

PDF - PRODUCTION PROCESSES OF IMPROVING THE QUALITY OF "PUPURU" (A FERMENTED TRADITIONAL CASSAVA FLOUR) - researchcub.info ABSTRACT

Pupuru (a fermented cassava product) is one of the major staple foods amongst the Yoruba, Ilaje and Ijaw speaking people in the south-south and south-western region of Nigeria, which had its source from the Ikale tribe of Ondo state. The traditional method of processing cassava tubers into pupuru involves, cassava tuber harvesting, peeling, washing, soaking, dewatering, moulding and smoking. The pressed and mashed cassava tubers are then rolled or moulded into a ball shape and dried by smoking: it was observed that the pupuru produced by this method is infested with unpleasant odour, drudgery, poor packaging and cannot be stored for a long period. Hence, this project investigates in detail an improved method that will eliminate the deficiencies associated with the traditional method of pupuru production. The proximate composition, sensory evaluation, PH, hydrocyanide content, density and water absorption capacity of the resulted pupuru from the improved method were determined. The moisture content (10.21%) was lower than the moisture content of the traditionally produced pupuru which is 24.01%. Also, the HCN content which is 0.81 mg/kg was found to be lower to the traditionally produced pupuru which was 1.45 mg/kg. With the introduction of improved techniques and modern equipment, this study has led to the production of improved pupuru with better organoleptic qualities such as colour, odour, mouldability, stickiness and texture. The improved method involves harvesting, peeling, washing, soaking, dewatering, pressing, sundrying, milling, sieving, remilling and packaging with the use of machines and methods that reduce the problem of traditional production minimally.

CHAPTER ONE

INTRODUCTION

1.2 BACKGROUND OF THE STUDY

Cassava (*Manihot Esculenta* Crantz) is a dicotyledonous plant belonging to the botanical family Euphorbiaceae. Cassava is primarily a source of carbohydrates and contains very little protein or fat. It is a staple food for over 500 million people in the developing world, (FAO, 2005).

Cassava tubers are highly perishable and cannot be kept in fresh condition for more than a few days after harvest without serious deterioration in quality. In order to extend its shelf life, cassava is being processed into dried products in a variety of ways in different parts of the world to meet the local needs, taste and storage.

The major process and form of cassava tuber fall into four general categories: meal, flour, chips and starch. (FAO, 2005). Traditionally, cassava roots are processed by various methods into numerous products, such as, Garri, fufu, lafun, abacha, pupuru e.t.c.

Cassava is widely used for both human consumption, livestock feed and various forms of Industrial uses, (FAO, 2006). It can be prepared by boiling, baking, frying and roasting. The young leaves of sweet cassava are used as vegetable greens and they are more wholesome than the roots since they contain high amount of protein, the leaves are also valuable food for particular goats, (Ihekoronye and Ngoddy, 1995). Also, there is an increase in the use of cassava in industrial fermentation for alcohol production and for microbial protein production for animal feed (FAO, 2005).

About 19% of the world production of cassava is used in the manufacture of industrial starch products (such as in laundry, gums and adhesive). And in the preparation of pharmaceuticals and in production of alcohols, (Agbo-Egbe and Mbome, 2006). The demand for these products is on the increase and Governments

interest in cassava research is also increasing with strong emphasis on mechanization. This is because cassava processing is labour intensive and the quality of the locally processed items are below acceptable standards. Lack of mechanization is responsible for the long time required for processing a given product.

Major importance of cassava processing according to.....includes:

Traditional processing methods produce shelf stable products e.g. gari, kokonte.

Grating, fermentation and other unit operations reduce the level of cyanide in cassava.

Cassava fermentation by lactic acid bacteria e.g. in gari, agbelima, akyeke, improves safety of the product against pathogens, reduce cyanide content, improves nutritional value.

New cassava products can be developed to expand market for cassava including downstream processing of cassava flour and cassava starch.

Cassava is one of the most drought tolerant crops and can be successfully grown on marginal soils, giving reasonable yields where many other crops do not grow well. One of the advantages of cassava over other starch crops is the variety of uses to which the roots can be subjected to (Olatidoye et al., 2010).

