Food and Public Health 2015, 5(3): 77-83
DOI: 10.5923/j.fph.20150503.03

Consumer's Knowledge, Attitude, Usage and Storage Pattern of *Ogi* – A Fermented Cereal Gruel in South West, Nigeria

Adebukunola M. Omemu A. M.[1,*], Mobolaji O. Bankole[2]

[1]Department of Foodservice and Tourism, Federal University of Agriculture, Abeokuta (FUNAA), Ogun State, Nigeria
[2]Department of Microbiology, FUNAAB, Ogun State, Nigeria

Abstract The perceptions, knowledge and attitude of the consumers of *ogi* – a common fermented cereal gruel was studied. A semi structured, validated questionnaire and a face-to-face interview was used to obtain information on the type of grains used for processing, the processing techniques and frequency of consumption. White Maize, yellow maize, sorghum and millet were used in *ogi* production in decreasing order of preference. The grains were used singly or in combination. Some (32.3%) of the respondents processed *ogi* for personal consumption while 20.5% processed the *ogi* for commercial purpose. Majority (207) of the respondents processed *ogi* using wet milling method. The spices commonly used in the production of *ogi* are ginger, garlic, black pepper and cloves. Many (102, 48.6%) respondents are aware that *ogi* can be fortified with some fruits and legumes however only 11.8% of the respondents processed or consumed fortified *ogi.* Category of family members that consumed *ogi* are infants between 4 months to 2 years (68%), children between 3 and 12 years (45%), adults (25%), convalescence (42%) and lactating or nursing mothers (56%). Majority of the respondents (52.4%) consumed *ogi* at least once in a week; 16.7% consumed it daily, and 15.2% consumed it twice in a week. Submergence in water and frequent changing of sour water was identified as the most effective way of storing and preserving *ogi.* Respondents reported the use of the supernatant of *ogi* and uncooked *ogi* in the management of diarrhea or dysentery (65%), common stomach upset (42%) and nausea (33%). The need for nutrition education of consumers of *ogi* to encourage consumer to accept the views of the experts is recommended.

Keywords Steeping, Souring, Storage, *Ogi*, Maize, Sorghum and millet

1. Introduction

The Nigerian indigenous fermented foods constitute a group of foods that are produced in homes, villages and small scale cottage industries. They are sold to the rural populace who buy them for food and social ceremonies. The fermented foods are derived from substrates like roots, legumes, cereals, oilseeds, nuts, meat, fish, milk and palm tree sap (Oguntunde, 1989; Uzogara *et al.,* 1990).

One of the popular indigenous fermented foods in Nigeria is *ogi* which is a fermented cereal porridge made from maize (*Zea mays*), sorghum (*Sorghum vulgare*) or millet (*Pennisetum typoideum*). The *ogi* porridge is very smooth in texture and has a sour taste reminiscent of that of yoghurt (Banigo and Muller, 1972). In Nigeria, the uncooked *ogi* is either prepared into a smooth porridge called "pap" or a solid gel known as "eko" or "agidi. The consistency of the pap varies from thick to watery according to choice. The pap can be sweetened with sugar and milk; it is then eaten with bean cake. The pap is used as the first native food for weaning babies (Onyekwere, *et al.*, 1989; Osungbaro, 1990). It also serves as breakfast meal for pre-school, school children and adults (Odunfa and Adeyele, 1987). In a more concentrated form it is boiled into a thick gel and then allowed to set stiff in leaf moulds as "eko" or "agidi". In either form, it is usually preferred to many other indigenous foods by the aged and the convalescence.

The stages of traditional *ogi* production include: washing of grains, steeping for 3 days at ambient temperature (28 ± 2°C), wet-milling, wet-sieving with a hand sieve or muslin cloth with about 300 µm pore size and sedimentation/ souring of the filtrate for 1–3days. Thereafter, the water is decanted and the wet, clean sediment (*ogi*) is collected and stored for personal use or sold to consumers in its wet form in small units packaged in leaves or polypropylene bags (Akingbala, *et al.,* 1989; Adeyemi and Beckley, 1986; Omemu and Omeike, 2010). The physical and biochemical qualities of *ogi* are influenced by the type of cereal grain, fermentation or souring periods and the milling method

* Corresponding author:
amomemu@gmail.com (Adebukunola M. Omemu A. M.)
Published online at http://journal.sapub.org/fph

(Osungbaro, 1990; Hounhouigan *et al.,* 1993).

