ISSN (Online): 2455-7838
SJIF Impact Factor (2017): 5.705

EPRA International Journal of

Research & Development

(IJRD)

Monthly Peer Reviewed & Indexed International Online Journal

Volume: 3, Issue:6, June 2018

Published By :
EPRA Journals

SJIF Impact Factor: 5.705 Volume: 3 | Issue: 6 | June | 2018 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)

CHARACTERIZATION OF PROPERTIES OF MAIZE-BASED OGI FORTIFIED WITH MORINGA LEAF POWDER IN EBONYI STATE NIGERIA

Peter Anyigor Okorie[1]
[1]Department of Food Science and Technology Ebonyi State University, Abakaliki, Nigeria

ABSTRACT

The effects of varying proportions of moringa leaf powder on the functional properties, proximate compositions and sensory properties of ogi made from maize flour produced in Ebonyi State Nigeria were determined. The results showed that the ogi-60%:40%-moringa blend had the highest effect on the moisture content with a difference of 1 % relative to the ogi-100%:0%-moringa blend which was the control sample, while the ogi-70%:30%-moringa blend had the least effect. The ogi-50%:50%-moringa blend had the highest reduction effect on the fat content. The crude fibre content was highest in the ogi-50%:50%-moringa blend. The water absorption varies inversely with the moringa leaf powder content, and reduced the oil absorption capacity. The ogi-50%:50%-moringa blend recorded the lowest gelatinization temperature. The sensory evaluation reports showed that the ogi-70%:30%-moringa blend is the most acceptable blend. The findings suggest that bending ogi flour with moringa oleifera leaf powder at different ratios increased the nutritional composition. Ogi flour fortified with moringa leaf powder could be a source of feed for the adult and children, including the infants at the weaning stage, provided a good blend is adopted.

KEYWORDS: *Moringa leaf powder, Ogi, Fortified ogi, Moringa*

INTRODUCTION

Ogi is a smooth-finished porridge with an acrid taste reminiscent of yogurt. Its shading relies upon the oat base used to set it up - cream for maize, ruddy darker for sorghum, and dim for millet. In spite of the fact that the term ogi normally refers in Nigeria to maize porridge, ogi baba and ogi gero are used to portray sorghum ogi and millet ogi, respectively (Alnwick *et al.*, 1987). Ogi as porridge (pap) has customarily been the principal sustenance for babies and youthful youngsters, and a noteworthy breakfast grain for grown-ups. Sugar or dense or powdered drain might be added to the porridge, as indicated by taste. Adults consume ogi with meat stew and with fried bean cake (akara); with steamed bean cake (moi-moi), or with bread and a fried egg. Ogi can be used to thicken soup and stews. Ogi is much cheaper than imported commercially-processed baby foods; however, they are also more perishable, and their preparation more time-consuming. Ogi made from maize is a popular starchy porridge in the west coasts of Africa.

Nutritionally, maize is a relatively poor cereal when it comes to the quality of its protein, because it has limited amounts of two essential amino acids, namely: lysine, and tryptophan (Azevedo *et al.*, 1997). During ogi manufacture, nutrients including protein and mineral, are lost from the grain, thereby affecting nutritional quality adversely. Moreover, when processed to its flour stage, the average composition is

protein, carbohydrate, and fibre with no vitamins (Sharma and Caralli, 2006). This calls for the need to fortify the ogi with substances that could improve the nutritional value. The moringa leaf is a dependable alternative.

Moringa leaf has been purported to be a good source of nutrition and a natural organic health supplement that can be used in many therapeutic ways (McBurney *et al.*, 2004). The leaf is a very rich source of nutrients and contain the essential vitamins A, C and E. It is suspected by many to contain as much vitamin A as a carrot, vitamin C as an orange and vitamin E as a pomegranate (Coppin, 2008). Nutritional analysis indicates that moringa leaf contains a wealth of essential disease preventing nutrients, including amino acids from plant source.

Aminigo and Akingbala (2014) examined the effects of replacing ogi made from maize produced in Ibadan, Nigeria with some quantity of defatted and roasted okra seed meals at substitution levels of 0, 10 and 20 % on the properties of ogi. The results showed that replacing ogi with defatted and roasted okra at the level of 20 % increased crude protein content by 122 % and 106 % respectively. The fat content of ogi samples fortified with 10 % and 20 % roasted okra seed meal were enhanced by 1.5 % and 2.2 %, respectively. The findings indicated that the Ogi samples replaced with some quantity of roasted okra seed meal had higher viscosities during heating and cooling cycles, as well as slightly higher sensory scores for colour and taste than samples fortified with the defatted meal.

