INFLUENCE OF SENSORY ATTRIBUTES ON THE ACCEPTABILITY OF INDIGENOUS SOUPS PREPARED WITH SELECTED GREEN-LEAFY VEGETABLES IN FOOD SERVICE ESTABLISHMENT IN KOGI STATE, NIGERIA

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ABSTRACT: This study evaluated the influence of sensory attributes on the acceptability of indigenous soups prepared with selected green-leafy vegetables in food service establishment in Kogi State, Nigeria. The soups were prepared with *Vitex doniana*, *Ipomea batatas* and *Talinum triangulare* leaves. The objectives of the study were to evaluate the sensory attributes of soups prepared with the selected green-leafy vegetables and to determine the influence of these sensory attributes on the overall acceptability the soup samples in food service establishment in Kogi State. The study adopted a sensory evaluation research design. Sensory evaluation was conducted using 35 customers as panelists, who were randomly selected from Niger Restaurant located in Federal Polytechnic Idah. The instrument for data collection was a sensory evaluation form based on a 9-Point hedonic scale. Data collected were analysed using one-way ANOVA and multiple linear regression. The sensory evaluation result showed that none of the soups was rated as most acceptable above the others, as all three soups - Ejiji, Emi-uchaomu and Gbogroguin – recorded high acceptability scores of 8.49±1.04, 8.31±1.02, and 8.57±0.81, respectively. The mean scores for the sensory attributes of taste, aroma, appearance and colour indicated that the soups were liked very much by the panelists. The results on the influences of sensory attributes revealed that the taste, texture, and aroma significantly influenced the overall acceptability of *Ejiji* soup (R^2 = 0.811). The overall acceptability of Emi-uchaomu soup was influenced mainly by sensory aroma (R^2 = 0.748). Appearance, colour, taste, and texture influenced the overall acceptability of Gbogroguin soup (R^2 = 0.700). In conclusion, given the remarkable medicinal and nutritional benefits associated with the consumption of green leafy-vegetables, soups prepared from indigenous leafy vegetables could complement exotic vegetables in menus featured in food establishments in Kogi State. It is therefore recommended that these indigenous soups be promoted and featured in the menus of various hospitality outlets across Kogi State to increase culinary varieties for consumers and to the preservation of cultural heritage.

Key words: Sensory attributes, Acceptability, Indigenous soups, Green-leafy vegetables, Food service establishments

1. Introduction

Green-leafy vegetables play important nutritional roles in the dietary structure of Nigerians in rural areas: apart from being rich sources of β-carotene, iron, minerals and vitamin C (Schönfeldt and Pretorius, 2011). Darkwa and Darkwa (2013) maintained that consumption of edible local green-leafy vegetables have positive effects on nutritional health and economic wellbeing of rural and urban population. It acts as medication and helps the body to grow healthier and the fibers present in them help the digestive system functions in humans. Asaolu, Adefemi, Oyakilome, Ajivulu and Asaolu (2012) and Olujobi (2015) found that the fibers in edible local green leafy vegetables eased the movement of bowel and lower the risk of colon cancer which is a great threat to human health. According to O'Brien and Choi (2022), food is a central component of the modern tourist and hospitality experience, with culinary tourism gaining prominence as a primary motivator for travel. Local cuisines, especially traditional soups made with local green-leafy vegetables, are increasingly recognized as key elements in destination branding, offering both cultural experiences and economic opportunities (Akinola, 2023). There are factors which can serve as motivators that can attract the consumers to local foods. They include awareness of nutritional values of these foods, additional taste and flavor of the food among several others (Dzeagu-Kudjodji, Adibolosoo and Otoo-Arthur (2019).