Many workers have reported on different aspects of *ogi* production. Particular attention has been given to process variations, process mechanization, and nutritional improvement (Akinrele 1970; Banigo *et al.* 1974; Onyekwere *et al.*, 1989; Olasupo *et al*. (1997). The traditional method of *ogi* processing is accompanied by severe nutrient losses, the magnitude of which depends on the type of grains and the processing method used (Aremu, 1993). Hence, there have been several attempts at improving the nutritional quality of *ogi*. The strategies used include the addition of high-protein material such as legumes or incorporation of fruits and vegetables such as pawpaw and okra (Akinrele *et al.,* 1970, Adeyemi and Soluade, 1993).

Recent works on *ogi* include the use of starter culture, significance of yeasts in *ogi*, evaluation of *ogi* during spoilage, identification of hazard analysis and critical control points during *ogi* processing (Teniola and Odunfa, 2001, Omemu *et al.,* 2007a,b; Omemu and Omeike, 2010).

Ogi, being important cereal porridge in the West African sub-region, has for some time been a subject of scientific evaluations; however, there is paucity of information on the knowledge and attitude of consumers to some of the scientific evaluations. This study was, therefore, designed to assess the knowledge, attitude and usage patterns of *ogi* by consumers South Western Nigeria. Such information would act as a useful basis for effective application of the interventions designed to improve the product. It is expected that the findings from the study can also serve to guide education programs for consumers of *ogi* in South west Nigerian.

2. Materials and Methods

2.1. Study Area

This study was carried out in 2 states (Lagos and Ogun state) in South Western Nigeria. Consumers of *ogi* were selected within each state using a convenient intentional and reasoned sampling with predetermined quotas as reported by Guerrero *et al.,* 2010. Convenience sampling is often used in exploratory research where the researcher is interested in getting an inexpensive approximation to a specific topic through involving participants who meet specific recruitment criteria with relevance for the subject under investigation. This non-probability method is recommended during preliminary research activities to get a gross estimate of the results, without incurring the cost or time required to select a random sample (Guerrero, 2010).

On average 105 consumers of *ogi* in each state (total n = 210 consumers) were recruited. The first criterion for selecting the participants was their involvement in deciding about purchase of food and preparation of food at home. Only consumers who stated to be involved in these two activities were selected. Second, the different quotas for selecting consumers were age (a minimum of 10% of consumers in each decade from 20 to 70 years old) and gender (a minimum of 10% of individuals of each gender within each age group).

2.2. Data Collection Procedure

A semi structured, validated questionnaire and a face to face interview was used to collect data on traditional production, consumption, usage and storage of *ogi*. The questionnaires and interview were administered through research assistants who distributed in person to the participants. The participants were located in their own homes, shops or offices. Each participant was instructed on the correct method of completing the questionnaire. Respondents with difficulty in understanding English were assisted by an interpreter.

2.3. Data Analysis

Responses to the questionnaire were compiled into frequency distributions. Percentages of subjects responding to each item were calculated using the Statistical Package for the Social Sciences (SPSS).

3. Results

Table 1 presents the socioeconomic characteristics of the 210 respondents surveyed. Majority (58.1%) of the respondents are female while 41.9% are male. Only 30 (14.3%) of the respondents are above 50 years, 62 (29.5%) are within 31-40 years of age and 31 (14.8%) are above between 20-25 years. Many (109) of the respondents are married, 34 are widowed, 12 are divorced and 55 had never married. Only 97 respondents practice Islamic religion while 101 are Christians. Twenty (9.5%) of the respondents had no formal education while 190 (90.5%) had one form of education from primary school to tertiary institution. Majority (41.9%) of the respondent are civil servants, 11(5.2%) are farmers, 55 (26.2%) are self-employed, 23 (11.0%) are unemployed while 21(10.0%) are students in different institutions.

