

## Comparison of Proximate Analysis of Yellow and Brown Tiger Nut Found in Samaru Zaria, Kaduna State

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### Abstract

*This study aimed to conduct a comprehensive comparative analysis of the proximate of two different species of Tiger nuts. Tiger nuts are a widely consumed known for its good juicy taste, nutritional value and potential health benefits. From the study conducted it was found that the Yellow Tiger nut has higher moisture content and crude fat than the Brown specie while all other proximate composition including carbohydrates is far higher than that of Yellow Tiger nut with about 59 percent.*

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### Introduction

Tiger nuts usually grow along rivers and are often cultivated on a small scale by local farmers mostly in the northern parts of Nigeria. It is known as “aya” in Hausa; “akiawusa” in Igbo; “ofio” in Yoruba (Musa AA *et al.*, 2014) It is also called yellow nut sedge, “souchet” in French, “ermandeln” in German, and “chufa” in Spanish (Odoemelan SA. 2003, Bamishaiye E., 2011). Tiger nut is cultivated in Europe, South America and Asia, and Africa. Many varieties are cultivated, but only yellow and brown varieties are readily available in for public consumption. Many prefer yellow variety to others because of its attractive color, bigger size, and fleshier nuts. It also produces more milk upon extraction, contains more proteins, and possesses less anti-nutritional factors like polyphenols and lower fat [Mishra S., *et al* 2016]. Tiger nut milk is served as healthy drinks in restaurants as a refreshing beverage (even competing favorably with other soft drinks) in Spain for several years. Unfortunately, it has been underutilized in Nigeria probably due to inadequate knowledge on its potential values (Food and Agriculture Organization (FAO). 2005). Tiger nut can provide a huge market for Africa because many tribes in Africa, often collected and eaten raw, as a vegetable. Its ground flour can be mixed with sorghum to make ice-cream, milky drink and porridge. Tiger nut is considered to possess some therapeutic effects. Moore coined that good consumption of tiger nut milky drinks will significantly lead to healthier cholesterol levels. Belewu and Abodunrin *et al.*, found that tiger nut milk is a highly nutritive and energetic drink, high in starch, glucose, and proteins, rich in minerals elements like phosphorous and potassium,

as well as in vitamins C and E. It equally contains a high amount of oleic acid which can defend the internal mechanisms and prevent constipation, diarrhea and cardiac disorders. Consumption of tiger nut milk has not been associated with any form of allergy. (Aremu et al 2017) found that tiger nut was rich in myristic acid, oleic acid and linoleic acid.

### **Aim**

To compare the proximate analysis of yellow and brown tiger nut found in Samaru market Zaria.

### **Objectives**

To be able to determine the proximate analysis of yellow and brown tiger nut found in Samaru market.

To compare the proximate analysis of yellow and brown tiger nut with the view of promoting further utilization in Nigeria and the world at large.

### **Materials and Method**

#### **Sample Collection and Preparation**

The two species of fresh raw tiger nut (yellow and brown) were purchased from Samaru Market in Sabon Gari Local Government Kaduna State. They were manually removed and discarded. The two tiger nuts were washed thoroughly in two changes of clean water, drained and sun-dried. Each of the samples were carefully crushed using a mortar and pestle until a very fine consistency was achieved, sieved with 2mm mesh size sieve and stored in air-tight container prior to analysis.

#### **Study Location and Duration**

This research work was carried out at the Nigeria Institute of Leather and Science Technology Kaduna State, in the Department of Science and Laboratory Technology in 2023.

#### **Sample Size:**

38g each of the two samples of tiger nuts were used in the whole experimental. Experiments Procedure; Determination of moisture content: Two crucibles were washed, and oven dried in the hot-air oven at 105°C for 30 minutes. It was cooled in the desiccator and 2g of each of the samples were weighed into labeled crucibles, these were transferred to the hot air oven at a temperature of 105°C and normal atmospheric pressure to dry for 1 hour, removed, cooled in the desiccator, and weighed. These procedures were repeated until a constant weight was obtained for each sample. Calculation: Moisture (%) =  $\frac{\text{Initial Weight} - \text{Dry Weight}}{\text{Initial Weight}} \times 100$  Determination of crude ash: Two empty heat resistant crucibles were dried with cover (silica dish) at 500°C for 1 hour. The official method of the Association of Official analytical chemist (AOAC, 2005) (M.O Aremu et al 2015). was used. 2g of each sample were weighed into the crucible and reweighed. Each of the crucibles containing the samples were heated on a Bunsen-burner in a fume cupboard

until smoke ceased. Each of the samples were transferred to the muffle furnace at a temperature of 550°C then transferred into a desiccator and cooled for 15-30 minutes.

