

NUTRIENT COMPOSITION, PHYTOCHEMICAL AND SENSORY PROPERTIES OF ZOBO (*HIBISCUS SABDARIFFA*) DRINKS SUBSTITUTED WITH PINEAPPLE (*ANANAS COMOSUS*) AND ORANGE (*CITRUS SINENSIS*) JUICES

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ABSTRACT

Zobo drink is usually produced by boiling the petals of Hibiscus sabdariffa flower along with pineapple peel, pineapple flavour and orange flavour in water. Pineapple fruit and orange fruit are rich sources of nutrients and phytochemicals which are beneficial to health. The aim of this study was to evaluate the nutrient composition, phytochemical and sensory properties of Zobo drinks, substituted with pineapple and orange fruit. Dried Zobo leaves, ginger, cloves, pineapple flavour, orange flavour, pineapple fruit and orange fruit were purchased at Eke- Ukwu Owerri Main Market in Imo State. Four blends of Zobo drink were prepared and were labeled A, B, C and D. Blend A was original Zobo drink using orange flavour and pineapple flavour, B was Zobo drink using pineapple flavour and substitution of orange flavour with orange juice, C was Zobo drink with orange flavour and substitution of pineapple flavour with pineapple juice and blend D was Zobo drink with substitution of both orange and pineapple flavour with orange and pineapple juice respectively. Proximate, minerals, vitamins, phytochemicals and sensory properties of Zobo drink produced were carried out using standard laboratory methods. Blend A had the highest moisture(93.53%) content while the highest ash (0.35%), crude fiber (0.22%), protein (0.87%) and carbohydrate (7.29%) values were observed in blend D. Blend B, C and D had equal values of fat (0.07%). The highest values of all the mineral and vitamins tested in this study were observed in Blend D. Blend D also had the highest values of flavonoid, phytate and phenol content. This study suggests that the addition of fruit juices to Zobo drink enhances its nutritive value which could be generally acceptable. Therefore, consumption of Zobo drinks substituted with pineapple and orange fruit juices should be encouraged to improve individual's intake of micronutrients.

Keywords: Zobo drink, Pineapple, Orange, Phytochemicals

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INTRODUCTION

Zobo drink is a non alcoholic drink made from petals of *Hibiscus sabdariffa* flower (Ezekiel, 2016). Zobo (*Hibiscus sabdariffa*) was cultivated in Mexico, parts of Central America, West Indies and in Southern Florida, Texas and California in the late 19th century (Kolawole and Ajayi, 2007). It is now grown for culinary purposes in most tropical areas (Fasoyiro et al., 2005). In Nigeria, it is mainly cultivated in the northern part of the country which includes Kano, Maiduguri, Jos, Katsina and Kwara states (Ekenam, 2018).

The calyx of *Hibiscus sabdariffa* is a considerable source of nutrients such as carbohydrate, fiber, vitamin C, calcium and iron (Ismail et al., 2008). Zobo also contains antioxidants such as beta-carotene, vitamin C (Gbadegesin and Gbadamosi, 2017) and phytochemicals such as flavonoids (Adelekan et al., 2013). The sour taste of Zobo is associated with the organic acids such as ascorbic, malic and tartaric acid present in Zobo (Adelekan et al., 2013). The leaves of *Hibiscus sabdariffa* could be used as vegetables while the seed is a good source of oil (Chukwu and Akaninwor, 2017). The leaves of Zobo plants could also be used to produce syrup, gelatin, jam and jelly (Izah et al., 2015).

The health benefits of Zobo drink cannot be overemphasized. In traditional medicine, Zobo drink is used to treat hypertension and urinary tract infection (Tseng et al., 2000). Several studies have shown that extracts of *Hibiscus sabdariffa* have a lipid lowering activity which could reduce the risk of hyperlipidemia and cardiovascular diseases such as atherosclerosis and coronary heart diseases (Ekenam, 2018).

Zobo is usually prepared by extracting the content of the calyces of *Hibiscus sabdariffa* with hot boiling water (Odebunmi and Dosumu, 2005). The shelf life of Zobo drink is estimated to be between 24- 28 hours if it is not refrigerated (Bamishaiye et al., 2011). Zobo drink is usually produced in small scale by traditional women at minimal cost as its ingredients are cheap and readily available (Ezekiel, 2016). This drink is widely consumed by people from different socio-economic classes in Nigeria (Odebunmi and Dosumu, 2005). It is also served at special occasions by various tribes (Bamishaiye et al., 2011). The consumer preference for Zobo drink could be attributed to its pleasant red colour (Olayemi et al., 2011).