Table 2 presents the different cereal grains used for the production of *ogi* and the level of preference in the use of each grain either singly or in various combinations. The cereal grains used in the production of *ogi* are maize (*Zea mays*), sorghum (*Sorghum vulgare*) and millet (*Pennisetum typhoideum*); however, the preference for maize in *ogi* production is significantly ($p<0.05$) higher as compared to the other grains. Fifty six percent (56%) and 24% of the respondents prefer and use white maize and yellow maize respectively for *ogi* production. Only 14% and 6% respondent prefer and use sorghum and millet respectively in *ogi* production. There are different possible grain combinations for *ogi* production. The grain combinations observed were: white/yellow maize (61%), white maize/sorghum (30%), white maize/millet (5%) and yellow maize/sorghum (4%).

Table 1. Characteristics of respondents (n=210) studied

Characteristics	n	Percentage (%)
Gender		
Males	88	41.9
Females	122	58.1
Age (years)		
20–25	31	14.8
26–30	41	19.5
31–40	62	29.5
41-50	46	21.9
Above 50	30	14.3
Religious preference		
Islam	97	46.1
Christianity	101	48.1
No preference	12	5.7
Marital status		
Married	109	51.9
Single	55	26.2
Widowed	34	16.2
Divorced	12	5.7
Education		
No school	20	9.5
Primary school	45	21.4
Secondary school	62	29.5
Tertiary institution	83	39.5
Occupation		
Unemployed	23	10.9
Civil servants	88	41.9
Housewives	12	5.7
Farmers	11	5.2
Self employed	55	26.2
Students	21	10.0

n = Number of respondent

Table 2. Types of grain used for the production of *ogi* and the level of preference (%)

Grains	Level of preference (%)
Singly	
White Maize	56
Yellow maize	24
Sorghum	14
Millet	6
Combination of grains	
White / yellow maize	61
White maize /sorghum	30
White maize / millet	5
Yellow maize /sorghum	4
Yellow maize / millet	0
Sorghum / millet	0

Table 3 presents the production and storage pattern of *ogi* by the respondents. Although all the respondents consume *ogi*, 68 (32.3%) of them indicated that they also produced *ogi* for personal consumption, 43(20.5%) produced for commercial purpose while the remaining 99 (47.1%) are just consumers of *ogi* and do not produce *ogi* at all. Out of the 210 respondents, only 12 prepare *ogi* by dry milling method or consume *ogi* produced by dry milling method.

Table 3. Production and storage pattern of *ogi* by the respondents studied

	n	(%)
Category of respondent		
Consumer	210	100
Processor:		
Personal	68	32.3
Commercial	43	20.5
Method used for *ogi* processing		
Dry milling	12	5.7
Wet milling	198	94.3
Type of spices used		
Ginger	77	36.7
Garlic	35	17.6
Others	10	4.8
None	88	41.9
Awareness of fortification of *ogi*		
Yes	102	48.6
No	108	51.4
Do you fortify *ogi*		
Yes	12	5.7
No	90	42.9
Fortification of *ogi* with fruits, legumes		
Pawpaw	0	0.0
Okro	0	0.0
Soya beans	6	2.9
Ground nut	4	1.9
Bambara nut	0	0.0
Cowpea	2	1.0
Packaging and storage of *ogi*		
Leaves	18	8.6
Polyethylene nylon	46	21.9
Bowl with cover	98	46.7
Bowl without cover	21	10.0
Submerged in water at room temperature	119	56.7
Refrigerator	10	4.8
Duration of storage		
1-3 days	57	27.1
3-7days	13	6.7
1-2weeks	18	8.6
2-4weeks	84	40.0
> 4 weeks	38	18.1

n = number of respondents

The dry milling process involved manual cleaning of grains to remove stones and dirt's, steeping of maize for 2 days, draining, sun drying and dry milling. The flour obtained is then stored for further use.

The spices commonly used in the production of *ogi* in decreasing order of preference are: ginger, garlic and others like black pepper and cloves. Out of the 122 respondents that used spices for *ogi* production, 77, 35 and 10 prefer ginger, garlic and other spices respectively. Many (88) of the respondents do not use spices in the *ogi* production.

