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Problems Facing Mushroom Availability and Consumption in Owerri Municipal Council of Imo State Nigeria

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Abstract
The need for mass consumption of mushroom and mushroom delicacies as an alternative source of protein and Vitamins has not been well appreciated by majority of our people, even when the market prices of meat and fish have increased enormously. Superstitious believes that all mushrooms are distasteful and poisonous are mysteries that have overwhelming the minds of many. This paper therefore is aimed at investigating and ascertaining the problems facing mushroom availability and consumption in Owerri Municipal Council of Imo State Nigeria. Research questions and Null-hypothesis were formulated to elicit these problems. It was discovered among other things that the major problems facing mushroom consumption include: fungi misconception, unavailability and seasonal scarcity. People are therefore encouraged to go into entrepreneurship through commercial mushroom cultivation. This would no doubt go a long way in saving man from protein deficiency diseases and create employment opportunities for our teaming unemployed youths.
Key words: Mushroom, Protein, Vitamins, Deficiency, Owerri Municipal Council, Poisonous.

Introduction

Mushrooms are macro-fungi with a distinctive fruiting body that may be above (epigeous) or below the ground (hypogenous). Mushrooms have a fruiting body visibly to the naked eyes and could be picked up by hand (Chang and Milea, 1997). They belong to the division of fungi known as Basidiomycota and class Basidiomycetes. The class include: smut, rusts, puff-balls, toadstools etc. Mushrooms vary distinctive from plants, animals, and Bacteria (Oei, 2003, Stern 2000). In classical botany, fungi exhibit some of the features of plants if considered superficially but this is a doubtful validity because mushrooms are similar to green plants in being fixed and possessing cell walls, but they differ fundamentally in their lack of chlorophyll and therefore cannot synthesize their own organic food from Carbon IV Oxide and water (Zoberi, 1972). The importance of mushroom dates back thousands of years to ancient times. Since earliest times, mushrooms have been treated as a special kind of food rich in protein and some vitamins. Because of the high cost of animal protein, it cannot be easily afforded. Plant protein is usually in very low quality and would not be sufficient. Therefore, single cell proteins like mushroom from microbial sources are the best alternative source of protein because, they are cheaper to produce and their growth rate is very high. Mushrooms can therefore, immediately supply additional protein to human diet. Mushrooms are suitable for production in tropical and sub-tropical regions where most developing countries that lack protein are located.

Distribution of Mushroom

Mushroom is world-wide in distribution, although their production may be seasonal. Adequate moisture leads to mushroom formation and their abundance frequently follows rain in temperate regions. There may be a particular flora of mushroom species associated with the season of fall, summer and winter. Relatively few mushrooms are produced during the cold winter months, although there are perennial fruiting bodies that persist during the winter such as *Flammulina veluptes*, which may form at near freezing temperature. This is why *F. veluptes* has the common name winter mushroom (Chang and Milea, 1997).

Identification of Mushroom

It has been estimated that our planet harbor about 1.5million different species of mushroom but only 64.000 species have been described so far (Oei, 2003). Edible mushroom cannot be easily distinguishable from poisonous ones except by critical examination or analysis. Mankind has harvested wild edible mushroom for decades yet, edible mushrooms are still gathered in the wild in many cultures. To this effect, much less controversial is the consumption of mushrooms as food, since there may be both edible, poisonous and perhaps, non-edible species under one genus. Therefore, species must be examined and identified carefully before they are utilized for gastronomic (act of cooking and eating good food) purposes. Seasonal hunting of a local and indigenous species of mushroom *Pleurotus spp* has over the years contributed greatly as a means of livelihood and source of food to some communities such as Ezinihitte Mbaise Local Government Area of Imo State Nigeria, however, indiscriminate consumption of unidentified species has consequently resulted to mushroom poisoning and death of many.