The acceptability of local foods can be promoted by their properties (texture, flavor, taste, appearance, smell, etc.) referred to as sensory properties. Sensory analysis examines the properties (texture, flavor, taste, appearance, smell, etc.) of a product or food through the senses (sight, smell, taste, touch and hearing) of the consumers (Ruiz-Capillas and Herrero, 2021). Despite the additional taste, flavor, acceptability, and nutritional richness of these traditional foods, they are still facing a decline in popularity, especially among younger generations and in urban areas. Factors leading to low patronage of local dishes include; lack of awareness of the importance of nutritive value of edible local green-leafy vegetables, poor preparation of local dishes with poor taste as a result of inadequacy of local caterers in luxurious hospitality outlets, inability of personnel to plan menu to give proper description of the delicacy served with local green-leafy vegetables. This hinders

customers from making the right choice of food involving green-leafy vegetables. These factors encourage some hospitality outlets resort to preparation of foreign dishes has motivated. This has motivated the study on ways to promote indigenous dishes in hospitality outlets through evaluating sensory attributes that influence the overall acceptability of soups prepared with selected green-leafy vegetables, preparation techniques and recipes standardization for each soup.

The aim of this study is to determine the influence of sensory attributes on the acceptability of indigenous soups prepared with selected green-leafy vegetables in food service establishment in Kogi State, Nigeria. Specifically, the study seeks to:

(i) evaluate the sensory attributes of soups prepared with selected green-leafy vegetables in food service establishment in Kogi State, and

(ii) determine the influence of sensory attributes on the overall acceptability of the soup samples prepared with selected green-leafy vegetables in food service establishment in Kogi State.

To achieve this aim, the following research questions were addressed:

(i) What are the sensory attributes of soups prepared with selected green-leafy vegetables in food service establishment in Kogi State?

(ii) What influences have the sensory attributes on overall acceptability of these soups prepared with selected green-leafy vegetables in food service establishment in Kogi State?

The hypotheses guiding this study are:

(1) There is no significant difference in the overall acceptability of these soups prepared with selected green-leafy vegetables in food service establishment.

(2) The sensory attributes do not influence the overall acceptability of the soups prepared with local green-leafy vegetable in food service establishment in Kogi State.

By addressing these questions and hypotheses, this research aims to contribute valuable insights into the cultural and hospitality-related significance of including indigenous delicacies in the menus of food establishments in Kogi State, Nigeria.

2 Materials and methods

2.1 Source and preparation of soups

The ingredients for sensory study were obtained from Ega market in Idah Local Government Area, Kogi State. All the recipes were measured with standard measurement equipment e.g scale, milk cup, tea spoon, table spoon. Other equipment used were cooking pots, chopped board, colander, tray, kitchen knife, gas cooker, service plates, blender/mortar and pestle etc.

2.2 Description of selected soup samples of vegetables delicacies prepared for sensory evaluation using hedonic test

A: *Vitex doniana* (African black prumb leaf - *Ejiji* soup)

B: *Ipomea batatas* (Sweet potato leaf - *Emi-uchaomu* soup)

C: *Talinum triangulare* (Water leaf - *Gbogroguin soup)*

Flow chart for material processing

2.3 Development of recipe and method of preparation

The following points were followed during the preparation and cooking of the green-leafy vegetables.

- All ingredients were measured using standard measurement equipment.
- All vegetables were washed thoroughly before slicing while some were sun dried
- To prevent loss of water soluble vitamins, the vegetables were not soak in the water for long time.
- Minimum quantity of water was used in cooking the vegetable
- All vegetables were cook within 1-2 minute depending on the hardness.

2.3.1 *Ejiji* soup recipe and preparation

The soup is made using *Virtex doniana* (*Ejiji*) leaves (500), meat (400g), cow skin (Kpomo- 400g), stock fish head (400g), crayfish (200g), smoked fish (400g), palm oil (half milk cup), locust beans (O*kpeheye*-20g), seasoning cubes (3 cubes), fresh pepper (5g), salt (to taste). Wash and season the meat, stock fish and cow skin then boil to tender. Also, wash and boil *Ejiji* leaves for 15 minutes. Rinse the leaves with fresh water and squeeze to remove excess bitterness. Prepare stock from meat, fish, stock fish head, then add *ejiji* leaves to the stock and simmer, add all the ingredients. Correct the seasoning and cook for 1 minute. Serve the soup with *oje-akpa*/pounded yam or boiled rice/ plantain.

