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*GJSFR-D Classification :* *FOR Code: 309999*

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*Keywords: tiger nut tubers milk, melon seeds, candy, sensory evaluation.*

## I. Introduction

Candy is a type of confectionary which describes a spectrum of sweet goods and takes on different meanings from one country to the other. Among several definitions, candy is defined as a highly cooked coloured and flavoured sugar mass formed into desired shapes. A more or less solid article of confectionery made by boiling sugar or molasses to the desired consistency, and then crystallizing, molding, or working in the required shape. It is often flavoured or coloured, and sometimes contains fruit, nuts, etc... Technically, milk or chocolate can be added to sugars mixtures in candy processing depending on the variety. The utilization of animal milk in candy production results in their unavailability in most African markets and to their high price of purchase. Other milks from plants can be investigated in the production of confectionaries especially candy.

These milks can be manufactured from melon seeds ("Egusi") which are commonly cultivated crops anywhere in the world. "Egusi" (*Colocynthis citrullus L.*) belongs to the species of the genus *Citrullus* of cucurbitaceae family, which usually consists of a large number of varieties that are generally known as melons.

Egusi (*Colocynthis citrullus L.*) is used both as condiment and thickener in Nigerian local soup.This plant family is known for its great genetic diversity and widespread adaptation which include tropical and subtropical regions, arid deserts and temperate locations. Curcubits are known for their high protein and oil contents. Seeds of cucurbits are sources of oils and protein with about 50% oil and up to 35 % protein (Achu, 2005). Specifically for these reasons they are cultivated and consumed world over. Egusi (*Colocynthis citrullus L.*) is among the 300 species of melon found in tropical Africa and it is cultivated for its seeds, which have been reported to be rich in oil and protein. Though the industrial scale production of the oil is yet to be utilized despite its huge potential.

Tiger nut (*Cyperus esculentus L.*) tuber is also another plant crop that its milk can be utilized in candy production. Tigernut (*Cyperus esculentus* L.) is an underutilized crop (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 (Odoemelan, 2003; Belewu and Belewu, 2007). The nut was found to be rich in myristic acid, oleic acid, linoleic acid (Eteshola and Oraedu, 1996). 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, Akihausa in Igbo where three varieties (black, brown and yellow) are found. Among these, only two varieties, yellow and brown are readily available in the market. Tigernut can be eaten raw, roasted, dried, baked or be made into a refreshing beverage called Horchata De Chufas or tiger nut milk.Tigernut milk is a very nutritive and energetic drink, both for young and old. It is 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 it is cardiac preventive. Tigernut milk has never been found to produce allergy (Belewu and Abodunrin, 2008).

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Traditionally, candies are made from cow milk which has led to little or no attention to various sources of imitation milk such as soy bean, melon seed and tiger nut. Therefore, there is need to evaluate the potentials of these plants so as to increase their utilization in the market for candy. Melon seeds and tiger nuts are highly healthful and nutritive. They are consumed as snacks and beverages but due to low awareness on the nutritive and health benefits of these plant crops there is need for increased awareness of their benefits in candy making.

Although previous researches have been made on melon seeds and tiger nuts, there is yet to be a research on the quality of candy produced from melon seed milk and tiger nut milk.

The possibility of candy production from melon seed and tiger nut milk on a large scale would be a good way of utilizing these underutilized plant crops. It will also give an opportunity of purchasing these candies at affordable prices. This work when properly carried out will create awareness on the quality characteristics of melon seed milk and tiger nut milk that will make it possible for them to be incorporated into candy and stabilize this sugar based product.

Main objective is to evaluate the quality characteristics of candy produced from melon seeds and tiger nuts milk blend. While the specific objectives are: to extract milk from melon seeds and tiger nut tubers, then to produce candy from melon seeds milk, tiger nuts milk and their blends. Then finally to determine proximate, mineral, vitamin composition and sensory analysis on candies produced from melon seeds milk, tiger nuts milk and their blends.

