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Assessment of Cowpea Dish Preparation for Nutritional Enrichment: A Case Study of Ebira Traditional Method 'Apapa' in Adavi Local Government Area, Kogi State

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Abstract

The primary objective of this study was to evaluate the nutritional enrichment of cowpea dish preparation using the traditional Ebira method known as 'Apapa', within the Adavi Local Government Area of Kogi State. This research was guided by three specific objectives, each corresponding to distinct research questions. One hypothesis was tested at 0.05 level of significance. To achieve this aim, two research designs were employed: a descriptive survey research design and a quasi-experimental design of one-shot case. The target population for the study encompassed 202,194 individuals belonging to the Ebira community residing in the Adavi Local Government Area. A sample size of three hundred and ninety-nine (399) respondents, and twenty (20) evaluators was used for the study. The study utilized two instruments – a questionnaire and a sensory evaluation form - to gather relevant data. Data collection was conducted by the researcher in collaboration with research assistants. Following data collection, analysis was performed using mean and standard deviation and dependent t-test. Through meticulous documentation, the study revealed the intricate steps involved in preparing 'Apapa' traditional dish, emphasizing its cultural significance and unique recipes. Moreover, the sensory analysis demonstrated a significant preference for the Apapa method over an alternative method, indicating its superiority in delivering a more favorable attributes in texture, taste, aroma and mouth feel. Additionally, the study highlighted the social acceptance of the 'Apapa' method recipe and its high likelihood of social acceptance among the Ebira people of Adavi local government of Kogi States. The study concluded that the traditional Ebira method of Apapa cowpea dish preparation is not only culturally significant but also nutritionally enriched and socially accepted. Recommendations were made that community-based initiatives, cultural festivals, and educational programmes should encourage the preservation and promotion of traditional methods of preparing cowpea dishes, such as the Apapa method, among the Ebira people and research institutions and funding agencies should allocate resources and support research initiatives focused on documenting and studying indigenous food traditions, culinary practices, and agricultural biodiversity.

Keywords: **'Apapa', moi-moi, Food scarcity, Nutritional content and composition.**

Introduction

Cowpeas, renowned for its nutritional richness, constitute a valuable dietary component due to their diverse nutrient profile. Notably abundant in protein, offering an amino acid composition that complements that of cereals, thus forming a balanced source of essential amino acids vital for human health (Mubaiwa et al., 2019). Moreover, cowpeas serve as an excellent

source of dietary fiber, providing essential vitamins such as folate and vitamin B, alongside crucial minerals like iron and zinc (Ajeigbe et al., 2019). These nutritional attributes collectively render cowpeas an attractive and accessible resource for addressing malnutrition and enhancing overall nutritional well-being, particularly in regions where access to diverse food sources remains limited.

The protein content in cowpeas, coupled with its amino acid profile, plays a pivotal role in meeting dietary requirements and ensuring optimal health outcomes. By complementing the amino acids present in cereals, cowpeas contribute to the provision of essential building blocks for various physiological processes within the human body (Mubaiwa et al., 2019). Furthermore, the inclusion of dietary fiber, vitamins, and minerals such as folate, vitamin B, iron, and zinc in cowpeas underscores their significance in promoting overall health and combating deficiencies prevalent in populations with limited access to diverse nutritional resources (Ajeigbe et al., 2019). In regions characterized by food scarcity and nutritional challenges, the nutritional richness of cowpeas holds immense importance. Their accessibility and versatility offer a viable option for improving dietary diversity and enhancing nutritional status among vulnerable populations. As a cost effective and readily available source of essential nutrients, cowpeas play a crucial role in addressing malnutrition and promoting sustainable food security strategies, thus contributing to the overall well-being of communities worldwide.

Consuming cowpeas provides a myriad of health benefits, encompassing the prevention of malnutrition-related disorders and the promotion of overall health and well-being, (Ofori et al., 2020). The protein-rich nature of cowpeas not only helps meet daily dietary protein requirements but also contributes to tissue repair, immune function and overall growth and development, making it an essential component of balanced diets, particularly in resource-constrained communities.