Pineapple (*Ananas comosus*) is a tropical fruit from the *Bromeliaceae* family. It is referred to as the queen of fruits due to its excellent flavour and taste (Baruwa, 2013). Pineapple is a rich source of nutrients such as calcium, vitamin C, potassium and carbohydrates and non-nutrients such as dietary fibre, and phytochemicals which are vital for the maintenance of an ideal body weight and a functional digestive system (Ishag et al., 2013).

Sweet orange (*Citrus sinensis*) commonly called orange is a member of the *Rutaceae* family (Angew, 2014). It is widely grown in Nigeria and many other tropical and sub-tropical regions (Piccinelli, 2008). Orange contains vitamins especially vitamin C and vitamin A and minerals such as calcium, potassium and magnesium (Angew, 2014). The potassium is an important component of cell and body fluids which helps to control heart rate and blood pressure (Ehler, 2011).

The increasing awareness in health and wellbeing has led to corresponding increase in the demand for healthy drinks worldwide. The consumption of Zobo drink in Nigeria is popular because of its claimed health benefits (Ezekiel, 2016; Chukwu and Akaninwor, 2017). Zobo drink is however produced using pineapple peel, pineapple flavour and orange flavour (Gbadegesin and Gbadamosi, 2017). Pineapple fruit and orange fruit are rich sources of nutrients and phytochemicals which are beneficial to health (Ehler, 2011). Adelekan et al., (2014) evaluated the acceptability of Zobo drinks enhanced with Iyeye fruit (*Spondias mombin*), pepper fruit (*Denettia tripetala*) and pineapple juice (*Ananas comosus*). Fasoyiro et al., (2005) examined the chemical composition and sensory quality of Zobo flavoured with orange, apple and pineapple. However they sweetened the Zobo drink with sugar. There is still limited data on the effect that enhancement of Zobo drink with pineapple and orange fruit juice may have on the nutrient, phytochemical and sensory properties of Zobo drink. Therefore, this study will evaluate the nutrient composition, phytochemical and sensory properties of Zobo drinks, substituted with pineapple and orange fruit juices.

MATERIALS AND METHODS

Sources of materials

Dried Zobo leaves, ginger, cloves, pineapple flavour and orange flavour, pineapple fruit and orange fruit were purchased at Eke- Ukwu Owerri Main Market in Imo State, Nigeria.

Preparation of the ingredients

The dried Zobo leaves were sorted to remove dirt and then washed three times with tap water. The cloves and ginger were washed thoroughly with tap water and ground using a blender (model: 220V/50Hz/200W). The pineapple fruit was washed thoroughly in running tap water and was peeled using a stainless steel knife. The pineapple fruit was sliced into small chunks and the juice was extracted using a fruit juice extractor (model: HA-9801, 220-240V). The orange fruit was washed with tap water and wiped dry using a clean towel. The juice was extracted using a manual juice extractor.

Recipe for the preparation of different Zobo drinks

The preparation of Zobo drink was carried out using the method of (Ezekiel et al., 2016) with slight modifications. The ingredients used in the preparation of Zobo include 30g of dried Zobo leaves, 20g of ginger 1 teaspoon of cloves, ½ table spoon of pineapple flavour, ½ table spoon of orange flavour, 200g of pineapple peel, 2 cups (500mls) of pineapple juice, 2 cups (500mls) of orange juice and 2000mls of water.

Formulation of Zobo drink blends: Four blends of Zobo drinks were prepared and were labelled blend A,B,C and D. Blend A was original Zobo drink using orange flavour and pineapple flavour, B was Zobo drink using pineapple flavour and substitution of orange flavour with orange juice, C was Zobo drink with orange flavour and substitution of pineapple flavour with pineapple juice and blend D was Zobo drink with substitution of both orange and pineapple flavour with orange and pineapple juice respectively.

