

ACCEPTABILITY OF CONFECTIONARIES PRODUCED FROM SNAIL BY PREGNANT MOTHERS AS NUTRIENT ENRICHMENT SNACKS FOR HEALTHY FEEDING

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Abstract

This study determined the acceptability of confectionaries produced from snail by pregnant mothers as nutrient enriched snacks for healthy feeding. Three snacks were produced from snails (these were: Snail Pie, Snail Roll and Snail Ball), their organoleptic and sensory characteristics were evaluated (appearance, colour, aroma and taste) using 4-points descriptive Hedonic scale. The findings reveal that, the respondents accept the appearance, colour, aroma and taste of the three snacks: In term of Appearance, Snail Roll was the most accepted (3.54), next to Snail Pie (3.31) and then Snail Ball (2.86); In terms of colour, Snail Roll was the most accepted (3.60), next to Snail Pie (3.46) and then Snail Ball (2.89); In term of Aroma, Snail Pie was the most accepted (3.54), next to Snail Roll and then Snail Ball; In term of taste, Snail Pie was the most accepted (3.66), next to Snail Roll (3.63) and then Snail Ball (3.43)..

Keywords: Snail, Healthy Feeding, Pregnancy, Economy Downturn, Mothers.

Introduction

Healthy feeding is important for every individual at every stage of development irrespective of the economic situation in the area. It is especially important for pregnant woman to eat healthy because more than one life is involved. Kebbe, Flanagan, Sparks and Redman (2021), observed that, nutritional status during pregnancy affects the mother's health, the fetal result in term of health and development. This is because in this condition, many nutrients are so much important for both the mother's health and the fetus' development. According to Sharma, Akhtar, Singh and Mehra (2020), eating in a healthy way during pregnancy and lactating are essential to satisfy the increased micro and macronutrient needed for better maternal and child birth. Adeoye and Okekunle (2022), are of the view that, nutritional status of mother is important for an ideal intrauterine environment, foetal development, birth weight, pregnancy and neonatal outcomes. Olayiwola, Ayodeji, Adesope, Ajayi Adisa, Akinola and Akinlo (2015) similarly remarked that, proper maternal weight status emanating from adequate nutrition dietary pattern affects the health of both the mother and her child all through the reproductive cycle. It is also noteworthy that, sufficient availability of nutrients is needed to preserve a sensitive balance between the requirement of the mother and those of the fetus (Arzoaquoi, Essuman, Gbagbo, Tenkorang, & Laar, 2015)

Irrespective of the economic situation or economic status, pregnant mothers cannot afford to handle their nutritional status carelessly, if not, some irreparable consequences will come into play. As pointed by Olatona, Olowu, Goodman and Amu (2021), inadequate nutrition during

crucial periods of fetal development resulting from poor dietary habits may lead to reprogramming within fetal tissues and pose as a risk factor for non-communicable diseases in later life. Ekwochi, Osuorah, Ndu, Ifediora, Asinobi and Eke (2016), similarly remarked that poor nutritional practices especially in pregnancy and early childhood can result in dire consequences in the growth and development of a child.

Currently, the economy situation in Ondo State which is a reflection of the cumulated economy of the nation is so pathetic as food price hike is biting hard on many citizenries. The reason for food price hike in Nigeria is way above the pandemic, other agents such as; fuel price hike, inadequate supply of electricity, Russia-Ukraine crisis and insecurity are all added (Ajulo, 2022). Some individuals cannot even afford to take one quality meal per day. According to Adebayo, Dare and Meckbib (2018) incident of price spikes have resulted in extraordinary and problematic changes in commodity prices, leaving adverse impacts on substantial number of households in developing countries. According to Gustafson (2013) rising food costs can have a major impact on food and nutrition security as these push the most vulnerable households further into poverty and weaken their ability to access adequate food.

Thankfully, nature has a way of caring for human if only we are sensitive to the necessary food items freely available for our consumption. Among such food item is snail. There are thousands of snail species, indifferent sizes and shapes, freely available for human consumption. They are always seen crawling around blocks, small bushes and house walls after, even a little rainfall. According to Oguntoye, Fatoki, Olushola and Arowolo (2020) snail (*Archachatina* species) are the largest groups of Mollusca. There are different types such as: garden snail, giant African land snail, Roman snail, spike-topped apple snail, gastropods, milk snail, white-lipped snail, *Helix lucorum*, red-rimmed melania, littorinidae, groove snail and *helix aperta*. Apart from the fact that snail provides first class type of protein nutrient being an animal, there are several other nutritional benefits that can be derived from snail.

