DEVELOPING AN EFFICIENT METHOD FOR OGI PRODUCTION:
TOWARDS EDUCATING THE RURAL WOMEN

John O. Okara and Osita O. Lokoyi

Abstract

Ogi is a fermented non-alcoholic starchy food and a major staple food consumed in most Nigerian communities. Improved methods of production have minimized significant nutrient losses inherent in the traditional method. The predominant microorganisms associated with ogi fermentation process include species of Cephalosporium, Fusarium, Aspergillus, and Corynebacterium. Others are Saccharomyces cerevisiae, Candida mycoderma, Lactobacillus plantarum and Corynebacterium sp. are responsible for formation of some carboxylic acids, while S. cerevisiae and C. mycoderma contribute to flavor development. Regular changes of surface water have been shown to enhance the keeping quality of ogi when stored at ambient temperatures. It is expected that further research aimed at manipulating the production conditions as well as microbial processes would ultimately yield an ogi variety superior in all ramifications to its traditional counterpart.

Man has been involved in the fermentation of food materials for consumption and other economic benefits since time immemorial. Food materials may be fermented for several reasons including the need: for variety in the diets; to mask undesirable flavors; to destroy toxic or other undesirable components thereby increasing the range of raw materials available as food; and for preservation (Parades-Lopez and Harry, 1998).

A wide variety of fermented food products are available worldwide. The microorganisms frequently identified in the fermentation processes are bacteria, yeasts and moulds. Cereals have been known to man from time immemorial, including maize (Zea mays), which is an important raw material in human diets. In Nigeria, maize is grown mainly in the Southern part while sorghum (Sorghum bicolor) and millet (Pennisetum typhoides) are grown in the northern part of the country (Banigo and Muller, 1972). Maize (also known as corn) is processed into traditional food condiments such as ogi and agidi (Okafor, 1987; Adeniji and Potter, 1978).

Ogi is accepted in most Nigerian communities as a palatable beverage. By and Large, it is consumed by children, the elderly as well as the convalescents who consider it to be a convenience food. Studies have identified certain
significant defects inherent in its traditional method of production. The aim of this paper, therefore, is to critically examine the traditional method of *ogi* production as obtainable in most of our rural communities. In this way, we can highlight possible means of manipulating the fermentation mechanism so as to enhance the process.

**Ogi: An Indigenous Beverage**

*Ogi* is a fermented non-alcoholic starchy food, and a major staple food widely consumed in West Africa. It is a sour fine paste beverage which when cooked produces a thin semi-solid porridge. *Ogi* porridge has a smooth texture and a sour taste resembling that of yoghurt. The name *ogi* has a Yoruba origin whereas in South-Eastern Nigeria, the product is called *akamu*.

Though in most states of Nigeria *ogi* is used as a generic name, it specifically refers to the one produced from maize. Similarly, the one produced from sorghum or millet is known as *ogi baba* and *ogi gero* respectively (Akinrele, 1970; Banigo and Muller, 1972). However, in parts of Northern Nigeria, the product is known as *furali* and may refer to either sorghum or millet *ogi* (Banigo and Muller, 1972). The color depends on the type of cereal used. When prepared from maize, it is cream or yellow in color, reddish brown for sorghum and dirty gray for millet.

Being a staple Nigerian diet, *ogi* is widely used as the first native food given to babies at weaning to supplement breast milk. It is also a palatable breakfast for pre-school, school children and most adults. As a weaning food, it is mainly patronized by the low-income earners because of high cost of imported infant formulations. *Ogi* is equally consumed as a main meal for convalescing patients due to its easy digestibility (Ekpeyong, 1980). Akingbola (1980) estimated that about 25 million adults eat *ogi* at least twice weekly while their children eat it 4 to 5 days weekly.

**Traditional Method of Ogi Production**

In spite of its importance in the Nigerian diet, the production of *ogi* is essentially a home-based industry. There are at present, no large-scale factory operations for the production of *ogi*. According to Okafor (1987), the traditional method is a batch process carried out on a small scale for domestic use or as a commercial venture by some housewives. Specifically, Umo and Fields (1981) outlined the procedure as follows: Maize grains are washed thoroughly to remove dust particles and other impurities.

The grains are then steeped in earthenware, plastic, or enamel pots for 1-3 days at room temperature. (Microbial fermentation takes place during the steeping).
An electrically powered grinder is used to wet-mill the softened grains. Water is then added to the ground material to obtain slurry. The slurry is sieved by means of a finely porous cloth in order to remove parts of the hull. The filtrate which is almost pure starch is allowed to stand for 20-30mins for sedimentation to take place. The starch paste which is obtained can be prepared into *ogi* porridge by introducing small quantity of hot water.

For commercial purposes, the raw product may be wrapped in leaves after the removal of excess water and sold. Removal of water is achieved by suspending the *ogi* in a thin muslin cloth. The procedure is summarized in Figure 1.

