JHER Vol. 26 No. 2 December 2019, pp. 167 - 173

Sensory Evaluation of Garden Egg Chilli Sauce

Ukam, N. U*.; Bessong, M.O. & Oka, C. O.
Home Economics Unit,
Department of Vocational Education,
University of Calabar.

Abstract

This study investigated proximate analysis and sensory evaluation of garden egg chilli sauce. There were two specific objectives. It was an experimental research. Garden egg and chilli sauce were mixed at different ratios for five-blend samples (A, B, C, D, and E). Proximate analysis and sensory evaluation were carried out. The sensory result showed that sample D (20:80) was the most acceptable in terms of colour, flavour, texture, and general acceptability. The protein content across the blends ranged between 3.19 to 3.54%. The crude fat content also ranged between 0.47 to 0.54%. The moisture content across the blend ranged from 89.33 to 90.77%. This may encourage the growth of micro-organism, except otherwise properly sterilized. The P^H and TTA ranged between 4.60 to 4.66 and 0.75 to 1.12% respectively. This indicates some degree of acidity which helps prevent growth of micro-organism. It was therefore recommended for regular use at home and further research on how to produce it as a powder to be used at will.

Keywords: Garden egg, Chilli, Sauces, Blend, Proximate, Sensory, Analysis

Introduction

Sauces are liquids, cream or seam-solid mixtures served with other foods. They are not normally consumed by themselves. They give additional flavour, moisture, nourishment and visual appeal to a dish. It is thickened by the addition of some ingredients such as roux (flour, eggs, butter(margarine).It is used to supply additional richness or to add some nutriment to a dish by its food value and sometimes to counteract the richness of some food and to add piquancy of flavour.

Traditionally, there are thickeners such as *achi, ofor, ukpotoro, ogbono*, etc which are used as soup thickeners and sauces. Sometimes, vegetables such as garden eggs, fruits (pawpaw) are used for thickening of sauces that are served with other foods such as boiled white rice, yam, meat, fish and cassava fufu, garri, etc. These sauces most of the times are delicacies and add to the nutrient content of the meals served/consumed.

Garden egg *Solanummelongena* is a member of the aubergine family and comes in different colors (pink, white, yellow, green, black, sometimes striped)shapes and sizes. It is called African eggplant in some regions. They basically have the same texture: meaty, light flesh with soft, edible seeds and thin, bright skin. They are mostly egg-shaped. Some varieties are round, flat or fusiform. They have been found useful in the preparation of stews and vegetable sauces to be with plantain, rice, yam and or to tubers and taste from bland to sweet or slightly bitter.

Chilli pappers belong to the same family as eggplant, winter cherry, potato, tamarillo

and tomato. The chilli is a pod that encloses multiple seeds inside its cavity. The different species of chilli have different sizes, shapes, colours and flavors. Some chilli peppers are green, others are purple or red, and others are yellow. Some chilli peppers are so strong that they cause tears when they are cut.

Nutritionally, capsicums are a superior food. They are an excellent source of the B vitamins, are superior to citrus as a source of vitamin C when they eaten raw, and they contain more vitamin A than any other food plant by weight. Vitamin A increases as the fruit matures and dries but is not affected by exposure to oxygen, while the production of vitamin C in peppers diminishes with maturity and drying and is, as in all plant foods, destroyed by exposure to oxygen. Capsicums also contain significant amounts of magnesium, iron, thiamine, riboflavin, and niacin. Even though chilli sauces are not usually eaten in large quantities, small amounts are important where traditional diets provide only marginal amounts of vitamins. However, ripe non-pungent varieties, such as bell peppers, can be eaten as painlessly as an apple while providing more food value (Murano, 2003).

Eggplant offers antioxidants with its purple shade though it is actually a fruit, a berry and part of the night shade family which includes tomatoes, potatoes, sweet peppers. Its proximate nutrient composition includes water 95%, protein 1%,fat 0.3% and carbohydrate 6% P. Southgate (2001) and Purseglove (1991) analyzed the chemical constituents as carbohydrate 4g, Fiber 1g,Calcium 10g, Iron 1mg,vitamin A trace, Thiamine 0.05g, Riboflavin 0.03mg, Nicotinamine 0.06mg and ascorbic acid 15mg.

Gruben, (2004) outlined the nutrient composition of edible portions of fresh eggplant as follows: water 92%,protein 1.2%,fat 0.2%,carbohydrate 5.6%,calcium 12mg,sodium 2mg,potassium 214mg, vitamin A 10mg and vitamin C 19mg.Therefore,the objective of the study is to determine the chemical composition of blends of garden egg and chilli sauce.

