International Journal of Academic Multidisciplinary Research (IJAMR)
ISSN: 2643-9670
Vol. 8 Issue 1 January - 2024, Pages: 169-177

Possibility of Enhancing Suya Beans Seasoning Using Ginger and Garlic for Cheaper Food Production

Eldah Ephraim Buba1 and Aishatu Ibrahim, Jamila Waziri Mohammed2

1Department of Tourism Management Technology
Federal polytechnic Kaltungo, Nigeria
Email: talk2elbubs@yahoo.com

2Department of Hospitality Management
Federal Polytechnic, Bauchi, Nigeria

***Abstract*:** *Despite the way garlic and ginger are widely used in Nigeria and it's proved nutritional value to man, it is observed that it has not gained general acceptance by the public. The present economic condition in Nigeria has made life difficult for the populace. People find it difficult to purchase daily necessities as such the need to use locally produce ingredients for food production. The advocating for the consumption of natural food substances is a pressing need for healthy eating and living. It is as a result of this that this study aimed to find out the possibility of enhancing soya bean seasoning with ginger and garlic through sensory evaluation of different Nigerian dishes produced using the enhanced seasoning. Three types of seasons were produced; soya beans enhanced with ginger, soya beans enhanced with garlic and soya beans enhanced with ginger and garlic and used in preparation of nine dishes with the seasonings. Sensory evaluation form was used by forty-five respondents who assessed the dishes produced from the seasoning based on taste, aroma, attractiveness, colour and general acceptability. Findings show general acceptability of the products with significant difference among the soya bean composite seasonings. Comparison of the three products on nine different dishes shows seasoning used in Soya bean and ginger Pepper soup differs from Soya bean and garlic pepper soup. Likewise, suya beans and ginger pepper soup differs with Soya bean, ginger and garlic pepper soup. Soya bean and garlic jollof rice differs with Soya bean and ginger jollof rice with. However, soya beans and ginger jollof rice and Soya bean and garlic jollof rice seasoning shows no significant difference from soya bean, ginger and garlic seasoning in jollof rice. Soya bean, ginger and garlic mixed vegetables and Soya bean and ginger mixed vegetables have significant difference. While Soya bean, ginger and garlic mixed vegetables and Soya bean and garlic mixed vegetables has no significant difference. The findings of this study have economic implications; considering the ease of production, these seasonings could be produced for both family use and commercial purposes. It can also be used by those who wish to go on healthy diets. The acceptability of the ginger and garlic used in enhancing suya beans seasoning is a finding that is of benefit to numerous individuals and organizations. Families and hospitality enterprises should adopt and incorporate these seasonings into their exquisite cuisine*

Keyword: Enhancing, Suya beans, Seasoning, Ginger, Garlic, Food production

1.0 INTRODUCTION

Seasoning is the process of enhancing food taste using herbs, salt, or spices to food. Seasoning can add to the taste and aroma of food, as such it is important for the right seasoning to be added during the process of food production. Soya beans have been used in the production of seasoning, it is beans that are widely cultivated all over the world and it is good nutritionally. Soya has transcended its Asian origins to become the most widely cultivated legume across the globe [1]. Soya beans are traditional part of diet in china, Japan, Korea, Nigeria countries etc. and are currently grown in countries across the world including brazil, Argentina, India unit states and Nigeria [2]. The use and popularity of soya beans is evident in the work of [3] who explains that Soya beans foods are found and eaten worldwide making it a popular choice of many health-conscious individuals. Soya bean is a stable food of great nutritional value. Its importance ranges from milk production, oil processing livestock feeds, industrial uses and human consumption of soya bean [2]. Further study by [4], also discovered that small and unique peptides in soya beans include defacing glycines, Conglycinins and lanansin which has health benefit and improve blood pressure regulation, better control of sugar levels and improved immune function. Soya bean has been recognized to be an ideal grain for meeting protein and energy requirement of both man and animal. Soyabean is probably the world's most valuable crop, used as feed by billions of livestock, as a source of dietary protein and oil by millions of people, and in the industrial manufacture of thousands of products. Soya bean is such an extremely rich source of protein and fat, and such a good source of energy, vitamins and minerals [1]. Garlic grows in many parts of the world and is popular ingredients in cooking due to its strong smell and delicious taste. Garlic is widely used around the world for its pungent flavour as a seasoning or condiment. It has long been used for consumption (raw or cooked) as seasoning in many other parts of the world. The garlic plant's bulb is the most commonly used part of the plant. The herb garlic has been used as a flavoring since the earliest time of man-kind. As mentioned, garlic or more specifically the cloves are believed to have many medicinal properties ranging from positively affecting anything such as high blood pressure (BP) and lowering cholesterol to using it as a treatment for the common cold [5]. On the other hand, Ginger root is the lower stem of the ginger specious named

