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Sensory and Proximate Analysis of Monkey Sugarcane *(costus afer)* in Akwa Ibom Traditional Weaning Food (oto mboro).

Usoroh, Comfort & Otu, Blessing D.
Department of Home Economics Education,
Faculty of Vocational Education,
Library and Information Science,
University of Uyo, Uyo.
comfortusoroh@gmail.com. blessingdomi7@gmail.com.

Abstract

Monkey Sugarcane, scientifically known as Costus afe, is a prenniel herb that is native to tropical Africa and is widely recognized for its medicinal, nutritional and ecological importance. In Akwa Ibom, this fern is not cultivated but grows in the bushes; also, it is not used in meal preparation despite its nutritional value. This study therefore examined the sensory, proximate, and chemical properties of monkey sugarcane in an Akwa Ibom traditional weaning food (Oto Mboro). Three purposes, three research questions and two null hypotheses guided the study. Experimental research design was adopted for the study. Ingredients for the preparation of the samples were purchased from a local market in Uyo, while Monkey Sugarcane was harvested from the bush and used for the study. A standard recipe for Oto Mboro was developed and monkey sugarcane juice was substituted with bone broth to create a new variant and the samples were coded as BBOM – Bone Broth Otor Mboro and MSOM – Monkey Sugarcane Otor Mboro. The sensory evaluation was conducted in the Home Economics Education Laboratory while the proximate and chemical analysis were conducted in the Food Science Laboratory, University of Uyo. Findings revealed that the monkey sugarcane oto mboro had overall acceptability of (7.69±0.97); the proximate analysis also showed significant levels of protein (19.48a ±0.09); carbohydrates1(9.09d ±0.25) and appreciable levels of energy (219.34b ±1.5). The result of the chemical analysis also revealed that MSOM is rich in essential minerals such as iron (2.04 ±0.5) and magnesium (13.49±0.08) compared to the bone broth otor mboro. The hypotheses revealed that there is a significant difference in the sensory evaluation of Oto Mboro made from bone broth and monkey sugarcane juice whereas, there is no significant difference in the chemical composition of Oto Mboro made from bone broth and monkey sugarcane juice. The findings of the study suggests that monkey sugarcane juice can be a nutritious alternative to bone broth in weaning food preparation. The researchers concluded that monkey sugarcane juice is rich in minerals necessary for bone and teeth growth and development, as well as iron required for blood formation which are needed by infants. The researchers recommend incorporating monkey sugarcane juice into Akwa Ibom traditional weaning food (Oto Mboro) to maximize its nutritional benefits. The findings have implications for infant nutrition and the use of locally available, wild-growing plants like monkey sugarcane as a sustainable and nutritious food source. By utilizing monkey sugarcane juice in weaning food preparation, lactating mothers can provide their infants with essential nutrients for growth and development.

Keywords: Weaning food, Bone Broth, Unripe Banana, Monkey Sugarcane.

Food, a vital source of sustenance, is a substance comprised of protein, carbohydrates, and fats that provides essential nutrients and energy for the growth, repair, and maintenance of an organism's body tissues and organs. Food is any substance consumed to provide nutritional support and energy for the body. It is typically composed of carbohydrates, proteins, fats, vitamins, and minerals, and is essential for growth, maintenance, and repair of the body's tissues and organs. Food is very important at each stage of development, each stage of development requires specific nutrients and feeding patterns to support optimal growth and development, like the infants, toddlers, preschool, adolescent etc. (Aduke, 2017).

Infancy is the first stage of life, from birth to around 1 year old is a time of incredible growth and development, full of wonder and discovery. Infancy, which spans from birth to 12 months, is a critical stage of development that requires specific nutrients for optimal growth and development. During this stage, protein, iron, zinc, and vitamin D are essential for building a strong foundation for future health. Exclusive breastfeeding for the first six months provides the necessary nutrients, followed by complementary feeding with breast milk or formula and solid foods. (Appiah, et al., 2020). Weaning foods, introduced around six months, include pureed, mashed, and finger foods that help infants develop oral motor skills and learn to eat from a spoon.

