

## Production, proximate, functional and organoleptic assessment of Ready-To-Cook “Ogbono”/“Egusi” seeds premix (Dry mix powder)

\*Kiin-Kabari D.B, Akusu O.M

Department of Food Science and Technology Rivers State University of Science & Technology, P.M.B 5080, Port Harcourt, Nigeria

### Abstract

Dry premix powder was formulated from Ogbono (*Irvingia gabonensis var Excelsa*) seed flour, Egusi (Melon) (*Citrullus vulgaris*) seed flour, crayfish, dry pepper, dry fish, stock fish and seasoning; ground and thoroughly mix to form a homogenous premix. The Ogbono/Egusi seed flour in the premix was formulated at different ratios (100:0, 0:100, 60:40, 50:50 and 40:60). The premix samples (A to E) were used to prepare soups. Proximate composition and selected functional properties of the premix samples were determined and the sensory properties of the soups prepared from each premix evaluated. The result showed that there was a significant ( $P < 0.05$ ) difference in the crude fat, crude protein and carbohydrate content between the five samples. The crude protein content increased from 25.66% sample A to 54.77% for sample B, there was no significant ( $P > 0.05$ ) difference in oil absorption capacity of all the samples (A – E). However, there was a significant ( $P < 0.05$ ) difference in the water absorption capacity and viscosity samples. Sample A (100% Ogbono) had the highest water absorption capacity of 2.09g/g and viscosity of 3.17Pa.S. Sample E had the lowest water absorption capacity of 1.30g/g while sample B (100% “Egusi”) had the lowest viscosity value of 1.26 Pa.S. The sensory properties of the soup prepared from the premix samples revealed that sample A had the highest mean sensory score of 8.09 for drawability while sample E had the lowest sensory score of 4.67 for thickness and 4.00 for drawability. Sample B had the lowest sensory score of 3.40 for drawability and the highest score of 6.07 for thickness. This study reveals that the premix can be used for quick soup preparation that meets the needs of consumers who like very thick and drawable soups (Sample C & D), those who like only thick soups (Sample B), those who like only drawable soups (Sample A) and those who like moderate thickness and drawability in their soup preparation (Sample E).

**Keywords:** “Ogbono”, “Egusi”, Premix Power, Soup Ingredients

### 1. Introduction

Soup is defined as a liquid food usually made by stewing ingredients such as meat, vegetables, fish or game often in a stock and with seasoning or a chemical mixture (New Webster’s Dictionary, 1995). Two nutritionally important indigenous tropical seeds that is highly cherished by the Nigerian consumers in the preparation of soups are “Ogbono seed” (*Irvingia gabonensis*) and “Egusi” or melon seeds (*Citrullus vulgaris*). Melon seeds is used traditionally as the basis for a number of soup preparation especially “Egusi” soup in Nigeria where the melon seed act as a thicker in the soup (Akusu and Kiin-Kabari, 2015) [5]. “Ogbono” soup is highly cherished for its drawability while “Egusi” soup is cherished for its thickening ability. (Kayode *et al.*, 2008; Bamidele *et al.*, 2015) [15, 9]. There are growing number of consumers who prefer the combined properties of drawability and thickness in their soup consumption. Akusu and Kiin-Kabari (2014, 2015 and 2016) [4, 5, 6] have carried out various studies on soup preparation using watermelon seed, Ogbono seeds and Egusi (melon) seeds that were processed and stored under different conditions. Time is a precious commodity for the working class women in Nigeria. Hence, the issue of convenience should be incorporated into our food ingredient formulation. There is a growing demand for quality and nutritious soups and much attention has been drawn to the role of the Food Industry in helping consumers to eat healthy, nutritious and sustainable food products (Buttriss, 2013). Creating awareness about the benefits of soup premix,

can help to reduce the kitchen drudgery to women, reduce post-harvest losses and make “Ogbono” and melon seed available to the consumers at affordable price during off-season.

One of the major setbacks in soup preparation in Nigeria especially among the younger generation and the working class is the stress involved in getting all the ingredients together. Thus, Ogbono/Egusi dry soup premix can provide a nutritious meal prepared within a short time without stress.

However, there is a dearth of information on the proximate, functional and sensory properties of Ogbono/Egusi seed premix used for soup preparation. The aim of this study is to develop recipe of an instant dry Ogbono/Egusi premix that contain all the ingredients except meat, oil, onion and vegetable for easy preparation of soup. This study is designed with the view to establishing the best acceptable ratio of Ogbono and Egusi in the premix for soup preparation.

