Food & Nutrition: Current Research
FNCR, 2(2): 155-157
www.scitcentral.com

ISSN: 2638-1095

Mini Review: Open Access

Obstacles to Improvement in Rudimentary West African Yam Food Technologies: A Synthesis

Felix I Nweke*

Michigan State University, USA.

Received April 16, 2018; Accepted March 06, 2019; Published June 20, 2019

Keywords: West Africa, Yam, Food technology, Food storage, Food preparation, Food processing

In West Africa yam is part of the traditional diet of many, is a major source of cash income for producers and is central in cultural rites that are important for the existence of the people in producing areas individually and communally [1]. The crop is expensive compared with other starchy stapes such as maize and cassava because low technologies are used in the yam food crop sector. Yam seed technology is low; there are no high-yielding yam varieties at the farm level; production and harvesting of yam are not mechanized; and yam storage technology is rudimentary. The yam food crop sector does not benefit from government food crop development programs which are based on available technologies [2].

The main nutritional value of yam, cassava and other root and tuber crops is food calorie (FAOSTAT) [1]. The margin of difference in calorie content between cassava and yam which is in favor of yam is low enough that production cost per unit of calorie is likely to be lower from cassava than from yam since yam is more expensive than cassava. Protein content is considerably higher in yam than in cassava; yet yam is not a major source of protein when weighed against pulses and grains. Similar comparisons are obtained with respect to fats. But the fact that yam has a considerably larger amount of protein and perhaps more calories as well as fats per unit weight than cassava is clearly sufficient justification for addressing the underlying causes of high yam production costs.

In West Africa, yam is produced more for sale, 60 percent of harvest than for home consumption 40 percent [2]. The crop is widely produced with purchased inputs, especially hired labor. Yam responds positively to the application of the purchased inputs in terms of yield and land area expansion, which shows that the potential for improvement is high if R&D (Research and Development) measures are implemented to improve production technologies.

Yam has an important role in the culture of the people in major producing areas in the region. Demand for yam for use as a ritual object in cultural rites of passage, thanksgiving, petition and appeasement practiced in major producing and consuming centres is high enough to produce significant effect on yam consumption [2,3].

Yam storage techniques vary from place to place depending on a range of circumstances including security and agro-ecology [3]. Common yam storage techniques are piling in thatched mud huts with perforated walls, tying on racks and piling up in dry material covered heaps. Each storage technique has upside and downside; security and enhanced aeration, especially in high humidity environments are the main advantages of storage by tying on racks at home while high labor requirement is the major drawback. In less humid environments, storage in thatched hut or in covered heap is preferred because of its less labor need but these methods expose yam to pests and diseases.

Under existing yam storage technologies, the crop is not storable from one harvest season to another because of limited postharvest shelf life of three to six months depending on variety. Farmers sell off their yams within a few months after harvest to avoid storage losses that are caused mainly by yam pests and diseases of which nematodes and viruses are the most damaging ones. The problems of yam nematodes and viruses have dogmatically defied solution; they are the key obstacles to change in yam storage technologies. Off farm yam storage is minimal; yam marketing channel is weak in terms of rural assembly and wholesale warehousing. Most yams for sale move directly

[1] FAOSTAT refers to Food and Agriculture Organization of the United Nations Statistics.

Corresponding author: Felix I Nweke, Michigan State University, USA, E-mail: nwekefel@yahoo.com

Citation: Nweke FI. (2019) Obstacles to Improvement in Rudimentary West African Yam Food Technologies: A Synthesis. Food Nutr Current Res, 2(2): 155-157.

from the farm through wholesale and retail markets to consumers as fast as possible for fear of losses through pest and disease attack.

The result of the inability of existing storage technologies to hold yam from one harvest to another is seasonality in supply and in market prices. This situation results in capital losses to producers who sell most of their yam at low prices during harvesting period and to consumers who pay high prices after harvesting period. In the absence of solutions to the problems of the major yam pests and diseases, can a technology be developed that can standardize yam storage methods across ecologies and be able to hold yam in good condition from one harvest to another? Such technology will reduce storage losses and also reduce capital losses to producers who sell most of their yams at low prices during harvesting period and consumers who pay high prices after the harvesting period. Such technology will permit yam storage off farm so that traders can perform speculative market function and enable farmers to concentrate on the production business.

In West Africa, yam food is prepared mostly from fresh tuber. Fresh yam tuber can be prepared into food forms such as roasted yam (grilled), boiled yam (cooked in water), pounded yam (boiled yam pounded) and fried yam (cooked in oil). All four yam foods are common in Nigeria, the center of diversification of fresh yam food preparation. In the country only 10 percent of total consumption is from yam product processed industrially.

Preparation as roasted yam or boiled yam is simple and consumption can also be simple because those yam foods can be eaten straight without a condiment. The cooking methods must have been adopted when man discovered yam, probably in Eastern Nigeria that is reputed as the center of origin of the white yam. Unlike most common varieties of cassava that must be pre-processed before cooking edible species of yam are safe for human consumption after simple cooking. There is a high likelihood that the early man first prepared yam for consumption by roasting it in open fire with firewood that must have been in abundance in his environment and later by boiling in water. Pounded yam and fried yam preparation methods must have followed when man's food consumption habit became more sophisticated.

