Acceptability of Snail as Source of Protein among Residents of New-Bussa and Its Environment, Niger State Nigeria

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Abstract
This study examined the acceptability of snail as source of protein among residents of New-Bussa, Niger State, Nigeria. Data was collected with the aid of well structured questionnaire among the residents purposively among the residents of New-Bussa and its environment. The data was analyzed with the use of descriptive statistics. The acceptability of Snail meat in New-Bussa and its environment revealed that majority are willing to buy and eat snail meat with a high mean of 3.99, followed by 'I have tasted snail meat before' with a mean value of 3.97 and the least is 'live Snails are sold in New-Bussa and its environment' with a mean value of 3.92. The constraints associated with consumption of Snail meat showed that cost (Price) of snail meat scored the highest with mean value of 4.12, followed by 'I do not eat Snail meat frequently because I hardly see it in my area' with a mean value of 4.11 and 'I do not eat Snails because my people do not eat it is the least with a mean value of 3.98. The Preference of Snails meat compared to meat from other animal sources' recorded the highest (1.63 mean value), followed by Fish and Goat meat with mean value of 1.57 and 1.52 respectively and Snail meat is the least with mean value of 1.26. This study recommends that awareness creation on the nutritional benefits of Snail meat consumption is necessary to enlist more consumers.

Keywords: Acceptability, New-Bussa, Protein, Snail

Introduction

Protein malnutrition is a major challenge to most developing countries especially in Africa. This has informed the need for man to explore the use of other sources in the wild in order to meet his body requirements (Ebabhamiegbbho *et al*., 2013). In Nigeria, it is now accepted that the use of mini-livestock such as snails, rodents and other small livestock in the wild can substantially improve the living conditions of people in urban and rural areas by acting as a valuable source of protein supplement to diet as well as generating additional income (Ezeama *et al*., 2007). Snails are usually herbivores with a complex hermaphroditic reproductive system (Akinnusi, 2004). They are high in protein, low in fat and a source of iron, magnesium, calcium and zinc (Adeola *et al*., 2022).

Snails are bilaterally symmetrical invertebrates with soft segmented exoskeleton in the form of calcareous shells. They belong to the *phylum Mollusca* and *class gastropoda* that have coiled shells in the adult stage, and when the word snail is used in a general sense, it includes; sea snail, land snail and fresh water snail which belong to the group of invertebrates. Snail is one of the earliest known types of animals in the world. There is evidence that snail evolved more than 600 million years ago (Ayodele and Asimalowo, 1999). Land snails habitat ranges from the dense tropical high forest in southern Nigeria to the fringing riparian forests of the derived guinea savanna, (Odebode, 1999; Adeniyi *et al*., 2013). In West Africa, snails dwell mostly in humid forest areas from where there are gathered by villagers for consumption and other uses (Ademosun and Omidiji, 1999). It is a popular meat of many Nigerians in the rural areas, in the rainforest belt where it is collected from the wild. The potential for it domestication and commercialization in the country has not been fully exploited, although many studies have shown that snail farming could highly be profitable and productive business (Amusan and Omidiji, 1999).

Over the past decades, Food and Agriculture Organization (FAO) has reported that the average animal protein intake in Nigeria is low, calling for concerted efforts towards alleviating this crisis of

protein shortage (Adeniyi *et al.*, 2013). Also, (Okeke, 2015) reported that the consumption of animal protein in Nigeria is 5.5kg per head per day which is absolutely below the Food and Agriculture Organization recommendation of 35kg per head per day. Unfortunately, the conventional and regular sources of animal protein in the country like beef, pork, goat meat, fish, poultry etc. are getting out of the reach of the common man due to their high price as a result of the economic down-turn in recent years (Okeke, 2015). Emphasis thus falls on the micro-livestock in which Nigeria is richly endowed with to complement the conventional sources of animal protein supply and as a major alternative which comes handy. There is therefore the need to look inwards and integrate into our farming system some non-conventional animal protein sources (Ebenebe, 2000). Information obtained from this study will create the awareness towards increased production and marketing of snails, for farmers to establish profitable innovative and sustainable activities thus increasing their economic power while at the same time conserving biodiversity.

