ACCEPTABILITY OF SELECTED INDIGENOUS RICE FOR SALE IN LOCAL RESTAURANTS IN NIGERIA

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Abstract

Three selected indigenous rice grains were prepared and subjected to sensory assessment in this study, to determine their acceptability for sale in local restaurants. Three different dishes were prepared from the three rice species using a prescribed recipe for the study in comparison with three control rice dishes. A group of 30 panelists was selected for acceptance test using a nine-point hedonic scale to test for appearance, texture, taste, aroma, and overall acceptability. Data were analyzed for inferential statistics for mean and standard error. Correlation and Analysis of Variance were carried out to determine relationships between the rice dishes. Results showed a variation in the colour, texture, taste, and aroma of the rice dishes. While fried Abakaliki rice has the highest acceptance score, a very strong positive relationship was indicated between Jollof Abakaliki rice and boiled Gboko rice, with a weak negative relationship between fried Ofada rice and Jollof Ofada rice. The study concludes that the concurrent introduction of the two indigenous rice dishes with a strong positive relationship in the study would assist in stimulating culinary tourism and promoting the cultural heritage of the localities cultivating the grain, and would also promote local agriculture and farm produce. It was recommended that all food commodities to be used in preparing and cooking indigenous rice dishes should be procured fresh and wholesome to ensure maximum portion yield, acceptable colour, taste, and aroma.

KEYWORDS: Culinary tourism, customer loyalty, indigenous rice, Nigerian restaurants, sensory assessment.

Introduction

Rice has been a staple food that has shaped the eating out pattern of most Nigerians over the years. The consumption of rice in local restaurants is occasioned by its year-round availability and easy preparation characteristic, which makes it relatively cheap than most other food products in local restaurants (Nwokorie, 2015). Over the years, hotels and restaurant operators have depended on the importation of rice for its availability. However, recent government policies prohibiting rice importation into Nigeria put tremendous pressure on restaurant operators for product availability since the demand for the product has to be met. Although imported rice grain is scarcely available in the local market, the cost of purchasing is relatively high.

While indigenous rice grains compete unfavourably with the imported grain in the local market, the need for restaurant operators to remain competitive and maintain customer loyalty by ensuring the availability of the food remains vital for business survival. Most well-established restaurants may have a way of ensuring the availability of the foreign grain which, invariably, enhances patronage due to customer perception of its 'specialness' over other indigenous rice grains (Nwokorie & Ayogu, 2019).

As government agencies have intensified machinery for the prohibition of rice importation, the need for local restaurant operators to standardize the preparation method of indigenous rice for general acceptability of consumers has become important to ensure customer satisfaction and retention. Fortunately, local rice grain is readily available in the local market following local farmers' embrace of rice cultivation in recent years, with many states in Nigeria producing different species of indigenous rice grain (Adams, 2018; Ajala & Gana, 2015; Aremu & Akinwamide, 2018; Longtau, 2003).

Acceptability of indigenous rice is influenced by various factors including palatability, aroma, stickiness, rate of breaking, ease of cooking, taste, and purchasing power of customers (Obih & Baiyegunhi, 2018; Ogundele, 2014).

Arguably, the acceptability is as a result of the presentation of the different rice dishes as influenced by the skill of the chef involved (Ogunleke & Baiyegunhi, 2019). To this end, standardizing the preparation method for the various rice dishes, using a set of recipes, is important to ensure the general acceptability of the different indigenous rice grains.

Bucharian (2009) described recipe standardization as the process of tailoring a recipe to suit a particular purpose in a specific foodservice operation. It is a food preparation method that could be tried, adapted, and retried for food production and could produce the same good result and yield each time the exact procedure is used with similar equipment, quantity, and quality of ingredients.

Ceserani and Kinton (2008) stated that standardization brings innovation because it provides a structured method and reliable data that saves time in the innovation process. It also helps to disseminate groundbreaking knowledge about leading-edge techniques. Besides, it stands apart as an indispensable development tool for foodservice establishments because it builds customer trust in the product, service, and systems.

While concerted efforts are being made towards developing the local hospitality industry to benefit from its revenue earning capacity, there is a need to have a look at the indigenous rice dishes to standardize their preparation methods. This will result in the emergence of standardized recipes that can be used anywhere in the world for various Nigerian rice grains.

Various ethnic groups in Nigeria eat most of the rice dishes but have different methods of preparation. Some of the minor ingredients are not commonly used by all ethnic groups. Also, most of the ingredients used for some of the indigenous dishes are seasonal (Nwokorie, 2015; Ogundele, 2014). Little research has been carried out on standardizing local rice dishes in Nigeria, thereby limiting information for inbound tourists who can become consumers of the rice dishes.

