

Comparison of Organoleptic Properties of Egusi and Efo Riro Soup Blends Produced with Moringa and Spinach Leaves.

BABAYEJU, A.A. babayejuadeshola@yahoo.com
GBADEBO, C.T. christy24ng@yahoo.com
OBALOWU, M.A. mobalowu@yahoo.com
OTUNOLA, G.A. adeglo2004@yahoo.com
NMOM, I.O nikeolaolufunke@yahoo.com
KAYODE, RMO, kayodermosnr@yahoo.com
Department of Home Economics & Food Science, Faculty of Agriculture, Universityof Ilorin.

TOYE, A.A. ayo.toye@btinternet.com
OJO, F.E mofesola1@yahoo.com
Department of Animal Production, Faculty of Agriculture, University of Ilorin.

Abstract
The organoleptic properties of melon, "egusi" (Citrullus colocynthis var. Lanatus seed) and efo riro (Spinach; Amaranthus spinosus) soup blends produced with Moringa (Moringa oleifera) and spinach leaves were compared. Three soup blends were produced for egusi soup: Spinach: Egusi (60:40; Control), Moringa: Egusi (60:40), Moringa: Spinach: Egusi (30:30:40). Also, three soups blends were produced for efo riro: Moringa: Spinach (Moringa only) (100:0;Control), Moringa: Spinach (MS) (50:50), Moringa: Spinach (Spinach only) (0:100). The soup blends were subjected to organoleptic tests using a 7-point hedonic scale. Data obtained were statistically analyzed. The control Spinash:Egusi soup had the highest acceptability in terms of colour, aroma, texture and general acceptability, this was closely followed by the soup blend with Moringa: spinach: egusi (30:30:40) and the Moringa: egusi (60:40) was least accepted. In the efo riro group, the 100% spinach had the greatest acceptability, while the 100% Moringa had the least acceptability. However, most of the respondents (60%) on realizing that Moringa leaf was included in the samples indicated their preference and higher rating for the Moringa soup blends. These studies show that a 30% or lower level of inclusion of Moringa leaves in traditional vegetable soup recipes is acceptable to consumers irrespective of whether content of the soup is declared/indicated, and a higher level of inclusion is acceptable when "Moringa" is declared/revealed as a recipe ingredient. Therefore, traditional soups can be used as vehicles or carriers of the nutritional/medicinal qualities of Moringa that are preserved during cooking, thereby circumventing negative psychological feeling of using medicines whilst gaining attendant benefits.
Key words: Soups, Efo Riro, Egusi, Moringa/Spinach Blend

Introduction

Good nutrition is a basic human right in order to have a healthy population that can promote development (Kuhnlein 2002). In developing countries, one of the ways of achieving this is through the exploitation of available local foo.ds ingredient in the formation of nutritional adequate diet which incorporate within essential food groups. Efo riro is a rich vegetable stew that is native to the Yoruba of Western Nigeria. Vegetables used include water leaves, pumpkin (ugu) leaves and spinach. Egusi is sometimes added for enrichment and as a thickening agent.

Shava, (2000) reported that melon seed (egusi) is a wild member of gourd family native to West Africa. It is native to the Igbos in the southern parts of Nigeria, and Yorubas in the west. Hausas call it miyan Gushi. It is referred to as the miracle melon. It is milled for soup and meat substitute and contains 50% oil and 30% protein and can be supplemented for meat or dairy product. (Davert, 2012) stated that Spinach is an annual plant of the family Amaranthaceae, which includes widely distributed shrubs and herbs. Spinach consists of small and medium leaves that are bright green, thick, soft, oval to arrow-shaped with green stems both of which are edible.

Moringa oleifera belongs to the plant family Moringaceae. In Nigeria, it is called Ewe ile, Ewe igbale, or Idagbo monoye (the tree which grows crazily) in Yoruba; Zogall, or Zogalla-gandi in Hausa; and Odudu oyibo, Okochi egbu, Okwe olu, Okwe oyibo, Okughara ite, Uhe, Ikwe beke in Ibo. Moringa oleifera, found almost in every region of the country has been shown to be useful purifying water, treating malnutrition, boosting immunity, fighting microbes, and cancers. (Muanya, 2009).