#### **Determination of crude fat:**

Soxhlet flask dried in an oven at 105°C, was allowed to cool and weighed ( $W_1$ ). Solvent extraction. 29g of each sample was weighed ( $W_2$ ) into a filter paper and introduced into a paper thimble and was transferred into a Soxhlet apparatus. A round bottom flask was fitted up to two quarters to the extractor with the condenser was fitted. Heating proceeds on a heating mantle using a temperature of 50°C for 45 minutes. The solvent was recovered and estimated by weight ( $W_3$ ) and the percentage fat calculated again, this was done in triplicate from each of the sample.

Calculation,

$$\text{Crude fat (\%)} = \frac{W_3 - W_1}{W_2} \times 100$$

Where:

$W_3$  - weight of fat

$W_2$  - weight of sample

$W_1$  - weight of the flask

#### **Determination of crude fibre:**

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3g of Sample was weighed into a beaker (250cm<sup>3</sup>). 100ml of 1.25% of sulphuric acid was added to the sample and heated to boil for 30-40 minutes. Excess foaming was reduced by adding 2ml of antifoam solution and boiled for 30 minutes, maintaining a constant volume by addition of water. The container was heated every few minutes to mix the contents well and the particles washed down from the sides. An 11cm filter paper was fitted in a Buchner funnel and hot water poured. into the funnel and allowed to stand until the funnel become hot. At the of the 30 minutes boiling, the acid was allowed to stand at approximately 1 minute and poured into a hot water in a prepared funnel. The suction of the filtration pump was adjusted in such a way that the buck of 200ml was filtered within 10 minutes. The insoluble matter was washed with boiling water until the washing became neutral to Litmus paper. The residue was washed into the beaker using 200mls measured at room temperature of 1.25% NaOH soluble and boiled for 30 minutes as described above and it was allowed to stand for approximately and was then filtered hot though, a filter crucible using gentle suction.

The whole of the insoluble materials was transferred to the crucible with hot washer and was washed with boiling water once with 10% HCl and then with H<sub>2</sub>O again until the washings are neutral to Litmus paper and washed twice with alcohol and two times with ether.

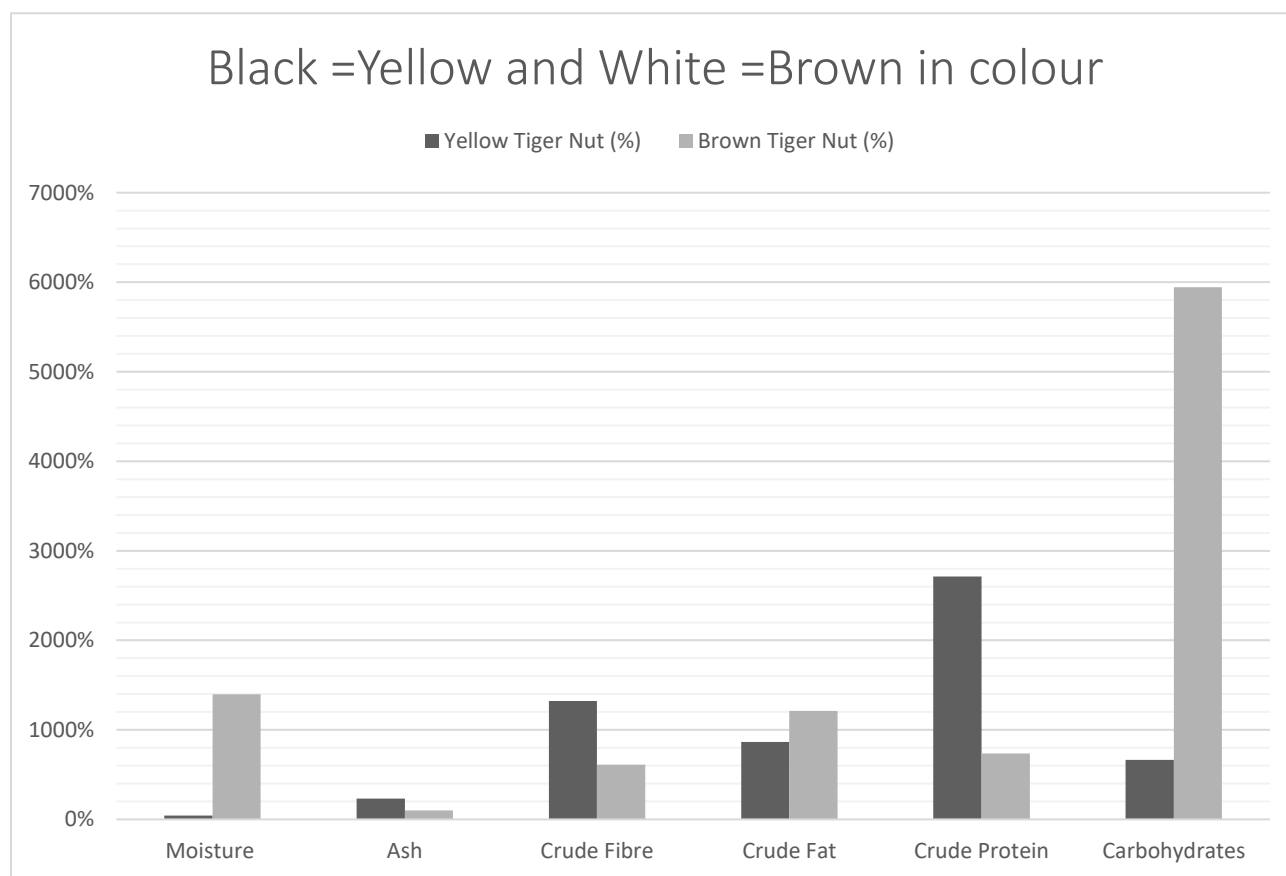
The crucible and its content were dried at 100°C and allowed to cool in a desiccator and was weighed. The crucible was placed in mantle furnace set at 450°C and the temperature maintained until washing was completed and finally the crucible was removed and cooled in a desiccator.

