This finding is consistent with

Odediran *et al.*, (2020), who emphasize that the current practices of bush burning, deforestation, and over-exploitation of timber and non-timber forest products are threatening the availability of mushrooms in Nigeria. Moreover, Ogunleye *et al.*, (2004) highlight how deforestation leads to the depletion of wildlife and biodiversity, resulting in the loss of essential non-timber forest products that sustain rural populations.

Table 5: Problems militating against consumption of mushroom

S/no	Problems	Mean score	Standard Deviation	Remarks
1	Lack of adequate fund	3.62	0.85	Agreed
2	Lack of storage facilities	3.31	0.60	Agreed
3	Deforestation	3.85	0.75	Agreed
4	Poor transportation	3.1	0.76	Agreed
5	Disease outbreak	2.96	0.70	Agreed
6	Pilferage and theft of products	3.05	0.48	Agreed
7	Unavailability of market outlet	2.85	0.71	Agreed
8	Fire Outbreak	3.65	0.51	Agreed

Table 6: Summary of T-test statistics on constraints facing bamboo business

Variables	N	Mean score	St Dev	df	T-cal	T-crit	Sig	Decision
Sample Population	100	3.1	0.75	99	7.96	1.96	0.002	Reject Ho

Conclusion

This study identified several key conclusions regarding mushroom consumption and production in the study area. Factors such as seasonal production were found to significantly influence mushroom consumption patterns, with households primarily consuming mushrooms for nutritional reasons. Empirical constraints, including a lack of adequate funding to acquire mushroom technologies, were identified as significant challenges facing both production and consumption in the study area. Despite these challenges, the consumption of mushrooms was found to have significant benefits for households, underscoring its importance as a dietary and economic resource. Deforestation emerged as a significant challenge in both the production and consumption of mushrooms, highlighting the urgent need for sustainable forest management practices to mitigate its impact on mushroom availability and biodiversity. Moving forward, addressing these challenges will require coordinated efforts from policymakers, researchers, and local communities to promote sustainable mushroom production and consumption practices.

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