2.3.2 *Emi-uchaomu* soup recipe and preparation

The soup is made using *Ipomea batatas (sweet potato*) leaf (500g), meat (500g), palm oil (half milk cup), crayfish (200g), stock fish head (400g), cow skin (kpomo- 400g), and dry fish (400g), locust beans *(Okpeheye* grinded – 20g), seasoning cubes (3 cubes), onions (100g), fresh pepper (5g) and salt (to taste). Wash and season the meat, stock fish head and cow skin and boil to tender. Wash and remove bone from fish then cook with minimum quantity of water. Add all the recipes together and cook for 1 minute then add sliced *Emi-uchaomu* leaves and simmer. Correct the seasonings. Add palm oil and cook for 3 minutes. Remove the pot from fire and serve. Serve the soup with *Oje-akpa*, boiled rice or boiled plantain/yam

2.3.3 *Gbogroguin* soup recipe and preparation

The soup is made using water leaf (500g), stock fish head (400g), meat (500g), dry fish (400g), palm oil (half milk cup), seasoning cubes (3 cubes), onion (100g), fresh pepper (5g), Crayfish (200g), and salt (to taste). In preparing the soup, the leaves were washed, sliced then set aside. The meat, fish, stock fish head, and dry fish are washed, seasoned and cooked then the leaves and other ingredients are added and allowed to simmer. The palm oil is added and allowed to cook for 3 minutes, and then the leaves are added and allow simmering for 1 minute. The seasoning is corrected and the pot is removed from fire. The soup is served with *fufu*/ pounded yam/boiled rice/ boiled plantain.

2.3.4 Research Population

The selected populations of the study are mainly customers comprising academic staff and students of Federal Polytechnic, Idah, Kogi State patronizing Niger food Restaurant that belong to Department of Hospitality Management Technology, Federal Polytechnic, Idah.

2.3.5 Sampling technique

The sensory study was carried out according to the method of Iwe (2002). For sensory evaluation, random sampling technique was used to select 35 taste panelists from Niger Food Restaurant. To participate, the individual has to be staff or student of Federal Polytechnic, Idah, Kogi State.

2.3.6 Sample description

Three indigenous soups were prepared using the following three green-leafy vegetables that are indigenous to the study areas. These vegetables are; *Virtex doniana, Ipomea batatas,* and *Talinum triangulare* and subsequently these soups were coded as sample A- (*Ejiji* soup), sample B – (*Emi-uchaomu* soup), and sample C – (*Gbogroguin* soup). All soups prepared were based on three (3) servings with *Oje-akpa* (mixture of corn and cassava flour), *fufu*, boiled rice or yam. All soup recipes were presented as small samples in small plastic plates to panel members for tasting.

2.3.7 Instrument for data collection for sensory evaluation study

The data for sensory evaluation were collected through the use of questionnaire administered to the taste panelists. The structured questionnaires consist of only closed ended questions was designed and presented to the panelists. Nine (9) - point Hedonic scale ranges from likely extremely = 9 to dislike extremely = 1 were used. The sensory attributes rating was based on appearance, colour, taste, texture, aroma and overall acceptability.

2.3.8 Data Analysis Techniques

The data collected were analyzed using one way analysis of Variance ANOVA with the aids of statistical package for social science called SPSS version 27.0. Analysis of variances was employed in order to determine the significant differences in treatment means and Turkey HSD test ($p<0.05$) was used to separate means. Also, multiple linear regression was employed to determine the influence of sensory attributes on the overall acceptability the soup samples prepared in food service establishments in Kogi State

3 RESULTS AND DISCUSSION

3.1 Sensory Evaluation of the Soup Samples

Table 1 shows the different mean hedonic scores of sensory attributes of the soup samples prepared with selected green-leafy vegetables in Niger food Restaurant located in Federal Polytechnic, Idah. The mean scores of the sensory attributes were ranked.