## Results and Discussion

TABLE 1 proximate analysis of

From the research carried out there are some notational differences between the two species of tiger nut the presented in the table below:

Parameters	Fresh Tiger Nut%	Dried Tiger Nut%
	Yellow Tiger Nut	Brown Tiger Nut
Moisture Content	42%	13.990%
Ash Content	2.33%	0.99%
Crude Fibre	13.22%	6.11%
Crude Fat	8.66%	12.11%
Crude Protein	27.13%	7.35%
Carbohydrates	6.66%	59.45%



### Discussion.

The moisture content of yellow tiger nut is (42%),while the brown tiger nut is (13.99%).Moisture content is the quantity of water contained in a certain material, so the yellow tiger nut has the higher water content than the brown tiger nut, which explains the fresh appearance of the yellow nut and in most cases it prone to bacterial contamination.

The ash content in brown tiger nut is lower than the yellow tiger nut.The yellow tiger nut is(2.33%)while the brown tiger nut is (0.99%),so for knowledge purpose on which among the tiger nut has less volatile matter and also have erosive effect on the system and increase it's maintenance, handling and operating costs, then the yellow tiger nut is more preferable

While the crude fibre of yellow tiger nut is (13.22%) and the brown tiger nut is (6.11%). The yellow tiger nut have higher crude fiber than the brown tiger nut. Furthermore, the yellow tiger nut contains higher crude fibre because it contains high quantity of indigestible cellulose and other components of this type.

Crude fat of brown tiger nut is (12.11%) while the yellow tiger nut is (8.66%), so the amount of crude fat of brown tiger nut is higher than that of the yellow tiger nut. Furthermore, the brown tiger nut has the higher amount of crude mixture of fat-soluble material present in a sample.

The crude protein in yellow tiger nut is (27.13%) and the brown tiger nut is (7.35%), so the yellow tiger nut has the higher crude protein than the brown tiger nut. The yellow tiger nut contains the higher body building food and plays an important role in bone, muscle and immune health.

The carbohydrate can act as energy source, help to control blood glucose and insulin metabolism, and help with fermentation. The yellow variety of tiger nut is (6.66%) while the brown variety is (59.45%). The brown variety of tiger nut contains the higher amount of energy.

### **Conclusion**

People often regard brown tiger nuts as less nutritious than yellow tiger nuts. This study showed that this is not always true as the brown tiger nuts have more carbohydrate concentration which is an important part of a healthy diet, carbohydrates provide the body with glucose, which is converted to energy used to support body functions and physical activity. It also contained a reasonable amount of protein fiber and ash. The yellow tiger also had more protein concentration, ash content, and fiber. Hence, in conditions where carbohydrates or energy food is demanded a brown tiger nut should be considered an option and the yellow nut should be considered in terms of a protein diet.

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