Weaning is the process of gradually introducing solid foods to an infant's diet, while simultaneously reducing the frequency and amount of breast milk or formula. It's a significant milestone in a child's development, marking the transition from a liquid diet to a solid food diet. (Westerfield, and Koenig 2018). Typical first weaning foods include iron-fortified infant cereals, pureed fruits and vegetables, and smooth nut or seed butters. Weaning is a gradual process that typically starts around 6 months of age, although the exact timing may vary depending on individual developmental readiness. Weaning is an exciting milestone that marks a significant transition in a child's life, as they begin to explore the world of solid foods, complementary foods are used like mix cereals, fish puree, mashed egg yolk, and banana porridge (oto mboro).

Complementary foods play a crucial role in meeting the nutritional needs of infants as they transition to a mixed diet. Providing a diverse and nutrient-rich diet during the complementary feeding period is essential for supporting optimal growth and development in infants. Further research is needed to explore the long-term effects of complementary feeding practices on infant health and development, as well as strategies to promote healthy eating habits from an early age (Dewey, 2017). Infancy is a critical period in a child's life, where nutrition plays a crucial role in their growth and development. Complementary feeding, which refers to the introduction of solid foods alongside breast milk or formula, is essential in meeting the nutritional needs of infants as they transition from exclusive milk feeding to a mixed diet. Complementary foods provide a range of essential nutrients that are necessary for the growth and development of infants, including protein, iron, zinc, and vitamins. Complementary foods offer a variety of important nutrients that are essential for infant growth and development. Protein is crucial for muscle and tissue growth, while iron and zinc are important for cognitive development and immune function. Vitamins such as vitamin A

and vitamin C are essential for vision and immune health, respectively. Additionally, the introduction of complementary foods can help expose infants to a wider range of flavors and textures, which can help establish healthy eating habits later in life. Timely introduction of complementary foods can help prevent nutritional deficiencies and promote optimal growth and development in infants (Victora *et al.,* 2017). Conversely, delayed introduction of complementary foods or inadequate diversity in the diet can lead to nutrient deficiencies and growth faltering. Therefore, understanding the nutritional benefits of complementary foods and ensuring their timely introduction is critical for infant health and well-being. The most common type of complementary food used in weaning infants among mothers is cereal pap commonly referred to as *Ogi* or *Akamu*, custard, sweet potatoes, beans porridge, and unripe banana porridge (*otor mboro*). (Ijarotimi et al., 2022).

Traditional weaning foods are more than just sustenance; they represented a loving bond between mother and child, a careful balance of flavors and textures to ease the transition from milk to solids. In the old days, mothers and grandmothers would lovingly prepare traditional weaning foods to introduce their little ones to the world of solids. These time-tested dishes were passed down through generations, each one a testament to the love and care that went into nurturing a growing child. In many African cultures, a thin porridge made from cornmeal or millet was a common first food. In other parts of the world, mothers would mash up ripe bananas, unripe banana, pap, corn and yam amongst others.

Unripe banana porridge which is known as (*Otor mboro*) among the residents of Akwa Ibom State in Nigeria is a common weaning food among nursing mothers. It is produced majorly from grated unripe banana paste with other ingredients. Unripe banana itself is a nutritious food for infants, offering several benefits. They are easy to digest due to their high starch and low sugar content, and rich in potassium, vitamins, and minerals like manganese and iron. Unripe banana also contain anti-inflammatory compounds and prebiotic fibers that promote the growth of beneficial gut bacteria, supporting healthy digestion. When cooked and mashed, unripe banana make a soft and easily digestible food for infants, making them an excellent addition to their diet. (Ranjha *et al*., 2022) However, other ingredients that promote the nutritional content of otor mboro are fish, vegetables, crayfish and bone broth.