Purpose of the Study

The study investigated the proximate analysis and sensory evaluation of five blends of garden egg chilli sauce. Specifically, the study:

1. Analysed the chemical composition of five blends of garden egg chilli sauce
2. Determined sensory attributed of five blends of garden egg chilli sauce.

Methods and Materials

***Design of study*:** The design of the study is experimental which involves five blends in the following ways: 80g of garden egg and 20g of chilli blends of sauce; 60g of garden egg and 40g of chilli blends of sauce; 40g of garden egg and 60g of chilli blends of sauce; 20g of garden egg and 80g of chilli blends of sauce and 50g of garden egg and 50g of chilli blends of sauce

***Materials*:** The raw materials used for this study were fresh garden egg *Solanummelongena* and chilli pepper *Capsicum anaheim*. They were purchased from North bank market in Makurdi Benue State and packed in a polyethylene bag transported from the market to the Food Science Department Laboratory, University of Agriculture, Makurdi.

Preparation of Garden Egg Sauce

The method used for the preparation of garden egg sauce was the method used by Gruere, (2006). The garden egg was bought fresh, from North bank market in Makurdi Benue State and packed in a polyethylene bag transported from the market to the Food Science Department Laboratory, University of Agriculture, Makurdi. It was sorted, washed, trimmed, sliced, blanched (at 70^0C for 5 minutes). It was wet milled, packaged and pasteurized for 15 minutes at 65^0C

Preparation of chilli sauce: The method of preparation was used in the sorting of the chilli fruits, which were then washed, trimmed and sliced. The chilli pepper was wet milled using the same milling machine. The sample was pasteurized in transparent plastic plates with cover for 15 minutes at 65^{o}c.

Blend formulation: The garden egg and chill sauce were mixed at different ratios for five samples as follows:

Table I: Blend formulation for Garden egg chilli sauce

Sample codes	Garden egg (g)	Chilli pepper (g)
A	80	20
B	60	40
C	40	60
D	20	80
E	50	50

***Chemical analysis*:** The moisture crude fat, ash, fibre, carbohydrate and energy content of the samples of the garden egg chill sauce were analyzed using AOAC, 2000. The moisture content of the samples was determined using air oven method of AOAC, (2000). The crude protein content of the samples was determined by automated micro-kjeldahl as described by AOAC, 2000. Fat was also determined by using the soxhlet extraction method AOAC, (2000). Ash content was also determined using AOAC, 2000. Crude fibre was also determined using AOAC (2000) and carbohydrate was determined by difference. The sum of percentages of protein, fat, ash, fibre and moisture was subtracted from 100% to obtain the value for carbohydrate.

Sensory evaluation: Sensory evaluation of the five sauce samples were carried by using nine (9) point heidonic scale to access the flavour, color, texture, appearance and general acceptability of the selection of the panel. Fifteen (15) students and five (5) lecturers of Department of Food Science and Technology, University of Agriculture, Makurdi were purposively selected as the panel for the sensory evaluation. This was because they were willing to participate in the sensory evaluation.

***Instrument for data collection*:** Sensory evaluation of the five sauce samples was carried out by using nine (9) point heidonic scale. It was structured to collect data on the flavour, color, texture, appearance and general acceptability of the five blend formulations of the garden egg sauce.

Data collection method: Each panelist was comfortably seated in the food laboratory in the Department Food Science and Technology, University of Agriculture, Markurdi to avoid communication with other panelists. This is to ensure that they take time to assess the garden egg chill sauce sample on their own. The table was arranged with the garden egg chilli sauce samples readily placed with drinking water and glasses to rinse their mouth after each tasting. This was done in one day.