Furthermore, cowpeas are rich in dietary fiber, a crucial component known for its positive impact on digestive health. The presence of dietary fiber aids in maintaining regular bowel movements, promoting gastrointestinal health, and reducing the risk of constipation and related discomfort. Moreover, dietary fiber intake has been linked to a lower incidence of non-communicable diseases such as diabetes and cardiovascular disorders (Mubaiwa et al., 2019). By incorporating cowpeas into diets, individuals can potentially mitigate the risk factors associated with these chronic conditions, thereby fostering long-term health benefits.

Cowpea dishes stand as essential elements within Nigeria's culinary landscape, epitomizing not only the country's diverse culinary heritage but also its cultural significance. Across various regions, cowpea dishes hold a revered place in everyday meals and celebratory occasions, reflecting the nuanced culinary traditions and regional variations prevalent throughout the nation (Agu & Nweze, 2018). These dishes offer a rich array of flavors and textures, showcasing the versatility and adaptability of cowpeas in Nigerian cuisine. Among the cherished cowpea dishes in Nigeria is "akara," a savory fritter crafted from cowpeas that delights as both a breakfast staple and a savory snack (Odunfa, 2013). The preparation of akara typically begins with cowpeas soaked overnight, thereafter blended into a smooth paste complemented with a medley of spices, including onions, pepper, and seasoning cubes. This flavorful mixture is then fried to perfection, resulting in crispy, golden-brown fritters that tantalize the taste buds of all who partake.

Another beloved cowpea delicacy in Nigeria is "moi moi," a steamed bean pudding renowned for its versatility as a main course or a delectable side dish (Oyedeji & Adebisi, 2010). To craft moi moi, cowpeas undergo a meticulous process of soaking, peeling, and blending into a batter, enriched with a blend of ingredients like onions, bell peppers, crayfish, and palm oil. Seasoned to taste, the mixture is then

delicately steamed until achieving a perfect, moist consistency, offering a comforting and satisfying culinary experience. Moi-Moi finds its perfect companionship with staples like rice, bread, or the traditional pap (ogi), a fermented cornmeal porridge that adds a delightful dimension to the meal. The harmony of flavors and textures in these cowpea dishes not only gratifies the palate but also reflects the ingenuity and creativity ingrained within Nigerian culinary traditions. The preparation of cowpea meals or dish is a crucial aspect of its utilization in the diet. Different communities have developed unique methods of preparing cowpea meals, each with its distinct cultural and nutritional implications.

In the Adavi Local Government Area of Kogi State, the Ebira people employ a traditional cowpea meal preparation technique known as 'Apapa'. This method involves specific processing steps that may influence the nutritional composition of the final product. The traditional method forms the cornerstone of culinary practices and holds immense significance within their cultural heritage. This time-honored technique encompasses a series of meticulous steps, starting from the sorting of cowpeas to the final seasoning of the dish. Each step in the process is infused with generations of culinary wisdom, reflecting the Ebira community's deep-rooted connection to their culinary traditions. The Apapa method encapsulates more than just a culinary technique; it represents a deep-rooted cultural heritage passed down through generations. However, there exists a restricted comprehension of the Apapa method and its nutritional enhancement concerning sensory characteristics.

This study aims to bridge the current knowledge gap by conducting a thorough evaluation of the nutritional enrichment, focusing on sensory attributes, of cowpea meals prepared using the Ebira traditional method 'Apapa' in Adavi Local Government, Kogi State. By juxtaposing this traditional approach against alternative methods, the research seeks to shed light on the nutritional implications of various cowpea meal preparation techniques. This inquiry holds significance for maximizing cowpea utilization and advocating for healthier dietary habits within the local community, potentially influencing broader nutritional strategies in similar regions

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Statement of the Problem

Cowpea consumption holds significant dietary importance across diverse communities worldwide, especially in regions grappling with limited access to diverse food sources. Within the Adavi Local Government Area of Kogi State, Nigeria, the Ebira people have entrenched cowpeas as a staple component of their diet for generations. Cowpeas feature prominently in their culinary repertoire, finding their way into other traditional dishes such as akara and moi-moi. Apart from these other methods of cowpea preparation, 'Apapa 'is cherished for its cultural significance and nutritional richness as it stands as essential dish with its cultural significance sustaining the dietary practices and nutritional well-being of the Ebira community.