Broth is a highly nutritious liquid made by simmering animal bones, connective tissues, and sometimes vegetables and herbs in water for an extended period of cooking time. This slow, gentle cooking process allows the bones and connective tissues to release their wealth of beneficial compounds, including collagen, gelatin, amino acids, and important minerals. Broth is prized for its exceptional nutritional profile and wide-ranging health benefits. It is an excellent source of protein, with the collagen and gelatin providing amino acids like glycine, proline, and glutamine. The long simmering process also extracts minerals from the bones, such as calcium, magnesium, phosphorus, and potassium. Broth is particularly rich in the mineral iron, which is important for healthy blood and energy levels. Other foods with plenty water content like fruits (orange, and watermelon), vegetables (cucumber) and herbs (sugarcane, and monkey sugar costus afer) are rich in nutritional profile.

Juice is a liquid extract from fruits, vegetables, or plants, typically consumed as a beverage. It is made by squeezing or pressing the water content from the desired source, resulting in a concentrated liquid containing the natural flavors, nutrients, and colors of the original material. (Mohammed and Sharif 2019).

Monkey sugarcane *(Costus afer)* Ker Gawl of the Zingiberaceae family, commonly called bush sugar cane or monkey sugar cane is a monocot and a relatively tall, herbaceous, unbranched tropical plant with creeping rhizome. It is commonly found in moist and shady forest of West and tropical Africa. C. afer is a perennial, rhizomatous herb that can attain a height of up to 4 m, and is often planted in home gardens for medicinal purposes as well as widely used for ceremonial and religious purposes (Nyananyo, 2016). It belongs to the Poaceae family and is closely related to sugarcane *(Saccharum officinarum L.)*. Monkey sugarcane is typically grown in tropical regions with high temperatures and humidity. Monkey sugarcane *(Costus afer)* has been an integral part of traditional medicine, food, and culture in many tropical regions for centuries. In traditional medicine, it is used to treat various ailments, including fever, cough, and digestive issues. Monkey sugarcane *(Costus afer)* is a type of sugarcane that is characterized by its slender stalks, sweet taste, and high water content. It is also known as "edible sugarcane" or "sweet cane" due to its sweet and juicy nature. The juice is consumed fresh or fermented to produce a beverage. The plant is harvested for its stalks, which are then processed to extract the juice, the juice can be consumed fresh, fermented, or processed into various products (e.g., syrup, sugar, and biofuels). (Etukudo, 2017). Monkey sugarcane *(Costus afer)* is rich in nutrients, including: Sugars (sucrose, glucose, and fructose), Minerals (iron, calcium, magnesium, and potassium), Vitamins (A, C, and B complex), Amino acids, Antioxidants and phenolic compounds. Monkey sugarcane *(Costus afer)* has been an integral part of traditional agriculture and culture in many tropical regions. It is a hardy and adaptable crop that can thrive in a variety of environments, making it an ideal crop for small-scale farmers and subsistence agriculture.

Statement of the Problem:

The current inflation has made it challenging for average citizens to afford basic necessities, including a balanced diet essential for children's growth and development. While a balance diet is crucial for children's health, not all families can afford weaning foods rich in nutrients, such as calcium, iron, and magnesium found in bone broth in Akwa Ibom traditional weaning food (oto mboro).

However, a readily available and affordable alternative exists in the form of Monkey sugarcane *(Costus afer)*. Monkey sugarcane (*Costus afer)* is a plant that is very common in the bush; many people know the plant but lack knowledge of the nutrient content, and majority of the people who use the plant, chew it for the water content (juice) or medicinal purposes. Monkey sugarcane *(Costus afer) has* an impressive nutrient profile, including iron, calcium, magnesium, and potassium, similar to that of bone broth. Monkey sugarcane (Costus *afer)* has the same nutrient content with bone broth, then it can be used to substitute bone broth to have the same nutrients in a meal. This study would be of help to people who cannot

afford meat bone at a particular time, but have monkey sugarcane juice to prepare a good meal.

Embracing Monkey sugarcane *(Costus afer)* as a food source, families can save money on groceries by using an affordable and readily available ingredient, increase their consumption of essential nutrients, promoting healthy growth and development, support local and sustainable food systems by utilizing a plant that grows abundantly in the wild, preserve traditional recipes and cooking methods while adapting to modern challenges.