## II. Materials and Methods

The melon (*Colocynthis citrullus L.*) seeds, tiger nut (*Cyperus esculentus*) tubers, granulated sugar, glucose syrup, and lime were purchased from Ubani market in Umuahia, Abia State, Nigeria. The melon seeds and tiger nut tubers were sorted manually to remove undesirable materials, washed with clean tap water for soil removal, blanched at 60$^{o}$C for 5 seconds in order to inactivate inherent enzymes and reduce microbial load, then drained prior to utilization.

## III. Preparation of Milk from Melon Seeds

Method described by Omole and Ighodaro (2012) was adopted, modified and used. Approximately 800g of melon seeds were toasted in a stainless steel pot for 3 minutes using gas cooker. The toasted melon seeds were boiled in boiling water for 15 minutes. The boiled melon seeds were cooled to 28$^{o}$C and then milled using a home blender (Evanita-FCL 1731) to obtain slurry which was subjected to filtration using a muslin cloth to obtain melon milk (plate 1). The melon milk obtained was packaged in an airtight plastic container and stored under refrigeration temperature prior to usage. Flow chart for the preparation of melon milk is shown in fig.1.

## IV. Preparation of Milk from Tiger Nuts

The already prepared tiger nut tubers (1000g) were soaked for 8 hours in clean tap water, then ground in a ratio of 1liter of water to each 300gram of tiger nuts and the mixture was left to macerate for 10 minutes. The mixture was pressed and filtered using a muslin cloth. The milk obtained (plate 2) was stored in an airtight container prior to usage. Flow chart for the preparation of tiger nut milk is shown in figure 2.

## V. Milk Blend Formulation

Tiger nut milk and melon seed milk were mixed at varying proportions; 90:10, 80:20, 70:30, 60:40 and 50:50 to obtain the raw material for candy production, with 100% cow milk serving as the control sample. This was done using a food blender (Evanita-FCL 1731) operated at full speed for 2 minutes.

## VI. Milk Candy Production

The method described by Sunny-Roberts (2007) was adopted, modified and used in the production of non-crystalline milk candy. Approximately 100g of sugar, 30g of glucose syrup, 8g of lime juice and specific ratio of milk blend from tiger nuts and melon seeds were combined in a heavy sauce pan over medium heat (45$^{o}$C) and stirred until the sugar dissolved. A thermometer was inserted into the mixture as it was brought to boiling without stirring until the temperature of the mixture reaches 120$^{o}$C and this lasted for 60 minutes. The mixture was allowed to cool to about 45$^{o}$C. The mixture was then poured into suitable molds to form. The resulting candies (plates 4 and 5) were removed from the molds after 30 minutes, cut with a very sharp knife and was left to completely cool for 24 hours. The candies were wrapped in an aluminum foil and stored in an airtight container at room temperature prior to analysis. The same process was repeated for other samples with varying milk blends. The flow chart for candy production is shown in fig. 3.

*a) Proximate Analysis*

Proximate composition of the milk candy samples was determined in duplicates except for carbohydrate content which was determined by difference.

i. *Moisture content determination*

The moisture content was determined using the conventional method (AOAC, 1990).

ii. *Ash content determination*

The furnace incineration gravimetric method recommended by AOAC (1990) was used in the determination of the ash content.

iii. *Crude fibre determination*

This was be determined by the Weende method described by James (1995).

iv. *Fat content determination*

The fat content was determined by continuous solvent extraction in a Soxhlet reflux apparatus (James, 1995).

v. *Protein determination*

The micro-kjeldahl method a described by James (1995) was used to determine the protein content of the samples.

vi. *Carbohydrate determination*

The carbohydrate contents of the test samples were determined by estimation using the arithmetic difference method described by James (1995).

## VII. Mineral Analysis

The mineral contents of the test samples were determined by the dry ash extraction method following each specific mineral element as described by James (1995). Twenty (20) ml of each sample was burnt to ash on a muffle (as in ash determination) and the resulting ash was dissolved in 100ml of dilute hydrochloric acid (1M HCl) and then diluted to 100ml volumetric flask using distilled water. The solution was used for the various analysis of mineral.

*a) Calcium and Magnesium Determination*

Calcium and magnesium contents of the test sample were determined by the EDTA complex isometric titration.

*b) Potassium and Sodium Determination*

The potassium and sodium contents of the samples were determined by photometric method.