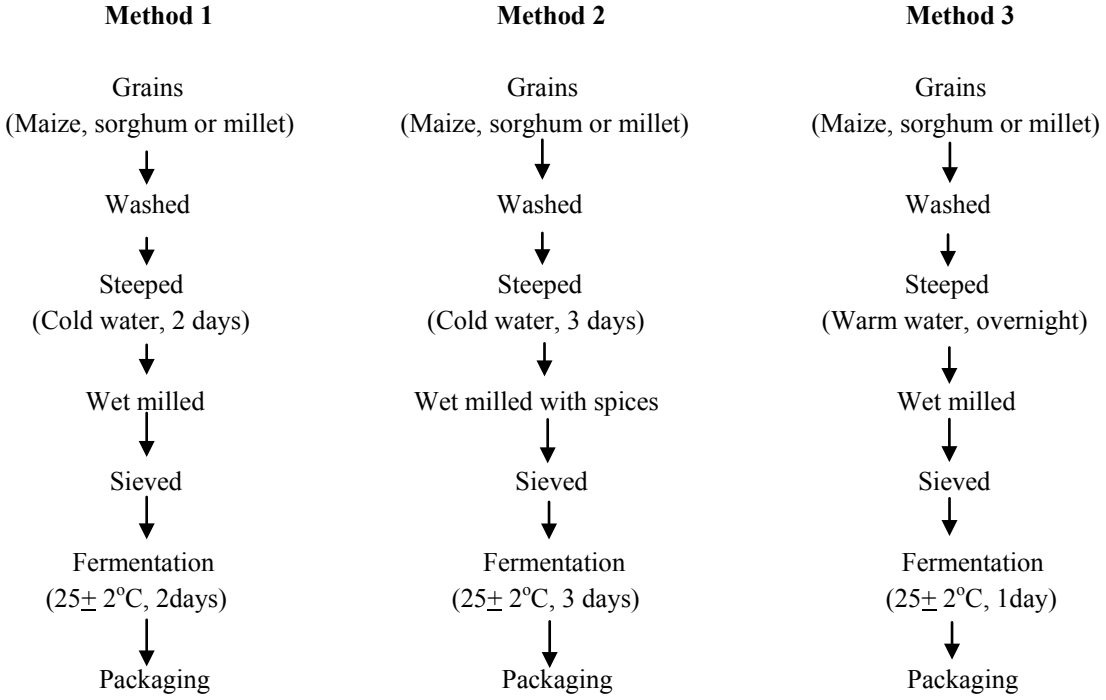

Figure 1. Different processing method of *ogi* by wet milling

Results on the knowledge of the respondents on *ogi* fortification as shown in table 3 also showed that 102 (48.6%) respondents are aware that *ogi* can be fortified with some fruits and legumes such as cowpea, soyabean, okro, bambara, groundnut and pawpaw. However, only 12 of the 102 respondents process or consume fortified *ogi.* Only 2 (1.9%) of the respondents that fortify *ogi* used cowpea for fortification while 4 (3.9%) and 6 (5.9%) fortified with groundnut and soya beans respectively.

The materials used for packaging and storage of *ogi* include leaves, polyethylene nylon, bowl with cover, bowl without cover and clay pot. The duration of storage ranged from 1 day to more than 4 weeks.

Figure 1 shows that the traditional wet milling processing is subject to modifications by different people. Results revealed variation in the number of days of soaking and souring during *ogi* production. The soaking period varied from overnight soaking in warm water to 3 days in cold water while the souring period also varied from 1 to 3 days. Some respondents steeped the grains with the spices while some added the spices at the point of milling. At the end of souring, the sedimented wet *ogi* was packaged in leaves and nylon or bulk stored submerged under water in buckets, basins, clay pots or drums.

Figures 2 and 3 showed the category of family members that consume *ogi* and the frequency of consumption respectively. In the family setting of the respondents, the category of family members that consume *ogi* are infants between 4 months to 2 years (68%), children between 3 and 12 years old (45%), adults (25%), convalescence (42%) and lactating or nursing mothers (56%). Results of the frequency of consumption (figure 3) showed that majority of the respondents 110 (52.4%) consumed *ogi* at least once in a week; 35 (16.7%) consumed it daily, and 32 (15.2%) consumed it twice in a week. Only 12 respondents claimed that they seldom take *ogi*.