For appearance, *Gbogroguin* soup had the highest mean score of 8.71±0.57, which was followed by *Ejiji* soup with mean score of 8.40 ±0.84, then *Emi-uchaomu* soup with mean scores of 8.31±0.83. The ANOVA result on

the differences in appearance attribute among the three soup samples showed that there was significant ($p<0.05$) difference in the appearance of the three soups. The result further showed that the appearance of the three soups was liked very much. The sensory attribute of appearance is the first characteristics perceived by human senses and plays an important role in the identification and final selection of foods. According to Carneiro, Adie, Yu, Beverly, Neill, Zhang, Kuhar, Rideout, Reiter, Huang, O'Keefe and Duncan (2022), appearance properties of vegetables can affect consumers' acceptance toward them as well as purchase intent. Therefore, appearance of a food is an important factor to determine its acceptability by customers.

Table 1: Mean sensory evaluation of quality attributes of soups prepared with selected green-leafy vegetables (N = 35).

Delicacies	Appearance	Colour	Taste	Texture	Aroma	Acceptability
Sample A (*Ejiji* soup)	8.40 ±0.84	8.37 ± 0.94	8.43 ± 1.06	7.37 ± 1.23[b]	8.11 ±1.43	8.49 ± 1.04
Sample B (*Emi-uchaomu* soup)	8.31 ±0.83	8.17 ±0.95	8.29 ± 1.17	7.26 ± 1.06[b]	8.11 ±1.05	8.31 ± 1.02
Sample C (*Gbogroguin* soup)	8.71 ± 0.57	8.63 ± 0.77	8.60 ± 0.65	8.06 ± 0.76[a]	8.49 ±0.78	8.57 ± 0.81

Source: Author's sensory data (2025). Values are presented as Mean value ± standard deviation. Mean with different superscripts across rows (sensory attributes) are significantly different from each other at $p<0.05$.

In terms of colour, *Gbogroguin* soup had the highest mean score of 8.63 ± 0.77, followed by *Ejiji* soup with mean score of 8.37 ± 0.94 while *Emi-uchaomu* soup had the lowest mean score of 8.17 ± 0.95. The result implies that the colour of three soups was liked very much by the panelists. The ANOVA result also showed no ($p>0.05$) significant difference in the colour of the three soups. Colour, a critical sensory attribute, significantly influenced consumers' perception and overall acceptability. According to Dana and Saguy (2006), sensory qualities like visual appeal play pivotal roles in food evaluation which can influence food consumption and purchases of a product.

The sensory attribute of taste showed no significant ($p>0.05$) differences among the three soup, hence, reflecting the no superior tastes in any of the soup samples presented for sensory evaluation. In terms of mean score of taste for each soup sample, *Gbogroguin* soup had the highest mean (8.60 ± 0.65), followed by *Ejiji* soup with mean score of 8.43 ± 1.06 while *Emi-uchaomu* soup recorded the lowest mean of 8.29 ± 1.17. The result further showed that the taste of the three soups was liked very much by the panelists. Taste perception has been suggested to play a key role in determining individual food preferences and dietary habits (IUFoST, 2012).

For the sensory attribute of texture, the result showed significant ($p<0.05$) differences indicating that the sensory attribute of the soups with regards to texture, were distinct. *Gbogroguin* soup had the highest mean (8.06 ± 0.76), while *Ejiji* and *Emi-uchaomu* soups had mean scores of 7.37 ± 1.23 and 7.26 ± 1.06, respectively. This implies that the texture of *Gbogroguin* soup was liked very much, while textures of *Ejiji* and *Emi-uchaomu* were liked moderately.

The mean scores for aroma showed that all soup samples were liked very much. *Gbogroguin* soup had the highest mean value of 8.49 ±0.78, while *E*jiji and *Emi-uchaomu* soups had mean scores of 8.11±1.43 and 8.11 ±1.05, respectively. The ANOVA result revealed no significant ($p>0.05$) differences in aroma across the three soup samples.

In terms of overall acceptability of the soups, the result showed no significant differences in the three soup samples. *Gbogroguin* soup had overall acceptability mean score of 8.57 ± 0.81, followed by Ejiji soup with mean score of 8.49 ± 1.04, while *Emi-uchaomu* soup had a mean of 8.31 ± 1.02. The mean scores of the three soups revealed that the panelists accepted the soups.