*c) Iron Determination*

AOAC (1990) method was used to determine the iron content.

## VIII. Vitamins a and c Determination

*a) Vitamin C Determination*

The vitamin C content of the beverage sample was determined by the isometric method as described by Pearson (1976).

*b) Vitamin A (Retinol) Determination*

Vitamin A was determined as described by James (1995).

## IX. Sensory Evaluation

The method described by Iwe (2002) was used. The quality attributes such as appearance, taste, flavour, mouth feel, and general acceptability of the candies were tested by 30 panelists randomly selected from the staff and students of Michael Okpara University of Agriculture, Umudike.

*a) Statistical analysis*

The data obtained were subjected to analysis of variance of a completely randomized design using the SPSS procedure version 16 for personal computers (SPSS 1995), while treatment means were separated using Duncan multiple range test at 95% confidence level.

## X. Results and Discussion

*a) Proximate Composition Of Tiger Nuts Milk, Melon Seeds Milk And The Candies*

The results of the proximate composition of tiger nuts milk, melon seeds milk and the candies are shown in Table1.The moisture content values recorded for milk candy samples ranged from 2.14%-4.31%. 100% melon seeds milk candy had the highest moisture content (4.31%) and it is significantly different ($p<0.05$) from other samples, while samples 60:40 (60% Tiger nuts milk and 40% melon seeds milk candy) and 80:20 (80% Tiger nuts milk and 20% melon seeds milk) had the lowest moisture content (2.14%). This could be as a result of the temperature and length of time the candies were cooked. The range of moisture content values (2.14%-4.31%) observed were lower than the values (5.93%, 4.44%, and 4.37%) reported by Sunny-Roberts (2007) for coconut milk candy, groundnut milk candy and soy milk candy respectively. The difference in values could be attributed to the composition of the candies. Most chemical and biological processes that cause spoilage and deterioration of food which are water dependent would be reduced because of low moisture content of the candies (Sunny-Roberts, 2007).

The fat content of the candies ranged from values 1.31%-2.10%. There was significant difference ($p<0.05$) among the samples. Sample 70:30 (70% Tiger nuts milk and melon seeds milk candy) had the lowest fat content value (1.31%) while 100% cow milk candy had the highest fat content value (2.10%). This could be attributed to the different sources of milk used for production. The fat content value (8.21%) of tiger nuts milk was higher than groundnut milk value (7.86%) which in turn was higher than the value (7.31%) of melon seed milk (Sunny-Roberts *et al.*, 2004) while Omole and Ighodaro (2012) reported the value (3.09%) of melon seed milk to be lower. The decrease in the fat content of the candies is an advantage for the keeping quality of the candies as chances of rancidity would be greatly reduced (Sunny-Roberts *et al.*, 2004).The range of the protein content of the candy samples was from values 1.04%-3.86%. From the result, 100% tiger nut milk candy had the highest value (3.86%) and 80:20 (80% Tiger nut milk and 20% melon seeds milk) sample had the lowest

protein content value (1.04%). This could be as a result of the ratios of the milk blends as the quantity of tiger nuts milk was higher in all the samples except sample 50:50 (50% Tiger nuts milk and 50% melon seeds milk). There was also significant difference ($p<0.05$) in the protein content of all the samples. The variation in the results is probably due to the method of extraction employed considering the fact that melon seeds have high level of protein content (32.6%) (Oyenuga and Fetuga, 1975).Ash represents the total mineral content of a food material and thus serves as a viable tool for nutritional evaluation (Lienel, 2002). The ash content of the candies ranged from 0.71%-1.25% and were higher than values obtained for candies from other imitation milk which ranged from values 0.23%-1.04% as reported by Sunny-Roberts (2007) while the values for the tiger nuts milk (1.21%) and melon seeds milk (1.49%) were higher than the values reported for imitation milk whose values ranged from 0.04%-0.85%. 100% melon seeds milk candy had the highest ash content value (1.25%) while 90:10 (90% tiger nuts milk and 10% melon seeds milk) candy had the lowest ash content value (0.75%). There was significant difference ($p<0.05$) among some of the samples.

