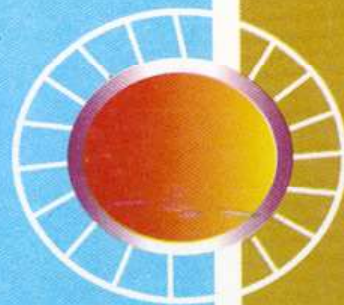


International
Journal of
Multi-disciplinary
Research



Vol. III, Nos. 1&2, December 2010
ISSN: 2006 - 7534

Published by:
The Postgraduate School,
Olabisi Onabanjo University,
Ago-Iwoye, Nigeria

page 188
200

Nutritional Evaluation and Sensory Qualities of Sekete Beverage Flavoured with Sugar or Ginger and Sweet Potatoes

By

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Abstract

The study was designed to evaluate the nutritional composition of "sekete" beverage and also assessed people's responses to "sekete" flavoured with ginger and sweet potato, and the second sample, flavoured with table sugar only. The raw materials used consist of guinea corn 85%, ginger 5% and sweet potato 10%. The control sample had guinea corn 85% sugar 15%. They were processed by adopting the local method.

The beverage "sekete" was nutritionally and organoleptically evaluated using standard methods. The "sekete" beverage flavoured with ginger and sweet potato appeared to have higher nutrient value, than the "sekete" flavoured with sugar only. The recorded values were energy (320.15kcal/100g), protein (18.10g/100g), carbohydrate (78.15g/100g), fat (1.32g/100g). They also contained fair levels of minerals. The sensory evaluation scores of the two samples indicated that flavoured "sekete" with ginger and sweet potatoes were most favoured by elderly panelists while majority of the youths among the panelists preferred the "sekete" flavoured with sugar. Generally, "sekete" beverage flavoured with ginger and sweet potato had higher overall acceptability.

Keywords: Flavoured "sekete" beverage.

Introduction

Traditionally, the term "beverage" refers to food drinks that contain water and other food nutrients incorporated as fluid. Beverage can be alcoholic and non alcoholic in nature. They include tea, coffee, cocoa, minerals, fruit juices, milk drinks etc. Others that are indigenous to Nigerians are made from sorghum, millet and guinea corn. They are "burukutu", "pito", "kainkain", and others⁽⁶⁾

Tea and coffee are the two major commonly consumed in homes and hotels worldwide. Studies traced the genesis of tea to 5000 years ago when it was accidentally dropped into boiling water and delicately flavoured the liquid. Tea is obtained from a tropical evergreen bush leaf *camellia sinensis*. It was confirmed that coffee originated 1,000 years ago in Yemen district of Arabia in the fifteen century. By the middle of the 16th century, coffee drinking had spread to The Sudan, Egypt, Syria and Turkey from where it spread through Britain to the Americas. The trees that produce coffee belongs to the genus coffee, belonging to the *Rubiaceae* Family.

China was noted as the oldest tea growing country and also known for special blends such as 'keemun', lapsang', 'spouchong' "oolongs" and green teas. India is the current largest producer of tea, i.e. 30% of world tea. Best known are the teas from Asaam, Darjeeling and Nilgiri. They all produce tea brands similar in quality to Sri-Lanka⁽⁸⁾. Guinea corn and millet are the world third important food grains being utilized for food as well as beverages. The cereal is very rich in carbohydrate, protein and fat. The hull from guinea corn and millet are used for animal feed, while the leaves are consumed by domesticated animals like goats, sheep and cattle⁽²⁾

Germination of cereals was discovered to have led to increase in the protein quality of the melted flours apart from modifying the starch granules. Studies also confirmed that fermented grains use for beverages contain high nutritive value and developed a diversity of flavours, aroma and

texture in fluid substances⁽⁵⁾ The production and consumption of fermented beverages from cereals are ancient practices in most parts of Africa. Such beverages include 'pito' burukutu, 'kunu', 'sekete' in Nigeria, "kafir" beer in south Africa, "Merisa" in Sudan, and "busea" in Kenya⁽⁶⁾