3.2 Influence of sensory attributes on the overall acceptability of *Ejiji* soup in food service establishment

The result of the multiple linear regression analysis on the overall acceptability of sample A (*Ejiji* soup) by the panelists is presented in Table 2.

Table 2: Sensory attributes influencing acceptability of *Ejiji* soup

Variables	Coefficient	Standard error	t-value	p-value
Constant	0.585	1.131	0.517	0.609
Appearance	-0.134	0.190	-0.705	0.486
Colour	0.039	0.228	0.169	0.867
Taste	0.462	0.137	3.360***	0.002
Texture	0.207	0.073	2.832***	0.008

Aroma	0.405	0.138	2.936***	0.006
R^2	**0.811**			
Adjusted R^2	**0.778**			
F-statistic	**24.828*** **			
p-value of F-statistic	**0.000**			
$F_{tab\ (5,\ 29,\ 0.05)}$	**2.53**			

Source: Sensory study data (2025). *** represent 1% level of significance.

The value of the coefficient (0.811) of multiple determinations (R^2) implies that about 81.10% of the variations in the overall acceptability of *Ejiji* soup by the sensory panelists is explained by the sensory attributes included in the model while the remaining 18.90% accounts for the unexplained variability that is not captured by the included sensory attributes. Taste, texture and aroma were the significant sensory attributes that influenced the overall acceptability *Ejiji* soup.

The result showed that the coefficient of taste (0.462) was positive and significantly influenced overall acceptability of *Ejiji* soup ES. This implies that an increase in the taste of the soup will increase the overall acceptability score by 0.462 points. This aligns with the specific mean score of taste (8.43) in Table 4.2 that was liked very much by the panelists. The acceptability of the soup as a result of taste highlights the critical role of ingredient composition, preparation techniques, and seasoning in enhancing the palatability of food products. The preparation techniques using blanching and thorough washing to reduce the bitter taste before use may have increased the taste. According to Odudu *et al.* (2024), blanching inactivates enzymes responsible for aroma and flavour, hence stabilizing the flavor components of the vegetable in soups. This agrees with the study of Sobowale, Olatidoye, Olorode and Sokeye (2015), that blanching of vegetables also improves the taste of vegetables in food. The result of this study is consistent with the findings of Aburime, Bassey, Ako, Odey and Odey (2020) which emphasized the role of ingredients and preparation methods in determining food taste.

The texture of *Ejiji* soup positively and significantly influenced the overall acceptability of the panelists. The positive coefficient of texture (0.207) implies that increase in the tenderness of the leaves will increase overall acceptability by 0.207 points. The acceptability of *Ejiji* soup as a result of its texture could be attributed to the preparation techniques which include washing, and squeezing of the green-leafy vegetable (*Vitex donanian*) used in the preparation of the soup. Squeezing of vegetable breaks down the structures inside and outside of the leaf cells, in turn, softens the tough texture of leaves and also exposes some of the leaf juices (chlorophyll). And the immediate cooking of the vegetable inactivates oxidative enzymes which prevent co-mingling of the leaves with the substrate (soup) that allows discoloration of the leaves (Pelalak, 2021).

The positive coefficient of aroma (0.405) significantly influenced the overall acceptability at 1% level of probability. This implies that increase in aroma of *Ejiji* soup ES would lead to an increase in the overall acceptable score by 0.405 points. The superior aroma of *Ejiji* soup ES could also result from the unique aromatic compounds in the spice, locust bean (*Okpeheye*) used in preparing the soup. This distinctive aroma profile likely contributed to the overall sensory appeal. The result of this study is in agreement with the submission of Jarotimi, Ogunmola and Oluwajuyitan (2020) whose study emphasized the importance of aroma in food evaluation. Equally, Umuhozariho, Shayo, Sallah and Msuya (2013) reported a similar relation of a strong influence of taste and aroma on food acceptability, and that the two sensory characteristics are considered the key of food choice.