From the result in Table 1, the carbohydrate content of all the samples was very high. 60:40 (60% Tiger nut milk and 40% melon seeds milk) sample had the highest (95.05%) and was significantly different ($p<0.05$) from other samples, while 100% tiger nut milk candy had the lowest level of carbohydrate. The increase in the carbohydrate content of the candy samples could be as a result of the ingredients added to the candies considering the fact that candy is sugar based product.

*b) Vitamin Contents of Tiger Nut Tubers Milk, Melon Seeds Milk and the Candies*

The results for the vitamin contents are shown in Table 2. Vitamin C is relevant in preventing scurvy and other degenerative diseases (Haliwell, 1996). The vitamin C content of the candies and milk samples ranged from 0.09%-1.19%. The vitamin C content of the tiger nuts milk (1.19mg/100) was significantly different ($p<0.05$) from the vitamin C content of the melon seeds milk and the candies. Vitamin A contents of the candies were very negligible from the results obtained. The vitamin A content ranged from 0.00% - 0.07%. This shows that candies from melon seeds and tiger nuts milk are poor sources of vitamin A.

*c) Mineral Contents of Tiger Nuts Milk, Melon Seeds Milk and the Milk Candies*

The results for the mineral contents of tiger nut tubers milk, melon seeds milk and the candies are seen in Table 3.

The sodium content of the candies ranged from 2.75mg/100-180.50mg/100g. The sodium content value (180.50mg/100g) of 100% tiger nut milk candy was significantly higher ($p<0.05$) than the sodium content value (152.50mg/100g) of 100% melon milk candy while 100% cow milk candy is significantly different ($p<0.05$) from other samples.

Potassium content of tiger nut milk candy was significantly higher ($p<0.05$) than other samples. The potassium content of the samples ranged from 46.00mg/100-172.00mg/100g with tiger nut milk candy showing the highest content and sample 90:10 (90% tiger nuts milk and 10% melon seeds milk) the lowest potassium content value (46.00mg/100). This is an indication that the consumption of the candies can reduce high blood pressure disease.

90:10 (90% tiger nuts milk and 10% melon seeds milk) sample had the highest (5.90mg/100g) iron content while 100% cow milk candy had the lowest content (0.46mg/100g). This could be attributed to the presence of melon seed milk in reasonable amount in that it has higher amount of iron contained in it. Studies have shown that cow milk is a poor source of iron and since it is an essential element in the body, the use of melon seed milk in making candy can help increase its supply to the body. There was significant difference ($p<0.05$) among the samples.

The candies had magnesium content range from values 6.00mg/100g-47.50mg/100g. 100% tiger nut milk candy had the highest magnesium content (47.5mg/100g) while 80:20 (80% tiger nuts milk and 20% melon seeds milk) sample had the lowest (6.00mg/100g). There was significant difference ($p<0.05$) among the samples except samples 70:30 (70% tiger nuts milk and 30% melon seeds milk) and 80:20 (80% tiger nuts milk and 20% melon seeds milk) which had no significant difference.

The values of the calcium content of the candies ranged from 27.15mg/100g- 125.10mg/100g. 100% Tiger nut milk candy had the highest (125.10mg/100g) content of calcium while 80:20 (80% tiger nuts milk and 20% melon seeds milk) sample had the lowest (27.15mg/100g). There was significant difference ($p<0.05$) among all the candy samples. The average value of calcium content of the milk candy samples was higher than the value of 45.70% stated by Manjula and Suneetha, (2014) for pumpkin juice candy. Generally, the presence of these minerals; sodium, potassium, iron, magnesium, and calcium in foods are necessary for bones, tissue repairs, muscles, the blood stream, for body growth and development, and for preventing high blood pressure (Bamishaiye and Bamishaiye, 2011).

*d) Sensory Evaluation of the Candy Samples*

The sensory scores of the candy samples are shown in Table 4.