Methodology

Study Area Description
Borgu Local Government Area (LGA) lies between latitude 9^0N and 11^0 N and longitude 2^0E and 4^0E. It is bounded to North by Kebbi State, to the South by Kaima and Baruten local government Areas of Kwara State, to the West by Benin Republic, and to the East by River Niger and Magama LGA of Niger State. Its headquarters are in the town of New-Bussa and in 2012 based on the World Bank indicator growth rate the LG has a population of 199,427, consisting of 102,463 males and 96,964 females (Garba *et al.*, 2015).

Study Population
The population for this study comprise of residents of New-Bussa and its environs.

Sample Size
The sample size was put at one hundred and twenty respondents.

Sampling Technique
A purposive sampling technique was used to select one hundred and twenty (120) residents of New-Bussa and its environs.

Method of Data Collection
Questionnaire was personally administered by the researcher and interpreted in local languages to the respondents with the help of an interpreter. The questionnaire contained a series of structured questions which were related to the research work and directed to respondents with the aim of gaining first-hand information.

Data Analysis
Data obtained were analyzed using descriptive statistics such as frequency tables, percentages and charts.

Results and Discussion

Results
The socio demographic characteristics of respondents is shown in Table 1, majority of the respondents were males (74.2%), while 25.8% were female. Age group 28-37 years recorded the highest (40.8%), followed by 18-27 years with 35.0% and the least were 48 and above with 6.7%. The highest percentage (54.2%) of the respondents is unmarried, while 45.8% are married. The table revealed the level of education of the respondents in which 39.2% of the respondents are NCE/ND holders, followed by secondary certificate with 32.5% and the least were first school leaving certificate with 12.5%. The major occupation of the respondents shows that majority (32.5%) are civil servants, followed by 26.7% who are students and the least are hunters with 4.2%. Majority (55.8%) of the respondents are Muslims while 44.2% were Christians. Table 2, revealed the acceptability of Snail meat in New-Bussa, the high mean of 3.99 were recorded among respondents that indicated 'I am willing to buy and eat snail meat', followed by 'I have tasted snail meat before' with a mean value of 3.97 and the least are 'live Snails are sold in New-Bussa metropolis' with a mean value of 3.92. The constraints associated with consumption of Snail meats is presented in Table 3, cost (Price) of snail meat scored the highest mean value of 4.12, followed by 'I do not eat Snail meat frequently because I hardly see it in my area' with a mean value of 4.11 and 'I do not eat Snails because my people do not eat it' is the least with a mean value of 3.98. Table 4, presents the awareness of the nutritional value of Snail meat, Snail meat are rich in good quality protein scored the highest mean value of 3.97, followed by 'Snail meat is rich in minerals essential for good health' and 'Snail meat is good for treating anaemia in children and pregnant women' scored a mean of 3.92 and 3.79 respectively. The Preference of Snails meat compared to meat from other animal sources is revealed in Table 5, in which beef recorded the highest (1.63 mean value), followed by Fish and Goat meat with mean vale of 1.57 and 1.52 respectively and Snail meat is the least with mean value of 1.26.

Discussion
This study revealed that most of the respondents were male; this is in line with Ayodele and Asimalowo, (1999) and Emmanuel (2016) that men consume snails than the women, because in some areas snail meat is forbidden for pregnant women. Also, the highest percentage of the age group are youths, this implies that younger people consume snails more than their elderly counterparts. This could because snail can be scout and freely picked from the forest without incurring costs. Age is one of the important factors which can positively or negatively affect the acceptability and consumption of snails. This affirms the findings of Cobbinah *et al.* (2008) and Tsegay (2012) that the younger ones are more willing to accept and consume snails compared to their aged folks. In terms of education, most of the respondents had one form of education or the other. Education plays a greater role in every facets of life including consumer preference as it helps the consumer to know the