Sugar is produced from sugar cane grown in a number of tropical and subtropical countries and from sugar beet which is grown in parts of Europe, including UK. As sugar contains 99.9% pure sugar it is invaluable for producing energy. Sugar is used mostly as food component and flavour especially beverages and also used industrially as preservative ingredient for pastry, fruits and nuts. Both alcoholic and non alcoholic beverages attain their best taste when seasoned with carefully measured quantity of sugar⁽¹⁰⁾

Ginger is a tropical plant that has green-purple flowers and aromatic underground stem called *rhizome*. It is commonly used as spice for cooking and medicinal purposes. It is believed that ginger contains anticoagulant/ antiplatelet drugs which are capable of slowing down blood clotting⁽⁹⁾. However, taking ginger with medications that also slow clotting, might increase the chances of intestinal bruising and bleeding.

Sweet potatoes are a long tuber with purple or brown coloured skins. They contain a comparatively large amount of starch and serves as a good source of energy, with a small amount of protein especially just below the skin. They are not rich in mineral salt but have valuable amounts of ascorbic acid, some thiamine and a little carotene⁽⁹⁾

This study is aimed at evaluating the Nutritional and Sensory qualities of sekete flavoured with sugar or ginger and sweet potato.

Materials and Methods

Guinea corn grains were purchased locally from Ayetoro Yewa market. For improving energy density, guinea corn grains (1 kg) were washed and soak in water overnight for 8-12 hours. Then were drained and wrapped with banana leaves then put in a sac and there after placed in a damp dark place at temperature 25-30°C for 4 days; after which the sprouted grains were lightly roasted in a heated earthen ware pot at temperature of 120°C. The grains were dry milled with a local grinding engine and diluted with warm water of temperature 10°C. The mixture were then inoculated with moist yeast *Osmophilic yeast (Saccharomyces cerevisiae)* was used to obtain effective fermentation, lasting for 24 hrs. This was followed by steaming at temperature 100°C for 1½ hours. A combination of crushed and sieved ginger and potatoes were added and allowed to simmer for 5 minutes. The mixture was stirred and removed from the heat source to cool for 24 hours. The next procedure was the boiling of the mixture briefly for 5 minutes at temperature of 100°C and then was removed from the fire and chilled at temperature -4°C before being served.

A portion of 400gm was taken from the prepared slurry, oven dried at temperature 200°C cooled and packed in moisture free polythene kept at 0°C prior analysis. Moisture and ash were determined as described by AOAC⁽¹¹⁾, crude protein was determined with kjeldal method of nitrogen/protein method. Minerals (zinc, calcium, iron) were determined in accordance with AOAC⁽¹¹⁾ procedures.

A 20-man trained sensory panel was selected to evaluate the two sampled beverages. One was flavoured with sweet potato and ginger and the other was flavoured with table sugar only. The panel assessed the beverages for colour, odour, taste and overall acceptability using a 9 point hedonic scale where 1-9 represent dislike extremely and like extremely etc.

Figure 1: Flow Chart Of “Oti Sekete” Brew

Cleaning of grains	(Guinea corn and millet) 50:50%
Add water; soak for	(8-12hrs)
Drain, fold with wet sac cloth or banana leaves	
Germinate in damp dark condition	(for 3 -4 days)
Sprinkle water	3 4 times daily
Dry in sun/roast lightly	
Mill to powder and dilute with warm water	(30°C)
Inoculate with yeast (<i>saccharomyces cerevisiae</i>)	24hrs 36hrs
Steam	(80°C 100°C) 1hrs
Add flavour and cool	(for 24 hrs)
Serve cool or chilled	

Results and Discussion

The Amylase Rich Flour (ARF) produced during germination of the grains dramatically reduced its viscosity by digesting starch to its constituents dextrin and sugar. At fermentation level, the complex carbohydrates, such as starches are partially broken down by bacterial actions with the production of acids and possibly antimicrobial substances. This is an ancient technology for bread, alcoholic and non alcoholic beverages processing⁽³⁾

During fermentation, the Ph drops, this is associated with the production of a characteristics tange taste. After 12-14 hours at room temperature (25 30°C) the Ph of the slurry fell below 4, a level at which studies have shown that the growth of entero-pathogenic bacteria is inhibited. The slurry is suitable for consumption over at least the next 12 hours without refrigerator or reheating. Flavour change include reduction in sweetness and increase in acidity due to fermentation of sugar to organic acids⁽⁴⁾.