Jude-Ojei et al. (2017) assessed the influence of moringa seed flour on the functional and pasting properties of ogi in Ondo State Nigeria. The ogi-moringa mix was formulated by mixing the samples in the ratio 90:10, 80:20 and 70:30 while 100% maize and 100% Moringa flour serves as control. The results showed that the 10 % to 30 % moringa seed inclusion had no gelation at 2 %, 4 %, 6 % and 8 %, weak gel at 10 %, 12 %, 14 % and 16 % and strong gel at 18 % and 22 %. The findings indicated that the inclusion of moringa seed flour to ogi decreased the functional and pasting properties of the ogi.

Abioye and Aka (2015) studied the effects of moringa leaf on the nutritional value and consumer acceptability of ogi in Oyo State Nigeria. The ogi produced from maize was fortified with moringa leaves at substitution levels of 0, 10, and 15%. The results showed about 94 % increase in protein content with 15% substitution of moringa leave. The crude fibre and mineral contents increased with an increase in the level of the moringa leaf substitution. The swelling capacity decreased with an increase in the level of moringa leaf substitution. The findings indicated that the addition of moringa to ogi affects the nutritional and sensory characteristics of the ogi samples

Although researchers have studied the effects of moringa leaf on the properties of ogi produced from maize in the past, yet attributes of maize depends on several factors like soil type, variety and climate condition. There is little literature on the influence of moringa leaf on the ogi produced from the maize that is cultivated in Ebonyi State Nigeria. Therefore, the present study seeks to characterize the properties of maize-based ogi fortified with moringa leaf powder in Ebonyi State, Nigeria.

MATERIALS AND METHODS

The test programme for the determination of the properties of maize-based ogi flour fortified with moringa leaf powder is shown in Figure 1. The yellow dried maize and moringa oleifera leaf were sourced from Abakaliki in Ebonti State Nigeria.

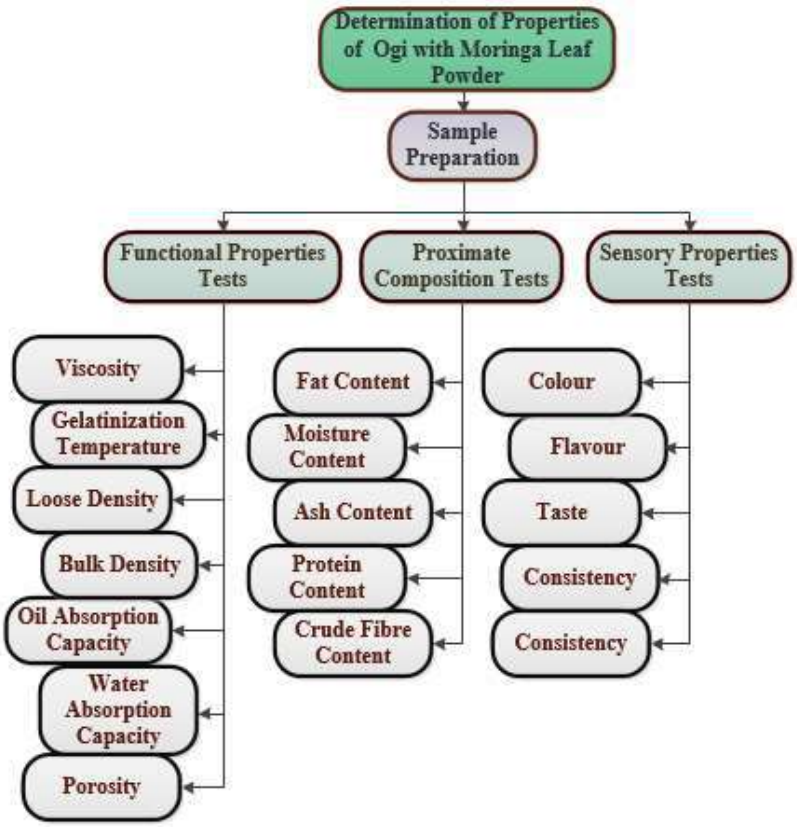

Figure 1: Test program for determining properties of ogi flour mixed with moringa leaf powder

The maize sample was steeped in cold water for 72 hours at ambient temperature (28 ± 2℃). It was wet milled, sieved and drained with muslin cloth to form a slurry. The slurry was further processed to obtain the maize flour known as ogi. The fresh moringa oleifera leaf sample was oven dried at 60 - 65℃ to reduce moisture. The dried leaf sample was blended and sieved to obtain moringa leaf powder. Blends of the ogi and moringa leaf powder were formulated to achieve the following ogi-moringa mix ratios: 100:0, 80:20, 70:30, 60:40, 50:50. The blends were thoroughly mixed until uniform blends were obtained. The blends were packaged in clean, dry and opaque plastic containers, and kept ready for functional properties, proximate composition and sensory properties tests.

