



EVALUATION OF VITAMIN C CONTENT AND CHEMICAL QUALITIES OF SOME PACKAGED JUICE DRINKS SOLD IN PARTS OF OWERRI, IMO STATE

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ABSTRACT

This work on vitamin C content and chemical qualities of some packaged juice drinks sold in parts of Owerri was conducted between the months of May to November, 2014. Different samples of packaged juice drinks were evaluated using standard biochemical methods. Each sample was subjected to vitamin (ascorbic acid) PH, titrable acidity, brix and refractive index evaluation. The result showed a vitamin C range of 18-31mg/100ml for five alive, Exotic, caparison, lucozade boost, ribena and mixed fruit juices. The brix content ranged from 10.01-16.04, while the refractive index varied from 1.3622-1.4632. The PH and titrable acidity varied from 4.86-6.24 and 1.02-2.06 respectively. Therefore, the result of the study shows that the samples evaluated are safe for human consumption.

Key word: *Vitamin C, juice drink, Brix, Refractive index, Titrable acidity.*

INTRODUCTION

Fruit juices are liquid expelled by pressure or by other mechanical means from the edible portion of fruits.

They are good sources of vitamins especially vitamin C and minerals. They are recognized as contributing to five portions per day of fruits and vegetables needed for healthy life. (Hulme, 1997).

Some fruit juices have been made from fruit concentrate.

This concentrate comes from fresh fruit, but the water content is usually reduced, and additives added to prolong the shelf life.

Also, certain fruit juice drinks (commercially packaged juice products) are not exclusively made from fruit juice, but the products contain a high proportion of water and other ingredients like sugar, flavours, food additives, preservatives and extra vitamins added. Brix and acid ratio are used to ensure that they meet the Internationally recommended standards.

Fruit juices are widely consumed in ever-increasing quantities in Nigeria with consumption rate of about 246 million litres in 2006 to 390 million litres in 2010 (Hulme 2012).

Juice undergo changes on storage due to chemical reaction between constituents. The loss of nutritional quality during the processing and storage of beverages have become an increasingly important problem.

Therefore, this fact is of great importance to consumers who must know how to store the fruit juice and when to consume them in order to get the maximum benefits of the vitamin C content.

AIMS & OBJECTIVES

1. To determine the vitamin C content and chemical qualities of some selected package juice drinks sold in parts of Imo State

MATERIALS AND METHODS

MATERIALS:

80 samples of fruit juices including five alive, exotic, lucozade boost, ribena, and mixed fruits were purchase for the open and supermarkets.

APPARATUS:

Burret, PH meter, magnetic slimen, refractometer, pipette.

METHODOLOGY FOR ASCORBIC ACID.

The method of lee (1975) was employed, which involves the following steps.

1. A 10ml aliquot of sample was placed into a 100ml volume line flask and brought to volume with 0.4% oxalic acid solution.
2. The solution was filtered through a whatman No 4 filter paper.
3. A 10ml aliquot of the filtered solution was pipette into a conical flask along with 15ml of 0.4% oxalic acid solution.
4. Solution was titrated using a micro burette with 0.04% aqueous 2, 6, dichloro phenol indophenols solution to the first pink shade.

PH VALUE

The pH Value of the samples were determined with a glass electrode PH meter (Karl Kolls, D-6072 Dereich) at room temperature.

TITRABLE ACIDITY (T.A)

Ten ml of sample were titrated against 0.1N sodium hydroxide using phenolphthalein as an indicator (Egan et al 1981).

Titration acidity is expressed as citric acid.

$$\text{T.A (mg/100g} = \frac{\text{ml of NaOH (equiv. wt of acid) x 100}}{1000 (\text{wt of sample})}$$

TOTAL SOLUBLE SOLID

Total soluble solids was determined using a refractometer expressed as brix degree.

BRUX/ACID RATIO

The brix and ratio is obtained by dividing the total soluble solid (Brix corrected for acids and temperature) by the total titration acidity (% acid w/w) at 20°C (68°F)

$$\text{Brix/Acid ratio} = \frac{\text{Brix}}{\% \text{ Acid (w/w)}}$$

REFRACTIVE INDEX

1. The refractometer was calibrated with the standard provided by the manufacturer for daily use distilled water was used R1 of 1.3330 at 20°C and 1.3325 at 25°C.
2. Aliquots/drops of samples were analyzed and attained for temperature equilibrium between instrument and sample
3. The board line was adjusted so that it falls on point of intersection of cross hairs.
4. The refractive index (RI) was read and readings taken from the refractometer.

STATISTICAL ANALYSIS

The data obtained were subjected to the analysis of variance and whenever appropriate the mean separation procedure of LSD were employed.

RESULTS

Table 1: Vitamin C, Refractive index, titration acidity, brix and PH values of different juice samples.

Parameters	Sample A	Sample B	Sample C	Sample D	Sample E	Sample F
Vitamin C	29	27	23	18	28	31
Titration acidity	1.02	1.13	1.14	1.09	1.07	2.0
Brix	11.32	10.01	12.16	11.11	16.04	13.44
Refractive index	1.2314	1.4632	1.4691	1.3112	1.3179	1.3132
PH	4.86	5.33	4.96	4.33	5.12	6.24

Key:

Sample A	=	Five Alive
Sample B	=	Exotic
Sample C	=	Caprison
Sample D	=	Lucozade Boost
Sample E	=	Ribina
Sample F	=	Mixed fruits

From table 1 above, the vitamin C content of the different fruit juices sampled are within the range of 18-31mg/100ml..

The study shows a significant different ($p < 0.05$) in the vitamin C concentration in five alive, exotic, caparison and mixed fruit juice, when compared with that in lucozade boost.

Also, from table 1 above, the brix content ranged from 10.01-16.04, whereas the refractive index varied from 1.3622-1.4632.

The PH and titrable acidity ranged from 4.86-6.24 and 1.02-2.06 respectively.

DISCUSSION

This study was carried out to evaluate the vitamin C content and chemical qualities of some packed juice drinks sold in parts of Owerri. The result of the study showed a vitamin C content within the range of 18-31mg/100ml, for the fruit juice samples evaluated.

The result of the study is in conformity with the report of manhokive et al, (2013). They reported vitamin C range of 30-35mg/100mg in five fruit juices evaluated in Zimbabwe.

The significant difference ($p < 0.05$) in vitamin content in lucozade boost reported in this study when compared with others could be as a result of storage problem. Since most of samples purchased from the open market were kept under the sun, and this could lead to chemical reaction and loss of nutritional quality (Hulme, 1997).

The result of the study also showed a brix content ranged 10.01-16.04. This result is in agreement with the report of FAO (1992). They recommended that brix value for orange juice should not be less than 10. Also, Antolerich (1995) reported that if brix value is below the required specification, it shows that there has been over dilution of the juice with water.

Also from the result, the refractive index, PH and titrable acidity were in the range of 1.3622-1.4632, 4.86-6.24 and 1.02-2.06% respectively.

The reported range of 1.3112-1.4166, 3.23-436 and 1.29-1.96% for refractive index, PH and titrable acidity reported by Ashurst et al (2008) respectively, agrees with the result of the present study.

CONCLUSION

From the result of the study, it can be concluded that the findings of the study conforms with the recommended standards and is also in line with the reports of other researchers in parts of sub-Saharan Africa.

This goes to show that all the fruit juices sampled are safe for human consumption

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