

Preparation of Ghanaian Dish ‘Fufu’ With Evaporated Milk

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Abstract Fufu is a staple and well patronised traditional Ghanaian dish. It is mainly made from cassava or yam, mostly with added unripe plantain or cocoyam. The food is almost always eaten with soup. In the current study, evaporated milk has been used in preparation of the dish as well as the soup that mainly goes with the food. A ratio of 2:1 evaporated milk and water was used to prepare the food; and the soup was also prepared by using the same milk and ground-nut paste to obtain a creamy soup that had chicken as the accompaniment. Eighty percent (80%) of the five food evaluation experts who assessed the food indicated that they extremely liked the product of the new recipe; the remaining 20% also liked the food very much. The food was generally accepted by all the experts who recommended incorporation of milk into preparation of the meal from time to time. Preparation of the food with milk adds the rich nutrient components of the milk to the cassava which principally contains carbohydrate to make up for some nutrients that may be lacking in the food. Adding milk to the mainly carbohydrate-rich fufu is therefore highly recommended as this will make the food richer in nutrients required by the body. Furthermore, the study has shown that milk can be used in the preparation of main course meals apart from the normal beverages and light food in which the product is mainly used.

Keywords: *fufu, evaporated milk, soup, cassava*

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1. Introduction

Fufu is a common food in West and Central Africa. In other parts of the world such as the Caribbean and many nations with population of West African origin, fufu, presented in different forms is normally eaten. It is mainly prepared by pounding boiled cassava or yam, most often with boiled plantain or cocoyam, in a wooden mortar using wooden pestle until the required texture is obtained. The pounding requires a lot of energy thereby making preparation of the food a laborious task, especially if it is to be prepared for many people as in restaurants or food joints popularly known as ‘Chop Bar’ in Ghana. In order to circumvent the arduous task of pounding, machines are now used in some facilities to do the pounding. Additionally, some companies have formulated the cassava and the plantain or cocoyam used as the main components of the food into powders, commonly called ‘Fufu Powder’ for commerce. Fufu is prepared from the powder by kneading it (the powder) in warm or hot water with wooden ladle; more warm water is added from time to time until one’s required texture is attained. Whether the food is prepared from the powder or it is pounded in a mortar with pestle the texture must always be soft enough

to make it swallowable without chewing. Fufu is almost always taken with soup which may contain meat, fish, chicken, mushroom, etc. The soup can be made from vegetables, seeds, fruits or any preferred ingredients. In the Nigerian context, fufu is one of the food forms of cassava fermentation, reconstituted by boiling in water to form a dough that is eaten with flavoured sauces [1].

Cassava (*Manihot esculenta* Crantz), the main ingredient in preparation of fufu, is the third most important source of calories in the tropics, after rice and maize, and millions of people depend on it in Africa, Asia and Latin America [2]. Though cassava provides a relatively inexpensive amount of calories, it is not a complete food as it lacks many other food nutrients. This is one of the reasons why other tropical food crop such as plantain or cocoyam is mostly added to cassava in preparation of fufu to improve the nutritional value. Consumers of the food may get other nutrients from the content of the soup and its content used with the food.

To further improve on the nutritional value of the food, evaporated milk has been used in its preparation. Milk is rich in many food nutrients required for healthy growth and development; the more reason why infants are fed on breast milk and other milk products from birth. Various types of milk have been used in preparation of mainly light food such as tea, coffee, cocoa, porridge. Varieties of

milk ranging from natural whole milk through skimmed or semi-skimmed, to evaporated and condensed milk are available in most countries [3]. When the water content of whole (fresh) milk obtained from herd or other animals is reduced by about 60% under low pressure at a temperature of 60 – 65°C, the homogenised reduced volume milk is normally referred to as evaporated milk. Milk is normally processed into different dairy products including cheese, yoghurts, ice cream and butter; and it can be fortified with vitamins and essential minerals.

Milk and milk products have been used as recipe in many dishes world-wide. It can be incorporated into daily cooking recipes ranging from chicken fried steaks to soup. In Ghana and in fact most African countries, milk is not much experimented on in new recipes. This is mainly because fresh milk is relatively not easy to come by, as compared to evaporated milk; and the evaporated ones are also much more expensive than the fresh milk. Few households and institutions use milk in trying new recipes. One such recipe recently designed is the use of evaporated milk in preparation of 'fufu', a local traditional food in Ghana.