Despite the nutritional significance of cowpeas in providing a myriad of health benefits, encompassing the prevention of malnutrition-related disorders and over all well-being by serving as a cornerstone in many diets, offering a rich protein, fibre, essential vitamins and minerals, there remains a dearth of comprehensive understanding regarding the nutritional enrichment achieved through traditional methods of cowpea preparation, particularly among the Ebira people of Adavi Local Government, Kogi State. While the traditional method of cowpea meal preparation, known as Apapa, holds immense cultural significance within the community, its specific impact on the nutritional composition of the final dish remains largely unexplored. There seems to be variations in taste, texture, aroma, mouth feel, cooking properties and nutritional contents of 'Apapa method of cowpea preparation that may have influenced the over nutritional profile of the prepared dish among other alternatives. Consequently, there is a pressing need to assess the nutritional enrichment achieved through the

Ebira traditional method 'Apapa' of cowpea preparation to elucidate its dietary implications and optimize nutritional strategies within the local context.

Objective

The main objective of the study is to assess the nutritional enrichment of cowpea dish preparation using the Ebira traditional method 'Apapa' of Adavi Local Government, Kogi State. Specifically, the study sought to:

1. Document the traditional method 'apapa' employed by the Ebira people of Adavi Local Government Kogi State in preparing cowpea dish.
2. Analyze the sensory attributes (texture, taste, aroma and mouth feel) of cowpea meal prepared using the Apapa method and other method.
3. Ascertain the social acceptance of the cowpea dish prepared through the Apapa method of the Ebira people in Adavi Local Government Area.

Hypothesis

The following null hypothesis was formulated and tested at 0.05 level of significance:

H_0: There is no significant difference between the sensory attributes (texture, taste, aroma and mouth feel) of cowpea meal prepared using the Apapa method and the alternative methods (akara and moi-moi).

Methodology

Research Design

The research design used for the study was descriptive survey and quasi-experimental design precisely the one-shot case.

Area of the Study; - The study was conducted in Adavi local government area of Kogi state. Ebira people residing in Adavi local government cultivate Cowpeas both for family consumption and large-scale business. The choice of Adavi was considered due to the availability of cowpea and cultural significance of the crop in the study area.

The population of the study: - The study population comprised all households in Adavi local government area of Kogi state with projected population of 202,194 (national population commission, 2006). Also, twenty (20) panel of judges form the population for sensory evaluation for the study.

Sample and Sampling Techniques: - The sample size was ninety-nine (99) respondents and twenty (20) evaluators. Simple random, proportionate stratified and convince sampling techniques was used to select respondents for the study from the following council wards in Adavi local government: - Eba, Egge-iruvochinomi, Okunchi, Idanuha, Kwaraworo, Kuroko1, Kuroko11, Nagazi, Ogaminana central, Osisi and Uhucheba. All the seven council wards were used, likewise all the twenty (20) panelists for the test of acceptability.

Instrument for Data Collection: - Two instruments were utilized for data collection. A self-developed structured questionnaire titled assessment of cowpea dish preparation for nutritional enrichment (ACDPNE) and a sensory evaluation form. While the questionnaire was used to elicit data on the social acceptance of cowpea dish prepared through the Apapa method, the sensory evaluation test was employed to collect relevant data on the sensory attributes (texture, taste, aroma and mouth feel) of cowpea using this Apapa method. Three experts validated the instruments two from test and measurement department Joseph Sarwaun tarka University Makurdi, and one lecturer from Home Science, Nutrition and Dietetics Kogi State University. The experts removed items that were not relevant to the study and also made inputs by adding more relevant items to the instruments. The ACDPNE was trial tested on twenty (20) persons in Nasarawa State who were not part of the study. The reliability of the questionnaire was established using Cronbach Alpa method where a coefficient of 0.81 was obtained. The researcher prepared cowpea dish using the Apapa method of Ebira people of Adavi local government of Kogi state.