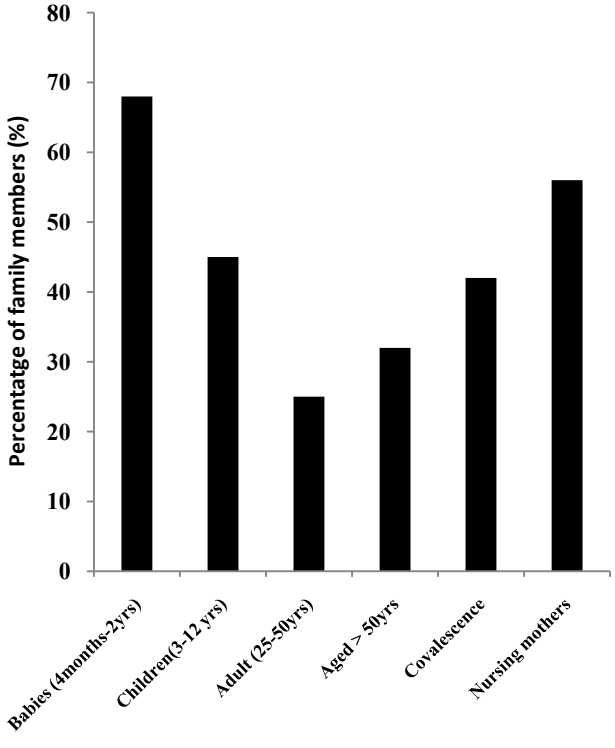

Figure 2. Category of family members that consume *ogi*

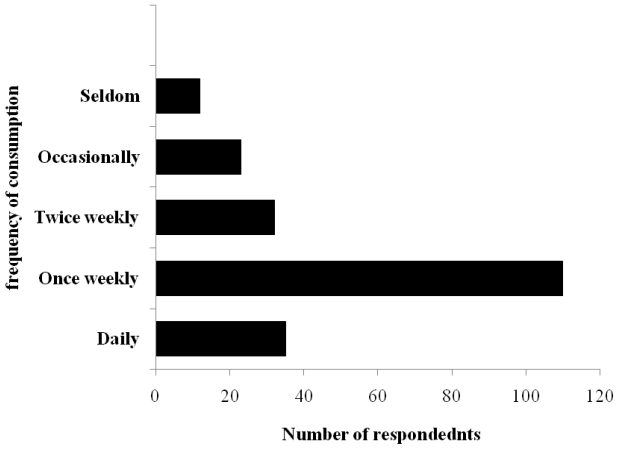

Figure 3. Frequency of consumption of *ogi* by respondents

Responses on the incidence and ways of preventing spoilage of *ogi* are presented in Table 4. *Ogi* is usually available and offered for sale in the open market or hawked in the streets. Most respondents usually purchased the *ogi* packaged in small unit and wrapped in leaves or polyethylene nylons. Respondents claimed that they rarely observed spoilage in purchased *ogi*. However, respondents that produce *ogi* for personal consumption observed that *ogi* is usually affected by one or more fungal species during long storage. The types of spoilage characteristics observed in *ogi* by different respondents include moldiness (45%); colour change (23%) and change in aroma. The most common mold in *ogi* exhibited white to grey colored mycelia while others appeared with either brown, yellow, or black loose and powdery substances after various periods of storage.

Submergence in water (88%) and frequent changing of the sour water (78%) was identified as the most effective way of storing and preserving *ogi*. None of the producers of *ogi* produced the exact amount needed at a given time while 90% consumers purchased the exact amount needed at a given time.

Table 4. Incidence of spoilage of *ogi* noted by respondents and the method of prevention of spoilage

	% of Respondents
Types of spoilage characteristics noted	
Moldiness	45
Colour change	23
Aroma is changed	34
Taste is off-putting	12
Storage or preservative measures:	
In the refrigerator	12
Submerged under water	88
Sun drying	0
Frequent changing of the sour water	78
Exact amount of *ogi* consumed is always produced	0
Exact amount of *ogi* consumed is always purchased	90

Some of the respondents claimed that they use *ogi* or the supernatant of wet *ogi* in the management of some negative symptoms (Figure 4). Some respondents reported the use of the supernatant of *ogi* and uncooked *ogi* in the management of diarrhea or dysentery (65%), common stomach upset (42%), nausea (33%). Many (47%) of the respondents are aware of the use of the supernatant of *ogi* as part of the component in the preparation of herbs for malaria, typhoid, small pox and chicken pox. Some (10%) of the claimed that wet *ogi* can be applied to fresh burns to prevent formation of blisters.