Most restaurants in Nigeria have neglected indigenous dishes in their menu on the excuses given that most of the local dishes are not quick to cook (Otemuyiwa & Adewusi, 2012; Awosan et al., 2014). Most ingredients used in the preparation of the local dishes are seasonal which will not allow the dishes to be available all the time (Adedoyin, 2012; Nwokorie, 2015; Obih & Baiyegunhi, 2018). Still, restaurant operators do not want to take the risk of disappointing their customers by not providing the dishes anytime on demand (Ogundele, 2014; Omage & Omuemu, 2018).

Nigerian food is essential to Nigeria's culture. It defines the citizens and the way of life. In Nigeria, eating out is becoming more common in recent times, even though people eat at home. Onyiriuka, Umoru, and Ibeawuchi (2013) found out that the majority of young Nigerians buy most of their daily meals outside their homes due to difficult time management and busy schedules. Therefore, preparation of Nigerian foods must be common and standardized, especially for restaurant operators as advised by Nwokorie and Ezeibe (2017), and Nwokorie and Kwusi (2020).

Western influences especially in urban centers have transformed Nigerians eating habits in many ways. City dwellers are familiar with the canned, frozen, and pre-packaged food found in most western-style supermarkets. However, supermarkets and restaurants often are too expensive for the average Nigerian. Thus, only the average diner can afford to eat like westerners (Cayot, 2010).

Most urban Nigerians seem to combine traditional cuisine with a little of western-style food and conveniences. Rural Nigerians tend to stick more with traditional foods and preparation techniques. But with the growing number of restaurant entrepreneurs in both rural and urban locations (Nwokorie & Igbojekwe, 2019; Obiora & Nwokorie, 2018), there would be a consequent surge in food innovation and culinary tourism. Therefore, traditional and indigenous foods would gradually find their way into the local restaurant industry, and it is important to standardize preparation methods for these dishes to make them globally acceptable.

Studies have found out that local dishes have always been used as the last choice in the menu list of most local restaurants who rarely include local dishes in their menu (Oktay & Sadıkoglu, 2018; Omage & Omuemu; 2018). This study will help to promote Nigerian cuisine, strengthen culinary heritage by serving local produce. Also, it will assist restaurant operators in applying acceptable methods in preparation of a variety of indigenous rice dishes that are of great value in strengthening the tourism industry.

Consequently, the major objective of this study is to standardize local recipes for the preparation of three indigenous rice dishes for sale in Nigerian restaurants. Specific objectives are to:

i. Prepare indigenous rice dishes from three Nigerian localities of Abakaliki, Gboko, and Ofada using selected ingredients.
ii. Determine the sensory qualities of the indigenous rice dishes prepared
iii. Determine the acceptability of the indigenous rice dishes through sensory assessment.

Materials and Method

Indigenous rice from three geopolitical zones of Nigeria were purchased from the local market for the study. The rice are cultivated in the localities of Abakaliki in Ebonyi State, Gboko in Benue State, and Ofada in Ogun State. The three species of rice were selected as a result of the history of the acceptability of the indigenous people where they are cultivated (Longtau, 2003; Nwali & Anyalor, 2019; Ogunleke & Baiyegunhi, 2019). The rice varieties were prepared with selected rice ingredients and a prescribed procedure for possible standardization. The rice dishes prepared are presented in Table 1.

Table 1. Rice varieties prepared in various dishes

S/N	Jollof Rice	Fried Rice	Boiled Rice	Control Rice
1.	Ofada	Ofada	Ofada	Jollof
2.	Abakaliki	Abakaliki	Abakaliki	Fried
3.	Gboko	Gboko	Gboko	Boiled

Three control rice portions were provided as a comparison for the acceptability factor. The control portions were evenly compared with each variable in the study during the sensory assessment of each portion of the indigenous rice dishes prepared. The control is important to increase the reliability of the results of the sensory assessment.

A nine-point Hedonic scale was distributed to the panelists to test for the likeness of the products. The scale ranged from 'like extremely' to 'dislike extremely' to determine the acceptability level of the rice dishes. Data from responses were analyzed using descriptive statistics for mean and standard deviation. Correlation and Analysis of Variance were carried out to determine the significant relationship between colour, taste, texture, aroma, and overall acceptability for the products, as well as sources of variation between the variables.