Method of Data Analysis

Descriptive Statistics of Mean and Standard

Deviation was used for Data analysis. Any item with mean of 2.50 and above was regarded as agreed, while any item with less than 2.50 was rejected.

The hypothesis was analyzed using t – test at 0.05 level of significance.

Procedure for Apapa Dish

1. Get beans (cowpea)
2. Sort out the beans to remove stones and other dirt's
3. Soak the beans for one hours
4. Add some ingredients like pepper and onion according to your taste to the soaked beans.
5. Grinding of the beans (mixture) usually not to smooth, the consistency must be a little bit rough.
6. Addition of other ingredients to the mixture such as red oil, salt, crayfish, magi cubes to your taste and mix well.
7. Heat the banana leaves directly on fire for 1-2 minutes and cut into various sizes of your choice.
8. Put enough portion of the mixture on the banana leaves and wrap it well.
9. Lay some sticks underneath the pot before placing the wrapped mixture into the pot.
10. Put all the wrapped mixture into the pot.
11. Put some water into the pot, cover it and steam the food for 1 hour to 1½ hours to hour to 1½ hours.

The traditional method of preparing 'Apapa' involves using a specific set of ingredients and following a precise procedure. To start, cowpeas are obtained and carefully sorted to remove any stones or debris. Unlike other alternative methods of cowpea preparation like akara and moi moi that requires removal of the back surface of the beans before grinding, the 'Apapa' method allowed beans to be soaked in water with its back for approximately one hour to soften them before further preparation. This method enhances the nutritional content (fibre) of the dish thereby improves its nutritional value. Also, the addition of varieties of ingredients such as red oil, crayfish, onions, pepper according to personal preference enhance its nutritious content over other alternative methods.

Results and Discussion

Table 1 shows the mean and standard deviation analysis of sensory attributes, including texture, taste, aroma, and mouth feel, for cowpea meal prepared using the 'Apapa' method and an alternative method. The results demonstrate superior performance of the 'Apapa' method across all sensory attributes. Specifically, the mean scores for texture were 4.59 and 2.83 for the Apapa method and the alternative method, respectively. For taste, the 'Apapa' method scored a mean of 4.64 compared to 2.92 for the alternative method. In terms of aroma, the 'Apapa' method yielded a mean score of 4.51, whereas the alternative method scored 3.00. Lastly, for mouthfeel, the Apapa method achieved a mean score of 4.55, surpassing the alternative method's mean score of 2.90.

Results Table 1: Mean and Standard Deviation Analysis of Sensory attributes (texture, taste, aroma and mouth feel) of cowpea meal prepared using the Apapa method in comparison to alternative method

S/N	Attributes	Sensory Attributes		
		Apapa Method	Alternative Method	
		$\bar{x}$ *SD*	$\bar{x}$	*SD*
1	Texture	4.59.74	2.83	.79
2	Taste	4.64.77	2.92	.80
3	Aroma	4.51.82	3.00	.84
4	Mouth feel	4.55.79	2.90	.88

Table 2 displays the mean and standard deviation analysis of the social acceptance of the cowpea dish prepared using the Apapa method among the Ebira people in Adavi Local Government Area. The results demonstrate high social acceptance, as indicated by the mean values ranging from 3.56 to 3.74 for all items (1, 2, 3, and 4), surpassing the benchmark. Additionally, the cluster mean of 3.64, with a standard deviation of 0.94, further supports the notion of high social acceptance. Based on the cluster mean exceeding the benchmark of 2.50, it can be inferred from this analysis that the cowpea dish prepared using the Apapa method among the Ebira people is highly likely to be socially accepted.