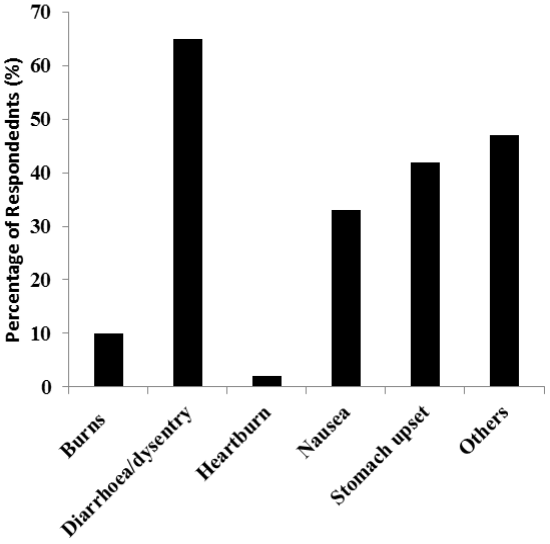

Figure 4. Use of *ogi* in the management of discomfort, ailment, illness and symptoms

4. Discussion

These results showed that the consumption of *ogi* cut across a wide range of people. *Ogi* has a widespread application in Sub-Saharan Africa as a weaning food, breakfast meals for school age children and adults, convenient meals for the aged and the convalescent. It is estimated that about 50 million people consume *ogi* at least once in a week (Dada and Muller, 1983; Steinkraus, 1996).

All the respondents who processed *ogi* either for personal consumption or for commercial purposes are all female. This agrees with previous reports by Omemu and Adeosun, 2010 where the 30 processors of traditional fermented wet *ogi* surveyed in Abeokuta were all female. Similarly, Watts (1984) reported that the preparation and sale of *eko*-a popular cold food made of boiled *ogi* is entirely in the hands of women. These findings suggest therefore, that any public education programs developed on the processing and storage of *ogi* will need to target females.

The order of preference for a particular grain in *ogi* processing differed between individuals in the same place. However, this study showed a high preference for maize and sorghum in *ogi* processing. Onyekwere, *et al.,* (1989) reported that production of *ogi* has been based on maize and sorghum, probably because of the lower market costs of

sorghum and maize compared with that of millet as well as the tiny size of millet which hampers cleaning and handling. The mixing ratio for the different combinations also varied and depended on preference. The reasons for proportional mixing of the grains included taste enhancement, color development and increase in certain nutrient components. Some respondents did not offer any reason for using the grains in combination but it appeared that most of the producers and consumers are aware of certain nutrient deficiencies among cereals.

Several reports had shown that dry-milling of fermented maize for *ogi* production improve the nutrient content of *ogi* by conserving the nutrient as well as enhancing the shelf life while wet milling results mostly in nutrient-loss, yield mainly starch and allows contamination from dirty water (Ruud and Rosa, 2002; Dal *et al.,* 2007). However, most consumers of *ogi* in this study still prefer and use the wet milling processing; this has serious nutritional implications for consumers of *ogi* especially the infants, aged and the convalescence.

The technology of production of *ogi* by wet milling varied based on producer's taste especially for individuals producing for home consumption. The production is predominantly at the household level using only a few pieces of equipment and home utensils. The materials used for steeping the maize included various sizes of plastic buckets, plastic drums and metal drums. The water used for steeping also varied depending on the water source of the respondents. The usual steeping medium observed in this study was well water, bore-hole water and tap water. The use of hot or warm water for steeping was observed mostly with commercial processors and the purpose was to reduce the steeping time.

Spices, when used in *ogi* production constituted only 1% or less by weight of all of the ingredients used. Spices impart pungent flavor hence only small quantities are used (Adeyemi and Umar, 1994). Most of the respondents that used spices for *ogi* production used it to enhance the sensory attributes of the *ogi*. Adesokan *et al.,* (2010) reported that incorporation of 5% ginger into *ogi* led to a relatively improved sensory attributes, a reduction in microbial load during storage and hence an improved shelf life.

