



Organoleptic Characteristics of Tiger Nut Drink (Kunu Ayaya) Preserved By Herbs

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Tiger nut drink (Kunu ayaya) is a local drink that has a life span of one day immediately after preparation because spoilage set in. Instead of using a preservative that contains chemical that has negative effects on final consumer of the drink, five (5) different herbal material that has antioxidant

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properties will be tried to preserve the drink and study the effect of each of them on organoleptic characteristics. The plant parts have been screened and tested for *In-vitro* experiment, 2kg of Tiger nut is used to prepare the drink each for each of the five herbal materials, and graded levels of the herbal plants are used, 2g, 4g and 6g of each of the herbal materials are added to 2kg of Tiger nut drink (*Adasonia digitata*, Tamarind, Tumeric, *Pakia biglobosa* and *Moringa olifera*), therefore each herbs will then have three (3) levels of treatments and the five (5) herbs make a total of fifteen (15) treatments with a control drink without any treatments making a total of sixteen (16) bottles, covered with paper foil in the laboratory at room temperature for a week to study the shelf life, organoleptic characteristics is then carried out on the first day on the control while after a week, the procedure is repeated to take data that was subjected to statistical analysis using Randomised complete block design (RCBD). There are twenty (20) pernalist of ten (10) each of male and female with age ranging from 18-22 years old. At the end of the fifth day, it was observed that those stored with *Pakia biglobosa* is better, followed by *Adasonia digitata* ($P < 0.05$).

Keywords: Preservatives; tumeric; microbial growth; screened and tamarind.

1. INTRODUCTION

The tiger nut, also known as the “underground walnut”, grows all over the world because of its high yield and broad prospects for comprehensive utilization. The tiger nut is the tiny tuber of *Cyperus esculentus* L., which can be roasted and used to be sweetmeat in Egypt Robert et al. [1]. Moreover, it is an important representative crop of the Spanish Mediterranean region, with an annual production of 9000 metric tons Sánchez-Zapata [2]. Later, it was made into a refreshing drink called “horchata de chufa” with the appearance of dairy look in the Mediterranean area, which is usually consumed in summer Robert et al. [1]. At present, the popularity of “Kunu Ayaya” has been extended from Northern part of Nigeria to other part of the country, then extended to other African countries Lawal et al. [3] Robert et al. [1].

In Nigeria, the utilization of tiger nut is highly limited in spite of the fact that tiger nut is cultivated widely in the Northern part of the country. Tiger nuts are eaten raw mainly as snacks or fried and eaten mixed with roasted groundnuts [4].

Although tiger nuts are widely cultivated around the world, the research on them is insufficient, which greatly limits their application Adejuyitan [5]. It has many nutrients that can be deeply explored and contains 22.14–44.92% lipids, 3.28–8.45% proteins, 23.21–48.12% starch, 8.26–15.47% fibers and 1.60–2.60% ashes Adel et al. [6]. In addition, it contains bioactive substances such as organic acids, alkaloids and phenols Nina et al. [7]. The tiger nut is a good source of edible oils that contain a lot of monounsaturated fatty acids. The nutritional

value of tiger nut oil is similar to olive oil Roselló-Soto et al. 2017. It also contains a lot of starch—a renewable and low-cost food ingredient Dos Santos Silveira [8]. The content of protein is relatively small, but it is found to be suitable for diabetic patients or those with digestive dysfunctions and may prevent heart disease after consumption Ogunlade et al. [9]. The dietary fiber in this tuber is effective in the prevention of colon cancer, obesity and gastrointestinal disorders Viuda-Martos et al. [10]. Due to the presence of flavonoids, the tiger nut has good antioxidant properties and can be used as a source of natural antioxidants Jing [11].

Gradually, there is increased utilization of tiger nut throughout Nigeria Lawal et al. [3]. Tiger nuts are valued for their highly nutritious starch content, dietary fibre and carbohydrate [12] and are rich in sucrose (17.4-20.0%), fat (25.5%), protein (8.0%) [13], Tiger nut is also rich in mineral content such as sodium, calcium, potassium, magnesium, zinc and traces of copper [14]. The dietary fibre content of tiger nut is effective in the treatment and prevention of diseases such colon cancer, coronary heart diseases, obesity, diabetes and gastro-intestinal disorders [15].