As regards to appearance, sample 50:50 (50% tiger nuts milk and 50% melon seeds milk) had the highest (8.13) mean score while sample 70:30 (70%

tiger nuts milk and 30% melon seeds milk) had the lowest (6.87) mean score. This indicated that 50:50 (50% tiger nuts milk and 50% melon seeds milk) candy and 70:30 (70% tiger nuts milk and 30% melon seeds milk) candy were liked very much and slightly respectively by the panelists and there was no significant difference ($p<0.05$) among the samples. In terms of taste, 100% tiger nuts milk candy ranked highest (7.53). There was no significant difference ($p<0.05$) among the samples. 100 melon seeds milk candy had the highest (7.00) mean score with respect to flavour while 70:30 (70% tiger nuts milk and 30% melon seeds milk) had the lowest mean score (6.13) and there was no significant difference ($p<0.05$) among the samples. The mouth-feel of 100% tiger nuts milk candy had the highest (7.33) mean score while 70:30 had the lowest mean score (5.57). No significant difference ($p<0.05$) existed among the samples. For general acceptability, 100% tiger nuts milk candy had the highest mean score (7.33) which indicated that the sample was moderately accepted by the panelists. 70:30 (70% tiger nuts milk and 30% melon seeds milk) was the least accepted with lowest mean score of 5.97. There was no significant difference ($p<0.05$) among the samples except for 70:30 (70% tiger nuts milk and 30% melon seeds milk) value. From the result obtained in Table 4., 100% tiger nut milk candy had the highest mean score (7.33) in terms of general acceptability which indicates that it is the most preferred by the panelists. This implies that tiger nuts milk can be used for candy production.

Therefore, it has been applied successfully in the making of candy which had comparable nutritional values with candy made from cow milk. This means that the production of such candies on a large scale would be a wise way of utilizing these crops. It would also provide an opportunity of purchasing these products at affordable prices which will in turn make the beneficial nutrients present in the crops available to the consumers through the candies, especially African children.

## XI. Conclusion

Aside from animals such as cow, milk can be extracted from other sources such as plant crops, precisely tiger nut tubers and melon seeds. Milk from these plant crops was found to have desirable, acceptable, and relevant physicochemical properties. The results obtained revealed the possibility of using tiger nut milk and melon seed milk as raw materials in food industries. Therefore, it has been applied successfully in the making of candy which had comparable nutritional values with candy made from cow milk. This means that the production of such candies on a large scale would be a wise way of utilizing these crops. It would also provide an opportunity of purchasing these products at affordable prices which will in turn make the beneficial nutrients present in the crops available to the consumers through the candies, especially African children.

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laboratory-prepared fermented groundnut milk. Eur. Food Res. Technol.218:452-45.