Packaging of wet *ogi* in small unit transparent polyethylene nylon or leaves was only necessary when it is produced for commercial purposes. For personal use, *ogi* was stored submerged under water in buckets, basins or drums. The water is frequently changed to prevent spoilage.

Despite abundant global food supplies, widespread malnutrition persists in many developing countries. In Nigeria, and indeed most developing countries, the underlying problems have been identified to include poverty, inadequate nutrient intake and ignorance about nutrient values of foodstuff. Major international and national efforts towards addressing these problems include nutritional supplementation and fortification of staple foods. As cereals are generally low in protein, supplementation of cereals with locally available legume that is high in protein increases protein content of cereal-legume blends (Bressani, 1993). From this study, it is evident that most of the respondents are aware of the fortification of *ogi* with fruits and legumes; however this knowledge was not translated to practice by the surveyed respondents. Many of the respondents claimed that fortification with legumes result in *ogi* with a beany flavor which is unacceptable by many the consumers.

The processing of *ogi* is arduous and time consuming; ogi is usually produced in large quantity and store for use.

The use of *ogi* in the management of some infection and illnesses agrees with several reports. The sour water of wet *ogi* has been traditionally found to be of medicinal importance in the South-Western part of Nigeria. It is used to soak bark of root of some plants to treat not only fever and malaria but is popularly used as solvent for herbal extraction. It has been used in the extraction of antimicrobial agents from some leaves such as *Bryophyllum pinnatum* and *Kalanchoe crenata* (Aibinu *et al*., 2007). According to Aderiye and Laleye, (2004) some local communities in southwestern Nigeria usually administered uncooked *ogi* to people having running stomach to reduce the frequency of stooling. Some reports have shown that *ogi* has the potentials for use in diarrhea control and other related gastrointestinal tract illnesses or discomforts (Odugbemi, *et al.,* 1991; Olasupo, *et al.,* 1997).

5. Conclusions

The consumption of *ogi* cuts across different people in the society. This study showed that there is the need for nutrition education of consumers of *ogi* to encourage consumer to accept the views of the experts on the processing and fortification of *ogi*.

REFERENCES

[1] Adeyemi, I.A, and Beckley, T. Effect of period of maize fermentation and souring on chemical properties and amylograph pasting viscosity of *ogi*. *Cereal Science*, 4, 353-360. 1986.

[2] Adeyemi, I.A. and Soluade, E.O (1993). Development and quality evaluation of pawpaw – *ogi. Plant Foods for Human Nutrition* 44 (3): 213-220.

[3] Adeyemi IA, Umar S (1994). Effect of method of manufacture on quality characteristics of kunun zaki, a millet based beverage. Nigerian Food Journal 12: 34–41.

[4] Aibinu, I, Adenipekun, E, and Odugbemi, T (2007). Emergence of Quinolone Resistance among *Escherichia coli* strains isolated from Clinical infections in some Lagos state hospitals in Nigeria. Nigerian Journal of Health and Biomedical Science 3(2):73-78.

[5] Akingbala, J.O, Rooney, LW, Faubion, J.M (1989). A laboratory procedure for the preparation of *ogi,* a Nigerian fermented food. Journal of Food Science, 46 **(**5): 1523-1526.

[6] Akinrele IA (1970). Fermentation studies on maize during the

preparation of a traditional African starch-cake food. Journal of the Science of Agriculture 21 **(**12):619-625.

[7] Aremu, C.Y (1993). Nutrient composition of corn *ogi* prepared by a slightly modified traditional technique. Food Chemistry; 46 (3): 231-233.

[8] Banigo, E.O.I, and Muller, H.G (1972). Carboxylic acid patterns in *ogi* fermentation. Journal of the Science of Food and Agriculture*,* 23 (1): 101-111.

[9] Bressani, R. (1993). Grain quality of beans. Food Review International 9(2): 237-97.

[10] Dada, L.O and Muller, H.G (1983). The fate of aflatoxin B1 in the production of *ogi,* a Nigerian fermented sorghum porridge. J. Cereal Sci. 1 (1) 63-70.