The water/oil absorption capacity, viscosity, gelatinization temperature, porosity, loose density and the bulk density were determined in line with the method adopted in Onwuka (2005). The moisture, ash, protein, fat, and crude fibre contents were extracted according to AOAC (2005). The sensory properties, namely: colour, flavour, taste, consistency and general acceptability were determined through a sensory evaluation technique, where 15 food technology experts from the Department of Food Science and Technology in Ebonyi State University, Abakaliki formed a panel to evaluate the sensory quality of the ogi flour fortified with moringa leaf powder. The yardstick for the evaluation ranged from 9 to 1, where a score of 9 means like extremely and 1 means dislike extremely. The statistical mean was used to determine the output.

RESULTS AND DISCUSSION

The results of the effects of moringa leaf powder on the proximate composition of ogi flour made from maize are presented in Figure 2. The results showed that fortification of ogi with moringa leaf powder affected the moisture content in an irregular pattern. The ogi-60%:40%-moringa blend had the highest effect on the moisture content with a difference of 1 % relative to the ogi-100%:0%-moringa blend which was the control sample, while the ogi-70%:30%-moringa blend had the least effect. The value of the moisture content in all the blend is safe, since the range is within the safe limit (7.50 %) for the storage of moringa leaf powder as proposed by Fuglie (1999}. Moringa leaf powder reduced the fat content of the ogi flour. The ogi-50%:50%-moringa blend had the highest reduction effect on the fat content. Nevertheless, the fat content in all the blends was within the required level reported in Ozumba (2008), Fuglie (1999), Ihekoronye and Ngoddy (1985). The moringa leaf powder increased the ash content of the ogi flour. The ash content pattern in Figure 2 showed that increase in the level of moringa leaf powder increased ash content.

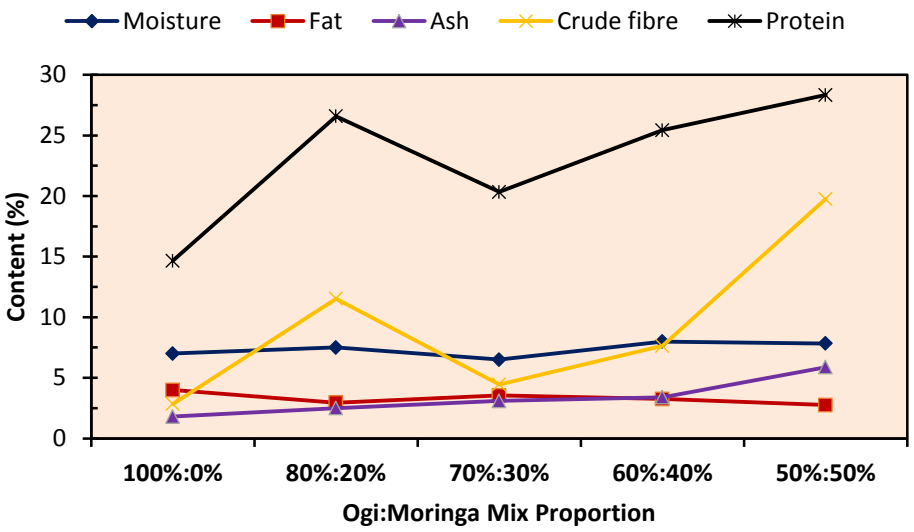

Figure 2: Proximate composition of ogi fortified with moringa leaf powder

The crude fibre content was highest in the ogi-50%:50%-moringa blend. This implies that fortification of ogi flour with moringa leaf powder to achieve high crude fibre content is an essential practice, since high content of fibre in food promotes digestion, prevents colon cancer, and discourages constipation and pile (Hung *et al.*, 2004). The protein content increased with an increase in the quantity of moringa leaf powder. This is in agreement with the fact that moringa leaf has more protein relative to the ogi flour (Oduro *et al.*, 2008). It implies that the inclusion of moringa leaf to ogi flour enriches the flour.

The results of the effects of moringa leaf powder on the functional properties of ogi flour made from maize are presented in Figure 3. The inclusion and change in quantity of moringa leaf powder caused indiscriminate variation in the viscosity, bulk density and loose density of the ogi flour. The water absorption varies inversely with the moringa leaf powder content. The addition of moringa leaf powder reduced oil absorption capacity of the ogi flour slightly, but increased porosity. The ogi-50%:50%-moringa blend recorded the lowest gelatinization temperature, probably due to the non-starch nature of the moringa leaf powder. The results are in line with the submission of Olorode *et al.* (2010).

