



TIGER NUTS: FOOD PRODUCTS, NUTRITIONAL AND HEALTH BENEFITS

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ABSTRACT

Cyperus esculentus is a crop of the sedge family which is spread all over the world. The plant is reproduced by rhizomes, seeds and tubers. The seeds of the plant are quite unique with a cluster of flat, oval seeds. Its colour ranges from straw colour to gold brown. Tiger nut has a smooth tender, sweet and nutty taste. It can be consumed raw, dried or as tiger nut milk. It has several nutritional and health benefits, and can also be used in cosmetic industry. It can be processed into oil, flour and milk. Records have it that a lot of research has been done on tiger nuts but there is still need for increased utilization and awareness about its health benefits.

KEYWORDS: *Cyperus esculentus*.

INTRODUCTION

Tiger nut (*Cyperus esculentus*) is a crop of the sedge family which is spread all over the world. The tiger nut plant is an annual plant which grows up to 90cm tall, with solitary stems growing from tuber. The plant is reproduced by rhizomes, seeds and tubers. The stems have slender leaves, about 3-10mm wide. The seeds of the plant are quite unique with a cluster of flat, oval seeds. The colour ranges from straw-coloured to gold brown. The plant foliage is quite tough and is often mistaken as grass. It is found in most of the western hemisphere, as well as southern Europe, Africa, Madagascar, the middle east and the Indian subcontinent. *Cyperus esculentus* can be found wild, as a weed or as a crop. Evidence exists for its cultivation in Egypt since sixth millennium BC and for several centuries in southern Europe. In Spain *Cyperus*

esculentus is cultivated for its edible tubers called earth almonds or tiger nuts, for the preparation of horchata de chufa, a sweet milk beverage. In Egypt it is used as a source of food medicine and perfumes. Tiger nuts are also known as chufa, sedge, nut grass, yellow nutsedge, tiger nut sedge or earth almond. It is known in Nigeria as "Aya" in Hausa, "ofio" in Yoruba and "akiausa" in Igbo where it is cultivated in three varieties; black, brown and yellow. Among these, the yellow variety is preferred because of its properties such as large size, attractive colour and fleshier nature. It also yields more milk during extraction, contains lower fat and higher protein and less anti-nutritional factors especially poliphenol (Okafor et al 2003). Records have it that a lot of research has been done on tiger nuts (Eteshola and Okafor, 1996; Devries 1991; Cortes et al 2005), there is still need for increased utilization and awareness about its health benefits.



Fig. 1: Tiger nut (*Cyperus esculentus*) plant and Fresh nut.

Products from Tiger Nuts

Dried *Cyperasus esculentus* has a smooth tender, sweet and nutty taste. It could be made into tiger nut milk, flour and oil.

Tiger Nut Milk

Tiger nut milk is a very nutritive and energetic drink. It is high in starch, glucose and proteins. It is also rich in minerals like potassium, phosphorus, vitamins E and C. Its milk contain large amount of oleic acid and it is cardiac preventive. It defends the internal mechanisms and prevents both constipation and diarrhoea. It is also used as flavouring agent for ice cream and biscuits

(Cantelejo, 1997). It is also used for the production of nougat, jam, beer, and as a flavouring agent in ice cream and in the preparation of kunnu, a local beverage in Nigeria (Belewu and aboderin 2008). Kunnu is a non alcoholic beverage prepared mainly from cereals by heating and mixing with spices and sugar. Tiger nut “milk” has been tried as an alternative source of milk in fermented products such as yoghurt production, and other fermented products common in some African countries and thus be useful in replacing milk in the diet of people intolerant to lactose to certain extent (sanchez et al, 2012). The production process for tiger nut milk is shown in figure 2.

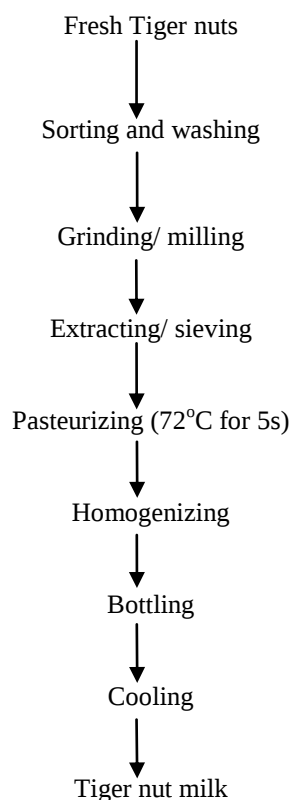


Fig. 2: Flow Chart for Tiger nut milk production.

Tiger Nut Flour

Tiger nut has a unique sweet that is found to be ideal for use in the baking industry. It can be used to make delicious cakes and biscuits and also as component of fruit flavors. Through various analysis, there is a strong belief in the benefits of flour for health reasons as it has been found to be an alternative for dietetics and it is gluten free which in any case, is a positive alternative within the use of any type of flour (www.tigernuts.com). It is a good alternative to wheat flour, as it is gluten free and good for people who cannot take gluten in their diet. It is considered a good flour or additive for the baking industry, because of its natural sugar (good option for diabetics). The high fiber content of its raw material (tiger nut) makes the product very healthy. Tiger nut flour does not lose any of its nutritional properties in the milling process (Salau et al, 2012). The chemical composition and functional properties of flour produced

from two varieties; yellow and brown varieties of tiger nuts have been studied (Oladele and Aina, 2007), which could find useful application in food formulation (Table 1 & 2). It has also been reported that tiger nuts with its therapeutic and nutritional advantage could serve as good alternative to cassava in baking industry (Ade Omowaye et al, 2008).

Table 1: Proximate Composition of Tiger nut flour.

S/N	Constituent	Yellow variety (%)	Brown variety (%)
1	Moisture	3.50	3.78
2	Fat	32.13	35.43
3	Protein	7.15	9.70
4	Ash	3.97	4.25
5	Carbohydrate	46.99	41.22
6	Crude fibre	6.26	5.62
7	Energy value (KJ)	1343.00	1511.00

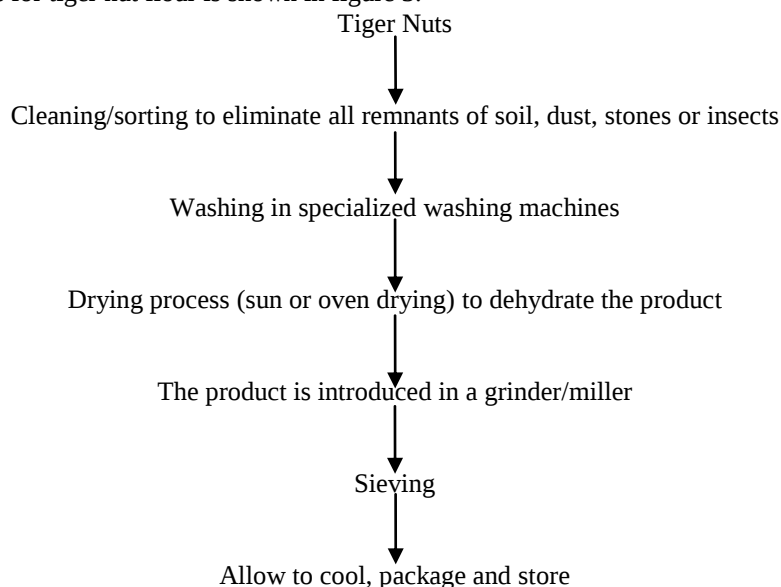
Source: Oladele and Aina (2007).

Table 2: Mineral Composition of Tiger nut flour (mg/100g flour).

S/N	Mineral Element	Yellow Variety	Brown Variety
1	Calcium	155.00	140.00
2	Sodium	245.00	235.00
3	Potassium	216.00	255.00
4	Magnesium	51.20	56.30
5	Manganese	33.20	38.41
6	Phosphorus	121.00	121.00
7	Iron	0.65	0.80
8	Zinc	0.01	0.01
9	Copper	0.02	0.01

Source: Oladele and Aina (2007).

The production process for tiger nut flour is shown in figure 3.

**Fig. 3: Flow Chart for the processing of Tiger nut flour (Tiger nut traders 2005).**

Tiger Nut Oil

The edible and stable oil obtained from the tuber is said to be superior oil that compares favourably with olive oil. It is regarded as high quality oil due to its extraction without adding any external heat (cold pressed oil), and is highly recommended for cooking over other oils because it is more resistant to chemical decomposition at high temperatures. Furthermore, less fat is absorbed into the food as it creates a crust on the surface during cooking, preventing the oil itself being absorbed into the product. Tiger nut oils can be used naturally with salads or for deep frying. It is considered to be high quality oil. The oil of the tuber was found to contain 18% (palmitic

acid and stearic acid) and 82% unsaturated (oleic acid and linoleic acid) fatty acids. The moderately high content of phytosterols further enriches the quality and value of tiger nut oil as a food source.

Since the tubers of *Cyperus esculentus* contain 20-36% oil, it has been suggested as potential oil crop for the production of biodiesel (Heyz et al 1995). The production process for tiger nut oil is shown in figure 4.