Thirty panelists were selected for the acceptability test on the different rice dishes prepared. The selection of the taste panelists was premised on the subjective nature of the response (Rai, 1987; Rutenbeck & Gacula Jr., 2006; Seaman et al., 1993). It is important to note that the respondents are representative of product users and the target market as a result of product preferences. Therefore, no special training or expertise is required from the panelists. Non-consumers can easily provide different results that would mislead product decisions and wrongly predict marketplace success (Gengler, 2010). However, respondents were informed beforehand on the need to have their breakfast before the time of the assessment in order not to allow contextual factors (like hunger and salivation) to influence the outcome of acceptability decisions as suggested by Murray and Baxter (2003).

Table 2. Recipe for Jollof rice using the three indigenous rice grains

Indigenous rice	300g
Margarine	25g
Vegetable oil	62ml
Tomato puree	1 tablespoon
Salt	1 teaspoon
Maggi (or equivalent)	3 cubes
Chicken stock	1 liter (1kg chicken)
Ground pepper	85mg
Sliced onions	25mg
Thyme	1 teaspoon
Curry	1 teaspoon

Method of preparation
Heat the vegetable oil and margarine in a pan
Add sliced onions and stir
Add tomato puree and allow to fry on low heat for 5 minutes
Add chicken stock
Add pepper, Maggi, thyme, and curry
Stir and taste
Add salt as required. Stir and taste
Add water and cover the lid of the pot to boil for 2 minutes
Add the washed drained rice and allow to cook for 45 minutes

Table 3. Recipe for fried rice using the three indigenous rice grains

Indigenous rice	300g
Margarine	25g
Vegetable oil	62ml
Green peas	25gms
Salt	1 teaspoon
Maggi or equivalent	1 teaspoon
Chicken stock	1 liter (1kg chicken)
Runner beans	25gms
Carrot	25gm
Fried rice seasoning	1 teaspoon
Onions	25gms
Cow liver	1kg

Method of preparation

Parboil the rice and strain in a colander
Dice onions, cow liver, and other vegetables
Sieve chicken stock into the cooking pot and boil
Pour the parboiled rice into chicken stock
Add salt as required, and fried rice seasoning to touch colour
Cover with lid and allow to cook thoroughly for 40 minutes
Transfer rice to a casserole dish for cooling, to avoid stickiness of the grains
Suaté onions, cow liver, and other vegetables on low heat for 5 minutes
Add suatéd vegetables bit by bit to the required quantity of rice
Stir to mix well, and transfer to a dry casserole dish.

Table 4. Recipe for boiled rice using the three indigenous rice grains

Indigenous rice	300g
Water	1½ liter
Salt	1 teaspoon

Method of preparation

Wash the rice and strain in a colander
Add the rice to the boiling water
Add salt and allow to cook for 30 minutes

Results and Discussion

Results of sensory assessment of the rice dishes are presented in descriptive statistics. Table 5 shows the result of the sensory evaluation of the indigenous rice dishes. The mean response of CJR, CFR, CBR, and FAR of approximately 8 implies that on average, the colour of the three indigenous rice dishes was 'very much liked' based on the sensory

assessment. However, mean response of JAR, JGR, BOR, and BAR indicates that on average of approximately 7, the colour of the rice dishes was 'liked moderately' with JOR and FOR 'slightly liked' on average of 6. Therefore, considering appearance, CJR, CFR, CBR, and FAR have a greater mean response than the other samples. This result implies that FAR has greater acceptability than the other dishes under consideration in terms of appearance. The studies of Ebuehi and Oyewole (2007) and Adekoyeni, Fagbemi and Ismaila (2018) agreed that appearance plays a great role in food product acceptability, and can influence consumer decision on food choice.

Table 5: Result of sensory evaluation of the indigenous rice dishes

food recipe	appearance		texture		taste		Aroma		overall acceptability	
	$\bar{x}$	±	$\bar{x}$	±	$\bar{x}$	±	$\bar{x}$	±	$\bar{x}$	±
JOR	5.76	.391	6.23	.414	6.42	.388	5.71	.410	5.96	2.235
JAR	6.63	.312	6.63	.357	6.81	.369	6.62	.312	7.03	1.691
JGR	6.51	.358	6.56	.302	6.46	.313	6.46	.408	6.93	1.436
FOR	6.33	.390	6.12	.393	6.23	.399	6.56	.341	6.73	1.638
FAR	7.66	.210	6.93	.244	6.96	.273	7.06	.275	7.53	1.224
FGR	6.93	.239	6.83	.240	7.13	.196	6.93	.234	6.96	1.159
BOR	6.62	.388	6.73	.306	6.71	.314	6.23	.357	6.92	1.668
BAR	7.16	.262	7.13	.210	6.81	.285	6.83	.288	6.92	1.668
BGR	6.86	.306	6.83	.214	7.00	.229	6.91	.193	7.21	1.270
CJR	8.36	.122	7.73	.172	7.86	.228	7.72	.204	8.43	.773
CFR	7.93	.165	7.63	.131	7.73	.214	7.46	.265	8.00	1.313
CBR	8.16	.144	7.86	.196	7.46	.233	7.63	.242	8.23	1.072