Table 2: Mean and Standard Deviation of the Social Acceptance of the Cowpea Dish Prepared through the Apapa Method of the Ebira People in Adavi Local Government Area

S/No	Social Acceptance of Apapa	Mean	SD	Decision
1	Likelihood of making recommendations of the Apapa-prepared cowpea dish to others around you	3.64	0.95	Very Likely
2	Likelihood of making Apapa prepared cowpea dish in a communal setting (e.g., gatherings, celebrations).	3.56	0.89	Very Likely
3	Likelihood to consider the Apapa dish to be prepared in households.	3.63	0.99	Very Likely
4	In your opinion, how likely are people to react positively to the Apapa-prepared cowpea dish in comparison to other cowpea dishes	3.74	0.93	Very Likely
	Cluster Mean	**3.64**	**0.94**	**Very Likely**

Table 3 presents the results of a dependent t-test analysis comparing the mean differences in sensory attributes (texture, taste, aroma, and mouthfeel) of cowpea meal prepared using the Apapa method versus an alternative method. The analysis indicates significant differences in all sensory attributes. Specifically, for texture, t = 3.552, df = 19, and p-value < .001; for taste, t = 3.346, df = 19, and p-value < .001; for aroma, t = 3.104, df = 19, and p-value < .001; and for mouthfeel, t = 3.218, df = 19, and p-value < .001. These results signify that the sensory characteristics of the cowpea meal significantly varied between the two preparation methods.

Table 3: Dependent t-test Analysis of Mean Difference between the Sensory Attributes (texture, taste, aroma and mouth feel) of Cowpea Meal Prepared using the Apapa Method and the Alternative Method

Pair	N	Std Error Mean	Df	t	Sig.	á-level	Remark
Apapa – Alternative Method (Texture)	20	2.456	19	3.552	.000	.05	Significant
Apapa – Alternative Method (Taste)	20	2.321	19	3.346	.000	.05	Significant
Apapa – Alternative Method (Aroma)	20	2.145	19	3.104	.000	.05	Significant
Apapa – Alternative Method (Mouth Feel)	20	2.223	19	3.218	.000	.05	Significant

Discussion

Firstly, the study documented that the preparation of Apapa, a traditional dish made from beans, involves several steps and the use of specific ingredients. To begin, beans, preferably cowpeas, are obtained and thoroughly sorted to remove any stones or debris. Subsequently, the beans are soaked in water for approximately one hour to soften them. After soaking, additional ingredients such as pepper and onions are added to the beans according to personal taste preferences. The mixture is then ground, ensuring that the consistency remains slightly rough rather than completely smooth. To this mixture, red oil, salt, crayfish, and magi cubes are added and thoroughly mixed in. The next step involves preparing banana leaves by heating them directly over a flame for a brief period, typically 1-2 minutes, before cutting them into various sizes. Portions of the bean mixture are then placed onto these banana leaves and securely wrapped. Before placing the wrapped mixture into a cooking pot, sticks are laid underneath to prevent direct contact with the bottom of the pot. All the wrapped mixtures are then arranged inside the pot, and a sufficient amount of water is added. The pot is covered, and the food is steamed for approximately 1 hour to 1½ hours. Once adequately steamed, the Apapa is ready to be served. This traditional dish, with its unique blend of flavors and textures, is a popular choice among the Ebira people of Adavi Local Government in Kogi State. This corroborate with the documentation of Oyedeji & Adebisi (2010) who reported that to prepare akara, cowpeas are soaked overnight, then blended into a smooth paste along with spices such as onions, pepper, and seasoning cubes. Similarly, Ene-Obong and Odeyemi (2010) also document that the preparation of cowpea dishes typically begins with the cleaning and soaking of the dried beans. This step helps to soften the beans and reduce cooking time while also removing any impurities. After soaking, the cowpeas are often boiled until tender, either in water or broth, depending on the desired flavor profile of the dish. Corroborating the above view, Okafor (2013) states that the traditional cowpea dish in Nigeria is "moi moi," a steamed bean pudding made from a mixture of blended cowpeas, onions, peppers, and spices.