Such nutritional benefits from snails are: They are high in protein, iron, calcium, vitamin A and low in fat (Kolawole, 2021). Oguntoye, Fatoki, Olushola and Arowolo (2020) reviewed in a study that, snail meat is rich in minerals such as calcium, phosphorus, potassium, iron and zinc. The low fat and cholesterol levels of land snail make it recommendable for people of all ages and especially for patient with vascular diseases (Fomine, 2022).

Unfortunately, there are some fabricated believes against consumption of snail by pregnant woman in Ondo State and some other parts of Nigeria. Some people believe eating snail by pregnant woman will make her child sluggish (Ekwochi et al, 2016). This has been prohibiting many pregnant mothers from enjoying this free, naturally available and nutrient rich animal. According to Ibrahim, Shuaib-Rahim and Olatunji (2020), Snail-meat is probably the greatest subject of food prohibitions in several African climes and beyond. Some Ghanaian dietary taboo are that pregnant women are not expected to eat snail to avoid giving birth to drooling babies and children (Arzoaquoi et al, 2015). Ekwochi et al (2016), identified in a research that, snail and grass-cutter meat were the commonly avoided food in pregnancy in Southeast Nigeria, and that some respondents believed eating snail and grass-cutter meat make a child sluggish and labour difficult. Whereas, according to Eshemokha (2021), there has not been

any established link between snail consumption and sluggishness of excessive salivation in babies.

Apart from the nutritional benefits, snails have a lot of economic value especially in this season of food price hike. Prohibition of snail-meat fuel deficiencies of micronutrients contributes significantly to maternal morbidity and mortality (Ibrahim, Shuaib-Rahim and Olatunji, 2020). According to Eshemokha, (2021), snail is full of protein, vitamin E, iron, magnesium, potassium, phosphorus, copper and selenium and high in good cholesterol, these attribute make eating snail safe in pregnancy. There are also limited knowledge of delicacies that can be produced from snail. In the bid to make variety of adequate food nutrient available for pregnant mothers the study introduced more delicacies from snail to pregnant mothers by producing confectionaries from snail.

Purpose of the study

The main purpose of the study is to test the acceptability of confectionaries produced from snail as nutrient rich snacks for pregnant mothers. Specifically, the study,

1. Produced three snacks from snail for pregnant women in Ondo West Local Government Area of Ondo State.
2. Tested the acceptability of confectionaries produced from snail for pregnant women in Ondo West Local Government Area of Ondo State.

Research Questions

The study answers the following questions

1. What are the confectionaries produced from snail for pregnant woman in Ondo West Local Government?
2. What is the level of acceptability of confectionaries produced from snail by pregnant women in Ondo West Local Government?

Materials and Methods

Research Design: The design of the study was experimental research designs.

Area of the Study

The research study was carried out in the food laboratory of Home Economics Department Adeyemi Federal University of education, Ondo, Ondo State. Ondo State is one of the states in Southwestern Nigeria. Ondo State can be classified as rainforest, the annual rainfall in the state is favourable for the breathing and habitation of many species of snails, as a result, not only is snail cheap in the state, but many species are also freely available.

Population and Sample of the Study

The population of the study comprised of all pregnant women in Ondo West local Government Area of Ondo State. Purposive sampling technique was used to select thirty-five (35) pregnant women as respondents for the study. The respondents tested the acceptability of the three confectionaries produced from snail as a nutrient rich snack for pregnant women.

Food Items and Material Collection and Preparation

The food items; snails, bread crumbs, vegetable oil, flavor, lime, flour, eggs, fresh carrots, pepper, onions and Irish potatoes were purchased from Ugele market in Ondo city. They were then taken to the food laboratory of Home Economics department, Adeyemi college of

Education, Ondo, where the materials; board, oven bowls, pie cutter, pot, cutleries, frying pan were gotten and the snacks prepared.

Procedure of Food Preparation

The purchased snails were washed with warm water, deshelled and washed again in both salt solution and lime; they were then seasoned, boiled, fried and blended. Nutmeg, boiled potato, onion, pepper and carrot were added to prepare it as filler.