Economic Importance

Poisonous Mushrooms

Before long, there would scarcely be any one capable of identifying the commonest mushroom species with authority hence, the importance of a descriptive work based on field studies will still be of unquestionable value (Zoberi, 1972). Poisonous mushrooms are popularly referred to as toadstools and cannot be consumed by humans because of their adverse effect. These mushrooms are described as poisonous because they contain toxins or alkaloids (alpha-amatin) that are responsible for the adverse and sometimes, lethal effect (Dutta 2008, Macrae et al 1993). These toxins are secondary metabolites. They play a role in protecting the function of the basidiocarp because the mycelium has expanded considerable energy and protoplasmic material to develop a structure to efficiently distribute its spores. Some poisonous species include the Panther cap, (*Amanita Pentherina*), *Cortinarius orellanus*, *psilocybe spp* etc. According to Dutta (2008) identifiable features of poisonous mushrooms include: Most of the species which have bright colour are to be regarded as poisonous. Those bearing pink spores and those with cap at the base are also poisonous. Finally, he pointed out that edible types grow in damp shaddy places. Some of the above claims especially the last two items may lose acceptance because, the common edible mushroom species, *Agaricus compestris* naturally grow on wood while *Vulvariella spp* grows on termite caste located in damp shaddy places.

Nutritional Values of Mushroom

Mushroom has been used as food in the past centuries, but the full nutritional values and other benefits from mushrooms have been discovered only in this century. Mushrooms contain all the essential amino acids that form the proteins. Furthermore, analysis of the amino acids essential in man's diet revealed that all are present in high amount, including lysine and leucine, though lysine and leucine are lacking in most staple cereal crops (Chang, 1989). Falade et al (2006) observed that some mushroom species in Nigeria contain between 81.4 and 93. 2% moisture and also have some plant nutrients like tannin and trypsin inhibitor. In addition, mushrooms have been reported to accumulate several trace elements at greatly exceeding contents than in other plant food (Kelac et al 2004). This was in conformity with a research conducted by Falede et al (2008) who observed that lead, cadmium, nickel, chromium, and Arsen were found in *Letinum subnudus* and *Chlorophylum molybditis*. The problem of lead and tannin associated with factors that could limit their utilization as food could be overcomed by adequate processing such as cooking in salt water and proper cooking before consumption.

Edible Mushrooms

A mushroom species is considered edible when a basic quantity of well prepared about 100-200g causes no health disorders, (Kelac et al 2004). Several wild mushrooms are edible and are regarded as delicacies. The best and most edible mushrooms in Owerri Municipal include *Agaricus Compestris* (Atakata eloo) and *Pleurotus Spp* (Erousu). Edible mushrooms are used extensively in cooking and in many cuisines. They are also good sources of some minerals such as iron, selenium, potassium, phosphorus etc.

Some mushrooms are neither edible nor poisonous; this is because of inadequate information as regards to their consumability or toxicity. It therefore, appears that mushroom in this group are not eaten because of certain unattractive morphological features that they possess. Some of these features may include small fruiting bodies, repugnant smell, unpleasant taste, toughness etc. it must be added here, that the evaluation of these characteristics is purely subjective and that some people may not mind eating these mushrooms provided they do not contain toxins. (Macrae et al, 1993)

Uses of Mushrooms

- They are used as tonics and medicine used in the treatment of various diseases like cancer, cardiovascular diseases, viral diseases, anti tumor, antibiotics, anti-inflammatory etc.
- Mushrooms are used for other purposes like dying wool and other natural fabrics.
- Mushrooms and other fungi are used in bio-remediation and filtration technologies. For instance, white rot fungi (*pheurotus species*) have been shown to be beneficial in the removal of certain pollutants like polychlorinated phenols, polycyclic aromatic hydro carbons etc.
- Spent compost from mushroom cultivation is used as fodder for livestock because *pleurotus spp* has the ability to breakdown lignin thereby increasing food digestibility for ruminants. Cultivation of Mushroom

Naturally, mushroom grows in forest, agricultural farmlands, tree trunks, wood logs around homes etc. The over dependent on naturally available mushroom has led to mushroom scarcity and shortage in supply. This is simply because mushrooms are seasonal and edible ones are selective in their natural habitat. Therefore to solve the problem of mushroom scarcity, mushroom has to be cultivated all year round in order to ensure its availability. Cultivation of mushroom utilizes Agro-industrial wastes and provides a way of alleviating

environmental pollution, thus transferring the inedible waste to edible biomass which is generally accepted as food of high quality, flavor and nutritive value (Chang and Quimo, 1989).