Purpose of the Study

The main purpose of the study was to determine the sensory, proximate and chemical analysis of monkey sugarcane *(Costus afer)* juice *in* Akwa Ibom traditional weaning food (oto mboro). Specifically, the study sought to determine the:

1. sensory evaluation of Akwa Ibom traditional weaning food (oto mboro) made from bone broth and monkey sugarcane *(Costus afer)* juice;
2. proximate analysis of Akwa Ibom traditional weaning food (oto mboro) made from bone broth and monkey sugarcane *(Costus afer)* juice;
3. chemical analysis on Akwa Ibom traditional weaning food (oto mboro) made from bone broth and monkey sugarcane (Costus afer) juice.

Research Questions

The study sought to provide answers to the following research questions:

1. What are the sensory properties of Akwa Ibom traditional weaning food (*oto mboro*) made from bone broth and monkey sugarcane (*Costus afer*) juice?
2. What are the proximate composition of Akwa Ibom traditional weaning food (*oto mboro)* made from bone broth and monkey sugarcane (*Costus afer*) juice?
3. What are the chemical composition of Akwa Ibom traditional weaning food (oto mboro) made from bone broth and monkey sugarcane *(Costus afer) juice*.

Research Hypotheses

Two null hypotheses guided the study and were tested at 0.05 level of significance:

H_{O1}: There is no significant difference in the sensory evaluation of Akwa Ibom traditional weaning food (*oto mboro*) made from bone broth and monkey sugarcane (*Costus afer*) juice

H_{O2}: There is no significant difference in the proximate analysis of Akwa Ibom traditional weaning food (*oto mboro*) made from bone broth and monkey sugarcane (*Costus afer*) juice.

Methodology

Monkey sugarcane samples were harvested at no cost from different farms in Uyo Local Government Area of Akwa Ibom State, Nigeria. The samples were collected by cutting

the monkey sugarcane stems at the base, leaving a small portion of the stem and roots intact. The samples were placed in labeled containers to prevent mixing or contamination. Each sample was labeled with sample number, and date of collection. The collected samples were stored in a cool, dry place to prevent spoilage or damage. The samples were transported to the Home Economics laboratory for the juice extraction. Unripe bananas and other ingredients used in the preparation of the product were bought from Itam market in Itu Local Government Area of Akwa Ibom state and used for the experiment. The sensory evaluation was carried out in Home Economics Education Laoratory while the proximate and chemical analysis were conducted in the Food Science Laboratory all in University of Uyo.

Sample Preparation:

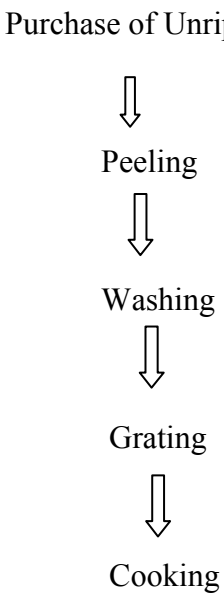

Fig 1. A flowchart for the preparation of unripe banana porridge (Otor Mboro)

Fig. 1, shows the flow chart for preparing Akwa Ibom traditional weaning food (otor mboro)

i. Unripe bananas were bought from the market

ii. The unripe bananas were peeled

iii. The peeled bananas were grated into unripe banana paste

iv. The paste was then used in cooking the otor mboro (weaning food)

Recipe for Unripe banana porridge (*otor mboro*)

125g	Grated banana
25g	Grounded crayfish
22ml	Oil
750ml	Water
15g	Chopped onions
13g	Shredded vegetables
1g	Pepper

2g Salt

Unripe bananas were peeled, washed thoroughly and grated using a manual grater, 125g of grated Unripe banana was measured out separately, 750ml of Monkey sugarcane juice was placed on the fire to boil, 22 ml of palm oil was added and allowed to boil for 20 mins; 25g of grounded crayfish, 15g of chopped onions, 1g of pepper and 2g of salt were added and allowed to boil for 3mins. The grated Unripe banana paste was cut into small pieces and dropped into the boiled broth and stirred properly for 2mins; 13g of shredded vegetables was added and the fire turned off. The experiment was conducted 10 times to ascertain the reliability.