### 2. Materials and Methods

#### 2.1 Materials

Ogbono seeds, melon seeds, stock fish head, chili pepper, dry fish and magi cubes were purchased from a local market in Port Harcourt, Nigeria. All chemicals used were of analytical grade and products of BDH Chemical Ltd. Pool. England.

#### 2.2 Methods

##### 2.2.1 Drying of all Materials

All the above stated food materials bought from the market was

oven dried at 45°C for 24h in a hot air oven (Model QUB 305010G, Gallenkamp, UK) and allowed to cool for 2h at room temperature (28±2°C).

### 2.2.2 Preparation of “Ogbonos” and “Egusi” seed flour

Three (3kg) of each Ogbono and Egusi seeds were milled separately into flour to pass through a 0.25 mm British standard sieve (Model -B 5410, Endecoths Lt, London, UK) as reported by Akusu and Kiin-Kabari (2015) [5]. Other ingredients of dried oporo (prawn), dried fish, stock fish head, dried chili pepper and seasoning such as magi cubes were milled separately using a laboratory dry milling machine (Numexpepe Grinding mill, India).

### 2.2.3 Formulation of Ogbono/Egusi Premix

“Ogbono” and “Egusi” premix powder is a form of convenience food ingredients formulation and was formulated from Ogbono and Egusi seed flour, crayfish, pepper, dried prawn, fish meal, stock fish head and cube seasoning were thoroughly mixed to form a homogenous premix. They were formulated at different ratios (100:0, 0:100, 60:40, 50:50 and 40:60) and labeled A to E as shown in Table 1. Each premix sample were properly blended to obtain a homogenous mixture and packaged separately.

**Table 1:** Formulation of Ogbono/Egusi Premix Blend (g)

Ingredients	Blend Code				
	A	B	C	D	E
Ogbono seed flour	250	0	150	125	100
Egusi seed flour	0	250	100	125	150
Oporo (Para...)	50	50	50	50	50
Stock fish head	100	100	100	100	100
Chilli pepper	5	5	5	5	5
Dried fish	50	50	50	50	50
Seasoning (maggi cubes)	10	10	10	10	10
Total	465	465	465	465	465

**Key:** A = 100% “Ogbono + other ingredients, B = 100% “Egusi” + other ingredients, C = 60:40 Ogbono : Egusi + other ingredients, D = 50:50 Ogbono : Egusi + other ingredients, E = 40:60 Ogbono : Egusi + other ingredients

### 2.3 Determination of proximate composition of the premix samples

Moisture content (method 14.004), total ash (method 14.006), crude fiber (method 7.070), ether extract (method 7.062) and crude protein (method 2.057) were determined according to AOAC (2012) procedures. The conversion factor N x 6.25 was used for conversion of nitrogen to crude protein. Carbohydrate content was calculated by Difference and energy (Kcal/100g) was determined using the Attwater factor as reported by Okoye (1992).

### 2.4 Functional properties of the premix samples

Selected functional properties of water and oil absorption capacities of each Ogbono and Egusi premix samples were determined according to the method of Beuchart (1977) while viscosity was determined according to Fleming *et al.*, (1975).

**Table 2:** Recipe for the preparation of premix soup

Ingredients	Weight/Volume
Ogbono/Egusi Premix (g)	300

Palm oil (ml)	60
Onion (g)	10
Salt (g)	10
Water (ml)	1500

### 2.5 Preparation of soups from ogbono and egusi premix recipe

The method of Akusu and Kiin-Kabari (2013 and 2016) [4, 6] was used in the preparation of soups from the premixes with slight modification. Three hundred (300g) of each premix sample was used in the soup preparation based on the recipe in Table 2. Palm oil was heated in a pot for 4 min, chopped onion was add and allowed to steam for 2 min; the soup premix was added and allowed to steam for 15 min with continuous stirring. One and half litre (1.5 L) of water was added together with 10g of salt and allowed to boil for 20 min. The soup was then allowed to cool for 20 min after which sensory evaluation was conducted on the premix soups.

### 2.6 Sensory evaluation of soups

A 20 man panelist who are used to ogbono and egusi soups were used for the sensory evaluation of the soup prepared from each premix samples. A 9 – point hedonic scale which ranged from 9 to 1 representing like extremely and dislike extremely, respectively were used for the evaluation of the prepared soups for colour, appearance, thickness, drawability, taste and overall acceptability. The soups were served to the panelists in the Food and Nutrition Laboratory of the Food Science and Technology Department at room temperature (28 ± 2°C).