It is observed that microbial growth during fermentation causes complex changes to the nutrients of the fermented grains, fats and carbohydrates, micro-organism absorbed fatty acids, amino acids, sugars and vitamins from the slurry⁽⁵⁾.

Tables 1 & 2 indicate the mean scores of the nutrients obtained from the two samples of “oti sekete” i.e. flavoured with ginger and sweet potatoes and sugar respectively. Results showed that scores obtained for all nutrients were relatively similar except for energy scores which was higher in “sekete” flavoured with table sugar ($x = 330.20 \pm 1.10$), but low in potatoes and ginger drink ($x = 320.15 \pm 1.01$), protein score is higher in the mean score of “sekete’ flavoured with ginger and sweet potatoes ($x = 18.10 \pm 0.1$) but low in the sugar flavoured sample ($x = 15.10 \pm 0.1$).

Table 3: The sensory scores of the two samples indicated that flavoured beverage with ginger and sweet potatoes was most favoured by majority of the elderly panelists while the beverage drink flavoured with sugar was preferred by majority of the young judges. Generally, “oti sekete” with ginger and potato flavour had higher overall acceptability.

This study therefore recommends that this local beverage be studied further for more acceptability in homes, Hotels, restaurants and canteens. The benefits derived does not lie in their nutritional values alone but was not prepared with additives and artificial colouring which. Fellows (2000) confirmed may pose some health hazards to consumers.

Table 1: Mean Scores of Proximate Composition and Energy Values of “sekete” flavoured with ginger, sweet potato, and sugar.

Nutrients (100g sample)	GP (85:5:10)	SG (85:15)
Energy (kcal)	320.15 ± 1.01	330.20 ± 1.10
Moisture (%)	16.10 ± 0.10	16.10 ± 0.10
Protein (%)	18.10 ± 0.01	15.10 ± 0.1
Fat (%)	1.32 ± 1.1	1.32 ± 1.0
Ash (%)	4.85 ± 2.01	4.85 ± 1.5
Fiber (%)	11.25 ± 1.01	11.20 ± 1.0
Carbohydrate (%)	78.15 ± 1.1	85.20 ± 1.0

Table 2: Mean Scores of Mineral Composition of “sekete” flavoured with ginger, sweet potato and sugar.

Nutrients (100g sample)	GP (85:5:10)	SG (85:15)
Zinc (mg)	2.15 ± 1.0	2.13 ± 1.0
Calcium (mg)	23.5 ± 1.11	23.10
Iron (mg)	6.35 ± 1.01	6.32 ± 1.0

Table 3: Mean Scores of Sensory Evaluation Scores of flavoured “sekete” with ginger, sweet potato and sugar Per 100g as consumed

Parameter	GP (85:5:10)	SG (85:15)
Odour	4.50 ± 1.01	4.51 ± 2.10
Colour	6.00 ± 1.12	4.25 ± 1.5
Taste	5.40 ± 0.91	4.55 ± 1.10

KEY:

GP “sekete” flavoured with ginger and sweet potato

SG “sekete” flavoured with sugar only

85:5:10:- Guinea corn 85%, Ginger 5%, Sweet potato 10%.

85:15:- Guinea corn 85%, Sugar 15%.

Scores are based on a 9 point hedonic scale comprising.

9 like extremely

6 like slightly

3 dislike moderately

8 like very much

5 neither like nor dislike

2 dislike very much

7 like moderately

4 dislike slightly

1 dislike extremely

mean were of four (4) determination ± SD)

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