Cassava is a perennial woody shrub, grown as an annual and is a tropical root crop, requiring at least 8 months of warm weather to produce a crop. It is traditionally grown in a savanna climate, but can be grown in extremes of rainfall. Cassava is a major source of low cost carbohydrate for populations in the humid tropics (Onwueme, 1978). The largest producer of cassava is Brazil, followed by Thailand, Nigeria, Zaire and Indonesia.

In Nigeria, many traditional foods are processed from cassava roots among which are "Pupuru", lafun, fufu and gari amala and eaten with soup depending on the family income. Cassava may be supplemented with legumes in this zone, many people cannot afford the supplementation which in most cases are in form of expensive animal proteins (Olatidoye et al., 2010).

The cassava used for the "pupuru" is the bitter variety. The use of cassava as a food is limited by its perishability, protein content and potential toxicity. Processing methods have been devised to reduce their toxicity and at the same time convert the highly perishable roots to more stable products. These processes include, soaking, fermentation, drying and roasting. The toxicity is due to the cyanogenic glycoside. Fermentation is one method by which cyanogenic glycoside in "pupuru" can be reduced and also result in the production of volatile compounds that give "pupuru" its unique flavor and colour. Most of the juice from the cassava pulp is expressed during this period.

"Pupuru" is commonly consumed by the people living in the riverine areas of the western, southern, eastern and the middle belts of Nigeria, where it is also known as "Ikwurikwu" [Aboaba, et al, 1988; Shittu, 2001]. It is a traditional fermented, smoked-dried cassava food consumed in Southwestern Nigeria. The technology of "pupuru" processing originated from the Ikalẹ people of the Riverine area of Ondo State, Nigeria [Shittu, 2005].

The time allowed for fermentation is critical, if too short, detoxication process will be incomplete, resulting in a potential toxic product and if it is too long, the product will have a strong sour taste and the texture will be coarse (Azam Ali, Judge, Fellows and Battcock, 2003).

Pupuru is probably the most important staple food in riverine area of Nigeria (Ihekoronye and Ngoddy, 1995) and development of any real significance in cassava processing has been concentrated on its production. (Akinrele, 1964).

According to Olowoyo et al., (2000) and Ikujenlola and Lawson (2005), process modifications and the use of modern technology (machine) led to the production of improved Pupuru of better organoleptic qualities. The production technique involves the use of simple machines such as; fermentation tank, conditioned water for soaking, hydraulic pressing, kiln oven, rotary dryer and better packaging practices. These helped reduce the production and reconstitution time by 45 and 65% respectively (Ikujenlola and Lawson, 2005). The improved Pupuru will have a longer shelf life.

The fresh cassava tuber is peeled, washed, sliced and packed into sack and soaked in a flowing stream from 3–4 days to soften the root. The softened cassava tubers are then defibered followed by de-watering process which is achieved by placing a heavy stone or concrete slab on the bag containing the defibered cassava pulp. The de-watered cassava pulps are moulded into a ball shape and placed on a wooden platform called “aka” and smoked for three days. The smoked pupuru can be further processed to make pupuru flour. (Olaoluwa et al 2012).

The disadvantages of traditional methods of pupuru production include poor shelf-life and the offensive odour which is caused by the fermentation process used. The local farmers in the rural areas may sometimes soak the cassava tubers with the peels in the stream inside a traditional pot for a good number of days. These local methods do not promote ease of production and at the same time large scale production is hindered. (Olaoluwa et al 2012).

Other disadvantages of traditional processing which tends to pose problems to quality pupuru flours as stated by..... includes:

High labour input – manual operations and low efficiency.

Scattered and uneconomical nature of operations.

Time consuming nature of the processes.

Lack of quality assurance and Poor product packaging.

Highly perishable – short storage life

Low levels of protein

Some varieties of cassava contain high levels of Cyanogenic glucosides which impart toxicity to the plant

However, because of the problems associated with the traditional method of pupuru production, the objective of this study is aimed at;

improving method of pupuru production that will reduce to minimum the problems associated with the local method as stated above.

examine the stages that products undergo and the time spent

To help reduce the odour and increase the shelf life of traditional cassava flour.

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