Method of preparation

- The water was heated in a pot and the Zobo leaves and pineapple peel were added to the boiling water and were boiled for 5 minutes
- The ginger and cloves were added into the mixture and was boiled for 1 minute.
- The pineapple flavour/orange flavour, pineapple juice/orange juices were added to the mixture and were allowed to boil for 1 minute.
- The pot was then removed from heat and the Zobo drink was allowed to cool.
- The drink was filtered using a muslin cloth and was packaged in a transparent bottle.

Chemical Analysis

The Kjeldahl method was used to determine the protein content (AOAC, 2004) fat was determined by the Soxhlet extraction method (AOAC, 2004), moisture was determined using hot air oven method (AOAC, 2004). Ash was determined by weighing 1g of each sample into a tarred porcelain crucible. It was incinerated at 600⁰C for six hours in an ashing muffle furnace until ash was obtained (AOAC, 2004). The carbohydrate content was determined by difference. The minerals calcium, potassium, iron, and zinc were determined using Atomic Absorption Spectrophotometer described by Ranjham and Gopa (1980). Potassium and sodium were determined using flame photometer, the vitamins were determined using AOAC (2010).

Phytochemical Analysis

Test for the presence of carotenoids, alkaloids, flavonoids, phenols, tannins and phytates was carried out following the method of Mieko and Delia (2003),Herborne (1973), Meda *et al.*, (2005), Singleton *et al* (1999), Pearson (2000) and Oberleas (1978) respectively.

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Sensory evaluation

The sensory evaluation was carried out using 20 panelists made up of students of Imo state University who are familiar with the sensory attributes taste, aroma, consistency and color. Their preference was rated on a nine (9) point hedonic scale. Where 9 = extremely liked, 8 = liked very much, 7 = liked moderately, 6 = like much, 5 = neither like nor dislike, 4 = dislike, 3 = dislike moderately, 2 = dislike very much, 1 = disliked extremely. The samples were served simultaneously clean white disposable cups. Tap water was provided for rinsing of mouth between samples.

Statistical analysis

The data collected was subjected to analysis of variance (ANOVA) and Duncan's test to separate the means among the sample using Statistical Package for the Social Sciences (SPSS) Version 21.0.

RESULTS

The proximate composition of Zobo drinks, substituted with pineapple and orange fruit juices is presented in table 1. There was significant variation ($p < 0.05$) in the moisture, ash and carbohydrate content of the four blends of Zobo fruit juice. Blend A had the highest moisture (93.53%) content while the highest ash (0.35%), crude fibre (0.22%), protein (0.87%) and carbohydrate (7.29%) values were observed in blend D. Blend B,C and D had equal values of fat (0.07%). Blend D had the lowest moisture content (91.19%) while the lowest ash (0.24%), crude fibre (0.08%), fat (0.05%), crude protein (0.76%) and carbohydrate (5.34%) values were observed in blend A.

The Mineral composition of Zobo drinks substituted with pineapple and orange fruit juices is presented in table 2. There were significant differences ($p < 0.05$) in the iron, potassium, zinc and calcium content of the four samples of Zobo fruit juice blends. Blend D had the highest iron (1.14mg), potassium (40.98mg), zinc (0.97mg) and calcium (14.42mg) content while Blend A had the lowest iron (0.85mg), potassium (23.45mg), zinc (0.84mg) and calcium (12.27mg) content.

The Vitamin composition of Zobo drinks, substituted with pineapple and orange fruit juices is presented in table 3. There was significant difference ($p < 0.05$) in the vitamin C and vitamin A content of the four blends of Zobodrinks prepared. Blend D had the highest vitamin C (28.93mg) and vitamin A (49.44 μ g) content while the lowest vitamin C (17.87mg) and vitamin A (28.57 μ g) were observed in blend A.

The phytochemical composition of Zobo drinks, substituted with pineapple and orange fruit juices is presented in table 4. There was no significant difference ($p > 0.05$) in the alkaloid, phytate and flavonoid content of blends. The highest tannin (0.67%) and alkaloid (0.02%) were observed in blend A while blend D had the highest values of flavonoid (0.08%), phytate (0.19%) and phenol (0.52%) contents.

The sensory properties of Zobo drinks, substituted with pineapple and orange fruit juices is presented in table 5. Significant difference ($p < 0.05$) were observed in the aroma, colour, taste, consistency and overall acceptability of the sensory properties of Zobo fruit juice blends. The highest Aroma (7.82), colour (8.00), taste (7.87), consistency (7.34) and overall acceptability (8.04) were observed in blend A, B, A, C and B respectively while the lowest aroma (6.34), colour (7.45), taste (5.63), consistency (6.15) and overall acceptability (6.03) were observed in blend D.