## Illustrations and Figures

*Plate 1 :* Melon seeds milk

*Plate 2 :* Tiger nuts milk

*Plate 3 :* Melon seeds milk candy

*Plate 4 :* Tiger nuts milk candy

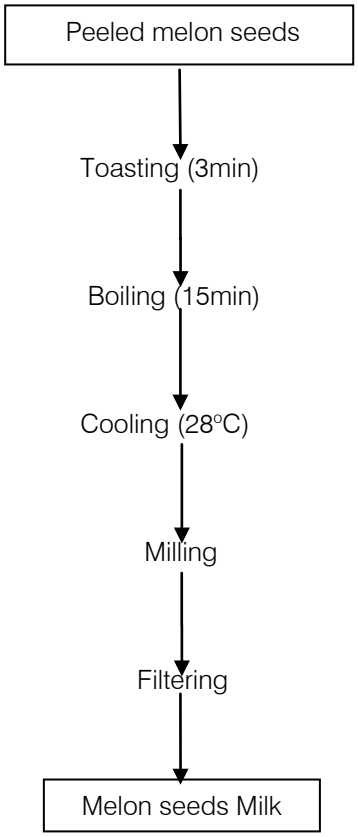


*Figure 1 :* Flowchart for the preparation of milk from melon seed

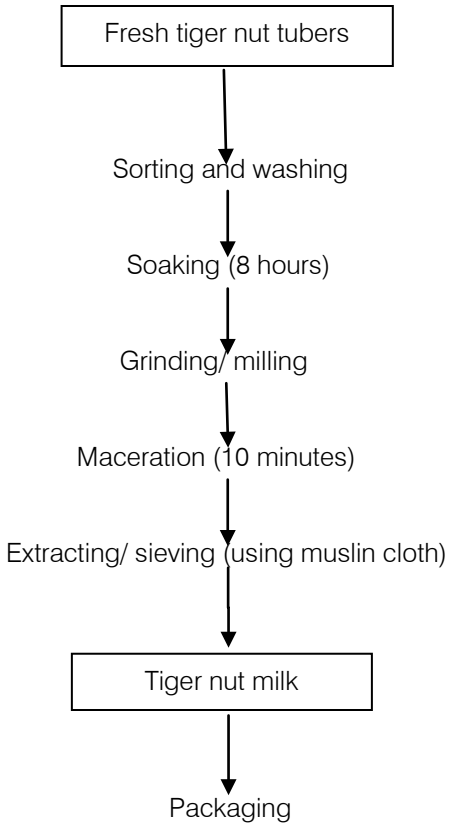


*Figure 2 :* Flowchart for the preparation of milk from Tiger nut

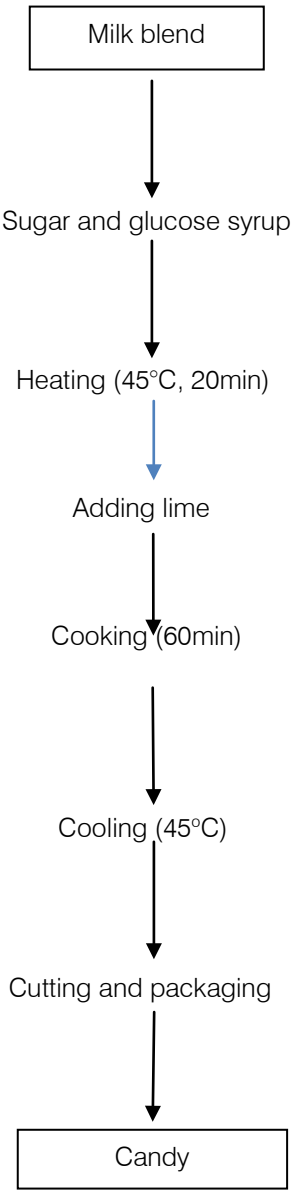


*Figure 3 :* Flowchart for the preparation of candies from milk blend

*Table 1 :* Formulation of milk blends

| Sample | cow milk (%) | tiger nut milk (%) | melon milk (%) |
|---|---|---|---|
| A | 100 | 0 | 0 |
| B | 0 | 100 | 0 |
| C | 0 | 0 | 100 |
| D | 0 | 90 | 10 |
| E | 0 | 80 | 20 |
| F | 0 | 70 | 30 |
| G | 0 | 60 | 40 |
| H | 0 | 50 | 50 |

*Table 2 :* Recipe for milk candy production per sample

| Ingredients | quantity (g) |
|---|---|
| Sugar | 100 |
| Lime | 8 |
| Glucose syrup | 30 |

*Table 3 :* Proximate composition of tiger nut tubers milk, melon seeds milk and the candies