Zingiberofficinale that has a great role in the treatment of nausea, blood pressure, common cold, anemia, toothaches, and hemorrhages. [6] also explain that Ginger root is the main part of the spice of ginger which contains a number of essential minerals that kills bacteria and small micro-organisms. Ginger contains volatile oil, resins and protein digesting enzymes, which neutralize acid and toxins in the digestives tract that harm the kidney. Leech [7] explains that ginger is among the healthiest (and most delicious) spices on the planet. It is loaded with nutrients and bioactive compound that have powerful benefits for the body and brain. Ginger can be used fresh, dried powdered, or as an oil or juice, and sometimes added to processed foods and it is a very common ingredient in recipes.

Several people felt that sensory factors can lead to their food choice. In addition, their experience of food and beverages was satisfied through the smell, taste and visual image of food [8]. Especially, flavour was considered a basic standard for consumption of food and beverages. Kivela and Crotts [9], many people do expect that food would be nice, but it was nice. Many have feeling of food being fresh due to its smell and they discovered it was fresher. Furthermore, visual images of food such as food well displayed and cooking performance may play a key motivational role in providing sensory pleasure to people and the displays of food look nice and attractive. Findings by [10] identified that sensory perceptions can play a crucial physiological and psychological part in appreciation of food. They further mentioned that sensory perceptions represent the considerations that people develop related to their taste in eating and drinking. In addition, taste can be a key consideration for most people in nearly all food and drinking settings. Since flavour is regarded as an essential criterion for food consumption, people most frequently consume food that they evaluate as tasty. Therefore, taste of food in the hospitality industry plays not only a central part in attracting potential visitors into a business but also becomes the ideal symbol of food consumption [11]. Pollard et al., [12] stated that sensory perceptions can play a crucial physiological and psychological part in appreciation of food. They further mentioned that sensory perceptions represent the considerations that people develop related to their taste in eating and drinking. Taste tends to be a key consideration for most people in nearly all food and drinking settings.

The present economic condition in Nigeria has made life difficult for the populace. People find it difficult to purchase daily necessities as such the need to use locally produce ingredients for food production. Fermented soya beans powder or mold have been used in various houses in the Northern Nigeria as local seasoning which gives taste and flavor to food. Likewise, the herb and spices garlic and ginger has served as flavoring since earliest time of mankind history. Despite the way garlic and ginger are widely used in Nigeria and it's proved nutritional value to man, it is observed that it has not gained general acceptance by the public. The limited evidence of soya beans seasoning enhanced with ginger and garlic or with other spices is part of the reasons that prompted this study. Personal observation has shown chemical contents in most of the seasoning used for cooking. Numerous studies have shown the negative effect of consuming chemicals to one's health. The advocating for the consumption of natural food substances is a pressing need for healthy eating and living, it is of these reasons the study seeks to carry out this research work in order to promote the healthy eating of local women and low-income earner, and to gain general acceptability by the public.

The aim off this study is to find out the possibility of enhancing soya bean seasoning with ginger and garlic through sensory evaluation of different Nigerian dishes produced using the enhanced seasoning.

Hypothesis

There is no significant difference between the dishes produced from soya beans seasoning enhanced with ginger and garlic.

2.0 METHODS

Sensory evaluation form with predetermined scores for organoleptic characteristics of dishes was designed and used for data collection. The taste panelists were required to express their opinion on the qualities of dishes produced from soya bean seasoning enhanced with ginger and garlic according to the following attributes; taste, aroma, appearance and general acceptability.

The first stage of data collection was the production of the soya seasoning which was used in producing local delicacies to determine the level of acceptability of the products. Nine different dishes were produced using the three different seasonings produced on fish pepper soup, jollof rice and mixed vegetable and pounded yam. Fifty (50) sensory evaluators, comprising chefs, nutritionists and dietetics, people from the hospitality industry and the general public from all formed the body of respondents. The panelists tasted the dishes produced with soya beans seasoning enhanced with garlic and ginger and then rated them based on their judgment. The taste panelists evaluated the dishes produced from the soya bean enhanced seasoning on the basis of taste, colour, aroma and texture using a likert scale.