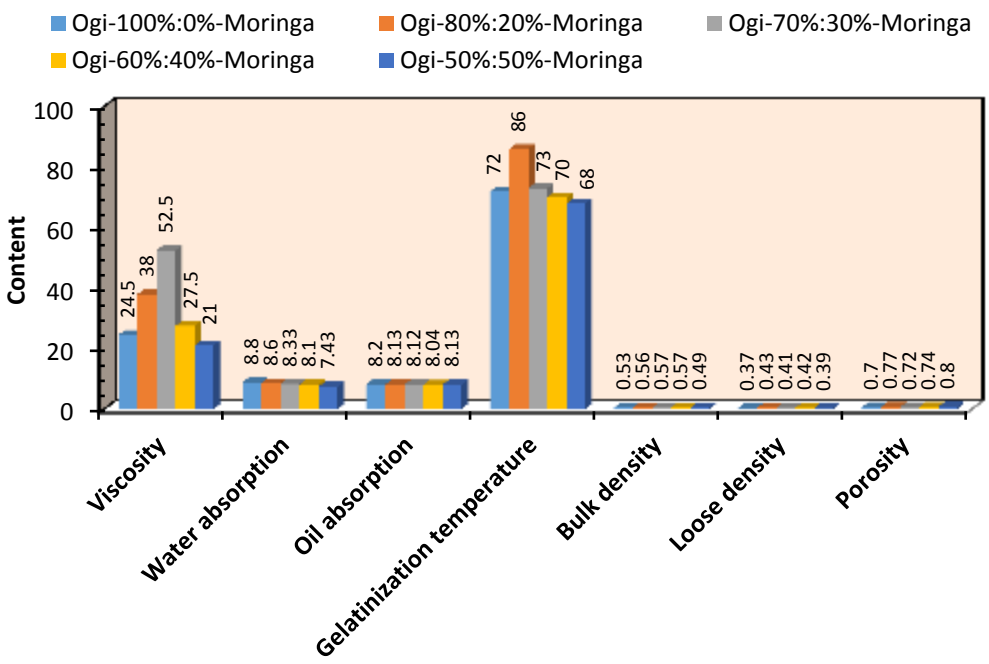

Figure 3: Functional properties of ogi fortified with moringa leaf powder

Figure 4 shows the results of the effects of moringa leaf powder on the sensory properties of ogi flour made from maize. The inclusion of the moringa leaf powder changed the colour of the ogi significantly and made it non-appealing to the eye. It reduced the flavour, good taste, consistency and general acceptability of the ogi flour.

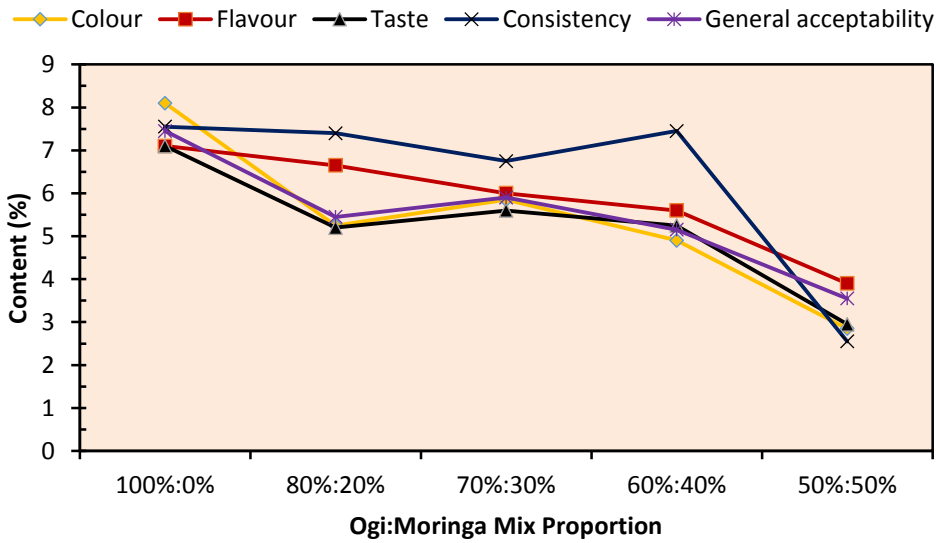

Figure 4: Sensory properties of ogi fortified with moringa leaf powder

The reduction in the sensory evaluation of the ogi fortified moringa meal in terms of colour, flavour, taste, consistency and general acceptability could be attributed to the unfamiliar consumption characteristics of moringa to the evaluators. The results indicated that the ogi-70%:30%-moringa blend was the most acceptable blend with good sensory qualities.