![Flow diagram of ogi production](image)

**Figure 1:** A flow diagram of the traditional method of *ogi* production (Umo and Fields (1981)).
Defects of the Traditional Method

Banijo et al. (1974) stated that the traditional method of ogi production causes significant nutrient losses, which may occur during steeping, milling or sieving. Studies indicate that the protein-rich part of the grain is mainly located in the testa and germ, which are usually sifted off during processing. Losses of fibre, protein, ash as well as vitamins have equally been reported, and current research in this product is aimed at reducing these losses (Parades-Lopez and Harry, 1988).

Improved Methods

The problem of nutrient losses can be ameliorated by the use of an improved wet milling method. This involves boiling the unfermented grain for about 20 minutes followed by grinding. Boiling for this period of time substitutes for steeping for 1-3 days, and thus, reduces the overall processing time to about 24 hours. An alternative method which involves dry-milling the grain into fine flour followed by mixing with water was described by Ekpeyong (1980). The resulting dough is then inoculated with cultures of Lactobacillus and yeast.

Studies have shown that corn, especially the white variety, is generally low in amino acids such as lysine, methionine, and tryptophan. Hence, ogi prepared from this variety is nutritionally deficient. Trustwell and Brock (1961) attributed this relatively poor quality of corn to high leucine content. Thus, direct amino acid supplementation has been suggested as a means of improving the nutritive value of corn-based preparations. A major setback, however, is the fact that most corn products, including ogi, are produced in homes by traditional methods.

Microbial Processes in Ogi Fermentation

During steeping, the pH of the medium usually decreases due to production of carboxylic acids by microorganisms. Studies have shown that the bacterial count is usually higher than that of fungi indicating the predominance of bacteria in maize fermentation. Lactobacillus plantarum and Corynebacterium spp are principally responsible for production of organic acids (Odunfa, 1985). Indeed, the overall effect of steeping and souring is the development of the characteristic flavor through the production of carboxylic acids, especially lactic, butyric and acetic acids (Oke, 1967). Saccharomyces cerevisiae, and Candida mycoderma both contribute to flavor development (Akinlere, 1970).

Okeke (2000) found that the predominant microorganisms in ogi fermentation include Cephalosporium spp, Fusarium spp, Aerobacter cloacae, Saccharomyces cerevisiae, Lactobacillus plantarum, Pediococcus guniben, Candida mycoderma, Pediococcus acidilactic, Lactobacillus fermentum and Lactobacillus cellobiosus.
Developing an Efficient Method for Ogi Production: Towards Educating the Rural Women

According to Umo and Fields (1981), the problems associated with traditionally produced *ogi* are off flavor and irregularity of flavor. These may be attributed to the activities of undesirable microorganisms as well as differences in processing conditions. Although it is possible that production contaminants may be pathogens, there is, indeed no public health threat as the product is normally cooked properly before consumption. Again, the acidic nature of the product renders it unfavorable for the growth of pathogens and spoilage organisms.

When stored at ambient temperatures, the shelf life of *ogi* is about 30 hours but can be extended to 96 hours or more with regular changes of surface water. Refrigeration, on the other hand, extends the shelf life to a much longer time. As should be expected, there are relatively high microbial counts in *ogi* stored without changes of water. Accordingly, regular changes of water preserve the keeping quality of *ogi* due partly to the reduction in microbial load (Okeke, 2000).

**Conclusion**

*Ogi* is indeed a major indigenous foodstuff cherished in most Nigerian communities. Being a cheap and convenience food, *ogi* is generally patronized by the lower as well as middle class citizens. Well over 70% of Nigerians are believed to be dependent on *ogi* as a staple food.

In view of the defects in the traditional method of production occasioned by significant nutrient losses, our local producers should be adequately educated on the improved methods now available. The adoption of these improved methods will minimize nutrient losses to the barest minimum, and greatly enhance the nutritional value of *ogi*.

Finally, there is need to intensify research with a view to devising more efficient methods capable of improving on *ogi* nutritional relevance. As a matter of fact, this can be achieved by carrying out defined investigation into the microorganisms as well as microbial processes associated with fermentation of the raw materials (cereals). It is hoped that an effective manipulation of the production conditions cum microbial processes would ultimately yield an improved product superior in all ramifications to its traditional counterpart.

**Recommendations**

Other varieties of corn which have been found to have higher nutritive value than the white variety should be used in the production of *ogi*. The improved wet-milling method, which involves boiling the fermented grains for about 20 minutes followed by grinding, should be adopted. This will ameliorate the problem of nutrient losses inherent in the traditional method. Alternatively, the grains can be dry-milled to make fine flour, mixed with water and inoculated with cultures of *Lactobacillus* and yeast. In this way, the problem of nutrient losses inherent in the traditional method can be eliminated.
There is need for direct amino acid supplementation since corn-based preparations have been found to be deficient in some essential amino acids. It is important to isolate the microorganisms associated with *ogi* fermentation into pure cultures. These cultures can be used for inoculation. This will solve the problem of irregular flavor attributed to the activities of undesirable microorganisms (contaminants).

As much as possible *ogi* should be preserved in the refrigerator, otherwise it should be kept at room temperatures with regular changes of water to avoid spoilage.

There is need to organize an enlightenment program to adequately educate local producers especially women in rural/sub-urban communities on the principles and practice of the improved methods described in this paper.

**References**


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