Further, the study revealed that there is a significant difference in sensory attributes (texture, taste, aroma, and mouthfeel) of cowpea meal prepared using the Apapa method versus the alternative method in favor of the Apapa method. This means that the Apapa method outperforms the alternative method across all sensory attributes. This corroborates with the research by Akande, Akinremi, and Ogundairo (2020), assessed Cowpea Varieties for Food Processing in Southwest Nigeria. Their study unveiled noticeable variations in sensory attributes and nutritional composition among different cowpea varieties, suggesting the potential impact of processing methods on sensory outcomes. Furthermore, the current findings

align with those of Oyeyinka, Adebisi, and Adeboye (2019), who explored variations in sensory attributes and nutritional content across various cowpea-based dishes. Their research highlighted the richness of nutrients and diverse sensory experiences offered by cowpea-based dishes, underscoring the multifaceted benefits associated with these culinary offerings. Similarly, Ijarotimi, Keshinro, and Adewale (2021) observed variations in sensory attributes and nutritional content among different cowpea-based dishes, echoing the notion of diverse sensory experiences and nutritional richness associated with such dishes. Moreover, the study findings resonate with the research conducted by Ogodo Igwe and Egbuonu (2018), who investigated the nutritional value of cowpea dishes in relation to cooking methods employed. Their findings revealed significant variations in the nutritional composition of cowpea dishes depending on the cooking techniques utilized, emphasizing the role of cooking methods in influencing the nutritional quality of cowpea-based meals. This highlights the importance of considering cooking techniques in optimizing the nutritional value and sensory attributes of cowpea dishes, thus contributing to a comprehensive understanding of their culinary potential.

Lastly, the study revealed that the cowpea dish prepared using the Apapa method among the Ebira people is highly likely to be socially accepted. This conclusion aligns with research conducted by Joshua, Soretire, Mohammed, and Olatunbosun (2023), who observed that diets incorporating sprouted cowpea and malted yellow maize flours substitutions were more favorably received than other test samples. This suggests a positive correlation between the acceptability of cowpea-based dishes and innovative ingredient substitutions, potentially indicating a broader trend toward embracing alternative food preparations. Furthermore, the present study's results resonate with the findings of Adetunji, Adegoke, and Ayodeji (2019), who investigated variations in consumer acceptance of cowpea-based dishes. Their research underscored the influence of factors such as taste, texture, and cultural preferences on consumer perceptions of these dishes. Similarly, the Apapa method's social acceptance among the Ebira people may be influenced by these same factors, suggesting the importance of considering sensory attributes and cultural context in food acceptability studies. Additionally, the current study's findings are consistent with those of Alemu and Seifu (2018), who explored consumer acceptance and preferences for cowpea-based dishes. Their research highlighted the significant impact of taste, texture, and cultural preferences on variations in consumer acceptance. The alignment of these findings reinforces the notion that factors beyond mere nutritional content play a pivotal role in shaping the acceptability of cowpea based culinary offerings, emphasizing the importance of holistic approaches to understanding food acceptance dynamics.

Conclusion and Recommendations

This study unequivocally demonstrates the sensory superiority of the traditional Apapa method in preparing cowpea dishes among the Ebira people of Adavi Local Government, Kogi State, when compared to alternative methods. Through meticulous sensory analysis, it became evident that the Apapa method outperforms alternatives across all sensory attributes, including texture, taste, aroma, and mouthfeel. This underscores the meticulous nature of the Apapa preparation process and the unique blend of flavors it imparts to the dish, thereby solidifying its position as a culinary masterpiece within the Ebira community. Moreover, the study provides compelling evidence of the high likelihood of social acceptance of cowpea dishes prepared using the Apapa method among the Ebira people. This reaffirms the cultural significance and culinary excellence associated with this traditional dish, which has been cherished and passed down through generations. The strong social acceptance reflects not only the sensory appeal of the Apapa-prepared cowpea dish but also its deep-rooted cultural significance, serving as a symbol of identity and tradition within the Ebira community.

Based on the findings of the study, the following recommendations were made:

i. Community-based initiatives, cultural festivals, and educational programmes should encourage the preservation and promotion of traditional methods of preparing cowpea dishes, such as the Apapa method, among the Ebira people.
ii. Research institutions and funding agencies should allocate resources and support research initiatives focused on documenting and studying indigenous food traditions, culinary practices, and agricultural biodiversity.

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