nutritional and health implication of what they eat. This was in agreement with the finding of Emmanuel (2016). Akinnusi, (2014) believes that illiteracy and lack of information on nutritional composition and health benefits could make acceptability and consumption of snails relatively difficult. It was reflected that 32.5% and 24.2% of the respondents were civil servants and business men respectively, this was in accordance with Emmanuel (2016) that occupation plays a major role in consumer preference; farmers could be disposed to scouting and picking snails from the forest in their day to day farming activities. On the other hand, traders could also consume snail significantly as it can be bought by the road side handy at cheaper rates. The constraints associated with consumption of snail meat shows that culture and religion did not prohibit consumption of Snail meat. Rather, respondents agreed that, they had eaten Snail meat in the past and their family members also consumed Snail meat. Also, respondents acknowledge that Snail meat is rich in good quality protein and minerals that are essential for growth and maintenance of good health. They also agreed that Snail meat has low fat content and is good for those with heart problems, diabetes and is required in management of anaemia. Ranking of consumer preference of the commonly available meat sources compared to Snail meat shows that majority of the respondents preferred beef meat and fish over Snail. This result has demonstrated a low preference rating to Snail meat which can be attributed to consumer behavior that is a complex phenomenon which is subjected to many factors. It has been observed that *Archachatina marginata* is generally accepted for consumption among the people in Southern Nigeria, there is a strong cultural discrimination in the consumption of *Achatina achatina* by some tribes in some Southern Nigeria (Malik *et al*., 2011). This finding in this research also corroborates Malik *et al*. (2011) who observed poor rating of Snail meat in the sensory evaluation among residents of Minna in the North-Central Nigeria, compared to chicken, beef and rabbit meat. It is confounding how in spite of the awareness of nutritional benefits of consuming Snail meat and the absence of cultural and religious restrictions on its consumption among the majority of inhabitants of New-Bussa and its environs. The poor preference can also be due to the high cost of Snail meat and the scarcity/unavailability of Snail Market in the study area.

Conclusion
The study concludes that the residents of New-Bussa and its environs accept Snail meat as source of protein and they are willing to buy and eat snail meat. The major constraints associated with consumption of Snail meats are cost (Price) and scarcity. The awareness of the nutritional value of Snail meat indicated that Snail meat is rich in good quality protein. The Preference of Snails meat compared to meat from other animal sources showed that Snail meat is least preferred. There is need therefore for policies to encourage Snail farming. Government should provide incentives to snail farmers to boost their production. Awareness should also be enhanced among communities on the different utilization of Snails in the study area.

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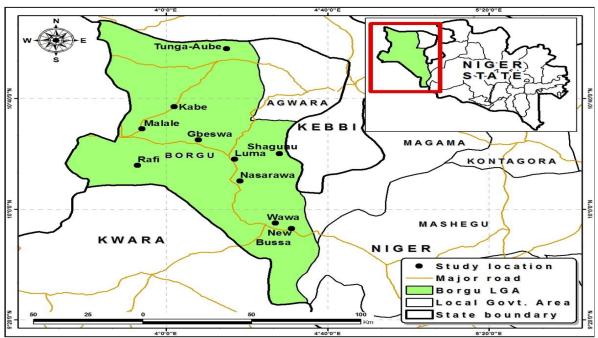
Fig. 1: Map of New-Bussa and Its Environs

Table 1: Demographic Characteristic of the Respondents

Demographic	Variables	Frequency	Percentage (%)
Gender	Male	89	74.2
	Female	31	25.8
Age Group	18-27	42	35.0
	28-37	49	40.8
	38-47	21	17.5
	48 and Above	8	6.7
Marital Status	Married	55	45.8
	Unmarried	65	54.2
Level Of Education	Primary	15	12.5
	Secondary	39	32.5
	NCE/ND	47	39.2
	HND/Bsc	19	15.8
Major occupation	Farmer	15	12.5
	Craftsman/Business	29	24.2
	Hunter	5	4.2
	Civil servant	39	32.5
	Student	32	26.7
Religion	Christianity	53	44.2
	Islam	67	55.8
Total		**120**	**100.0**