According to Okenyodo, (2012), Wolof communities, have used Moringa for its high nutritional value, in salads, juices, soups and medicine. Its seeds are now scientifically proven to be useful in treating water for domestic and public consumptions which supplies all the 8 essential amino acids which sustain human life. Although well known and utilized in the Northern part of Nigeria, available information has not revealed that this seemingly

valuable plant is as well in the valued and used as food Southwestern part of Nigeria and its acceptability to the central/southern Nigeria is not known .

This study therefore compares the organoleptic properties of each of Moringa and Spinach with melon in soup blends using a panel of vegetables selected from north central part of Nigeria.

Materials and Methods

Materials: The materials used for the preparation of the soup are as follows:

Meat, palm oil, onion, tomato, smoked fish, fresh Moringa leaves spinach leaves fresh ground pepper, salt, bouillon cubes, and melon seeds were purchased at the local market.

Methods for soup preparation:

Formulation of composites blends.

Six different composites soup blends were formulated as shown in Table 1:

Table1: Soup blends from Melon (egusi) and efo riro produced with Moringa and Spinach leaves.

Sample codes	blend ratio	Moringa	Spinach	Melon
1.) SE	60:40	0.00 g	300.00 g	200.00 g
2.) ME	60:40	300.00 g	0.00 g	200.00 g
3.) MSE	30:30:	150.00 g	150.00 g	200.00 g
4.) MO	100:0	500.00 g	0.00 g	0.00 g
5.) MS	50:50	250.00 g	250.00 g	0.00 g
6.) SO	100:0	0.00 g	500.00 g	0.00 g

Key: SE=Spinach Egusi, ME=Moringa Egusi, MSE=Moringa Spinach Egusi, MO=Moringa Only, MS=Moringa Spinach, SO=Spinach Only.

Sensory Evaluation:

A panel of twenty (20) randomly selected untrained judges who were familiar with the use of Moringa and spinach in soups assessed the soup blends. Each of the products was evaluated on a 7-point hedonic scale where 7 represents like extremely and 1 represents dislike extremely. The soup blends were evaluated for quality characteristics of aroma, taste, texture, colour and overall acceptability (Poste et al., 1991).

Statistical analysis: Data were analyzed using the general linear model (GLM) procedure with SPSS Statistical Package for the Social Sciences (16.0) Means ± (SD) were calculated, Analysis of variance (ANOVA) and Duncan's New Multiple Range Test (DNMRT) were used to test the significance of the difference among means. Means, where significant, were separated by Least Significant Difference (LSD) test (Steel and Torrie, 1980). The null hypothesis was tested with a two-tailed t-test to test significance difference between samples fortified with egusi and those not fortified with egusi.

Results and Discussion:

Table 2 presents the mean sensory evaluation scores of the samples. It was observed that the soups from SE (Spinach + Egusi) (control) had the highest organoleptic or sensory attributes of aroma, colour, taste, texture and overall acceptability. (7.00, 6.8, 6.6, 6.8, and 6.1) respectively, on a 7 point hedonic scale than other test samples. While the MO (Moringa only) had the least sensory attribute in colour, taste, texture, and overall acceptability (3.20, 3.3, 4.6, 3.8) respectively, than the other products. The blend with MSE (Moringa + Spinach + Egusi) had the best sensory attribute next to the control in texture and overall acceptability (6.4 and 5.6) while SO (Spinach only) has high attributes next to MSE in aroma, colour and taste (5.4,6.1,and 5.4) and was acceptable to all the assessors. All the blends had sensory scores higher than that of the mean mark (4.00) for the attributes and were acceptable to the panelists except sample MO (Moring only) that has least sensory score lower than the mean mark(4.00) in aroma, taste and overall acceptability (3.20,3.3,3.8) respectfully. The ANOVA result revealed a significant difference among the test samples on organoleptic attributes. ($P<0.05$).