Codes
(JOR) – Jollof Ofada Rice
(JAR) – Jollof Abakaliki Rice
(JGR) – Jollof Gboko Rice
(FOR) – Fried Ofada Rice
(FAR) – Fried Abakaliki Rice
(FGR) – Fried Gboko Rice
(BOR) – Boiled Ofada Rice
(BAR) – Boiled Abeokuta Rice
(BGR) – Boiled Gboko Rice
(CJR) – Control Jollof Rice
(CFR) – Control Fried Rice
(CBR) – Control Boiled Rice

For texture, the mean response of CJR, CFR, and CBR of approximately 8 implies that the rice dishes were 'very much liked.' Also, the mean response of JAR, JGR, FAR, FGR, BAR, and BAR indicate that on an average of approximately 7, the texture was 'liked moderately' with JOR 'slightly liked' on an average of 6. The CJR, CFR, and CBR have the best texture among other rice dishes in the study. The JOR and FOR were the least of the dishes with mean response ≤ 6. The texture described in this context is the softness versus the hardness of the rice dishes. Texture helps in determining the eating quality and food choice of individual consumers because it influences the rate of food intake (Kohyama, 2020; Anuonye et al., 2016).

Descriptive statistics of taste for the rice dishes were also analyzed. Mean response of CFR, and CJR of approximately 8 showed that on average, rice dishes 'very much liked' based on the sensory assessment. However, the mean response of JAR, JGR, FAR, FGR, BOR, BAR, and BGR indicates that the taste of the rice dishes were 'liked moderately' with JOR, JGR, and FOR 'slightly liked' on an average of 6. Considerably, all the rice dishes tend to have a good taste for CFR and CJR. Customers emphasize of the sensory function of taste to make repeat purchase decisions in food service, as it has a multiplicity of functions for food acceptability (Wang, 2016).

The mean response of CJR and CBR of approximately 8 showed that the aroma of the rice dishes was 'very much liked' by respondents. However, mean response of FOR, FAR, FGR, BAR, and CFR indicates that on average of approximately 7, the aroma of the rice dishes was 'liked moderately' with JGR and BOR 'slightly liked' on the

average of 6 respectively. Considering the direction of the responses for aroma, all the dishes tend to have good taste and acceptability tendencies in line with the studies of Ogunleke and Baiyegunhi (2019) and Wang (2016).

For the overall acceptability of the rice dishes based on sensory assessment, the mean response of FAR, CJR, CFR, and CBR of approximately 8 showed that on the average, overall acceptability for the dishes considered was 'very much liked.' Also, the mean response of JAR, JGR, FOR, BOR, BAR, and BGR showed that on the average of approximately 7, acceptability ratings of the rice dishes were 'liked moderately'. The outcome of the response shows that all the dishes considered tend to have wider acceptance. However, FAR was found to be 'very much liked' with higher acceptance assessment among the indigenous rice varieties considered in the study, while JOR has the lowest score on overall acceptability. Objectives within the fields of sensory assessment have determined the acceptance rates of numerous food commodities by consumers. Acceptability ratings are used extensively during the development and introduction stages of new food products in the food industry and have mostly provided successful results (Gámbaro, 2012).

Evidence from the correlation matrix in Table 6 shows a coefficient of 0.7 and above to indicate a strong relationship between the different rice dishes under investigation. The correlation coefficient of 0.974 implies a very strong positive relationship between JAR and BGR. But FOR and JOR pose a weak negative relationship since the respective coefficient was found to be -0.622 in the first column. As the product with the highest acceptance rating in the study, FAR has a weak negative relationship with JOR and a strong positive relationship with FOR at -0.581 and 0.524 respectively. This implies that FOR can be a successful alternative for FAR, and can be introduced simultaneously by restaurant operators to enhance demand and patronage in line with the suggestion of Nwokorie and Ezeibe (2017) and Nwokorie and Kwusi (2020).