3.3 Influence of sensory attributes on the overall acceptability of *Emi-uchaomu* soup in food service establishment

Table 3: Sensory attributes influencing overall acceptability of *Emi-uchaomu* soup.

Variables	**Coefficient**	**Standard error**	**t-value**	**p-value**
Constant	0.863	1.169	0.738	0.466
Appearance	0.099	0.147	0.673	0.507
Colour	-0.077	0.148	-0.517	0.609
Taste	0.198	0.124	1.592	0.122
Texture	0.026	0.092	0.278	0.783
Aroma	0.670	0.160	4.174***	0.000
R^2	**0.748**			
Adjusted R^2	**0.705**			
F-statistic	**17.251*** **			
p-value of F-statistic	**0.000**			
$F_{tab\ (5,\ 29,\ 0.05)}$	**2.53**			

Source: Sensory survey data (2025). *** represent 1% level of significance.

The coefficient (0.748) of multiple determinations (R^2) implies that about 74.80% of the variations in the overall acceptability of *Emi-uchaomu* soup by the sensory panelists is explained by the sensory attributes included in the model while the remaining 25.20% accounts for the unexplained variability that is not captured by the included sensory attributes. For *Emi-uchaomu* soup, aroma was the significant sensory attribute that influenced the overall acceptability.

The coefficient of aroma (0.670) was positive and significant implying that increase in aroma of the *Emi-uchaomu* soup would lead to an increase in the overall acceptability score by 0.670 points. The aroma could stem from the unique aromatic compounds present in the leaf and also from its medicinal plant-based compounds.

3.4 Influence of sensory attributes on the overall acceptability of *Gbogroguin* soup

The value of the coefficient of multiple determinations (R^2) was 0.700, implying that 70.0% of the variations in the overall acceptability of the soup by the panelists were explained by the independent variables (sensory attributes) included in the model.

Results presented in Table 4 showed that appearance, colour, taste and texture were significant variables that influenced overall acceptability of *Gbogroguin* soup.

Table 4: Sensory attributes influencing overall acceptability of *Gbogroguin* soup.

Variables	Coefficient	Standard error	t-value	p-value
Constant	-1.123	1.724	-0.651	0.520
Appearance	-0.920	0.357	-2.574***	0.015
Colour	1.192	0.299	3.982***	0.000
Taste	1.010	0.201	5.011***	0.000
Texture	0.253	0.111	2.274**	0.031
Aroma	-0.389	0.208	-1.870	0.072
R^2	**0.700**			
Adjusted R^2	**0.648**			
F-statistic	**13.541*** **			
p-value of F-statistic	**0.000**			
$F_{tab\ (5,\ 29,\ 0.05)}$	**2.53**			

Source: Sensory survey data (2025). *** and ** represents 1% and 5% levels of significance, respectively.

The model showed that the coefficient (-0.920) of appearance was negative and significant at 1% which implies that an increase in the appearance of the soup may decrease overall acceptability score by 0.920 points. A reason for the negative effect of appearance on the overall acceptability of *Gbogroguin* soup could be as a result of the blanching process which has the potential to trigger the production of chlorophyll derived substances (Leite *et al.*, 2018) and on exposure to air during the shredding process, results to a darkish discoloration as a result of oxidation. This process results to the dark hue and dullness of the water leaf in *Gbogroguin* soup. According to Ogunyemi (2021), the appearance of food is the first characteristic perceived by human senses and it plays importance role in the identification and final selection of food. Appearance of a food impacts the appetite to stimulate the sensory organ to look at the food by eye before smelling or tasting it. Thus, the acceptance or rejection of food sometimes depends on the appearance.

The sensory attribute of colour positively and significantly influenced the overall acceptability of *Gbogroguin* soup. The positive coefficient of 1.192 implies that increasing the colour of the soup will increase the overall acceptability score by 1.192 points. Colour, is a visual sign, which show cases the freshness of a food (Olugbuyi *et al.*, 2025). Therefore, green vegetables that retain or intensify their greenish colour after cooking could increase the likelihood of acceptance of such dish by consumers.