DISCUSSION

In this study, the nutrient, phytochemical and sensory properties of Zobo drinks, substituted with pineapple and orange fruit juices were evaluated. There was significant difference ($p < 0.05$) in the moisture content of the Zobo blends. Blend A which is original Zobo drink produced using orange flavour and pineapple flavour had the highest moisture content (93.53%). The moisture content of the Zobo drinks declined with addition of orange or pineapple fruit juice and was lowest in sample D which contained both pineapple and orange fruit. This decline could be attributed to the lower moisture content of the juices. The high moisture content suggests that the Zobo fruit juice blends are likely to be capable of quenching thirst (Adamu et al., 2014). The values of moisture content observed in this study is higher than 86.01% reported by (Adamu et al., 2014) and 87.13% moisture reported by Fasoyiro *et al.*, (2005).

The marked increase in the crude fibre from 0.08% in blend A to 0.22% in sample D could be attributed to the high fibre content of pineapple and orange fruit juices as they are good sources of dietary fibre (Ehler, 2011). Fasoyiro (2005) also observed an increase in the crude fibre content of Zobo drink with increase in the proportion of fruits used in the preparation of Zobo. The fat content of the Zobo drink blends is quite negligible with values ranging from 0.05% in blend A to 0.07% in blend D. The low fat content observed in this study indicates that consumption of Zobo drink could be suitable for individuals who are interested in weight management as well as in prevention of diseases linked to high dietary fat intake. Ekanem et al., (2018) reported higher values of fat (0.87%) in Zobo drinks sold in Ikot Ekpene Metropolis in Akwa Ibom State, Nigeria.

The carbohydrate values observed in this study is similar to the report of Fasoyiro (2005). The increment in carbohydrate content of the blends could be associated with the content of the fruits

juices as the carbohydrate content of the Zobo drinks increased with addition of pineapple or orange juice or both with the highest values observed in blend D which contained both pineapple and orange juice.

The significant ($p < 0.05$) difference in the crude protein content of the Zobo fruit juice blends could also be linked to the protein content of the pineapple and orange fruit juices. The low protein values observed in this study suggests that consumption of Zobo drink is likely to be suitable even for patients with liver problems who require low or no protein in their diet (29). Gbadegesin *et al.*, (2017) and Fasiro (2005) reported similar protein content in Zobo drinks. The ash content of the Zobo drinks improved from 0.24% in blend A to 0.35% observed in blend D with addition of orange and pineapple fruit juices. The values of ash observed in the Zobo drink blends is not in agreement with the report of Ekanem *et al.*, (2018) as they did not observe any ash content in the Zobo drinks sold in Ikot Ekpene while Gbadegesin *et al.*, (2017) and Fasiro (2005) observed similar ash content in their Zobo drinks

Significant differences ($p < 0.05$) were observed in the vitamin composition of the Zobo drinks. This values of vitamin A and Vitamin C observed in this study is related to the reports of Gbadegesin *et al.*, (2017) and Adelekan *et al.*, (2014). Blend D which contained both pineapple and orange fruit juice had the highest vitamin A (49.44 μ g) and vitamin C (28.93mg) contents. The increase in the vitamin A and vitamin C contents of the Zobo drinks with addition of pineapple and orange fruit juices could be associated with the composition of pineapple and orange as they are good sources of vitamins (Angew, 2014). This suggests that substitution of orange and pineapple flavours used in the production of Zobo with orange and pineapple fruit juices could enhance the nutritional value of Zobo. Therefore, consumption of Zobo produced with pineapple and orange juices could be useful in meeting the body's demands for vitamins.

Significant differences ($p < 0.05$) were observed between blend A (original Zobo drink) and blend D which contained Zobo drink with both pineapple and orange fruit juices. The highest iron (1.14mg), potassium (40.98mg), zinc (0.97mg) and calcium (14.42mg) contents were observed in blend D. Like the vitamins, the higher mineral contents observed with addition of pineapple juice, or orange juice or both could be linked to the composition of pineapple and orange as they are considerable sources of minerals. The increase in the mineral contents of Zobo drinks reported in this study is in agreement with the findings of Gbadegesin *et al.*, (2017) who observed an increase in the mineral contents of Zobo drinks with increasing concentration of pineapple juice.