### 2.7 Statistical Analysis

The data obtained were subjected to Analysis of Variance (ANOVA) using Statistical Package for Social Science (SPSS) version 20.0 software 2011. All analysis was done in triplicates and means separated using Duncan Multiple Range Test.

## 3. Results and Discussion

### 3.1 Effect of ingredient on the proximate composition of the premix

The proximate composition of the formulated Ogbono/Egusi premix samples is shown in Table 3. The 100% melon (Egusi) seed sample (sample B) had the highest crude protein content of 54.77% while Ogbono seed sample (sample A) had the least protein content of 25.66%. Akobundu *et al.*, (1982) [2] and Achinewhu *et al.*, (1996) [1] reported protein values ranging from 25.36 to 33.02% for melon seed flour. Akusu and Kiin-Kabari (2015) [5] also reported a crude protein content of melon seed flour to be 25.36% while Giami *et al.*, (1994) [13] observed that the crude protein content of Ogbono seed flour ranged from 8.3 – 109%. These values are lower compared to the values obtained in this study. The difference may be attributed to the inclusion of fish and stock fish in the premix formulation. However, there was no significant difference ( $p > 0.05$ ) in the crude protein content of samples B, C, and D. Ogbono seed (sample A) had the highest crude fat content of 31.22%. Crude fat was observed to decrease with addition of Egusi seed flour between 26.93% (B) 27.85% (C), 27.49% (D) and 28.00% (E). Sample a premix (100% Ogbono) had the lowest energy value of 414.30 Kcal/100g. The energy value of the premix increased significantly ( $P > 0.05$ ) as the level of Ogbono seed flour decreased from sample B to E.

**Table 3:** Proximate composition of Ogbono/Egusi Premix

Blend Code	Moisture (%)	Crude Fat (%)	Crude Protein (%)	Crude Fibre (%)	Carbohydrates %	Energy value Kcal/100g
A	4.05 <sup>a</sup>	31.22 <sup>a</sup>	25.66 <sup>c</sup>	0.90 <sup>c</sup>	8.18 <sup>c</sup>	414.30 <sup>c</sup>
B	3.82 <sup>b</sup>	26.93 <sup>b</sup>	54.77 <sup>a</sup>	2.90 <sup>b</sup>	12.18 <sup>b</sup>	502.73 <sup>b</sup>
C	4.39 <sup>a</sup>	27.85 <sup>b</sup>	52.88 <sup>a</sup>	3.52 <sup>b</sup>	11.35 <sup>b</sup>	504.73 <sup>b</sup>
D	4.86 <sup>a</sup>	27.49 <sup>b</sup>	52.10 <sup>a</sup>	1.05 <sup>c</sup>	14.50 <sup>a</sup>	513.43 <sup>a</sup>
E	4.09 <sup>a</sup>	28.00 <sup>b</sup>	48.99 <sup>b</sup>	4.31 <sup>a</sup>	14.61 <sup>a</sup>	502.75 <sup>b</sup>

<sup>abc</sup> ± Standard deviation of duplicate reading. Means bearing the same superscript within the same column do not differ significantly (P>0.05).

Premix were prepared from Ogbono/Egusi flour blend A = 100:0; B = 0:100; C = 60:40; D = 50:50; E = 40:60.

### 3.2 Effects of premix ogbono/egusi ratio on selected functional properties of the premix

The effects of Ogbono/Egusi ratio on selected functional properties of the premix are shown in Table 4. Water absorption capacity of the premix decreased significantly (p<0.05) as the level of ogbono in the premix decreased (C - E). Whereas there was no significant (p>0.05) difference in the water absorption capacity of the premix as the level of egusi substitution in the

premix decreased from 100% to 40%. Water absorption capacity represents the ability of a product to associate with water under conditions where water is limited. Protein is linked to water binding capacity whereas starch is associated to swelling power, water absorption capacity and viscosity of flours (Ige *et al.*, 1984). The capacity of Ogbono (sample A) to absorb water and increase viscosity may be due to that Ogbono may also function as hydrocolloids. The lower carbohydrate content of egusi (melon) in sample B may be responsible for its low viscosity. However, it is high in crude protein content which may be accounted for its swelling ability.