Sensory Evaluation

Sensory evaluation was conducted on 16th September, 2024 in the Home Economics Education Laboratory Town Campus, University of Uyo at 10.00 am. Ten panelists consisting of nursing mothers and women were selected and trained for the sensory evaluation. Each panelist was then presented with a glass of water, a serviette, a teaspoon and three different coded otor mboro weaning foods: OM (Otor Mboro), BBOM (Bone Broth Otor Mboro) and MSOM (Monkey Sugarcane Otor Mboro). This labeling helped to maintain clarity during the evaluation process. Each panelist received two copies of a sensory evaluation form, which was rated on a 9-point hedonic scale to assess their preferences. This structured approach allowed the panelists to express their opinions effectively and provided valuable data for the analysis. The forms were collected at the end of the evaluation and the data obtained analysed using mean and standard deviation.

Proximate Analysis

The moisture, ash, protein, fiber carbohydrate and energy content of the samples were analyzed using the standard Association of Official Analytical Chemists (A.O.A.C., 2010) method. Moisture content was obtained by heating the samples to about a temperature of 60□C at a constant weight and dried. Organic matter was burnt off at a low temperature and the inorganic matters left were cooled and reweighed to obtain the ash content. The lipid (fats) was obtained from a dried sample using petroleum ether b/p 40-60°C as extracting solvent, the lipid present was obtained after evaporating off the solvent from the extract. The dried lipid free residue in lipid content analysis was used, acid and base digestion with reasonable filtration and washing in each case was carried out, the fiber content was obtained by noting the difference in weight before and after the ignition exercise. The samples were digested with concentrated sulphuric acid using a suitable catalyst (mercury), to convert organic nitrogen to ammonium ion, (40%) NaOH was then added to decompose the ammonium sulfate and the liberated ammonia distilled into boric acid double indicator and titrated with 0.1 N-HCL to determine the protein content. The carbohydrate content of the samples were obtained by the differences in subtraction of the protein, lipid, ash and fiber from total dry weight. Energy value of the samples were obtained by adding protein, carbohydrate and fats contents.

Statistical Analysis: Data obtained was analyzed using Analysis of Variance (ANOVA) at 0.01 level of significance. The (ANOVA) was used to determine the significant differences

between the samples while the means were separated using Duncan Multiple Range Test at p≥0.05.

Results

Research Question 1: What are the sensory properties of Akwa Ibom Traditional weaning food (*oto mboro*) made with bone broth and monkey sugarcane (*Costus afer*) juice?

Table 1: Result of Sensory Evaluation of Bone Broth *oto mboro* (BBOM) and Monkey Sugarcane *oto mboro* (MSOM)

Sample	Appearance	Taste	Texture	Aroma	Overall acceptability
BBOM	8.18±0.97	8.08±1.03	7.71±1.09	7.70±3.04	8.13±0.97
MSOM	7.05±0.16	7.31±0.71	8.07±2.03	7.91±2.01	7.69±0.97

Values were means ± standard deviation (STD) *Keys: BBOM = Bone broth otor mboro*
MSOM = Monkey sugarcane otor mboro

Table 1, shows the result for the sensory evaluation of Bone broth *otor mboro* (BBOM) and *Monkey sugarcane otor mboro* (MSOM). Findings revealed that BBOM scored 8.18±0.97 for appearance, 8.08±1.03 for taste, 7.71±1.09 for texture, 7.70±3.04 for aroma and 8.13±0.97 for overall acceptability, whereas MSOM scored 7.05±0.16 for appearance, 7.31±0.71 for taste, 8.07±2.03 for texture, 7.91±2.01 for aroma and 7.69±0.97 for overall acceptability. The analysis favoured the bone broth *oto mboro* because of the sharp taste of the monkey sugarcane juice.

Research Question 2: What is the proximate composition of Akwa Ibom traditional weaning food (*oto mboro)* made with bone broth and monkey sugarcane (*Costus afer*) juice.