The tannin content of the Zobo drinks dropped significantly with addition of pineapple or orange fruit juice or both. This reduction in the tannin content of the drinks is likely to be of importance as tannins could interact with dietary iron by preventing its absorption and also interferes with protein digestibility by forming insoluble complexes with protein (Stéphanie, 39).The alkaloid

content of the drinks also decreased with addition of pineapple and/or orange fruit juice. The flavonoid, phytate and phenol contents of the Zobo drinks improved with addition of pineapple and/or orange fruit juice. The range of tannins and phytate values observed in this study are higher than 0.0026%-0.0056% of tannins and 0.0038%-0.0078% of phytate reported by Adelekan et al., 2014

Significant differences ($p < 0.05$) were observed in the aroma, colour, taste, consistency and overall acceptability of the Zobo fruit juice blends. The values obtained from this study indicate that the four samples were accepted by the panellist in all the attributes tested. However, blend B which contained Zobo drink with pineapple flavour and orange fruit was most preferred by the panellist. This study therefore suggests that the substitution of pineapple and orange flavour with pineapple and orange fruit juices respectively in the production of Zobo drink produces a Zobo drink that is generally acceptable with enhanced nutritive value.

CONCLUSION

The result from this study shows that the nutritional value of Zobo drink was improved when produced with pineapple and orange fruit juices instead of pineapple and orange flavour however, sample blend B was the most preferable. In addition, the ratings by the panellists suggests that Zobo drink is likely to be accepted by the general public if prepared with pineapple/or orange juice. Pineapple and orange fruits are nutritious and their addition to the Zobo drink makes it a beverage that could be used to improve the nutritional status of an individual as well as help in fighting diseases and infections. The use of orange juice and pineapple juice in the production of Zobo drink in order to enhance its nutritional value should be encouraged in a bid to improve an individual's intake of micronutrients.

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Table 1: Proximate composition of Zobo drinks substituted with pineapple and orange fruit juices

Blend	Moisture (%)	Ash (%)	Crude fibre (%)	Fat (%)	Crude protein (%)	Carbohydrate (%)
A	93.53 ^a ±0.02	0.24 ^d ±0.02	0.08 ^c ±0.00	0.05 ^a ±0.01	0.76 ^c ±0.02	5.34 ^d ±0.02
B	92.52 ^b ±0.02	0.29 ^c ±0.01	0.15 ^b ±0.01	0.06 ^a ±0.01	0.83 ^b ±0.01	6.16 ^c ±0.02
C	91.77 ^c ±0.01	0.32 ^b ±0.01	0.20 ^a ±0.01	0.06 ^a ±0.01	0.82 ^b ±0.01	6.91 ^b ±0.02
D	91.19 ^d ±0.01	0.35 ^a ±0.04	0.22 ^a ±0.01	0.07 ^a ±0.01	0.87 ^a ±0.01	7.29 ^a ±0.01

Values are means ± standard deviation of the two determinations

Means with same superscript within the column are not significantly different ($p>0.05$) while different superscript within the column are significantly different ($p<0.05$)

Key:

Blend A= Original Zobo drink using orange flavour and pineapple flavour.

Blend B = Zobo drink using pineapple flavour and substitution of orange flavour with orange juice.

Blend C= Zobo drink with orange flavour and substitution of pineapple flavour with pineapple juice.

Blend D= Zobo drink with substitution of both orange and pineapple flavour with orange and pineapple juice respectively.

Table 2: Mineral composition of Zobo drinks substituted with pineapple and orange fruit juices

Blend	Iron (mg/100g)	Potassium (mg/100g)	Zinc (mg/100g)	Calcium (mg/100g)
A	0.85 ^b ±0.02	23.45 ^d ±0.01	0.84 ^c ±0.01	12.27 ^c ±0.04
B	1.00 ^a ±0.01	32.27 ^c ±0.03	0.94 ^b ±0.04	13.06 ^b ±0.02
C	1.05 ^a ±0.01	35.73 ^b ±0.04	0.92 ^b ±0.03	13.94 ^a ±0.05
D	1.14 ^a ±0.02	40.98 ^a ±0.01	0.97 ^a ±0.01	14.42 ^a ±0.02

Values are means ± standard deviation of the two determinations

Means with same superscript within the column are not significantly different ($p>0.05$) while different superscript within the column are significantly different ($p<0.05$)

Key:

Blend A= Original Zobo drink using orange flavour and pineapple flavour.