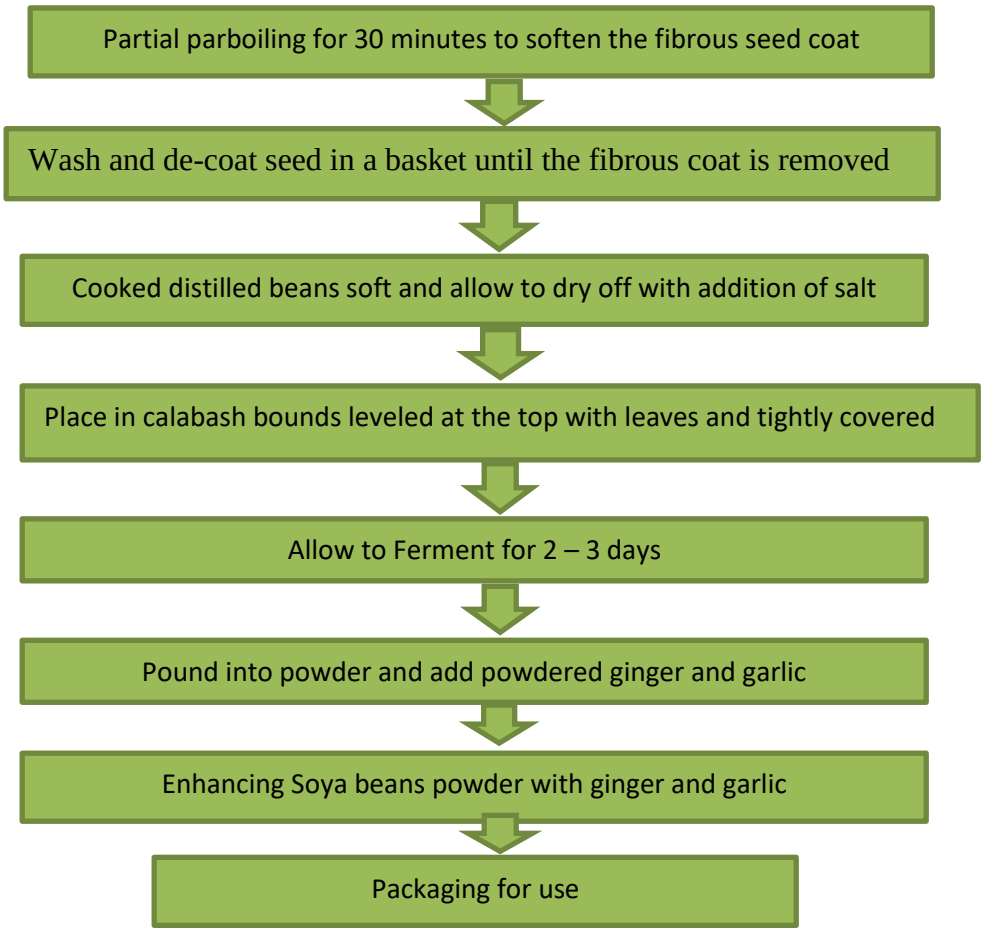
Thus, the 50 taste panelists were chosen for sensory evaluation based on their characteristics as follows

Respondents	Frequency	Frequency Percentage

Sex	Female	35	75%
	Male	15	25%
Sector	Hospitality industry	15	30%
	Nutrition and dietetics	10	20%
	Chefs	7	14%
	General public	18	36%

The above table shows the distribution of the taste panelist who took part in the experiment of the dishes cooked from the enhanced soya beans seasoning. The panelists consist of specialist in the hospitality industry, nutritionist and the general public.

Flow Chart of the production of Enhanced Soya beans seasoning



SOURCE: [1]

The above chat shows the production procedure of the enhanced soya beans seasoning. The soya beans was processed into a powdery form and mixed with the ginger and garlic powder.

3.0 RESULTS

A total of fifty respondents randomly selected from among the hospitality lecturers, students and industry practitioners participated in the taste panel for this research. Three sampled dishes prepared with Soya bean - ginger seasoning, soya bean – garlic seasoning and Soya bean – ginger- garlic seasoning were produced and served to the panelists respectively. The products were evaluated against taste, aroma, appearance and general acceptability on a 5-point scale ranging from very poor to very good. The cumulative mean rating on taste, aroma, appearance and general acceptability of the panelists was determined as follows: 5 = Very good, 4 = Good, 3 = Fair, 2 = poor and 1= very poor.