Table 2: Result on Proximate Analysis of *oto mboro* (OM), Bone Broth *otor mboro* (BBOM) and Monkey sugarcane *otor mboro* (MSOB)

Sample	Moisture (%)	Ash(%)	Fat(%)	Protein (%)	Fiber (%)	Carbohydrate (%)	Energy (kcal/100g)
OM	40.99c ±0.03	4.10a ±0.05	11.50b ±0.05	9.56c ±0.15	4.7c ±0.10	29.11a ±0.08	258.26a ±0.21
BBOM	38.04a ±0.11	4.43a ±0.48	12.25a ±0.5	23.49a ±0.08	7.68a ±0.07	16.09d ±0.46	228.59b ±2.3
MSOB	35.01a ±0.12	5.42a ±0.35	10.12a ±0.5	19.48a ±0.09	6.79a ±0.18	19.09d ±0.25	219.34b ±1.5

Values were means ± standard deviation (STD) *Keys: OM =otor mboro*
BBOM = Bone broth otor mboro MSOM = Monkey sugarcane otor mboro

Table 2 shows the results for the proximate analysis of Analysis of Variance three samples of Akwa Ibom traditional weaning food OM, BBOM and MSOM. Otor *Mboro (OM)* was used as the control in developing standard recipe for the study and the proximate analysis revealed the following results: Findings revealed that OM contained 40.99c ±0.03% moisture, 4.10a ±0.05% ash, 11.50b ±0.05% fat, 9.56c ±0.15% protein, 4.7c ±0.10% fiber, 29.11a ±0.08% carbohydrates, and had an energy value of 258.26a ±0.21 kcal. Sample BBOM had 38.04a ±0.11% moisture, 4.43a ±0.48% ash, 12.25a ±0.5% fat, 23.49a ±0.08% protein, 7.68a ±0.07% fiber, 16.09d ±0.46% carbohydrates, and an energy value of 228.59b ±2.3 kcal. While sample MSOM contained 35.01a ±0.12% moisture, 5.42a ±0.35% ash, 10.12a ±0.5% fat, 19.48a ±0.09% protein, 6.79a ±0.18% fiber, 19.09d ±0.25% carbohydrates, and had an energy value of 219.34b ±1.5 kcal. The proximate composition of the samples indicated that moisture, carbohydrate and energy level recorded were higher in the control while the bone broth and monkey sugarcane otor mboro had higher ash, fat, protein and fiber which are major nutrients needed for growth.

Research Question 3: What is the chemical analysis of Akwa Ibom traditional weaning food (*oto mboro*) made with bone broth and monkey sugarcane (*Costus afer*) juice?

Table 3: Result of chemical analysis of Bone Broth *otor mboro* (BBOM) and Monkey sugarcane *otor mboro (*MSOB)

Sample	Calcium (mg/100g)	Potassium (mg/100g)	Iron (mg/100g)	Magnesium (mg/100g)
BBOM	13.83±0.22	248.01±0.01	0.97±0.11	11.86±0.02
MSOM	11.45±0.11	198.06 ±0.48	2.04 ±0.5	13.49±0.08

Values were means ± standard deviation (STD), *Keys: BBOM = Bone broth otor mboro*
MSOM = Monkey sugarcane otor mboro

Table 3, shows the result on the chemical analysis of Bone broth otor mboro (BBOM) and monkey sugarcane *otor mboro* (MSOM). BBOM records a nutrient value of 13.83±0.22 for calcium, 248.01±0.01 for potassium, 0.97±0.11 for iron and 11.86±0.02 for magnesium while MSOM has 11.45±0.11 for calcium, 198.06 ±0.48 for potassium, 2.04 ±0.5 for iron and 13.49±0.08 for magnesium. The analysis shows that BBOM is very high on calcium, potassium and magnesium while MSOM has high value in iron and magnesium. The result shows that monkey sugarcane juice is a good source of minerals (calcium, potassium, iron and magnesium) required for healthy living.