In the fufu recipe with milk presented in this study, evaporated milk has been used to prepare the food from the fufu powder; and the same milk together with ground-nut paste, was used to prepare a creamy soup to take with the food. The aim is to introduce the use of milk in main course dish; milk has almost always been used in preparation of 'light food' in Ghana and other parts of the world. Additionally, the new recipe seeks to incorporate food nutrients that may be lacking in the mainly carbohydrate food (fufu) so that consumers would obtain most food nutrients from its consumption.

2. Materials and Methods

2.1. Source of Ingredients

The main ingredients used in preparation of the food (fufu) and the soup were purchased from a local market, known as Asafo market. The market is located at the central part of Kumasi, the regional Capital of the Ashanti Region of Ghana.

Major ingredients bought from the market included the fufu powder made from cassava and some amount of plantain (Neat® Fufu Powder produced by Neat Foods Company Ltd in Accra, Ghana); Ideal® evaporated milk produced by Nestle Ghana Ltd in Tema; ground-nut paste, ginger, white garden eggs, pepper, onion, garlic, fresh tomatoes, frozen local chicken, spice (Maggi® produced by Nestle Ghana Ltd in Tema, Ghana).

2.2. Preparation of Milk Fufu

Washed sauce pan was placed on fire from a gas oven (Olis Italia, manufactured in Italy) and 500ml of Ideal evaporated put in the pan. The milk was allowed to simmer and then 250ml of water was added. The 2:1 milk and water mixture was then allowed to boil for 3 minutes. The fufu powder (about 700g) was poured gradually into the boiling mixture whilst stirring. The preparation was kneaded gentle and uniformly, with occasional addition of more milk and water mixture in the stated ratio, until a smooth soft solid mass that can be swallowed without

mastication was obtained. This was moulded into oval shapes and placed in nice bowls; ready to be eaten with soup.

2.3. Preparation of Milk Soup

Defrosted chicken was chopped into pieces and steamed. Three hundred grams (300g) of ground-nut paste was added to the chicken being seasoned; and a litre of 1:1 milk and water was added. Previously boiled, cooled and blended mixture of tomatoes, garden eggs and pepper was also added to the chicken soup. Maggie spice and salt were added. The milk-water mixture was added periodically any time the soup was found to becoming too thick. The soup was allowed to boil gently till it became well-cooked. This was used to serve the prepared milk fufu.

2.4. Sensory Evaluation

Organoleptic characteristics such aroma, colour, texture, taste and general satisfactoriness of the food and soup were assessed using the 9-point hedonic scale [4]. Five experts (four females and one male) from the Faculty of Applied Science, Kumasi Polytechnic, who have rich experience in sensory evaluation of food products gave assessment on the sensory characteristics of the food. The experts took cognisance of the aroma, observed the colour, tasted the food, and gave comments on the texture and general acceptability of the evaporated milk fufu and milk soup under consideration.

3. Results and Discussion

Fufu and soup is largely patronised by many people in Ghana. Some prefer taking the fufu with palm-nut soup, and others like it with ground-nut soup. Some also like it with 'light' soup (soup made from vegetables like garden-eggs, pepper, tomatoes, etc). Fufu which is mainly a carbohydrate food is eaten generally with the right hand in Ghana; where an easily swallowable piece shaped into a ball, with indentation made in it to scoop the soup that goes with it, is swallowed. The nutritional value obtained from consumption of the food is largely dependent on the soup and its accompaniment such as the fish or meat present in the soup and the type of vegetable used in making the soup. Cassava which is the main ingredient of fufu is rich in carbohydrates [5] which help supply the body with its energy requirement [5]. Plantain also provides some amount of carbohydrate and fibre [6,7]. Additionally, it supplies a good amount of potassium and other minerals [8]; hence its choice as recommended food for those suffering from hypokalaemia (low amount of potassium in the blood). The vegetables in the soup also serve to supply vitamins and minerals, whilst the fish and/or meat provide protein [9,10] for tissue and muscle development as well as controlling biochemical reactions and helping the immune system [11].

Inclusion of evaporated milk in fufu and the soup adds unique nutritional value to the preparation. The use of the milk in preparation of fufu can be seen as biofortification, a process of adding nutritional value to a crop [12]. In this instance the cassava being the crop has received nutritional value from the milk added.

The presence of the evaporated milk made the fufu appear creamy in colour as compared with that which is normally made with only water (Plate 1).