[11] Dal, B.F, Clarke, C.I, Ryan, L.A.M, Ulmer, H, Schober T.J, Ström K, Sjögren J, Van Sinderen D, Schnörer J, Arendt, E.K (2007). Improvement of the quality and shelf life of wheat bread by fermentation with the antifungal strain *Lactobacillus plantarum* FST 1.7.Journal of Cereal Science 45 (3): 309-318.

[12] Guerrero Luis, Anna Claret, Wim Verbeke, Geraldine Enderli,Sylwia Zakowska-Biemans, Filiep Vanhonacker, Sylvie Issanchou, Marta Sajdakowska, Britt Signe Granli, Luisa Scalvedi, Michele Contel and Margrethe Hersleth (2010). Perception of traditional food products in six European regions using free word association. Food Quality and Preference 21: 225–233

[13] Hounhouigan, D.J.; Nout, M.J.R.; Nago, C.M.; Houben, J.H.; Rombouts, F.M. (1993). Characterization and frequency distribution of species of lactic acid bacterial involved in the processing of mawe, a fermented maize dough from Benin. International Journal of Food Microbiology 18 (4): 279-287.

[14] Odugbemi T, Odujinrin, H.T, Akitoye, C.O, Oyerinde J.P.O (1991). Study on the pH of *ogi*, Nigerian fermented weaning food and its effect on Enteropathogenic *Escherichia coli, Salmonella typhi* and *Salmonella paratyphoid*. J Trop Med Hyg 91: 219–223.

[15] Odunfa, S.A, Adeyele, S (1987). Sugar changes in fermenting sorghum during preparation of *ogi*-baba gruel. Journal of Food and Agriculture*,* 1 (2): 95-98.

[16] Oguntunde, A.O (1989). Traditional convenience foods from major Nigerian cereal grains. Nigerian Food J., 7, 58-66.

[17] Olasupo, N.A, Olukoya, D.K, Odunfa, S.A (1997). Assessment of a bacteriocin-producing Lactobacillus strain in the control of spoilage of a cereal-based African fermented food. Folia Microbiologica 42 (1): 31-34.

[18] Omemu, A.M, Oyewole, O.B, Bankole, M.O, (2007a). Significance of yeasts in the fermentation of maize for *ogi* production. Food Microbiology 24: 571–576.

[19] Omemu, A.M, Bankole, MO, Oyewole, O.B, Akintokun, A.K (2007b). Yeasts and moulds associated with *ogi*-a cereal based weaning food during storage. *Research Journal of Microbiology* 2 (2): 141-148.

[20] Omemu, A.M and Omeike, S.O (2010). Microbiol*ogi*cal hazard and critical control points identification during household preparation of cooked *ogi* used as weaning food. *International Food Research Journal* 17*:* 257-266.

[21] Onyekwere, O.O, Akinrele, I.A, Koleoso, O.A (1989). Industrialization of *ogi* fermentation. In*: Industrialization of Indigenous Fermented Foods* 33, 329-362.

[22] Osungbaro, T.O. (2009). Physical and nutritive properties of fermented cereal foods. African Journal of Food Science. 3(2) pp. 023-027.

[23] Ruud V, and Rosa S.R (2002). An overview of small-scale food fermentation technologies in developing countries with special reference to Thailand: scope for their improvement. International Journal of Food Microbiology. 75 (3): 231-239.

[24] Steinkraus, K.H (1996). Indigenous fermented foods involving an acid fermentation. Handbook of Indigenous Fermented Foods, Marcel Dekker, Inc. New York, 111-347.

[25] Teniola, O.D, Odunfa S.A (2001). The effects of processing methods on the level of lysine, methionine and the general acceptability of *ogi* processed using starter cultures. International Journal of Food Microbiology. 63, 1-9.

[26] Uzogara, S.G, Agu LN, Uzogara EO (1990). A review of traditional fermented foods, condiments and beverages in Nigeria: Their benefits and possible problems. Ecol. Food Nutr., 24, 267-88.

[27] Watts, S.J (1984). Rural Women as Food Processors and Traders: *Eko* Making in the Ilorin area of Nigeria. The Journal of Developing Areas 19 (1), 71-82.