Researchers have developed phyto milk of acceptable quality from tiger nut tubers [4], (Ukwuru et al. 2008). Possible industrial application of tiger nut tubers has also been investigated [16-18].

As a crop that is grown widely throughout Nigeria, its availability is guaranteed, therefore its usage for different product formulation and continuous supply of such products is assured, but where the concern is, is the shelf life of

products from Tiger nut, as it deteriorate and loos value within 24 hours.

This research therefore will look into possibilities of extending the shelf life of products from Tiger nut by using some herbal materials.

1.1 Objectives of the Study

- i. Prepare tiger nut drink
- ii. Add the herbal materials at graded levels, to study the shelf life of Tiger nut drink
- iii. Carry out organoleptic characteristics

1.2 Justification

- i. The tiger nut is available throughout the year round
- ii. Most people are avoiding carbonated drinks because of health reasons nowadays
- iii. Tiger nut is rich in nutrients useful to the body

2. MATERIALS AND METHODS

The experiment was carried out in the Agricultural garden of Kwara State Polytechnic, Ilorin, the ingredient needed are Tiger nut, coconut and dates all were purchased from Ipata market, Ilorin, Kwara State, Nigeria while the herbal materials are harvested from around the school area, the local drink is prepared and packaged in 30cl each in ragolis bottle in sixteen places, each of the herbal plant is then prepared into powder. The herbal materials are the treatments and are added in 2g, 4g and 6g, meaning for Adasonia digitate, Tumeric, Tamarind, Pakia biglobosa and Moringa olifera, each has three graded levels, to make fifteen bottles while the sixteenth bottle is the control without any treatment. The deterioration is therefore monitored by inverting twenty panelist (20) containing ten (10) boys and girls each, with

their ages ranging from 18 to 21 years old, they were all briefed on how to fill the questionnaire and they were also advised to rinse their mouth with water before tasting another sample to avoid interference of taste by different samples that may affect result and each panelist are inside cubicle so that they don't influence each other results. The organoleptic characteristics is performed the first day after preparation and the repeated three (3) days later. All the questionnaire are then collated and are analyzed statically using Randomized Complete Block design (RCBD).

3. RESULTS AND DISCUSSION

3.1 Results

It was observed that, there was no significant difference between the drink without preservatives, those with Adasonia digitata, Pakia biglobosa irrespective of the level of inclusion, no significant difference between the three of them ($P>0.05$) while the drinks preserved with Tumeric, Tamarind and Moringa olifera had no significant difference too ($P>0.05$) but significant difference occurred between these two groups ($P<0.05$).

3.2 Discussions

The anti-oxidant effect of Adasonia digitata and Pakia biglobosa is not much is almost to those drink without preservatives, this may be the reasons why there was no significant difference ($P>0.05$) between the drinks preserved with these three preservatives.

Also the anti-oxidant effect of Tumeric, Tamarind and Moringa olifera is almost the same that may be why there was no significant difference ($P>0.05$) between the three of them, but the level of significant difference between these two groups are different as reveal by the panelist ($P<0.05$).

Table 1. Effect of preservatives on shelf life of Tiger nut drink (Kunu Aya)

Source of variation	D.f	SS	MS	Fcal
Blk	5	695	139	0.316
Trmt	5	6393	3196	7.2
Blk*trmt	11	3185	31.8	0.072
Error	54	396	440	
Total	75			

4. CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

- i. The drinks were only preserved to the next day by the herbs
- ii. The drinks begin to change taste the next day
- iii. Pakia biglonbosa seemed to be the best of them all at 4g inclusion level though there was no significant difference between Pakia biglobosa and Adasonia digitata,
- iv. Addition of these herbs above 4g changes the taste of the drinks to the taste of the herb without any significant input of preservations

4.2 Recommendations

- i. Pakia biglobosa was the best of them all followed by Adasonia digitata
- ii. More work should be carried out on both Pakia biglobosa and Adasonia digitata
- iii. More herbal materials should be investigated for their anti-oxidant ability for storing the Tiger-nut drink

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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