Snail pie was prepared thus: flour was sieved and weighed; appropriate baking powder, flavour and salt to taste were added and mixed; margarine was rubbed in, egg was added, the whole mixture was kneaded and cut into shape; it was filled with fried minced snail mixture, enclosed with egg and then fried.

Snail Roll was prepared thus: Flour was sieved and weighed; appropriate baking powder, flavour and salt to taste were added and mixed; egg was added and kneaded; it was then cut and rolled out; it was filled with fried minced snail mixture, enclosed with egg and then fried.

Snail Ball was prepared thus: flour was sieved and weighed; appropriate baking powder, flavour, salt to taste were added and mixed; egg was whisked and snail blended, snail meat was smashed together with corn; the smashed snail meat was molded into round ball; the mold was mixed with flour and coated with whisked egg, it was thereafter enclosed with bread crumbs and deep fried.

Instrument Design and Data Collection

Four-point hedonic scale was designed to evaluate the organoleptic and sensory characteristic of the three samples of the confectionaries made from snails. The information was solicited from the respondents. Thirty-five copies of the questionnaire were made. The respondents were presented with the three (3) samples of the confectioneries to be evaluated for appearance, aroma, taste and colour. The thirty five (35) copies made were personally administered to the respondents with the interpretation of the items. The entire administered instrument was retrieved, representing 100% return rate. All were properly filled and analyzed for the study.

Analysis of Data

The responses to the four-point hedonic scale were collated and analyzed using mean and standard deviation. The mean and standard deviation of the four-point hedonic scale was used and interpreted based on statistical real limit of the numbers as follows; like extremely (LE)=4 Like Slightly(LS) = 3, Dislike Slightly (DS) = 2, Dislike Extremely (DE) = 1. A cut-off point determined the accepted and rejected items. A cut-off point of 2.5 was obtained. Any item with the Mean of 2.50 and above was taken as agreed while anyone with the mean below 2.50 was taken as disagreed.

Results and Discussion

Table1: Mean and Standard Deviation of Responses of the Respondent on the Acceptability of Snail Pie

N=35		C=2.50						
S/N	Sensory Attributes	LE	LS	DS	DE	($\bar{X}$)	S.D	DECISION
1	APPEARANCE	15(42.9)	16(45.7)	4(11.4)	0(0)	3.31	0.68	Accepted
2	COLOUR	19 (54.3)	13 (37.1)	3 (8.6)	0 (0)	3.46	0.66	Accepted
3	AROMA	23 (65.7)	10 (28.6)	0 (0)	2 (5.7)	3.54	0.78	Accepted
4	TASTE	23 (65.7)	12 (34.3)	0 (0)	0 (0)	3.66	0.48	Accepted

Key: LE= Like Extremely, LS = Like Slightly, DS = Dislike Slightly, DE= Dislike Extremely, N= Number of respondents, C = cut-off point, $\bar{x}$ = Mean of responses, S.D= Standard Deviation

Table 1 revealed that the mean responses on all the items range from 3.31 - 3.66 which were greater than the cutoff point of 2.50. Therefore, the respondents agreed on all the item statement as part of the acceptability test of snail pie as a nutrient rich snack for pregnant women. The standard deviation of the responses ranges from 0.48 – 0.78 and was relatively low. This indicates that the responses were clustered around the mean.

Table 2: Mean and Standard Deviation of Responses of the Respondent on the Acceptability of Snail Roll

		N=35		C=2.50				
S/N	Sensory Attributes	LE	LS	DS	DE	($\bar{X}$)	S.D	Decision
1	APPEARANCE	22 (62.9)	10(28.6)	3(8.4)	0(0)	3.54	0.68	Accepted
2	COLOUR	25 (71.4)	8 (22.9)	0 (0)	2 (5.7)	3.60	0.77	Accepted
3	AROMA	21 (60.0)	8 (22.9)	4 (11.4)	2 (5.7)	3.37	0.91	Accepted
4	TASTE	26 (74.3)	7 (20.0)	0 (0)	2 (5.7)	3.63	0.77	Accepted

Key: LE= Like Extremely, LS = Like Slightly, DS = Dislike Slightly, DE= Dislike Extremely, N= Number of respondents, C = cut-off point, $\bar{x}$ = Mean of responses, S.D= Standard Deviation.