CONCLUSIONS

This paper presented the effects of replacing ogi flour with different proportions of moringa leaf powder on the functional properties, proximate compositions and sensory properties of ogi made

from maize flour produced in Ebonyi State Nigeria. The results showed that fortification of ogi with moringa leaf powder affected the moisture content in an irregular pattern, reduced the fat content, and increased the ash content of the ogi flour. The water absorption varies inversely with the moringa leaf powder content, and reduced the oil absorption capacity. The findings suggest that bending ogi flour with moringa oleifera leaf powder at different ratios increased the nutritional composition. Ogi flour fortified with moringa leaf powder could be a source of feed for the adult and children, including the infants at the weaning stage, provided a good blend is adopted.

REFERENCES

1. *Abioye, V. F., & Aka, M. O. (2015). Proximate composition and sensory properties of moringa fortified maize-ogi, Journal of Nutrition & Food Sciences, S12, 4 pages, DOI: 10.4172/2155-9600.S12-001.*
2. *Alnwick, D., Moses, S., & Schmidt, O. G. (1987). Improving young child feeding in eastern and southern Africa, Proceedings of International Development Research Centre (IDRC) workshop held in Nairobi, Kenya on 12-16 October 1987.*
3. *Aminigo, E. R., & Akingbala, J. O. (2004). Nutritive composition and sensory properties of ogi fortified with okra seed meal, J. Appl. Sci. Environ. Mgt., 8(2), 23-28.*
4. *AOAC, (2005). Cereal Food. Official Method of Analysis, 17th ed.", AOAC International. Maryland, USA, pp. 53.*
5. *Azevedo, R. A., Arruda, P., Turner, W. L., & Lea, P. J. (1997). The biosynthesis and metabolism of the aspartate derived amino acids in higher plants, Phytochemistry, 46(3), 395-419.*
6. *Coppin, J. (2008). A study of the nutritional and medicinal values of Moringa oleifera leaves from sub-Saharan Africa: Ghana, Rwanda, Senegal and Zambia, An MSc thesis, Rutgers, The State University of New Jersey.*
7. *Fuglie, L. J. (1999). The miracle Tree: Moringa oleifera: Natural Nutrition for the Tropics. Church world service, Dakar. pp.68.*
8. *Hung, H. C., Joshipura, K. J., Jiang, R., Hu, F. B., Hunter, D., Smith-Warner, S. A., Colditz, G. A., Rosner, B., Spiegelman, D., & Willett,W. C. (2004). Fruit and vegetable intake and risk of major chronic disease, Journal of National Cancer Institute, 96(22), 1577-1584.*
9. *Ihekoronye, A. I. & Ngoddy, P. O. (1985). Integrated food science and technology for the Tropics. Macmillian Publishers Ltd, Londan. Pg. 243.*
10. *Jude-Ojei, B. S., Lola, A., Ajayi, I. O., & Ilemobayo, S. (2017). Functional and pasting properties of maize 'ogi' supplemented with fermented moringa seeds, Journal of Food Processing & Technology, 8(5), 4 pages, DOI: 10.4172/2157-7110.1000674.*
11. *McBurney, R. P. H., Griffin, C., Paul, A. A., Greenberg, D. C. (2004). The nutritional composition of African wild food plants: from compilation to utilization, Journal of Composition and Analysis, 17(3-4), 277-289.*
12. *Oduro, I., Ellis, W. O., & Owusu D. (2008). Nutritional potential of two leafy vegetables: Moringa oleifera and Ipomoea batatas leaves, Sci. Res. Essays, 3(2), 057-060.*
13. *Olorode, O. O., Idowu, M. A, & Babajide, J. M. (2010) Effect of addition of benoil (moringa oleifera) leaf powder on the functional properties of ogi, NIFST Annual seminar proceeding, paper 25.*
14. *Onwuka, G. (2005). Food analysis and instrumentation, Napholhla Print, 3rd Edition, A division of HG support Nigeria Ltd, pp. 133-161.*
15. *Ozumba, N. A. (2008). Moringa oleifera: a review of its medical and other uses. Institute for Development studies, University of Nigeria, Enugu campus, pp. 1-20.*
16. *Sharma, J. L., & Caralli, S. (2006). A Dictionary of food and Nutrition. CBS publishers and Distributors, New Delhi.*