Table 1: Sample A1 Pepper Soup seasoned with soya beans and ginger

Variables	Average mean	Total Response
Taste	4.35	50
Aroma	4.33	50
Appearance	4.47	50
General acceptability	4.44	50

Source: [1]

The table above shows data from the taste of the fish pepper soup seasoned with soya bean and ginger. The result shows the taste is considered very good with average mean score of responses of 4.53.Aroma has an average mean score of 4.33 which is good while appearance and general acceptability have mean score of 4.33, and 4.44. The data above shows that the seasoning of soya beans and ginger is generally accepted.

Table 2: Sample A2, Pepper Soup Seasoned with Soya Beans and Garlic

Variables	Average mean	Total Response
Taste	3.27	50
Aroma	4.33	50
Appearance	4.47	50
General acceptability	4.01	50

Source: [1].

Data shown on the above table on the taste of the pepper soup using soya beans and garlic has average mean score of 3.27 which rates as poor. The aroma has 4.33 which is good. The appearance of the meal has a mean of 4.47 which is good. General acceptability is good with average mean score of 4.01.

Table 3: Sample A3, Pepper Soup Seasoned with Soya Beans, Ginger and Garlic

Variables	Average mean	Total Response
Taste	4.36	50
Aroma	4.67	50
Appearance	4.47	50
General acceptability	4.50	50

Source: [1].

The above table is pepper soup seasoned with soya beans, ginger and garlic. The results show good rating for taste with average mean score of 4.36. The aroma has very good rating with average mean score of 4.67. The appearance is good with average mean score of 4.47. While the general acceptability has average means score of 4.50 which is very good.

Table 4: Sample B1, Jollof rice seasoned with Soya beans and Garlic

Variables	Average mean	Total Response
Taste	4.44	50
Aroma	4.56	50
Appearance	4.38	50
General acceptability	4.46	50

Source: [1].

Table 4 above is data for jollof rice seasoned with soya beans and garlic. The results show good rating for taste with average mean score of 4.44. The aroma has very good rating with average mean score of 4.56. The appearance is good with average mean score of 4.38. While the general acceptability has average means score of 4.46 which is very good.

Table 5: Sample B2, Jollof rice seasoned with Soya beans and Ginger

Variables	Average mean	Total Response
Taste	4.23	50
Aroma	3.45	50
Appearance	4.38	50

General acceptability	3.99	50

Source: [1].

The table above is data for jollof rice seasoned with soya beans and ginger. The results show good rating for taste with average mean score of 4.23. The aroma has fair rating with average mean score of 3.45. The appearance is good with average mean score of 4.38. While the general acceptability has average means score of 3.99 which is fair.

Table 6: Sample B3, Jollof rice seasoned with Soya beans, Garlic and Ginger

Variables	Average mean	Total Response
Taste	4.44	50
Aroma	4.56	50
Appearance	4.38	50
General acceptability	4.67	50

Source: [1].

The above table presents data on Jollof Rice seasoned with soya bean and garlic. 45 respondents rated the aroma of the meal which consists the product to be very good with an average mean score of 4.56. The general acceptability has average mean score of 4.67 which is very good too. However, the taste results showed an average mean score of 4.44 which is good. The appearance of the sample is also good with an average mean score of 4.38. The product has a general acceptability according to the results shown above.

Table 7: Sample C1, Mixed Vegetable Soup and Pounded Yam with Soya bean and Ginger

Variables	Average mean	Total Response
Taste	4.29	50
Aroma	4.16	50
Appearance	4.29	50
General acceptability	4.21	50

Source: [1].

This table shows that Sample C which is mixed vegetable pounded yam seasoned with soya bean and ginger. This sample has combination of three ingredients. The taste of the sample has average mean score of 4.29 which is good. The aroma of the product was good with average response of 4.16. Appearance has average of 4.29 which translate to good rating. The general acceptability of the product is good with average mean of 4.21.

Table 8: Sample C2, Mixed Vegetable Soup and Pounded Yam with Soya bean and Garlic

Variables	Average mean	Total Response
Taste	3.29	50
Aroma	3.16	50
Appearance	4.29	50
General acceptability	3.57	50

Source: [1].

This table shows that Sample C which is mixed vegetable pounded yam seasoned with soya bean and garlic, this sample has combination of three ingredients. The taste of the sample has average mean score of 3.29 which is fair. The aroma of the product was fair with average response of 3.16. Appearance has average of 4.29 which translate to good rating. The general acceptability of the product is fair with average mean of 3.57.