Purpose of the Study

The objective of the study is to determine the major problems facing mushroom consumption in Owerri Municipal Council and to provide possible solutions to those problems. The work specifically seek to:

- Find out the major problems facing mushroom availability in our local markets.
- Find out the extent people demand for mushroom in our local markets.
- Ascertain the perceptions of nutritional value on mushroom consumption in Owerri Municipal Council Area.
- Determine ways the problems of mushroom scarcity and consumption can be solved.

Significance of the Study

The study will go a long way creating awareness on mushroom consumption and eliminate the fear and misconception that all mushrooms are poisonous.

Research Questions/Null-Hypothesis

- What are the major problems facing mushroom availability in our local markets?
- To what extent do people demand for mushroom in our local markets?
- What are the perceptions of nutritional value on mushroom consumption in Owerri Municipal Council Area?
- In what ways can the problems of mushroom scarcity and consumption be solved?
- Null-Hypothesis: (H01) There is no significant nutritional value attached to mushroom consumption in Owerri Municipal Council Area at $P< 0.05$.

Area of Study

The study was carried out in Owerri Municipal Council of Imo State. Owerri Municipal is the Capital City of Imo State, Nigeria. It is cosmopolitan in nature with people of various profession such as civil servants and public servants, farmers, artisans, and other professionals. Owerri Municipal is made up of five (5) villages, they are: Umuoronjo, Amawom, Umuonyeche, Umuoyima, and Umuodi. Owerri Municipal is accessible to almost all part of Imo state by road and air. This is possibly one of the reasons for use of Owerri Municipal as the case study of this research.

Design

The research design used in this study is a descriptive survey design. Here the population was studied by collecting and analyzing data from sample respondents.

Instruments for Data Collection

The instrument used in this study is questionnaire that has four points for each item. These are strongly agree (SA), Agree (A) strongly disagree (SD) and Disagree (D). The questionnaire has 13 item questions. Each item-section deals on a research question. Section of three (3) questionnaire items were used to answer the four research questions and for the testing of null-hypothesis: (H0).Problems facing mushroom consumption has four (4) items, Extent of mushroom demand has three (3) items, Nutritional value perceptions has three (3) items, Solving problems of mushroom scarcity and consumption has three (3) items.

Administration of Instruments

The researchers randomly distributed the questionnaire to 100 persons within Owerri Municipal Council. This was done irrespective of Age, gender, and occupation. They waited on the respondents to fill out the instruments and collect the responses thereafter.

Method of Data Analysis

Data were arranged and analyzed in tables using CHI-Square. The CHI-Square technique utilizes contingency tables which are tables with cells corresponding to cross classification of attributes or events in research studies. The bases for the analysis in the property of independent events which state that two events A and B are dependent if $P(A \cap B) = P(A)\,P(B)$. The test statistics for independent is

$X = \sum_{11}^{r} \sum_{11\ 3}^{c} (O - E)^2$. With $df = (r-1)$

Where r = rows and C = columns . The calculated value of X is then compared with the value obtained from the X table at (r-1) df and H0 rejected or accepted according to whether cal > y.

Results/Discussion

Research Question 1: What are the Major Problems Facing Mushroom Availability in our Local Markets?**Table 1.1:** Major Problems Facing Mushroom Availability in our Local Markets.

S/NQ1	NO: A (%)	NO: D (%)	TOTAL
1	180(90.4)	19(9.5)	199
2	184(92.40)	15(7.5)	199
3	174(87.4)	25(12.5)	199
4	170(85.4)	29(14.5)	199
Total	708(88.9)	88(11.0)	796

Research Questions 2: To What Extent do People Demand for Mushroom in our Local Markets

Table 1.2: Extent of Mushroom Demand in our Local Markets

S/NQ1	NO: A (%)	NO: D (%)	TOTAL
5	170(85.4)	29(14.5)	199
6	160(80.4)	39(19.5)	199
7	166(83.4)	33(16.5)	199
Total	496(83.4)	101(16.9)	597

Research Question 3: What are the perceptions of nutritional value on mushroom consumption in Owerri Municipal Council Area?