| *Candy Samples and blends of Tigernut: Melon seeds milk | Moisture content (%) | Crude protein (%) | Ash content (%) | Fat content (%) | Carbohydrate (%) |
|---|---|---|---|---|---|
| 100% Cow milk candy | 2.65f±0.07 | 2.11$^{c}$±0.01 | 1.15$^{cd}$±0.07 | 2.10$^{c}$±0.00 | 91.73$^{c}$d±0.14 |
| 100% Tigernut milk candy | 3.02$^{e}$± 0.01 | 3.86$^{b}$±0.00 | 0.80$^{g}$±0.00 | 1.75$^{d}$±0.07 | 90.58$^{d}$±0.06 |
| 100% melon milk candy | 4.31$^{c}$±0.01 | 1.35$^{e}$±0.00 | 1.25$^{b}$±0.07 | 1.41$^{f}$±0.01 | 91.69$^{cd}$±0.08 |
| 50:50 Tiger nut milk : melon milk | 3.65$^{d}$±0.07 | 1.32$^{e}$±f0.00 | 1.03$^{e}$±0.00 | 1.32$^{g}$±0.01 | 92.67$^{bc}$±0.06 |
| 60:40 Tiger nut milk : melon milk | 2.14$^{g}$±0.01 | 1.21$^{h}$±0.01 | 1.11$^{d}$±0.01 | 1.51$^{e}$±0.01 | 95.0$^{a}$±1.44 |
| 70:30Tiger nut milk : melon milk | 3.11$^{e}$±0.01 | 1.24$^{g}$±0.01 | 0.93$^{f}$±0.01 | 1.31$^{g}$±0.01 | 93.42$^{b}$±0.00 |
| 80:20 Tiger nut milk : melon milk | 2.14$^{g}$±0.00 | 1.15$^{i}$±0.00 | 1.21$^{b}$c±0.00 | 1.51$^{e}$±0.01 | 93.00$^{bc}$±1.41 |
| 90:10 Tiger nut milk : melon milk | 3.13$^{e}$±0.04 | 1.04$^{j}$±0.01 | 0.71$^{h}$±0.01 | 1.73$^{d}$±0.01 | 93.28$^{b}$±0.22 |
| 100% Melon milk | 83.2$^{a}$±0.01 | 1.52$^{d}$±0.01 | 1.49$^{a}$±0.00 | 7.31$^{b}$±0.01 | 8.02$^{f}$±0.02 |
| 100% Tiger nut milk | 73.9$^{b}$±0.01 | 4.13$^{a}$±0.01 | 1.21$^{b}$c±0.01 | 8.21$^{a}$±0.01 | 12.56$^{e}$±0.01 |
| LSD | 0.08 | 0.08 | 0.05 | 0.01 | 1.43 |

**Means in the same column with different superscripts are significantly different (P<0.05).*

*Table 4 :* Vitamin contents (mg/100g) of tiger nut tubers milk, melon seeds milk and the candies

| *Milk and candy samples | Vitamin C | Vitamin A |
|---|---|---|
| 100% Cowmilk candy | 0.84$^{d}$±0.01 | 0.060.00 |
| 100% Tigernut milk candy | 0.91$^{b}$±0.01 | 0.040.00 |
| 100% Melon milk candy | 0.34$^{g}$±0.01 | - |
| 50:50 Tigernut milk: melon milk | 0.22$^{h}$±0.01 | - |
| 60:40 Tigernut milk: melon milk | 0.09$^{i}$±0.01 | - |
| 70:30 Tigernut milk: melon milk | 0.44$^{f}$±0.01 | - |
| 80:20 Tigernut milk: melon milk | 0.79$^{e}$±0.01 | - |
| 90:10 Tigernut milk: melon milk | 0.84$^{c}$±0.01 | - |
| 100% Melon milk | 0.79$^{e}$±0.00 | - |
| 100% Tigernut milk | 1.19$^{a}$±0.01 | - |

**Means in the same column with different superscripts are significantly different (P<0.05).*

*Table 5 :* Mineral contents(mg/100g) of tigernut tubers milk,melon seeds milk and their candies