***Data Analysis technique*:** Data were analysed using means.

Findings

Results and Discussion

Table 1: Proximate composition of garden egg/chilli sauce chemical properties

	A	B	C	D	E	LSD
Moisture	90.77^{ad} ± 0.25	90.3^{acd}0 ±0.44	89.73^{abc} ±0.21	89.33^{b} ±0.49	90.17^{acd} ±0.21	0.62
Carbohydrate	4.47^{a}±0.15	4.87^{a}±0.14	5.60^{a}±0.05	6.12^{a}±0.17	5.12^{a} ±0.03	0.22
Protein	3.19^{a}±0.03	3.27^{b}±0.02	3.29^{b}±0.04	3.54^{a}±0.03	3.25^{b}±0.02	0.05
Fats	0.53^{b}±0.15	0.47^{b}±0.03	0.54^{b}± 0.04	0.52^{b}±0.15	0.54^{b}±0.02	0.13
Ash	0.87^{b}±0.15	0.88^{b}±0.03	0.80^{b}±0.02	0.81^{b}±0.02	0.84^{b}±0.04	0.13
P^{H}	4.65^{ac}±0.01	4.63^{bc}±0.02	4.60^{bc}±0.03	4.60^{bc}±0.03	4.66^{bc}±0.02	0.04
TTA	0.75^{b}±0.56	1.10^{b}±0.02	1.12^{b}±0.01	1.12^{b}±0.01	1.06^{b}±0.05	0.46

Key A:80g of garden egg and 20g of chilli pepper blends of sauce
B:60g of garden egg and 40g of chilli pepper blends of sauce
C:40g of garden egg and 60g of chilli pepper blends of sauce
D:20g of garden egg and 80g of chilli pepper blends of sauce
E:50g of garden egg and 50g of chilli pepper blends of sauce
P^{H}:Hydrogen ion concentration
TTA: (Total Titrable Acid)

Table 1 shows the proximate composition of the five blend formulations showed that the moisture content of sample A(80g of garden egg and 20g chilli pepper blends of sauce) ranged from (89.73--90.77%), protein(3.19--3.54%), fats(0.47--0.52%), ash (0.80--0.88%), carbohydrate (4.47--6.12%),pH of the blends ranged from (4.60--4.66%)respectively.

Table 2: Sensory evaluation of Garden egg/chilli sauce

Attributes	**A**	**B**	**C**	**D**	**E**	**LSD**
Colour	2.73^{d}	3.87^{d}	5.13^{c}	7.13^{b}	8.40^{a}	1.17
Flavour	4.27^{b}	4.13^{b}	6.40^{a}	7.13^{a}	4.73^{b}	1.52
Texture	3.33^{d}	4.73^{bcd}	5.13b^{c}	6.87^{a}	5.73^{ab}	1.64
General Acceptability	3.60^{c}	3.27^{c}	5.13^{b}	6.33^{b}	8.07^{a}	1.30

Table 2 shows that the sensory evaluation scores as follows: colour score of the blends ranged from 2.73-8.40% Plavour (4.13-7.13%), Texture (3.33-6.87%) and general acceptability (3.27-8.07%) respectively.

Discussion

The moisture content of the garden egg and chili Pepper sauce were significantly not different (Pco.05) with exception of sample D (20g of garden egg and 80g of chili pepper lends sauce (89.33≠ 0.49) which incidentally was the lowest values among the samples (A, B, C and D) (90.77 vs 90.30 vs 89.73 vs 89.33 vs 90.17) respectively. This agrees with the findings of Ene-obong, (2001). Murano (2003), Southgate that the moisture content of fresh green leafy vegetables including garden egg and pepper sauce is high which range from 72% for cassava leaves to 92-93% for Indian Spinach.

The implications are that this sauce cannot be kept for a long time due to high moisture content is an index of stability of food (Udofia and Obizoba, 2005). However, water main turgidity and strength of vegetables. The protein values of the sauce (03.19-3.54%) which were moderately low and agreed with the observations of Udofia and Obizoba (2005) (2.47-4.33%) and other workers. It thus confirmed that vegetables are poor sources of protein as such could be recommended for the dietary regime of the obese and hypertensive patients.

The mean ash values of garden egg\chili sauce were significantly not different (Pco.03). The ash values ranged from (0.80-0.88%).The ash values were low. They were lower than the observations of other worker (Ukam, 2017; 4.27-7.30%); Ene-obong (2001) (0.8-15.15%) for fresh vegetables and spices respectively. Ash values are pointers to the mineral and vitamin content of vegetables (plants). These low ashes values may be due to plant specify (soil fertility, type and quality of fertility used) (Ogumtona 1998).

The low fat values for all the five samples (0.53 vs 0.47 vs0.54vs 0.52 vs 0.54%) respectively. for sample A B C D and E was not a surprise. This is because vegetables have low fat to maintain cellular integrity. The fat values were comparable to what other workers like Oguche, (2012) (1.23-16.1) Udofia and Obizoba (2005) (0.47-2.00%) and Ezeife, (2010) (0.65-4.45%) respectively, this low fat values were not surprising because fresh vegetables are known to contain low fat. This implied that they could be used for dietary regime of hypertensive patients, diabetes and the obese.

