

*Full Length Research Paper*

# **Sensory evaluation of four pepper soup dishes prepared with four varieties of protein sources using Itsekiri pepper soup spices**

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Four types of protein sources were used in the preparation of pepper soup dishes using Itsekiri pepper soup spices were evaluated. The protein sources used for the pepper soup dishes were: Cow-leg, goat meat, fresh fish and dry stock fish. Sensory evaluation of the four pepper soup dishes was done using 40 trained panelists based on a 5-point hedonic scale. Result on the acceptability of the soup dishes revealed that dry stock fish pepper with  $4.58 \pm 0.50$  was highly acceptable, cow leg pepper with average score of  $3.93 \pm 0.80$  was moderately acceptable, fresh fish pepper soup with  $3.85 \pm 0.86$  was also averagely acceptable while goat meat pepper soup with score of  $3.48 \pm 0.64$  was the least acceptable. Based on the results of the ratings of the dishes, it was recommended that the pepper soup seasoning was generally acceptable and hence, should be promoted on a wider level.

**Key words:** Pepper soup, Itsekiri spices, protein sources, sensory evaluation, acceptability.

## **INTRODUCTION**

A soup is a liquid food prepared by boiling fish, meat or vegetable stock as a base. Soups generally accompanied main meals to rouse appetite for food. According to Tapsell et al. (2006) and Jiang (2019) seasonings, which are also ingredients used in soup making are composed of notable list of phyto-nutrients, essential oils, antioxidants, minerals and vitamins that are essential for good health. It is interesting however to note that the use of seasonings in food preparation has been an old tradition for many cultures of the world. The use of seasonings in food preparation has also become an

integral part of life over the centuries, in many parts of the world (Tapsell et al., 2006; Otunola et al., 2010).

Seasonings are ingredients which are added to foods to enhance flavor. These ingredients included salt, onion, curry, parsley, sesame seeds, mint and thyme; pepper powder and condiments such as mustard and vinegar. Apart from adding flavour to foods, some seasonings also contained medical and health benefits such as lowering of cholesterol levels, removal of scalp itching and peeling caused by candidiasis, relieve arthritis and back pain, healing of colds, sinus infections and sore throats, burn

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**Table 1.** Acceptability level of meat and fish sources of protein in pepper soup dishes (Mean  $\pm$  SD).

Sample code	Source of protein	Aroma	Appearance	GA	Sensory attribute		Overall acceptability
					Visual texture	Taste	
A	CLP	3.93 $\pm$ 0.73	3.15 $\pm$ 0.95	3.93 $\pm$ 0.80	3.30 $\pm$ 0.82	4.05 $\pm$ 0.597	3.67
B	GPS	3.40 $\pm$ 0.55	2.88 $\pm$ 0.56	3.48 $\pm$ 0.64	3.10 $\pm$ 0.59	3.58 $\pm$ 0.64	2.57
C	FFP	3.78 $\pm$ 0.66	3.58 $\pm$ 0.78	3.85 $\pm$ 0.86	3.25 $\pm$ 0.54	3.83 $\pm$ 0.81	3.66
D	DSP	3.93 $\pm$ 0.53	4.05 $\pm$ 0.71	4.58 $\pm$ 0.50	3.78 $\pm$ 0.66	4.45 $\pm$ 0.68	4.16

GA: General acceptability.

calories, speed up metabolism, cancer-fighting and anti-inflammatory properties, help to fight communicable diseases as well as lower the levels of bad cholesterol and triglycerides in the blood (Ajayi et al., 2013; Jiang, 2019).

In Nigeria, seasonings are commonly used in the production of dishes and drinks such as: pepper soup, jollof rice, yam pottage, all types of soups and stews, local drinks such as Zobo, ginger and other fruit drinks. Though, seasonings are used in small quantities that they contribute to the nutrient content of the food (Jiang, 2019). These seasonings are manufactured as bouillon cubes and in powdered form which are packaged with different brand names and are used extensively in food preparation (Otunola et al., 2010; Ajayi et al., 2013). They are added to soups, stews, puddings and sometimes as stimulants which are mixed along with other beverages and used as pepper soup ingredients.