Table 3 reveals that the calculated t-value of (2.94) exceeds t-value critical of (1.96) (t-cal > 1.96) for a two-tailed test and the probability level of 0.006 less than 0.05 ($P < 0.05$). This therefore implies that there is significant difference between organoleptic properties of efo riro soup blends produced with Moringa and spinach leaves fortified with egusi (samples 1-3) and those not fortified with egusi (samples 4-6) in aroma, colour, taste, texture, and overall acceptability. Thus the null hypothesis of no significant difference is rejected.

Discussion:

Although sensory attributes of test blends were lower than those of the control, all the blends were acceptable to the panelists except sample MO (Moringa only) that has least sensory score lower than the mean sensory score in aroma, taste and overall acceptability. The observation that the soups from SE (Spinach + Egusi)(control) had the highest organoleptic attributes could be due to the fact that the panelists were familiar with it being one of the most popular soup among Nigerians. Davert, (2012) and Onimawo, (2012) have also described melon seed meal (egusi) as an appetizing product used as meat substitute.

The fact that the MO (Moringa only) had the least sensory attribute in aroma, taste, texture, and overall acceptability may be due to its yet unpopular nature with the panelists. The blend with MSE (Moringa + Spinach+ Egusi) had the best sensory attribute next to the control in texture and overall acceptability and could therefore be recommended as the best since it had a balance nutrient content and acceptable to the assessors. SO (Spinach only) has high attributes next to MSE in aroma, colour and taste and was also acceptable to all the assessors. This could be as a result of its attractive colour and aroma. Rotapol and Hooker, (2006) reported that appearance of food evokes initial response, and that flavour determines the final acceptance or rejection by the consumer. There was a statistical significant difference between samples 1 2 3 and sample 4 5 6 in sensory evaluation value relative to the control ($P<0.05$). It therefore implies that there is significant difference between organoleptic properties of efo riro soup blends produced with Moringa and spinach leaves fortified with egusi (samples 1-3) and those not fortified with egusi (samples 4-6) in aroma, colour, taste, texture, and overall acceptability. Samples SE,ME, MSE and SO had very high ratings in colour followed by MO and MS. Good colour quality of the blends may be due to the combination of Moringa and spinach which has general higher retention of green colour . However, most of the respondents (60%) on realizing that Moringa leaf was included in the samples indicated their preference and higher rating for the Moringa soup blends.

Conclusion

The present study indicates that a 30% or lower level of inclusion of Moringa leaves in traditional vegetable soup recipes is acceptable to consumers irrespective of whether content of a soups is declared/indicated, and a higher level of inclusion is acceptable when “Moringa” is declared/revealed as a recipe ingredient. Therefore, traditional soups can be used as vehicles or carriers of the nutritional/medicinal qualities of Moringa that are preserved during cooking, thereby circumventing negative psychological feeling of using medicines whilst gaining attendant benefits.

References:

Davert,E (2012) Egusi the Miracle Melon Retrieved from blogs. World watch.org/nourishing

Dolcas B.L, (2008) Benefits of Moringa Retrieved from info@dolcas-biotech.com

Fuglie, L.J (1999) The Miracle Tree: Moringa oleifera: Natural Nutrition for the Tropics. Church World Service, Dakar Retrieved fromhttp://www.echotech.org/bookstore/advanced_search_result.php?keywords=Miracle+Tree. on 4/8/2012

Fahey,J.W & Sc.D,(2012) Moringa oleifera: A Review of the Medical Evidence for Its Nutritional, Therapeutic, and Prophylactic Properties. Part 1.

Kuhnlein, H. V. (2003). Micronutrient nutrition and traditional food system of indigenous peoples. Rome: FAO.