Blend B = Zobo drink using pineapple flavour and substitution of orange flavour with orange juice.

Blend C= Zobo drink with orange flavour and substitution of pineapple flavour with pineapple juice.

Blend D= Zobo drink with substitution of both orange and pineapple flavour with orange and pineapple juice respectively.

Table 3: Vitamin composition of Zobo drinks, substituted with pineapple and orange fruit juices

Blend	Vitamin C (mg/100g)	Vitamin A (µg/100g)
A	17.87 ^d ±0.01	28.57 ^d ±0.01
B	24.84 ^b ±0.06	40.75 ^c ±0.04
C	24.16 ^c ±0.02	41.42 ^b ±0.03
D	28.93 ^a ±0.04	49.44 ^a ±0.06

Values are means ± standard deviation of the two determinations

Means with same superscript within the column are not significantly different ($p>0.05$) while different superscript within the column are significantly different ($p<0.05$)

Key:

Blend A= Original Zobo drink using orange flavour and pineapple flavour.

Blend B = Zobo drink using pineapple flavour and substitution of orange flavour with orange juice.

Blend C= Zobo drink with orange flavour and substitution of pineapple flavour with pineapple juice.

Blend D= Zobo drink with substitution of both orange and pineapple flavour with orange and pineapple juice respectively.

Table 4: Phytochemical composition of Zobo drinks, substituted with pineapple and orange fruit juices

SAMPLE	Tanin (%)	Alkaloid (%)	Flavonoid (%)	Phytate (%)	Phenol (%)
A	0.067 ^a ± 0.01	0.02a± 0.01	0.05 ^a ±0.01	0.016 ^a ± 0.01	0.038 ^d ± 0.02
B	0.063 ^b ± 0.01	0.019a±0.01	0.06 ^a ±0.01	0.017 ^a ± 0.01	0.049 ^b ± 0.01
C	0.063 ^b ± 0.01	0.019a± 0.01	0.06 ^a ±0.01	0.017 ^a ± 0.01	0.043 ^c ± 0.01
D	0.061 ^b ± 0.01	0.018a± 0.01	0.08 ^a ±0.01	0.019 ^a ± 0.01	0.052 ^a ± 0.04

Values are means ± standard deviation of the two determinations

Means with same superscript within the column are not significantly different ($p>0.05$) while different superscript within the column are significantly different ($p<0.05$)

Key:

Blend A= Original Zobo drink using orange flavour and pineapple flavour.

Blend B = Zobo drink using pineapple flavour and substitution of orange flavour with orange juice.

Blend C= Zobo drink with orange flavour and substitution of pineapple flavour with pineapple juice.

Blend D= Zobo drink with substitution of both orange and pineapple flavour with orange and pineapple juice respectively

Table 5: Sensory properties of Zobo drinks substituted with pineapple and orange fruit juices

Sample	Aroma	Colour	Taste	Consistency	Overall Acceptability
A	7.82 ^a ±0.03	8.00 ^a ±0.06	7.87 ^a ±0.01	7.08 ^b ±0.01	7.88 ^b ±0.02
B	7.75 ^a ±0.06	7.47 ^b ±0.01	7.33 ^b ±0.01	7.28 ^a ±0.02	8.04 ^a ±0.06
C	7.47 ^c ±0.01	7.74 ^c ±0.02	6.94 ^c ±0.01	7.34 ^a ±0.01	7.94 ^b ±0.03
D	6.34 ^d ±0.01	7.45 ^b ±0.02	5.63 ^d ±0.04	6.15 ^c ±0.03	6.03 ^c ±0.04

Values are means ± standard deviation of twenty five determinations

Means with same superscript within the column are not significantly different ($p>0.05$)while different superscript within the column are significantly different ($p<0.05$)

Key:

Blend A= Original Zobo drink using orange flavour and pineapple flavour.

Blend B = Zobo drink using pineapple flavour and substitution of orange flavour with orange juice.

Blend C= Zobo drink with orange flavour and substitution of pineapple flavour with pineapple juice.

Blend D= Zobo drink with substitution of both orange and pineapple flavour with orange and pineapple juice respectively.