| *Milk and Candy Samples | Sodium | Potassium | Iron | Magnesium | Calcium |
|---|---|---|---|---|---|
| 100% Cow candy | $152.50^{c}\pm0.71$ | $140.0^{c}\pm0.00$ | $0.46^{b}\pm0.00$ | $32.25^{c}\pm0.07$ | $110.00^{c}\pm0.00$ |
| 100%Tigernut candy | $180.50^{b}\pm0.71$ | $172.0^{b}\pm0.00$ | $0.57^{i}\pm0.21$ | $47.50^{b}\pm0.71$ | $125.10^{b}\pm0.00$ |
| 100% Melon candy | $3.20^{i}\pm0.00$ | $68.65^{d}\pm0.00$ | $5.26^{c}\pm0.01$ | $16.25^{d}\pm0.07$ | $90.15^{d}\pm0.07$ |
| 50:50 melon seeds milk | $6.20^{i}\pm0.00$ | $71.25^{e}\pm0.07$ | $1.28^{e}\pm0.01$ | $12.05^{f}\pm0.07$ | $63.25^{f}\pm0.07$ |
| 60:40 Melon seeds milk | $11.25^{d}\pm0.07$ | $60.35^{e}\pm0.07$ | $1.31^{d}\pm0.01$ | $8.70^{g}\pm0.00$ | $48.25^{g}\pm0.07$ |
| 70:30 Melon seeds milk | $9.15^{e}\pm0.07$ | $57.30^{f}\pm0.14$ | $1.13^{f}\pm0.01$ | $6.05^{h}\pm0.07$ | $36.25^{h}\pm0.07$ |
| 80:20 melon seeds milk | $7.05^{f}\pm0.07$ | $50.05^{g}\pm0.07$ | $1.03^{g}\pm0.00$ | $6.00^{h}\pm0.00$ | $27.15^{i}\pm0.21$ |
| 90:10 melon seeds milk | $4.25^{h}\pm0.07$ | $46.00^{h}\pm0.07$ | 5.90+±0.00 | $12.30^{f}\pm0.00$ | $81.20^{e}\pm0.00$ |
| 100% melon seeds milk | $2.75^{i}\pm0.07$ | $68.00^{d}\pm0.00$ | $6.71^{a}\pm0.01$ | $13.60^{e}\pm0.85$ | $81.00^{e}\pm1.41$ |
| 100% Tiger nut milk | $203.00^{a}\pm0.00$ | $194.0^{a}\pm00.00$ | $0.61^{h}\pm0.00$ | $51.50^{a}\pm0.71$ | $152.00^{a}\pm0.00$ |
| LSD | 0.71 | 1.02 | 0.93 | 0.20 | 0.03 |

**Means in the same column with different superscripts are significantly different (P<0.05).*

*Table 6 :* Sensory Quality Scores of the Candy samples

| *Candy samples | Appearance | Taste | Flavour | Mouthfeel | General acceptability |
|---|---|---|---|---|---|
| 100% cow | $7.21^{bc}\pm1.20$ | $6.73^{abc}\pm1.66$ | $6.37^{ab}\pm1.22$ | $6.33^{bc}\pm1.67$ | $6.53^{ab}\pm1.20$ |
| 100% Tigernut | $8.10^{a}\pm0.89$ | $7.53^{a}\pm1.01$ | $6.93^{a}\pm1.34$ | $7.33^{a}\pm1.58$ | $7.33^{a}\pm1.09$ |
| 100% melon | $7.77^{ab}\pm1.07$ | $7.30^{ab}\pm1.53$ | $7.00^{a}\pm1.51$ | $7.00^{ab}\pm1.53$ | $6.97^{ab}\pm1.07$ |
| 50:50 Tiger nut : Melon milk | $8.13^{a}\pm0.82$ | $6.50^{bc}\pm1.43$ | $6.87^{ab}\pm1.25$ | $6.43^{abc}\pm1.63$ | $6.67^{ab}\pm0.96$ |
| 60:40 Tiger nut : Melon milk | $7.37^{bc}\pm1.16$ | $6.93^{ab}\pm1.66$ | $6.87^{ab}\pm1.41$ | $7.23^{ab}\pm1.55$ | $7.17^{ab}\pm1.29$ |
| 70:30 Tiger nut : Melon milk | $6.87^{c}\pm0.97$ | $5.97^{c}\pm1.45$ | $6.13^{bc}\pm1.07$ | $5.57^{c}\pm1.83$ | $5.97^{c}\pm1.19$ |
| 80:20 Tiger nut : Melon milk | $7.03^{c}\pm1.27$ | $6.67^{bc}\pm1.42$ | $6.83^{ab}\pm1.32$ | $6.67^{ab}\pm1.69$ | $6.73^{ab}\pm1.26$ |
| 90:10 Tiger nut : Melon milk | $7.47^{bc}\pm1.04$ | $7.00^{ab}\pm1.58$ | $6.80^{ab}\pm1.67$ | $6.90^{ab}\pm1.65$ | $7.03^{ab}\pm1.47$ |
| LSD Tiger nut : Melon milk | 0.78 | 0.75 | 0.69 | 0.83 | 0.61 |

**Means in the same column with different superscripts are significantly different (P<0.05).*

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