Table 9: Sample C3, Mixed Vegetable Soup and Pounded Yam with Soya bean, Ginger and Garlic

Variables	Average mean	Total Response
Taste	4.29	50
Aroma	4.16	50
Appearance	4.29	50
General acceptability	4.21	50

Source: [1].

This table shows that Sample C which is mixed vegetable pounded yam seasoned with soya bean, ginger and garlic, this sample has combination of three ingredients. The taste of the sample has average mean score of 4.29 which is good. The aroma of the product was good with average response of 4.16. Appearance has average of 4.29 which translate to good rating. The general acceptability of the product is good with average mean of 4.21.

Table 10: Summary of Response

	N	Mean	Std. Deviation	Minimum	Maximum
Soya bean + ginger Product	135	4.2144	.34906	4.00	5.00
Soya bean+ garlic product	135	3.9911	.38787	3.35	5.00
Soya bean +ginger +garlic	135	4.4633	.47254	3.55	5.00

Source: [1].

This table presents the summary evaluation of the three products. The soya bean and ginger seasoning has mean score of 4.444 with SD = 0.34906; soya bean and garlic seasoning has average of 4.51 and standard deviation of 0.38787. Soya bean, ginger and garlic seasoning has mean of 4.283 and standard deviation of 0.47254. The data shows product made from soya beans and garlic have more acceptability than the one consisting soya beans, garlic and ginger.

Table 11: ANOVA (LIKENESS)

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1.234	2	.617	3.736	.026
Within Groups	21.806	132	.165		
Total	23.040	134			

Source: [1].

Table 8 above shows the results of One-Way ANOVA performed to test the relative acceptability of the three products from Soya Bean Composite seasonings. At $\alpha = 0.05$, F (3.736) P=0.026<0.05. Hence, the null hypothesis is rejected and the alternate is accepted. There is statistically significant difference among the three products from soya bean composite seasonings.

Table 12: Multiple Comparisons

(I) Samples	(J) Samples	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Soya bean + ginger Pepper soup	Soya bean + ginger pepper soup	-.06667	.08569	.717	-.2698	.1364
	Soya bean + ginger + garlic pepper soup	.16111	.08569	.148	-.0420	.3642
Soya bean + garlic jollof rice	Soya bean + ginger jollof rice	.06667	.08569	.717	-.1364	.2698
	Soya bean + ginger + garlic jollof rice	.22778*	.08569	.024	.0247	.4309
Soya bean+ ginger + garlic	Soya bean + ginger mixed vegetables	-.16111	.08569	.148	-.3642	.0420

mixed vegetables	Soya bean + garlic mixed vegetables	-.22778*	.08569	.024	-.4309	-.0247

*. The mean difference is significant at the 0.05 level.

From this table, it is noticed that the seasoning used in Soya bean + ginger Pepper soup differs from Soya bean + ginger pepper soup. Likewise, suya beans + ginger pepper soup differs with Soya bean + ginger + garlic pepper soup at P = 0.717 and 0.148 > 0.05. Soya bean + garlic jollof rice differs with Soya bean + ginger jollof rice with P= 717>0.05. However, soya beans + ginger jollof rice and Soya bean + ginger + garlic jollof rice seasoning shows no significant difference from soya bean – ginger – garlic seasoning at P = 0.024 < 0.05. Soya bean+ ginger + garlic mixed vegetables and Soya bean + ginger mixed vegetables differ at P=0.148 while Soya bean+ ginger + garlic mixed vegetables and Soya bean + garlic mixed vegetables have no significant difference with P = 0.024 < 0.05.

3.1 Discussion

Findings of the study show favourable results on the three products produced. The study produced nine dishes seasoned by the products. Findings on the fish pepper soup which has three dishes made from suya beans and garlic, suya beans and ginger and suya beans, ginger and garlic gained acceptability. The taste of the meal with suya beans and ginger, likewise that of suya beans, ginger and garlic were rated high which shows the product is accepted. The second meal which is jollof rice cooked by the same products shows the taste of all the three samples accepted. The third meal which was mixed vegetable soup with pounded yam has the seasoning of suya beans and ginger, suya beans, ginger and garlic all rated very good and good respectively, however the seasoning with suya beans and garlic has a fair acceptance of taste. Though the taste of the meal with suya beans and garlic season shows fair rating, the result still shows acceptability. This finding is in accordance with [13] which says that the taste of food in hospitality contexts plays not only a crucial part in adding to the total destination image and experience but also becomes the ideal symbol of food consumption. Taste tends to be a key consideration for most people in nearly all food and drinking settings and in the hospitality industry, [14]