**Table 4:** Selected functional properties of Ogbono/Egusi Premix

Blend Code	Water Absorption Capacity (g/g)	Oil absorption Capacity (g/g)	Viscosity (Pa.s)
A	2.09 <sup>a</sup>	1.23 <sup>a</sup>	3.17 <sup>a</sup>
B	1.45 <sup>b</sup>	1.34 <sup>a</sup>	1.26 <sup>c</sup>
C	1.59 <sup>b</sup>	1.09 <sup>a</sup>	1.82 <sup>b</sup>
D	1.49 <sup>b</sup>	1.21 <sup>a</sup>	1.56 <sup>b</sup>
E	1.30 <sup>b</sup>	1.15 <sup>a</sup>	1.46 <sup>c</sup>

<sup>abc</sup> ± Standard deviation of duplicate reading. Means bearing the same superscript within the same column do not differ significantly (P>0.05).

**Key:** Premix were prepared from Ogbono/Egusi flour blend A = 100:0; B = 0:100; C = 60:40; D = 50:50; E = 40:60.

### 3.3 Effects of ingredients on the sensory properties of soups prepared from the premix

The mean sensory scores for soups prepared from the premix samples are presented in Table 5. There were no significant (p>0.05) differences in appearance, color and flavour of soups prepared from the premix (A to E). However, there were significant differences (p<0.05) in taste, thickness, drawability and overall acceptability of soups prepared from the premix (A to E). Sample B (100% Egusi) had the highest rating in terms of taste. Similar observation had been reported for taste by Akusu and Kiin-Kabari (2015) [5] for soup prepared from melon seed

flour. Sample a (100% Ogbono) had the highest mean sensory scores of 8.09 for drawability while sample E (40% Ogbono and 60% Egusi) had the lowest mean sensory score of 4.67 for thickness and drawability. Sample E had the highest mean sensory score for overall acceptability followed by sample B and A. This observation is also in agreement with the report of Akusu and Kiin-Kabari (2016) [6] for storage stability and sensory properties of soup prepared with Ogbono seed flour. It is therefore suggested that consumers who do not like very thick soups and those that does not draw too much would prefer sample E, while consumers who prefer thick soups but low drawability will go for sample B. Likewise consumers who prefer thick soup with high drawability will go for sample A.

**Table 5:** Mean sensory evaluation of Ogbono/Egusi Premix Soups.

Blend Code	Appearance	Colour	Taste	Favour	Thickness	Drawability	Overall acceptability
A	6.72 <sup>a</sup>	6.33 <sup>a</sup>	6.61 <sup>a</sup>	6.28 <sup>b</sup>	4.12 <sup>c</sup>	8.09 <sup>a</sup>	8.28 <sup>b</sup>
B	6.78 <sup>a</sup>	6.89 <sup>a</sup>	7.67 <sup>a</sup>	7.67 <sup>a</sup>	6.07 <sup>a</sup>	3.40 <sup>e</sup>	7.79 <sup>a</sup>
C	5.94 <sup>a</sup>	6.33 <sup>a</sup>	6.78 <sup>b</sup>	6.78 <sup>b</sup>	5.14 <sup>b</sup>	5.28 <sup>c</sup>	7.00 <sup>c</sup>
D	6.28 <sup>a</sup>	6.17 <sup>a</sup>	6.61 <sup>b</sup>	6.61 <sup>b</sup>	5.09 <sup>b</sup>	6.21 <sup>b</sup>	6.83 <sup>c</sup>
E	5.94 <sup>a</sup>	6.78 <sup>a</sup>	6.50 <sup>b</sup>	6.50 <sup>b</sup>	4.67 <sup>c</sup>	4.00 <sup>d</sup>	9.98 <sup>a</sup>

<sup>abc</sup> ± Standard deviation of duplicate reading. Means bearing the same superscript within the same column do not differ significantly (P>0.05).

Premix were prepared from Ogbono/Egusi flour blend A = 100:0; B = 0:100; C = 60:40; D = 50:50; E = 40:60.

## 4. Conclusion

This study has shown that premix dry powder can be prepared

from Ogbono and Egusi (melon) seed flours which can be used for quick soup preparation that meets the needs of consumers with preference for draw and thick soups, (Sample A) while Sample B and E are by consumers who prefer moderate thickness and drawability. Further work on the storage stability

of the premix dry powder is therefore in progress.

## 5. References

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