The Nigerian, pepper soup is a popular soup recipe. It is usually prepared with different types of protein sources such as chicken, beef, goat meat, cow leg, other assorted types of meat, animal intestines, fresh or dried fish (Keswet and Abia, 2015). People usually eat pepper soups at home, exclusive hotels, bars and beer parlors. Also, pepper soup dishes are eaten by both male and female, in all parts of Nigeria. Different cultures prepare pepper soup dishes in different ways, with different ingredients/spice and for different purposes (Keswet and Abia, 2015). Among the Itsekiri tribe in Nigeria, some seasonings are especially used to prepare special pepper soup for women who have just delivered. It is believed that the use of these soups helps to quicken the healing of the body processes after birth. The ingredients used in the preparation of Itsekiri pepper soup seasonings included: *Monodora myristica* (Iwo), *Tetrapleura tetraepera* (Iyanghangangh), *Panirari curatellifolia* (Aghafilo), *Chrysobalanus icaco* and *Xylopiya ethiopia*. In northern Nigeria, just like in Itsekiri land, various seasonings are used for the preparation of pepper soup dishes, local puddings, gruels, local food drinks and various snacks (Keswet and Abia, 2015). Such seasonings are produced locally by many households and used in generous amounts and are also added to the nursing mother's foods and drinks.

The aim of this study was to prepare four pepper soup

samples using Itsekiri pepper seasoning as well as using goat meat, cow leg, fresh fish and dried stock fish as sources of protein. This was done to assess the general acceptability of the pepper soup dishes.

## MATERIALS AND METHODS

The following spices: (1) *M. myristica* (Iwo), (2) *T. tetraepera* (Iyanghangangh), (3) *P. curatellifolia* (Aghafilo), (4) *C. icaco* and (5) *X. ethiopia* were bought from Terminus market in Jos, Plateau State, Nigeria. The spices were cleaned, mixed together, ground and sieved into fine pepper soup powder using a standard (fine) kitchen sieve. Salt was also added to taste (pepper soup seasoning). The seasoning was packaged into 100 g samples.

The following ingredients: 1 kg each of cow leg, goat meat, fresh fish and dry stock fish were bought from Terminus market. Other ingredients included 8 sachets of 100 g Itsekiri seasoning, 4 Knorr cubes and salt to taste. These ingredients were divided into four portions and each portion was added to the following protein sources to prepare four pepper soup samples: (A) cow leg, (B) goat meat, (C) fresh fish and (D) dry stock fish respectively. Keswet and Abia (2015), pepper soup recipe was adopted as control for the production of the four samples as follows: Wash the stock fish, rinse thoroughly and cut into smaller pieces. Place in a pot, add enough water to cover the stock fish, add the Itsekiri pepper soup seasoning and cook until the stock fish is done cooking.

Panelists were composed of 40 men and women (middle aged and income earners) purposively selected by simple random sampling technique for the sensory evaluation. There was an equal selection of 20 males and 20 females for the study. Each panelist was offered small portions of the pepper soup samples in small white soup plates which were coded cow leg pepper soup (CLP), goat pepper soup (GPS), fresh fish pepper soup (FFP) and dry stock fish pepper soup (DSP), based on a five hedonic scale (1 and 5, representing extreme like and extreme dislike respectively), of taste, aroma, appearance, visual texture and general acceptability. Only one sensory attribute was tested in one sitting and in separate compartments with good lighting. Data collected were subjected to analysis of variance (using IBM SPSS version 20) at 0.05 level of significance.

## RESULTS

Table 1 presented the analysis of data, using means and standard deviation (mean  $\pm$  SD) on the acceptability level of Itsekiri pepper soup. Samples A - C are the experimental while sample D is the control. Table 1 showed that the acceptability of pepper soup dishes

**Table 2.** Comparative analysis of pepper soup samples by gender.

<b>Summary of multi-t-test analysis by gender</b>							
<b>Attributes</b>	<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>Std. deviation</b>	<b>Df</b>	<b>t<sub>cal</sub></b>	<b>P-value</b>
Taste	Male	20	4.15	0.49	38	1.061	0.298
	Female	20	3.95	0.69			
Aroma	Male	20	3.65	0.59	38	-2.545	0.015
	Female	20	4.20	0.77			
Appearance	Male	20	2.90	0.79	38	-1.707	0.096
	Female	20	3.40	1.05			
General acceptability	Male	20	3.85	0.75	38	-0.590	0.559
	Female	20	4.00	.86			
Visual texture	Male	20	3.10	0.72	38	-1.566	0.126
	Female	20	3.50	0.89			

based on protein sources with score sheets (Smiley's) on a 5-point hedonic scale of "poor" to "excellent", and dishes ranked to determine consumer preference. The dishes showed significant levels of acceptability across the various sources of protein. Based on aroma in Table 1, CLP and DSP dishes were moderately acceptable ( $3.93 \pm 0.73$ ), followed by FFP ( $3.78 \pm 0.66$ ) and the least aroma score was GPS ( $3.40 \pm 0.55$ ). Appearance scores of the dishes revealed that DSP with  $4.05 \pm 0.71$  was highly acceptable followed by FFP with  $3.58 \pm 0.78$  as moderately acceptable, CLP with  $3.15 \pm 0.95$  was averagely acceptable and GSP with  $2.88 \pm 0.56$  was the least acceptable.