Many have feeling of food being fresh due to its smell and they discovered it was fresher [9]. The aroma derived from food is a motivation for eating of the particular food. Seasoning tends to contribute to food aroma and adds to choose of some certain types of seasoning used for cooking. The aroma of the pepper soup, jollof rice and the mixed vegetable soup were all accepted. Though the aroma for suya beans seasoning and garlic on the vegetable soup was rated fair. This could partly be because of some flavour that may not go well with some specific food as stated by [12] in their findings. The aroma acceptability of the sensory evaluation supports the findings of [9] which states that flavour was considered a basic standard for consumption of food and beverages.

On the appearance of the dishes, the fish pepper soup, jollof rice and the mixed vegetable soup with pounded yam all have good appearances. This can be partly due to presentation as stated by [11], which says many people do expect that food would be nice, but it was nice due to how it was presented. Furthermore, visual images of food such as food well displayed and cooking performance may play a key motivational role in providing sensory pleasure to people and the displays of food look nice and attractive. Other findings which support to food adding to sensory experience are that of [8].

The general acceptability of the three types of seasoning on the three dishes shows that all dishes cooked with the soya bean enhanced seasoning were generally good and accepted. The taste, aroma and appearance of the dishes compare favourably as can be seen from tables 1 to 9. Considering the composition of the sensory evaluation panel drawn from the industry and institution, the implication of this finding is that soya bean seasoning enhanced with ginger and garlic could offer an excellent choice among the condiments in Nigerian cuisine. This is more so because of the nutritional and health benefits of ginger and garlic.

This supports the findings by [10], which identified that sensory perceptions can play a crucial physiological and psychological part in appreciation of food. They further mentioned that sensory perceptions represent the considerations that people develop related to their taste in eating and drinking. In addition, taste can be a key consideration for most people in nearly all food and drinking settings. Furthermore, Kivela and Crotts [9] emphasized that tasting local food and beverages are a kind of pleasurable sensory experience. Dann and Jacobsen [15] suggested that people need for seeking sensory experience can be satisfied through the smell and taste of food, visual images of heritage buildings, and auditory cues from traditional music in a tourist destination. Food, including regional beverages, local cuisine and indigenous agricultural products, can be regarded as an attribute of reemphasis or re-discovery of sensory experience.

The relative acceptability of the three products from Soya Bean Composite seasonings are at $\alpha = 0.05$, F (3.736) P=0.026<0.05. Hence, the null hypothesis is rejected and the alternate is accepted. There is statistically significant difference among the three products from soya bean composite seasonings. Comparison of the three products on nine different dishes shows seasoning used in Soya bean and ginger Pepper soup differs from Soya bean and garlic pepper soup. Likewise, suya beans and ginger pepper soup differs with Soya bean, ginger and garlic pepper soup at P = 0.717 and 0.148 > 0.05. Soya bean and garlic jollof ricediffers with Soya bean and ginger jollof rice with P= 717>0.05. However, soya beans and ginger jollof rice and Soya bean, ginger and garlic jollof rice seasoning show no significant difference from soya bean, ginger and garlic seasoning at P = 0.024 < 0.05. Soya bean,

ginger and garlic mixed vegetables and Soya bean and ginger mixed vegetables differs at P=0.148 while Soya bean, ginger and garlic mixed vegetables and Soya bean and garlic mixed vegetables has no significant difference with P = 0.024 < 0.05.

4.0 CONCLUSION

Nigerians are looking for alternatives that are cheaper to survive. Prices of food have gone higher as such any substitute to an ingredient that is cheaper will be a welcome idea. The use of soya beans as a seasoning will be a welcome idea. The findings of this study have economic implications; considering the ease of production, these seasonings could be produced for both family use and commercial purposes. With current economic situation in Nigeria, entrepreneurs can take advantage of this cheaper option since there is availability of raw materials at a very cheaper rate. The acceptability of the ginger and garlic used in enhancing suya beans seasoning is a finding that is of benefit to numerous individuals and organizations. Families and hospitality enterprises should adopt and incorporate soya bean enhanced seasonings into their exquisite cuisine. Those into healthy or natural dieting can replace the different seasonings used which contain chemicals with this natural and healthy product.

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