Table 2 revealed that the mean responses on all the items range from 3.37 – 3.63 which were greater than the cutoff point of 2.50. Therefore, the respondents agreed on all the item statement as part of the acceptability test of snail roll as a nutrient rich snack for pregnant women. The standard deviation of the responses ranges from 0.68 – 0.91 and was relatively low. This indicates that the responses were clustered around the mean.

Table 3: Mean and Standard Deviation of Responses of the Respondent on the Acceptability of Snail Ball

S/N	Sensory Attributes	LE	LS	DS	DE	$\bar{X}$	N=35 S.D	C=2.50 Decision
1	APPEARANCE	9 (25.7)	16 (45.7)	6 (17.1)	4 (11.4)	2.86	0.94	Accepted
2	COLOUR	11 (31.4)	13 (37.1)	7 (20.0)	4 (11.4)	2.89	0.99	Accepted
3	AROMA	17 (48.6)	15 (42.9)	2 (5.7)	1 (2.9)	3.34	0.73	Accepted
4	TASTE	24 (68.6)	3 (8.6)	7 (20.0)	1 (2.9)	3.43	0.92	Accepted

Key: LE= Like Extremely, LS = Like Slightly, DS = Dislike Slightly, DE= Dislike Extremely, N= Number of respondents, C = cut-off point, $\bar{x}$ = Mean of responses
S.D= Standard Deviation.

Table 3 revealed that the mean responses on all the items range from 2.86 – 3.43 which were greater than the cut-off point of 2.50. Therefore, the respondents agreed on all the item statement as part of the acceptability test of snail ball as a nutrient rich snack for pregnant women. The standard deviation of the responses ranges from 0.73 – 0.99 and was relatively low. This indicates that the responses were clustered around the mean.

Discussion of the Findings

From the findings, acceptability of the snail pie with the use of the rating scale: Based on the appearance: 42.9% of the respondents like it extremely, 45.7% like it slightly and 11.4% dislike it slightly while none of the respondent dislike it extremely. Based on the colour, 54.3% of the respondents like it extremely, 37.1% like it slightly and 8.6% dislike it slightly while none dislikes it extremely. Based on the aroma, 65.7% of the respondents like it extremely, 28.6% like it slightly while none dislikes it slightly and 5.7% dislike it extremely. Based on the taste; 65.7% of the respondents like it extremely, 34.3% like it slightly and none dislike it either slightly or extremely.

The acceptability of the snail roll sample with the use of the rating scale, based on the appearance of the snail roll, indicates that; 62.9% of the respondent like it extremely, 28.6% like it slightly and 8.4% dislike it slightly while none dislike it extremely. Based on the colour, 71.4% of the respondents like it extremely, 22.9% like it slightly, none dislikes it slightly and 5.7% dislike it extremely. Based on the aroma, 60.0% of the respondents like it extremely, 22.9% like it slightly, 11.4% dislikes it slightly and 5.7% dislike it extremely. Based on the taste, 74.3% of the respondents like it extremely, 20.0% like it slightly and none dislike it slightly but 5.7% dislike it extremely.

Furthermore, the acceptability of the snail ball sample with the use of the rating scale, based on the appearance of the snail ball, indicates that; 25.7% of the respondents like it extremely, 45.7% like it slightly, 17.1% dislike it slightly, while 11.4% dislike it extremely. Based on the colour, 31.4% of the respondents like it extremely, 37.1% like it slightly, 20.0% dislikes it slightly and 11.4% dislike it extremely. Based on the aroma; 48.6% of the respondents like it

extremely, 42.9% like it slightly, 5.7% dislike it slightly, while 2.9% dislike it extremely. Based on the taste, 68.6% of the respondents like it extremely, 8.6% like it slightly, 20% dislike it slightly, while 2.9% dislike it extremely.

Hedonic ratings on overall acceptability of the snail snacks indicate that all the confectioneries produced from snail were accepted. However, snail pie has the highest acceptability rate followed by snail roll and afterwards snail ball. Finally, the study revealed that confectioneries produced from snails are acceptable as nutrient rich snacks for pregnant women.

Conclusion

It is obvious from the study that, pregnant mothers like all the confectionaries produced from snail both in term of the appearance, colour, aroma and taste. Though there are some food fallacies against snail consumption by mothers during pregnancy, but it is mere fallacies which do not have scientific or nutritional backing. There is therefore, need for massive propagation to encourage consumption of snail by pregnant mothers as additional nutrition for healthy feeding to ease the effect of food price hike on the family income.

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