Null Hypothesis 1: There is no significant difference in the sensory evaluation of Akwa Ibom traditional weaning food (*oto mboro*) made from bone broth and monkey sugarcane (*Costus afer*) juice

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Table 4: Independent t-test Analysis showing significant difference in the sensory evaluation of Akwa Ibom traditional weaning food (*oto mboro*) made from bone broth and monkey sugarcane (*Costus afer*) juice

Categories	N	$\bar{X}$	SD	Df	t-cal	Sig-value	Decision
Weaning food prepare with bone broth	5	7.82	0.30				
				8	6.17	0.000	Significant
Weaning food prepare with monkey sugarcane (Costus afer) juice	5	6.72	0.26				

Significant at p<0.05

The independent t-test result in Table 4 shows that t-calculated is 6.17 and the Sig-value is 0.000 at 8 degrees of freedom. Since the Sig-value (0.000) is less than the significance level of .05 the null hypothesis was rejected. Hence, there is a significant difference in the sensory evaluation of weaning food (*oto mboro*) made from bone broth and monkey sugarcane (*Costus afer*) juice.

Null Hypothesis 2: There is no significant difference in the proximate analysis of Akwa Ibom traditional weaning food (*oto mboro*) made from bone broth and monkey sugarcane (Costus afer) juice.

Table 5: Independent t-test analysis of Akwa Ibom traditional weaning food (oto mboro) made from monkey sugarcane (Costus afer) juice

Categories	N	$\bar{X}$	SD	Df	t-cal	Sig-value	Decision
Weaning food prepare with bone broth	7	51.17	92.33				
				12	0.091	0.929	Not Significant
Weaning food prepare with monkey sugarcane(Costus afer) juice	7	46.94	81.43				

Not Significant at p<0.05

The independent t-test result in Table 5, shows that t-calculated is 0.091 and the Sig-value is 0.929 at 10 degrees of freedom. Since the Sig-value (0.929) is greater than the significance level of .05 the null hypothesis was retained. Hence, there is no significant difference in the proximate analysis of Akwa Ibom traditional weaning food (*oto mboro*) made from bone broth and monkey sugarcane (*Costus afer*) juice.

Discussion of Findings

The versatility and nutritional value of monkey sugarcane (*Costus afer*) makes it a valuable resource, worthy of exploration and development (Asaolu and Asaolu, 2017). Fresh

monkey sugarcane juice extracted through the elimination of the juice from fibrous and solid particle, it is a technological step of fruit juice production. The study findings align with the work of (Chuwa *et al.* 2022), who emphasize the importance of sensory characteristics in the acceptance of complementary foods for infants. They argue that the sensory qualities of weaning foods are crucial for ensuring that infants receive adequate nutrition while also enjoying their meals, which can influence feeding practices and overall dietary habits in early childhood.

The comparison indicates that BBOM has a distinct nutritional profile characterized by higher moisture, ash, fat, protein, and fiber contents, while MSOM has higher carbohydrate content and energy value. These differences can influence caregivers' preferences and infants' nutritional choices, suggesting that BBOM is a suitable option for weaning, particularly due to its higher protein content, addressing a common deficiency in traditional weaning foods. These findings support the work of (Okwu *et al*. 2020), who emphasize the importance of incorporating nutrient-dense foods into infants' diets to promote optimal growth and health.

Conclusion

Based on the findings, the researcher concludes that indigenous Akwa Ibom traditional weaning food (*otor mboro)* can be substituted with monkey sugarcane juice as an alternative to bone broth to enhance the nutritional quality of the indigenous weaning food.

Recommendations

Based on the findings of the study on the sensory and proximate analysis of monkey sugarcane (*Costus afer*) in Akwa Ibom traditional weaning food (*oto mboro*), the following are recommended:

1. Industrial-scale production of monkey sugarcane juice-based otor mboro should be explored to make the product widely available.
2. Develop and validate methods for standardizing monkey sugarcane juice extraction and processing.
3. Incorporate information on local ingredients like monkey sugarcane into food science and nutrition curricula.
4. Promote experiential learning opportunities for students in food science and nutrition.
5. Develop educational materials on the cultural significance and nutritional benefits of traditional foods like otor mboro.

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