Source (Field survey, 2022)

Table 2: Acceptability of Snail Meat in the Study Area

Variable	Strongly Disagree F	%	Disagree F	%	Undecided F	%	Agree F	%	Strongly Agree F	%	Mean	Remark
Live Snail are sold in New-bussa	0	0	11	9.2	27	22.5	31	25.8	51	42.5	3.92	6th
Cooked Snail meat is sold in New-bussa	0	0	0	0	14	11.7	44	36.7	58	48.3	3.94	5th
I am willing to buy and eat snail meat	0	0	0	0	8	6.7	21	17.5	91	75.8	3.99	1st
I have tasted snail meat before	0	0	0	0	13	10.8	34	28.3	73	60.8	3.97	2nd
Snail Meat is delicious	0	0	0	0	0	0	51	42.5	69	57.5	3.96	3rd
Members of my family eat Snail meat	0	0	0	0	0	0	59	49.2	61	50.8	3.95	4th

Source (Field survey, 2022)

Table 3: Constraints Associated with Consumption of Snail Meat

Statement	Strongly Disagree F(%)	Disagree F (%)	Neutral F (%)	Agree F (%)	Strongly Agree F (%)	Mean	Rank
Culture of my ethnic group prohibits consumption of snail meat	20(16.7)	32(26.7)	34(28.3)	14(11.7)	20(16.7)	3.99	10th
My religion prohibits consumption of snail meat	12(10.0)	24(20.0)	34(28.3.0)	30(25.0)	20(16.7)	4.02	9th
Snail meat has unpleasant taste	2(1.7)	20(16.7)	11(9.2)	49(40.8)	38(31.7)	4.04	7th
Snail meat has unpleasant appearance	0(0.0)	0(0.0)	21(17.5)	40(33.3)	59(49.2)	4.08	4th
Snail meat has unpleasant flavor	0(0.0)	20(16.7)	21(17.5)	38(31.7)	41(34.2)	4.05	6th
Snail meat is dirty	8(6.7)	22(18.3)	35(29.2)	27(22.5)	28(23.3)	4.03	8th
Slimy secretion produced by snails is hard to get rid of before cooking	0(0.0)	0(0.0)	20(16.7)	39(32.5)	61(50.8)	4.09	3rd
I do not eat snails because I have not done it before	0(0.0)	11(9.2)	28(23.3)	31(25.8)	50(41.7)	4.07	5th
I do not eat snail meat frequently because I hardly see it in my area	0(0.0)	0(0.0)	11(9.1)	37(30.8)	72(60.0)	4.11	2nd
I do not eat snail because my people do not eat it	21(17.5)	25(20.8)	48(40.0)	11(9.2)	15(12.5)	3.98	11TH
I cannot afford price of the snail	0(0.0)	0(0.0)	0(0.0)	38(31.7)	82(68.3.0)	4.12	1st

Source (Field survey, 2022)

Table 4: Awareness of Nutritional Benefits of Snail Meat

Variables	Mean±SD	Rank
Snail Meat is low in fat content and is good for those with heart problem	3.80±1.58	3rd
Snail Meat is rich in minerals essential for good health	3.92±1.54	2nd
Snail Meat is good for those managing diabetes	3.75±1.65	5th
Snail Meat is good for treating anaemia in children and pregnant women	3.79±1.62	4th
Snail Meat is rich in good quality protein	3.97±1.34	1st

Source (Field survey, 2022)

Table 5: Preference of Snails Compared to Meat from Other Animal Sources.

Meat Type	Mean±SD	Rank
Snail	1.26	8th
Fish	1.57	2nd
Goat	1.52	3rd
Pork	1.35	5th
Dog	1.31	6th
Beef	1.63	1st
Poultry	1.48	4th
Bush meat	1.29	7th

Source (Field survey, 2022)