The regression result for taste sensory attribute showed a highly significant ($p<0.05$) influence of taste on the acceptability of *Gbogroguin* soup highlights the critical role of ingredient composition and preparation techniques in enhancing the palatability of the soup. Furthermore, the result revealed that increase in taste of the soup will increase acceptability score by 1.010 points. Taste perception has been suggested to play a key role in determining individual food preferences and dietary habits (IUFoST, 2012).

The coefficient (0.253) of texture was significant and positively influenced the overall acceptability of *Gbogroguin* soup. Increase in crispy and crunchy texture of the vegetable leaf used in the preparation of the soup will increase the overall acceptability score by 0.253 points. Textural changes are among the main causes of the quality loss of leafy green vegetables (Dhakal, Ravi and Nandwani, 2021). Vegetables that maintain

crispy and crunchy textures are highly desirable quality and consumers associate these textures with freshness and healthiness (Fillion and Kilcast, 2002).

Results of Hypotheses

Hypothesis 1: The null hypothesis (Ho) proposed no significant difference in the acceptability of soups prepared with selected green-leafy vegetables in food service establishment.

Table 5: Summary of analysis of variance on the acceptability of the different soup samples prepared with selected green-leafy vegetables.

	Sources of variation	Sum of square	Df	Mean square	F-value	p-value
Acceptability	Between groups	1.200	2	0.600	0.645	0.527
	Within groups	94.857	102	0.930		
	Total	96.057	104			

Source: Sensory study data (2025).

A One-Way Analysis of Variance (ANOVA) was conducted to examine differences in the acceptability of the soup samples. The results in Table 5 showed no significant difference in acceptability of these soups, leading to the acceptance of the null hypothesis..

Hypothesis 2: The sensory attributes do not influence the overall acceptability of the three soup samples namely *Ejiji, Emi-uchaomu* and *Gbogroguin* soups prepared with local green-leafy vegetable in food service establishment in Kogi State. However, the F-test results of multiple linear regression presented in Tables 2-4, indicated the influence of sensory attributes in the overall acceptability across the soup samples since the computed F-values are greater than the F- tabulated values. Therefore, the null hypothesis was rejected, and the alternative hypothesis, which affirms significant influences of the sensory attributes in overall acceptability of the soup samples.

Conclusion

The results of this study showed that the three indigenous soups prepared with selected green-leafy vegetables were generally accepted and liked very much by the panelists. Analysis of the sensory evaluation results revealed that there was no significant difference in the overall acceptability of Ejiji, Emi-uchaomu and Gbogroguin soup as perceived by the respondents. The sensory attributes of appearance, colour, taste, texture, and aroma influenced the overall acceptability of the soups.

Given the remarkable medicinal and nutritional benefits associated with the consumption of green leafy-vegetables, it is imperative to promote their consumption in food establishments. Consequently, it is recommended that all three indigenous soups - Ejiji, Emi-uchaomu and Gbogroguin - be featured on the menus of various hospitality outlets across Kogi State to ensure diverse culinary offerings for consumers and clients.

Recommendations

Based on the findings of this study, the following recommendations are made;

1. Given the overall acceptability of these soups prepared with different green-leafy vegetables, it becomes imperative to promote their consumption by including these indigenous soups on the menus of various hospitality outlets across Kogi State, so as to could enhance their acceptance, linking the gap between indigenous and modern food culture.
2. All soup ingredients especially the green-leafy vegetables to be used in preparing the indigenous soups should be procured fresh and wholesome to ensure maximum portion yield, acceptable appearance, colour, taste, texture, and aroma.
3. The hospitality industry requires more skilled employees as a result of advancement in the sector. Therefore, catering staff among hospitality employees should undergo continuous training in the preparation of indigenous foods with green-leafy vegetables. This could serve as a measure of quality improvement in local dishes and increase turnover.
4. Consistent food quality, predictable yields, measurement control, and elimination of guess cooking procedures of these soups should be adhered to so as to reduce chance of producing poor local food product among others.

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