Table 1.3: Nutritional value Perception on Mushroom Consumption

S/NQ1	NO: A (%)	NO: D (%)	TOTAL
8	166(83.4)	33(16.5)	199
9	167(83.9)	32(16.5)	199
10	49(24.6)	150(75.3)	199
Total	382(63.5)	215(36.0)	595

Research Question 4: In what ways can the problems of mushroom scarcity and consumption be solved?

Table 1.4 Solving Problems of Mushroom Scarcity and Consumption.

S/NQ1	NO: A (%)	NO: D (%)	TOTAL
11	174(87.4)	25(12.6)	199
12	184(92.4)	15(7.5)	199
13	193(96.9)	6(3.0)	199
Total	551(92.9)	46(7.7)	597

From the result shown in table 1.1 above, items no 1, 2, 3 and 4 were used. A total of 708 (88.9%) agreed responses show that inadequate number of local mushroom hunters, unavailability of mushroom in the wild and urbanization are the major problems facing mushroom availability, while 88 (11.0%) disagreed responses were obtained on the contrary. These problems are therefore significant at ($P \leq 0.05$)

(2) Answering research question II

To what extent do people demand for mushroom in our local markets?

Obtained value of contingency coefficient = 1.80

X2tab (0.05, 2) = 5.99. X^2 Cal < X^2_{tab}

The above result in table 1.2 show that items 5, 6 and 7 were used to elicit the problem. A total of 496 (83.0%) agreed responses revealed that some people dislike mushroom because of the fear of mushroom poisoning. This is in line with the view of Zoberi (1972). The responses also indicated that despite the fact that mushroom unavailability remains a major problem in mushroom consumption, they agreed majority will still buy well packaged mushroom if available in the supermarket, while 101 (16.9) disagreed responses was against this view. However, the demand for mushroom were found to be mutually significant at $p \leq 0.05$.

(3) Answering Research Question Three.

What are the nutritional value perceptions on mushroom consumption in Owerri Municipal Council Area? Testing of null hypothesis (HO_1) show that there is no significant nutritional value attached to mushroom consumption by the people living with the area of study.

Obtained value of contingency co-efficient. = 200.32 X^2_{tab} (0.05) = 4.61. X^2_{cal} X^{2tab}

From the above result shown in table 1.3, items no. 8, 9 and 10 were used. A total of 382 (63.9%) agreed responses show that most people prefer eating dishes prepared with mushroom, because of its medicinal effects, 46(36.0%) disagreed that people prefer mushroom to meat and fish. The null hypothesis that there is no significant nutritional value perception on mushroom consumption was rejected at ($P \leq 005$).

From table 1.4 above items 11, 12 and 13 were used. 551 (92.9%) responses show that embarking on commercial mushroom cultivation encourages local mushroom hunters. Similarly training of interested persons on mushroom cultivation would solve the problems of mushroom scarcity and consumption while 46(7.7%) respondents disagreed that embarking on commercial mushroom cultivation and training interested persons would solve the problems of mushroom scarcity.

Obtained value of contingency coefficient = 5.99

X^2_{tabl} (0.05, 3) =7.81

$X^2_{cal} < X^2_{tab}$

Conclusion and Recommendation

Mushroom have been found to be suitable enough to supplement protein obtained from plant and animal origin. Mushroom increase the protein content of the diet of man especially those living in the developing countries like Nigeria where supply of protein is low.

The various problems facing mushroom availability and consumption in Owerri Municipal Council of Imo State have been revealed by this work. We therefore recommend as follow.

- The young unemployed youths should go into commercial mushroom cultivation since it requires small portion of land and less capital to set up.
- In picking wild mushroom carefulness should be maintained so that only the edible ones are collected.
- The government should through its Agricultural development organizations/agencies train interested persons free of charge on mushroom cultivation and provide them with grants and loans to acquired instruments in mushroom cultivation.

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