Plate 1. Fufu prepared with evaporated milk (A) and fufu prepared with only water (B)

Evaporated milk contains fat (including saturated fatty acid), carbohydrate and protein. It also contains calcium and sodium, and has been enriched with vitamin A.

Calcium is a key mineral element required for building the skeleton and maintaining bone mass throughout life. About 99% of the calcium in the body is found in bones, with the remaining 1% playing vital functions such as coagulation of blood, muscle and heart activity, arterial blood pressure, transmission of nerve impulses to muscle, function of a number of enzymes, in the body [13]. The

human body does not synthesise calcium, and its level is required to remain fairly constant. As it is lost through sweat, faeces and urine, there must be adequate consumption to ensure maintenance of its level in the blood. Absence or inadequate intake of the mineral will cause the body to draw on the reserves present in the skeleton, thereby leading to osteoporosis especially in elderly women.

Calcium can be obtained from, apart from milk, other sources such as fish, meat and vegetables. That obtained from milk has advantages over those from other sources mainly because milk calcium is particularly well absorbed, bioavailable and most milk products contain the mineral (calcium) in sufficient quantities. Interaction between calcium and other components in milk (such as lactose, caseinophospho-peptides, vitamin D, etc) enhance absorption and bioavailability. Some compounds like oxalic acid, phytic acid and tannins present in some vegetables containing calcium may interfere with absorption and utilization of calcium [14]. This means that equivalent calcium contents, of say milk and spinach, do not guarantee equivalent nutritional values [15].

The sodium present in the milk will also help ensure proper hydration of the cells and the body as a whole. Additionally, this mineral is an important factor in muscle and heart contractions as well as in nerve impulses transmission.

Table 1. Panelists' evaluation of fufu made with evaporated milk using the Hedonic scale.

Attribute	Scale	LE	LVM	LM	LS	N	DS	DM	DVM	DE
Colour		4	1	-	-	-	-	-	-	-
Taste		3	2	-	-	-	-	-	-	-
Flavour/ Aroma		3	2	-	-	-	-	-	-	-
Texture		2	3	-	-	-	-	-	-	-
General Acceptability		4	1	-	-	-	-	-	-	-

Key:

- LE - Like Extremely
- LVM - Like Very Much
- LM - Like Moderately
- LS - Like Slightly
- N - Neither Like nor Dislike
- DS - Dislike Slightly
- DM - Dislike Moderately
- DVM - Dislike Very Much
- DE - Dislike Extremely.

On the sensory evaluation of the food, the 9-Point Hedonic Scale developed by Peryam and colleagues in 1952 [16] which gives the acceptability and other organoleptic characteristics of food was employed. The scale gives a nine-point evaluation options namely; *Like Extremely*; *Like Very Much*; *Like Moderately*; *Like Slightly*; *Neither Like nor Dislike*; *Dislike Slightly*; *Dislike Moderately*; *Dislike Very Much*; *Dislike Extremely*. Using this scale all the experts who evaluated the food gave highly positive comments about the evaporated milk fufu and the soup. Three of the five panelist indicated that liked extremely the aroma of the food and soup, whilst the other two liked it very much. On the colour, four of the evaluators liked it extremely whilst one liked it very much. The texture of the food, which in this context refers to how the food felt with the fingers, in the mouth and when swallowing, was also extremely liked by two, and the others liked it very much. On the taste, 60% said they liked it extremely, and 40%, very much. Eighty percent

(80%) of the panelists described the food as very much acceptable, and 20% saw it as extremely acceptable. In general all the panellists or judges were very much satisfied with the new milk fufu recipe, which hitherto was unknown.

4. Conclusion

Fufu is a well patronised food in Ghana; eaten by both the rich and the poor. As cassava is the main ingredient, if the accompanying soup does not contain enough vegetables and fish and/or meat, consumers would not get enough nutrients required for body building and other metabolic activities. This may lead to diseases associated with lack of proper food nutrients such as kwashiorkor. Incorporation of evaporated milk adds rich nutrients to the food to augment its nutritional value. Consumption of such food will therefore help circumvent some of the

disease that the poor people especially, children, tend to suffer from as a result of lack of proper nutrients in their meals. The study has also introduced the use of evaporated milk in the preparation of a main course meal; milk is hardly found as an ingredient in main meal. Milk could be introduced in the preparation of other main dishes in various cultures to benefit from the rich nutrients it contains.

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