As a tuber crop, in unprocessed form yam has high water content and short shelf-life compared with in processed forms. The high water content and short shelf-life characteristics are drawbacks which impede bulk purchase for home use that reduces the frequency of shopping which is of interest to working class homemakers. Fresh yam is unstable in all cooked forms; cooked yam foods lose quality when not warm. Therefore fresh yam is cooked in small quantities in order to be consumed within the shortest period of time to avoid waste. Yam food is more commonly prepared from fresh tuber because of the relative ease of fresh yam food preparation, consumer income and large rural population, non-conventional value of the yam crop and low yam food processing technology. Yam is used in fresh form for cultural rites of passage, thanksgiving, petition and appeasement practiced in major producing and consuming centers in West Africa.

In West Africa, yam faces the challenge of high cost in food industries [4]. Often at yam conferences, workshops, and related gatherings, food scientists excitedly display pastry products made from yam flour. Such excitements are justified because the products are proof that making pastries from yam flour is technically feasible, but economic feasibility needs to also be established to consummate the excitement. That can be done by bringing the cost of yam down to the cost levels of cassava and imported grains which are used to prepare pastries. Poundo yam and amala are the processed forms of yam; both are dried tuber flour for preparation as foofoo [2]. Yam consumed in any other food form is prepared from fresh tuber. Poundo yam is prepared industrially and amala is prepared in the traditional sector.

The consumption frequency of pounded yam increases from low income group through medium income group to upper income group [3]. Some members of the medium income group who cannot afford pounded yam settle for poundo yam. Affordability of pounded yam includes having facility for pounding. Apartment buildings are not suitable for pounding yam because the pounding can shake such buildings and the noise can disturb neighbors. The consumption frequency of amala decreases from the lower income group among whom it is highest through medium income group to the upper income group among whom the frequency is lowest because the processing method is traditional and can turn off some upper and medium income consumers. Quality instability is an encumbrance on poundo yam consumption. Packaged poundo yam is not common in Nigerian markets; when sales were delayed the product deteriorates because poundo yam is more susceptible to weevils and fungi than grain flours. Demand is low because of high cost and because consumers have access to the real thing, namely pounded yam from fresh tuber.

The ability of simple cooking methods to eliminate poisonous substances in edible yam species is an obstacle to progress in yam processing technology. Consumer preference for yam food prepared from fresh tuber and high cost of processed yam food products compared with substitutes such as processed cassava and grain food products are further drawbacks to progress in yam processing technology. Processed yam food is inferior substitute for fresh yam alternative because consumers prefer food prepared from fresh yam. But at the same time

[2] A common African food pattern is called *foofoo* in Anglo-phone West Africa, *foutou* in Franco-phone West Africa, *ugali* in East Africa and *nsima* in Southern Africa.

processed yam product is more expensive than its substitutes made from cassava and grains.

To summarize, yam postharvest losses owing to pests and diseases, particularly the problems of nematodes and viruses impede change in yam storage technologies. Consumer preference for yam food prepared with fresh yam to food prepared with yam processed product is a key obstacle to processing of yam. Other obstacles to yam processing include high cost of processed yam compared with its substitutes made with cassava and grains; relative ease of yam food preparation from fresh tuber compared with grains and legumes; the fact that yam is save for human consumption after simple cooking; relative long postharvest shelf life of up to six months depending on variety compared with cassava, two or three days of postharvest shelf life; non-conventional uses of yam that are always in fresh form; and large rural low income populations [5].

Development of technologies to control yam postharvest losses due to pests and diseases problems such as nematodes and viruses can help bring about change in yam storage technology. Improvement in consumer income with growth in the working class middle income group will promote demand for processed yam food products that are more convenient to prepare into meals than fresh tuber. Food technologies that can make poundo yam quality competitive with pounded yam will promote yam food processing in West Africa. Development of technologies for processing yam into forms that can be prepared as boiled, fried and grilled yam that can perhaps stabilize their qualities in cooked form will provide further possibilities for yam food processing in West Africa. Most importantly, development and dissemination of technologies that can drive down yam production costs and make the commodity price competitive with alternative staple substitutes such as cassava and maize will encourage change in yam food technologies.

CONFLICT OF INTEREST

Published in full as Nweke, Felix I. 2017. West African yam food technologies: Possibilities and impediments to change. African Journal of Food Science and Technology. Vol. 8, No. 3. pp. 40-49.

REFERENCES

1. Nweke FI (2017) West African yam food technologies: Possibilities and impediments to change. Afr J Food Sci Technol 8: 40-49.
2. Nweke FI (2016) Yam in West Africa: Food, money and more. Michigan State University Press, East Lansing.
3. Nweke FI, Aidoo R, Okoye B (2013) Yam consumption patterns in West Africa. Unpublished report prepared for Bill and Melinda Gates Foundation.
4. Ugwu BO (1990) Resource use and productivity in food crop production in major yam producing areas of southeast Nigeria. Ph.D. thesis, University of Nigeria, Nsukka, Nigeria.
5. Tshiunza M (1996) Agricultural intensification and labor needs in the cassava growing zones of sub-Saharan Africa. Ph.D. thesis, Katholieke Universiteit Leuven, Leuven, Belgium.