Table 6: Correlation analysis of the rice dishes for colour, taste, texture, aroma and overall acceptability

	JOR	***JAR***	***JGR***	***FOR***	***FAR***	***FGR***	***BOR***	***BAR***	***BGR***	***CJR***	***CFR***	***CBR***
JOR	1.000											
JAR	0.258	1.000										
JGR	-0.034	0.852	1.000									
FOR	-0.622	0.536	0.635	1.000								
FAR	-0.581	0.327	0.460	0.524	1.000							
FGR	0.412	0.409	-0.121	0.025	-0.090	1.000						
BOR	0.567	0.727	0.678	-0.073	0.249	0.113	1.000					
BAR	-0.201	-0.390	-0.055	-0.379	0.417	-0.671	0.191	1.000				
BGR	0.103	0.974	0.821	0.688	0.341	0.444	0.552	-0.518	1.000			
CJR	-0.300	0.586	0.628	0.483	0.942	0.076	0.535	0.310	0.556	1.000		
CFR	-0.001	0.662	0.632	0.274	0.809	0.171	0.744	0.315	0.573	0.953	1.000	
CBR	-0.435	0.350	0.675	0.416	0.852	-0.475	0.470	0.615	0.296	0.837	0.759	1.000

The outcome of the test of significance in Table 7 shows that there is a significant difference in the mean response of the indigenous rice varieties evaluated since F of 30.14621 ≥ F crit of 2.641845 respectively. The result also implies that there is variation in colour, taste, texture, and aroma of the indigenous rice dishes used for the study.

Table 7: Test of significance on mean difference using ANOVA

Source of Variation	***SS***	***df***	***MS***	***F***	***P-value***	***F crit***
Between Groups	18680.6	11	1698.236	30.14621	7.85E-18	2.641845
Within Groups	2704	48	56.33333			
Total	21384.6	59				

Conclusion

The standardization procedure were effected following recommended food service procedures. In the course of the standardization, many dishes having two or three methods of preparation and cooking were harmonized following the studies of Alozie and Ene-Obong (2018), Obanla et al (2016), Oguntona, Odunmbaku and Ottun (1999), Oguntona and Adekoya (2009). The benefits of standardization, such as measurement control, consistent food quality, appropriate food cost, and elimination of guess cooking procedures, were demonstrated in this study. Preparation of the indigenous rice dishes in the acceptable state using the selected ingredient goes to prove that indigenous rice grains are easy to cook, and can compete favourably with foreign rice grains in the local restaurant industry. The assessment of the level of acceptability of the indigenous rice dishes for promoting culinary tourism for the development of the tourism industry through sensory evaluation is also a point to note and can be replicated for other indigenous food products. Though the fried Abakaliki rice has the highest acceptability score for the study, other indigenous rice dishes considered in the study did not record dislike scores during sensory evaluation which is also suggestive of their acceptability for sale in local restaurants. The boiled Gboko rice can equally serve as an alternative for the fried Abakaliki rice because of the very strong relationship with Jollof Abakaliki rice. This relationship suggests that the fried Abakaliki rice should not be introduced in isolation for sale by restaurant operators. The concurrent introduction of the indigenous rice dishes with a strong positive relationship in the study would assist in stimulating culinary tourism and promoting the cultural heritage of the localities cultivating the grains, and would also promote local agriculture and farm produce.

Given the crucial role that indigenous Nigerian rice dishes have to play in the growth and development of tourism, the following areas in food standardization and research need to be addressed:

a. All food commodities to be used in preparing and cooking indigenous rice dishes should be procured fresh and wholesome to ensure maximum portion yield, acceptable colour, taste and aroma.
b. Indigenous rice grains required for producing rice dishes should be purchased from reliable sources and areas devoid of contamination and spoilage. Proper adherence to suggested recipes should be ensured to guarantee the acceptable output of the rice dishes.
c. The Gboko rice should be introduced as an alternative to the Abakaliki rice because of the strong relationship established in the study. The Ofada rice should equally be considered with the prescribed recipe because of its unique indigenous outlook compared to the similarity in appearance between Gboko rice and Abakaliki rice. The concurrent introduction can gradually enhance acceptability for the products within a short period.
d. Local restaurant operators should give indigenous rice dishes more prominence through the promotion of Nigerian cuisine to strengthen the culinary heritage by serving more of the local rice produce than foreign rice dishes often served as a show of class.
e. Sustenance and promotion of traditional food culture should be adhered to by restaurant operators, to ensure rejuvenation of the various forgotten culinary expertise of the local people. Promotion of the local culinary culture can help reinvigorate inbound tourism and positive tourist perception of our traditional food system.
f. Local rice producers in Nigeria should emulate some developing countries that have carried out surveys on indigenous foods and dishes, maintained a database on the grains available, nutrient composition, and predictable yields.
g. The government should assist local rice farmers in ensuring that the quality of the rice grains is maintained, especially by providing chemicals and storage facilities during cultivation and storage, to ensure that pests' infestation does not affect the quality and nutritional composition of the rice grains.

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