General acceptability of the dishes revealed that sample D (stock fish, DSP) with  $4.58 \pm 0.50$  was highly acceptable followed by sample A (cow leg, CLP) with average score of  $3.93 \pm 0.80$  was moderately acceptable, sample C (fresh fish, FFP) with  $3.85 \pm 0.86$  was averagely acceptable and sample B (goat meat, GPS) with score of  $3.48 \pm 0.64$  was the least acceptable. The study revealed that DSP had the highest score overall acceptability (4.15), while GPS had the lowest (3.24).

Table 2 showed the t-Test analysis of pepper soup samples based on gender. Parameters used for rating were: taste, aroma, appearance, general acceptability and visual texture. Based on the taste assessment of the pepper soup samples, the mean of males was  $4.15 \pm 0.49$  signifying very good, while the female had a mean score of  $3.95 \pm 0.69$  signifying good with calculated t-Test value of 1.06 and p-value  $\geq 0.05$ . This implies that there was no significant difference between male and female assessment based on taste of the pepper soup, appearance, general acceptability and visual texture. But there was a significant difference between male and female in Aroma assessment of the pepper soups with

females mean score of  $4.20 \pm 0.77$  greater than males of  $3.65 \pm 0.59$ . This implies that females could be more sensitive to aroma than males.

## DISCUSSION

The consumption of pepper soup has become an integral part of life over the centuries in many parts of Africa and particularly in Nigeria. In Plateau State, pepper soup consumption occurred more during afternoon break periods in specific spots. Some of the spots included bars, hotels, canteens and special huts where people gather to eat and drink (Keswet and Abia, 2015). The consumption of hot pepper soup is very common among men and women who consumed alcoholic drinks such as beer and the local drink called "Burkutu". This study is in line with that of Keswet and Abia (2015) who commented that pepper soup dishes are loved by Nigerians because of their medicinal and healing effects. According to Keswet and Abia (2015), all Itsekiri women are lovers of spices and therefore prepared them in different forms, using different types of ingredients. It was traditionally prepared for mothers who have just delivered and for convalescents. This study, along with others have confirmed the wide acceptance and use of various pepper soups dishes prepared from various seasonings and using meat varieties such as bush meat, poultry and both dry and fresh fish (Keswet and Abia, 2015; Salmon, 2016).

Pepper soup dishes are widely accepted because of their health and nutritional benefits. Thus, the results revealed that pepper soup dishes prepared from Itsekiri pepper soup seasonings were highly acceptable. Table 1 showed that all the pepper soup samples were generally

accepted at different levels by the respondents. This confirms the assertion that pepper soup in Nigeria has become such a general dish across all cultures (Salmon, 2016). It is a delicacy dish for many cultural groups which goes with palm wines, local wines (Burkutu and Pito) and other alcoholic beverages. According to Keswet and Abia (2015), Nigerian pepper soup is such a versatile recipe as it can be prepared with different types of meat and fish such as cow leg, cow tail, chicken and catfish, among many others.

The results of the sensory analysis have shown the wide acceptance of Itsekiri pepper soup dishes prepared with four different protein sources and consumed by both males and females. Ajayi et al. (2013) have also shown that many of the local seasonings are beneficial and very good sources of minerals which help the metabolic processes inside the body cells. The existence of these nutrients in the pepper soup seasoning as well as in the type of protein used and other ingredients used, can help to meet some of the nutritional requirements of individuals (Bouba et al., 2012; Keswet and Abia, 2015; Jiang, 2019). Based on the results of the study, the Itsekiri pepper soup dishes could be introduced successfully to all parts of Nigeria and other African countries.

## Conclusion

The Itsekiri seasoning is a widely accepted condiment in the preparation of some kinds of pepper soup dishes. It can also be used like other popular seasonings like Maggi and Knorr cubes, among many others for the preparation of most Nigerian meals or menus.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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