Muanya, C. (2009) How local plant addresses water purification, malnutrition, immune deficiency. Guardian. Lagos, Nigeria. 26.Feb.09 Retrieved at Ibile Faith Online Congregation on 12/8/2012

Nigerian Traditional Food (2012) www.uga.edu/vegetable/spinach.html Nature's Most Nutritious Vegetable Power Food www.leafygreens.org/greens/spinach_nn.html

Okenyodo, O.D. (2012). Nutritional Analysis of Moringa Leaf Powder. Trees for Life.West Africa Horizon Scanning, Centre For Democracy Development in West Africa Retrieved from http://www.Moringaleafpowder.co.za/analysis.html

Onimawo, I. (2010). Nigerian Traditional Food System and Nutrition Security presented at International Scientific Symposium on Biodiversity And Sustainable Diets United Against Hunger.

Poste, L.M., Mackie, D.A., Butler, G. and Larmond, E. (1991). Laboratory Methods Sensory Analysis of Food. Research Branch, Agriculture Canada, Publication 1864/E.

RotapolT.E&Hooker,W.A.(2006)Retrieved from www.All Nigerian recipes.com/soups/egoism abubello , nairaland forum

Steel,R.G and Torrie,J.H (1980) Prinples and Procedures of Statistics, 2nd Edn. New York, McGraw Hill Books.

Shava, S. 2000. The Use of Traditional plants as Food by Rural Community in the Eastern Cape: An Educational Exploration. Unpublished Master’s Thesis. Rhodes University

Sonder D.J, Mekonen,Y and Agena (2012)Leaf yield and Nutritive value of Moringa stenopetala and Moringa oleifera Accessions Retrieved fromAnjulohttp://www.Moringanews.org/doc/GB/PowerPoint/Dechasa_Jiru_GB.pdf

Wikipedia, the free encyclopedia (2012) From Wikipedia, the free encyclopedia http://en.wikipedia.org/wiki/Moringa_oleifera

Table 2: Mean sensory evaluation of soup blends from egusi and efo riro produced with Moringa and spinach leaves.

Blends	SE	ME	MSE	MO	MS	SO
Aroma	$7.0^{a}\pm1.89$	$4.8^{b}\pm0.61$	$5.0^{c}\pm0.76$	$3.2^{d}\pm0.29$	$4.4^{d}\pm0.70$	$5.4^{c}\pm0.89$
Colour	$6.8^{a}\pm1.81$	$6.0^{a}\pm1.17$	$6.0^{a}\pm1.20$	$5.7^{b}\pm0.88$	$5.4^{b}\pm0.76$	$6.1^{a}\pm1.23$
Taste	$6.6^{a}\pm1.70$	$4.5^{c}\pm0.73$	$4.8^{c}\pm0.74$	$3.3^{d}\pm0.51$	$4.3^{c}\pm0.59$	$5.4^{b}\pm0.75$
Texture	$6.8^{a}\pm1.81$	$5.6^{b}\pm1.15$	$6.4^{a}\pm1.78$	$4.6^{c}\pm0.94$	$5.3^{b}\pm1.05$	$5.6^{b}\pm1.11$
Overall Accept.	$6.1^{a}\pm1.39$	$5.2^{b}\pm0.65$	$5.6^{b}\pm0.86$	$3.8^{c}\pm0.50$	$5.0^{b}\pm0.69$	$5.5^{b}\pm0.97$

Mean (±SD) with different letter superscript in the same horizontal line are significantly different($P<0.05$) while means with the same letter superscript in the same horizontal line are NOT significantly different ($P>0.05$)
Blends: SE=Spinach Egusi, ME=Moringa Egusi, MSE=Moringa Spinach Egusi, MO=Moringa Only, MS=Moringa Spinach, SO=Spinach Only.
Overall Accept= Overall Acceptability

Table 3: t-test analysis of significant difference between organoleptic properties of efo riro soup blends produced with Moringa and spinach leaves fortified with egusi and those not fortified with egusi.

Group	N	X	SD	Df	t-cal	P	t-crit	Remark
With Egusi (blends 1-3)	20	16.9	3.31	38	2.9378	0.006	1.96	S
Without Egusi (blends 4-6)	20	14.3	2.17					

t-cal > 1.96 P < 0.05 Ho is rejected.

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
http://www.iiste.org

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: http://www.iiste.org/journals/ All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: http://www.iiste.org/book/

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar