



American Journal of  
**Food Technology**

ISSN 1557-4571



Academic  
Journals Inc.

[www.academicjournals.com](http://www.academicjournals.com)

## **Tigernut Processing: Its Food uses and Health Benefits**

J.A. Adejuyitan

Department of Food Science and Engineering, Ladoke Akintola University of Technology, P.M.B 4000, Ogbomoso, Nigeria

### **ABSTRACT**

The search for lesser known and underutilized crops, many of which are potentially valuable as human and animal foods has been intensified to maintain a balance between population growth and agricultural productivity, particularly in the tropical and sub-tropical areas of the world. Tigernut (*Cyperus esculentus*) is an underutilized crop of the family Cyperaceae which produces rhizomes from the base and tubers that are somewhat spherical. Many authors have reported the nutritional value of tigernut. Tigernut produces high quality oil about 25.5% of its content and protein about 8% of the nut. The nut is high in oil content and the oil was implicated as lauric acid grade oil, non acidic stable and very low unsaturated. The nuts were valued for their nutritious starch content, dietary fibre and carbohydrate. The nut is also very rich in mineral content (Sodium, Calcium, Potassium, Magnesium, Zinc and traces of Copper. Its tubers are also said to be aphrodisiac, carminative, diuretic, emmanogogue, stimulant and tonic. Tigernut has also been reported to be used in the treatment of flatulence, indigestion, diarrhoea, dysentery and excessive thirst. In addition, tigernut has been demonstrated to contain higher essential amino acids than those proposed in the protein standard for satisfying adult needs. There is the need for increased utilization and awareness about its health benefits.

**Key words:** Tigernuts, nutritional value, health benefits

### **INTRODUCTION**

Tigernut (*Cyperus esculentus* L.) is an underutilized crop which belongs to the division-Magnoliophyta, classliliopsida, order - cyperales and family-Cyperaceae (family) and was found to be a cosmopolitan perennial crop of the same genus as the papyrus plant. Other names of the plant are earth almond as well as yellow nut grass (Odoemelán, 2003; Belewu and Belewu, 2007). Tigernut has been cultivated since early times (chiefly in south Europe and West Africa) for its small tuberous rhizomes which are eaten raw or roasted, used as hog feed or pressed for its juice to make a beverage. Non-drying oil (usually called chufa) is equally obtained from the rhizome. In West Africa, the plant is gathered from the wild while it is a troublesome weed in planted field in S. United States (Belewu and Belewu, 2007). The nut was found to be rich in myristic acid, oleic acid, linoleic acid (Eteshola and Oraedu, 1996). In Egypt, it is used as a source of food, medicine and perfumes (De-Vries, 1991). Tigernut is commonly known as earth almond, chufa and chew-fa and Zulu nuts. It is known in Nigeria as Aya in Hausa, Ofio in Yoruba and Akiausa in Igbo where three varieties (black, brown and yellow) are cultivated. Among these, only two varieties, yellow and brown are readily available in the market. The yellow variety is preferred to all other varieties because of its inherent properties like its bigger size, attractive colour and fleshier body. The yellow variety also yields more milk upon extraction, contains lower fat and more protein and possesses

less anti-nutritional factors especially polyphenols (Okafor *et al.*, 2003). Tigernut can be eaten raw, roasted, dried, baked or be made into a refreshing beverage called Horchata De Chufas or tigernut milk (Fig. 1). Tigernut milk is a very nutritive and energetic drink, both for young and old. It is a tremendously high in starch, glucose and proteins. Also rich in minerals like Potassium, Phosphorous, Vitamins E and C. Tigernut milk contains a large amount of Oleic acid and is cardiac preventive. It defends the internal mechanisms and prevents both constipation and diarrhoea. Tigernut milk has never been found to produce allergy (TIGERNUTS TRADERS, Belewu and Abodunrin, 2008). It also finds uses as a flavouring agent for ice cream and biscuits (Cantalejo, 1997), as well as in making oil, soap, starch and flour. Although, many researchers have worked on tiger nut (Eteshola and Oraedu, 1996; De-Vries, 1991; Cortes *et al.*, 2005; Addy and Eteshola, 1984), yet there is the need for increased utilization and awareness about its health benefits. Belewu and Abodunrin (2008) has also found its usefulness in the preparation of kunun (a local beverage in Nigeria). The chemical composition and functional properties of flour produced from two varieties (yellow and brown) of tigernut (*Cyperus esculentus*) have been studied (Oladele and Aina, 2007) which could find useful application in food formulation (Table 1, 2). The inclusion of 33.33% of Tigernut in the diet of cockerel starters was reported by Bamgbose *et al.* (2003). It has

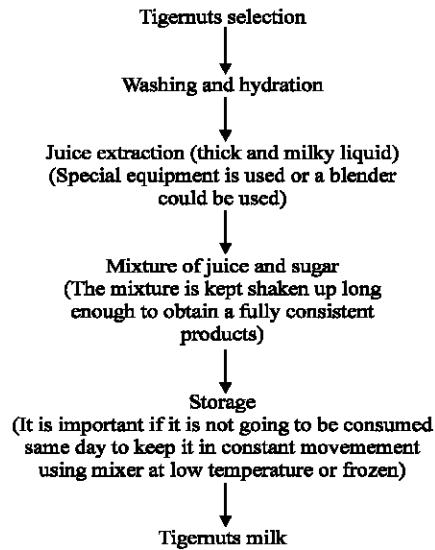


Fig. 1: Flowchart showing Tigernut Milk (Horchata) processing. Source: www.tigernuts.com. Tigernuts Traders, S.L

Table 1: Proximate composition of tigernut flour

Constituent	Yellow variety (%)	Brown variety (%)
Moisture	3.50	3.78
Fat	32.13	35.43
Protein	7.15	9.70
Ash	3.97	4.25
Carbohydrate	46.99	41.22
Crude fibre	6.26	5.62
Energy value (KJ)	1343.00	1511.00

Source: Oladele and Aina (2007)

Table 2: Mineral composition of tigernut flour (mg/100 g flour)

Mineral element	Yellow variety	Brown variety
Calcium	155.00	140.00
Sodium	245.00	235.00
Potassium	216.00	255.00
Magnesium	51.20	56.30
Manganese	33.20	38.41
Phosphorus	121.00	121.00
Iron	0.65	0.80
Zinc	0.01	0.01
Copper	0.02	0.01

Source: Oladele and Aina (2007)

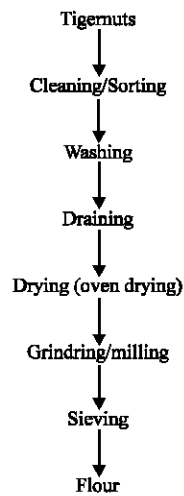


Fig. 2: Flowchart showing tigernut flour processing

also been reported that, tigernut, with its inherent nutritional and therapeutic advantage, could serve as good alternative to cassava in baking industry (Ade-Omowaye *et al.*, 2008). Fermentation process has also been applied to improve the nutrient of the tigernut flour (Adejuyitan *et al.*, 2009).

### HEALTH BENEFITS FROM TIGERNUT CONSUMPTION

Tigernut (*Cyperus esculentus*), an underutilized crop, was reported to be high in dietary fibre content, which could be effective in the treatment and prevention of many diseases including colon cancer, coronary hearth diseases, obesity, diabetics and gastro intestinal disorders (Anderson *et al.*, 1994). Tigernut flour has been demonstrated to be a rich source of quality oil and contains moderate amount of protein. It is also an excellent source of some useful minerals such as iron and calcium which are essential for body growth and development (Oladele and Aina, 2007). The process of flour production is as shown in Fig. 2. Its tubers are also said to be aphrodisiac, carminative, diuretic, emmanogogue, stimulant and tonic (Chopra *et al.*, 1986; Chevallier, 1996). Tigernut has also been reported to be used in the treatment of flatulence, indigestion, diarrhoea, dysentery and excessive thirst (Chevallier, 1996). In addition, tigernut has been demonstrated to contain higher essential amino acids than those proposed in the protein standard by the FAO/WHO (1985) for satisfying adult needs (Bosch *et al.*, 2005). Tigernut milk has been found to be good for

the Arteriosclerosis which contains Arginina which is a precursor of nitric oxide which helps to the vein expanded effect. Tigernut milk without sugar can be drunk for diabetics for its content in Carbohydrates which a base of sucrose and starch (without glucose) and due to its content of Arginina which liberates the hormone that produces the insulin. Tigernut milk is also an ideal drink for people who are not able to take gluten and also for those who are able to take cow's milk and derivatives. It could also be recommended for those who have heavy digestions, flatulence and diarrhea because it provides us a lot of digestive enzymes like catalase, lipase and amylase (TIGERNUTS TRADERS).

## CONCLUSION

Considering the nutritive and health benefits of the underutilized tigernuts, there is the need for increased utilization and awareness of its health benefits. Moreover it is suggested that products from Tigernuts should be encouraged so as to solve the problem of protein-calorie malnutrition in Africa more so that high price of imported milk and milk products (for instance) coupled with poor milk production in Nigeria in particular and Africa in general seem to have made consumers more ready to accept milk produced from plant sources.

## REFERENCES

- Addy, E.O. and E. Eteshola, 1984. Nutritive value of a mixture of tigernut tubers (*Cyperus esculentus* L.) and baobab seeds (*Adansonia digitata* L.). *J. Sci. Food Agric.*, 35: 437-440.
- Ade-Omowaye, B.I.O., B.A. Akinwande, I.F. Bolarinwa and A.O. Adebisi, 2008. Evaluation of tigernut (*Cyperus esculentus*)–wheat composite flour and bread. *Afr. J. Food Sci.*, 2: 87-91.
- Adejuyitan, J.A., E.T. Otunola, E.A. Akande, I.F. Bolarinwa and F.M. Oladokun, 2009. Some physicochemical properties of flour obtained from fermentation of tigernut (*Cyperus esculentus*) sourced from a market in Ogbomoso, Nigeria. *Afr. J. Food Sci.*, 3: 51-55.
- Anderson, J.W., B.M. Smith and N.J. Gustafson, 1994. Health benefits and practical aspects of high fibre diets. *Am. J. Clin. Nutr.*, 59: 1242-1247.
- Bamgbose, A.M., D. Erubvetine and W. Dada, 2003. Utilization of tigernut (*Cyperus rotundus* L.) in the diets for cockerel starters. *Bioresour. Technol.*, 89: 245-248.
- Belewu, M.A. and K.Y. Belewu, 2007. Comparative physico-chemical evaluation of tigernut, soybean and coconut milk sources. *Int. J. Agric. Biol.*, 9: 785-787.
- Belewu, M.A. and A.O. Abodunrin, 2008. Preparation of Kunun from unexploited rich food source: Tigernut (*Cyperus esculentus*). *Pak. J. Nutr.*, 7: 109-111.
- Bosch, L., A. Alegria and R. Farre, 2005. RP-HPLC determination of tigernut and orgeat amino acid contents. *Food Sci. Technol. Int.*, 11: 33-40.
- Cantalejo, M.J., 1997. Analysis of volatile components derived from raw and roasted earth almond (*Cyperus esculentus* L.). *J. Agric. Food Chem.* 45: 1853-1860.
- Chevallier, A., 1996. *The Encyclopedia of Medicinal Plants*. Dorling Kindersley Publishers, London.
- Chopra, R.N., S.L. Nayar and I.C. Chopra, 1986. *Glossary of Indian Medicinal Plants*. Council of Science Industrial Research, New Delhi, India.
- Cortes, C., M.J. Esteve, A. Frigola and F. Torregrosa, 2005. Quality characteristics of horchata (A Spanish vegetable beverage) treated with pulsed electric fields during shelf-life. *Food Chem.*, 91: 319-325.
- De Vries, F.T., 1991. Chufa (*Cyperus esculentus*, Cyperaceae): A weedy cultivar or cultivated weed?. *Econ. Bot.*, 45: 27-37.

- Eteshola, E. and A.C.I. Oraedu, 1996. Fatty acid composition of tigernut tubers (*Cyperus esculentus* L.), baobab seeds (*Adasonia digitata* L.) and their mixture. *J. Am. Oil Chem. Soc.*, 73: 255-257.
- FAO/WHO/UNU, 1985. Expert Consultation. Energy and Protein Requirements. World Health Organization, Geneva.
- Odoemelan, S.A., 2003. Chemical composition and functional properties of conophor nut flour (*Tetracarpidium conophorum*) flour. *Int. J. Food Sci. Technol.*, 38: 729-734.
- Okafor, J.N.C., J.I. Mordi, A.U. Ozumba, H.M. Solomon and O. Olatunji, 2003. Preliminary studies on the characterization of contaminants in tigernut (Yellow variety). Proceedings of 27th Annual Nigerian Institute of Food Science and Technology (NIFST) Conference, Oct. 13-17, Nigeria, pp: 210-211.
- Oladele, A.K. and J.O. Aina, 2007. Chemical composition and functional properties of flour produced from two varieties of tiger nut (*Cyperus esculentus*). *Afr. J. Biotechnol.*, 6: 2473-2476.