The carbohydrate mean values (4.47 vs 4.87 vs 6.12 and 5.12%) for samples A,B, C, D and E of garden egg sauce respectively confirmed the expert reports that vegetables are poor source of carbohydrates. The nutritional implications of low values of carbohydrates are that the source supply low energy in the body when constantly consumed, as much could be prescribed for diabetic, obese ad hypertensive patients. (Joshi, 2010).

The P^H (Hydrogen ion concentration) and TTA (Total Titrable Acid) of 4.63-4.66% and 0.75-1.12%) respectively indicated some degree of acidity which was supposed to check microbial growth. The P^H of sample A, B, C and E were significantly not different (PCO.05) (4. 65 vs 4.63 vs 4.60 and 4.60 %) respectively, with the exception of sample D (4.60%) while the TTP of all the samples were significantly not different.

The sensory/attributes evaluation of garden egg pepper sauce for colour for the five samples A, B, C, D and E were significantly different except for samples E (8.40%) which is 50% of garden egg and 50g of chili pepper paste. The flavor/taste of samples A (80% of garden egg and 20g chili pepper sauce, 4.27% B (60g of garden egg and 40g of chili pepper sauce (4.13%) and E (50g of garden egg and 50g of chili pepper sauce (4.73) were significantly not different, while samples C (40g of garden egg and 60g of chili pepper sauce (6.40%) and D (20g of garden egg and 80g of chili pepper sauce (7.13%) were not significantly different. It appears that the low the garden egg paste and more of the chili pepper sauce the better the flavor.

The textures of the samples blends of A (3.335), B (4.73%), C (5.13%) were similar, while the textures of samples D (6.87) and E(5.73%) were also significantly not different. This implies that the lower the garden egg 20% and the higher the chili pepper sauce 80g, the better the texture.

The general acceptability showed that sample E (8.07%) was the most accepted and was significantly different ($P<0.05$) from the other samples. However, sample C (5.13%) and D (6.33%) were not significantly different also. In the same way samples A (3.60%) and B (3.27%) were also not significantly different. It implied that when equal quantity of garden egg and chili pepper are blended, a better sauce is obtained in colour (8.40%) and was generally accepted by the consumers (50g of garden egg and 50g of chili pepper paste.)

Vegetables are in abundance especially during the raining seasons, as such a lot of these vegetables are produced and not all are consumed, the left over are discarded because of lack of preservation. Hence, local processing of these vegetables into other uses could make them available for consumption in a different way. Hence, garden egg and chili pepper sauce could be

used as an accompaniment for some dishes like rice, plantain, soups etc. the sauce is rich in nutrient as shown by its proximate analysis and sensory evaluation showed that the blend with equal garden egg and chili pepper appeared to be the most acceptable. However, its high water content reduced its keeping quality and lead to high microbial load.

Sauces are liquids, cream or seam-solid mixtures served with other foods. They are not normally consumed by themselves. They give additional flavour, moisture, nourishment and visual appeal to a dish (En.dO'Rally-Wright, 1985). It thickened by the addition of some ingredients such as roux (flour, eggs, and butter margarine) it is used to supply additional richness or to add some nutrient to a dish by its food value and sometimes to counteract the richness of some food and to add piquancy of lavour.

Traditionally, there thickens such as achi, Ofor, Ukpotoro, Ogbono, etc which are used as soup thickness and sauces. Sometimes, vegetables are such as garden eggs, fruits (pawpaw) are used for thickening of sauce, that are served with other foods such as boiled white rice, yam, meat, fish and cassava fufu, garri etc. these sauces most of the times are delicacies and add to the nutrient content of the meals served /consumed.

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Gruben & Delton (2004) outlined the nutrient composition of edible portions of fresh eggplant as follows; water 92%, protein 1.2%, Fat 0.2%, carbohydrates 5.6%, calcium 12mg, sodium 2mg, potassium

214mg, vitamin A 10mg and Vitamin C 19mg. Therefore, the objective of the study is to determine the chemical composition of blends of garden egg and chili pepper sauce.

Conclusion

The blend of garden egg and chili sauce help to ensure house hold food security so that households would have something to eat at all time, thereby leading to a healthy life.

Recommendations

It is recommended that:

1. further work (research) should be conducted on preservation of the blends.
2. The blend should be into a powder form.

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