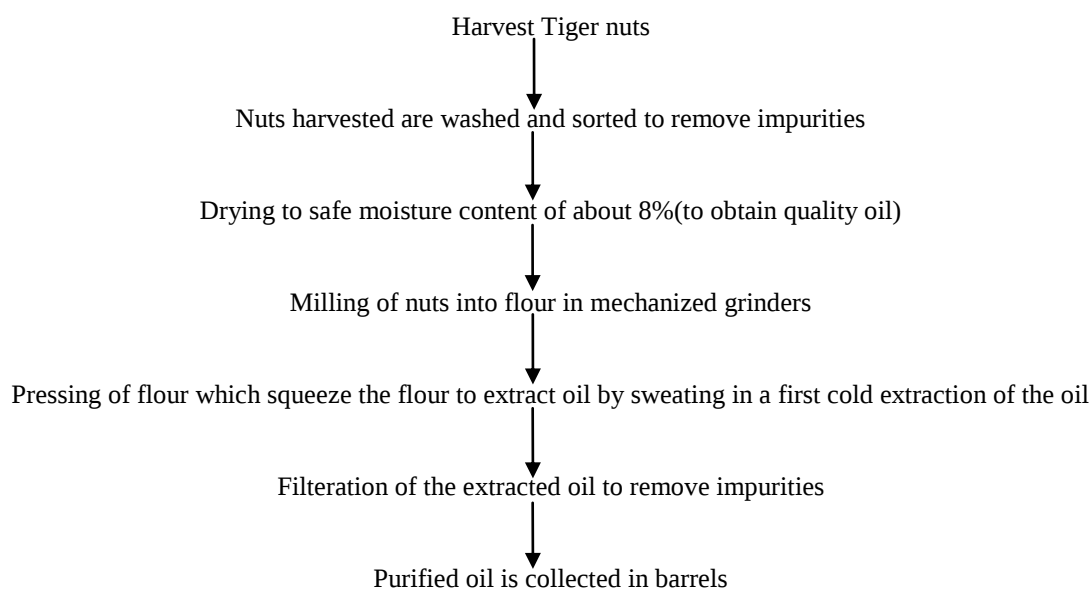


Fig. 4: Production process for the production of Tiger nut oil.

Nutritional and Health benefits of Tiger Nuts

The tubers of *Cyperus esculentus* were used in pharmacy under the latin name bulbuli thrasi beginning no later than the 18th century.

Cyperus esculentus has been reported to be a “health” food, since its consumption help in preventing heart diseases, thrombosis and activates blood circulation, responsible for preventing and treating urinary tract and bacterial infection, assist in reducing the risk of colon cancer (Adejuyitan *et al.*, 2009). They are thought to be beneficial to diabetics and those seeking to reduce cholesterol or lose weight, the very high fibre content combined with a delicious taste make them ideal for health eating. Tiger nut milk has been found to be good for preventing arteriosclerosis, since its consumption can help prevent heart problems and thrombosis and activate blood circulation (Chukwuma *et al.*, 2010). Tiger nut without sugar can be used for diabetes for the carbohydrate content with best of sucrose and starch{without glucose} and due to its high content of Arginine, which liberates the hormone insulin. Tiger nut milk is also a suitable drink for celiac patients, who are not able to tolerate gluten and also for the lactose-intolerant who stay away from cow milk and many dairy foods. In Ayurvedic medicine, Tiger nuts were recommended for those who have problems with digestion, flatulence, and diarrhoea because it provides some digestive enzymes like catalase, lipase, and amylase (Adejuyitan, 2011). Tiger nut milk is also said to be recommended for those who have heavy digestion, flatulence, dysentery and diarrhea because it provides a lot of digestive enzymes diuretic, stimulant and tonic in addition to being thirst quencher (Abaejoh *et al.*, 2006). Tiger nut milk is said to be rich in minerals, like phosphorus, calcium and magnesium, iron and in vitamin C and E which are essential for body growth and development. Its energetic value (100 cal/100g) makes it a very good energetic drink. A very important point is

that it does not contain lactose or gluten (Belewu and Abodunrin, 2006). Tiger nuts are said to be aphrodisiac and carminative, also promote urine production and menstruation. The tiger nut has higher fiber content than the oat bran, the cabbage, the carrot, plums etc. The fiber helps prevent constipation and acts as an appetite suppressant, which helps us to control our body weight. Tiger nut oil is used in cosmetic industry. As an antioxidant (because of its high content in vitamin E) it helps slow down the ageing of the body cells. It favours the elasticity of the skin and reduces skin wrinkles. It supplies the body with enough quantity of vitamin E, very essential for fertility in both men and women. It promotes the production of urine and this is why it is a preventive measure for cyst, prostrate, hernia, rectum deformation and prolapsed anal fissure. It also helps to prevent endometriosis or fibrosis as well as blockage of the tip of the fallopian tube. The oil reduces low density lipoprotein-cholesterol (LDL-C) and increases high density lipoprotein-cholesterol (HDL-C), reduces levels of triglycerides in blood and the risk of forming bloody clots, thereby preventing arteriosclerosis. It also stimulates the absorption of calcium in bones and the production of new bony material, due to short and medium chain fatty acids, oleic acid and essential fatty acid. It is also recommended for infants and the elderly because of its high content in Vitamin E and its antioxidant benefits in the cell membrane (David, 2010).

CONCLUSION

Considering the nutritive and health benefits of the underutilized Tiger nuts, there is need for increased utilization and awareness of its health benefits. Moreover it is suggested that products from Tiger nuts should be encouraged so as to solve the problem of malnutrition and high price of milk products in Africa and Nigeria in particular.

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