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Protein and mineral composition of some fruit juices (*Citrus cinesis* Spp) in some selected areas in Lokoja metropolis

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Keywords

Minerals, protein, lemon, grape, lime, citrus, and juice.

Abstract

Fruit juice of four varieties of oranges, Lime, grape, Lemon, and orange species were analyzed for protein and elemental composition. Samples were randomly obtain from four selected markets in Lokoja metropolis. the experiment carried out on these four varieties show that, orange juice has the least acidic PH. value of 4.69 ± 0.08 while, Lime has the highest acidic pH. value 2.07 ± 0.06.Grape juice has highest protein value 0.97±0.05% while orange record the least value of 0.52± 0.02% the elemental mineral content analyzed for the four juices show that ,orange has the highest potassium content of 47.90± 0.17ppm while grape has the least potassium content of 23.99± 0.03ppm .calcium content in lemon was the highest recorded, while grape juice has the least calcium content with values of 3. ± 0.02 ppm and 1.55 ± 0.04 respectively. Orange has the highest amount of magnesium recorded while grape has the least. Lime has more iron than others with values of 2.89 ± 0.02ppm and orange the least in iron with values of 0.46 ± 0.44ppm. from the results of this study, citrus fruits are highly recommended for daily consumption, since they are rich in in mineral content and low in protein with the exception of lime orange which is high in acidic PH. level, this is because of its, likely hood of increasing the PH./acidic level of the body.

Introduction

FRUIT juices are widely consumed drinks across the world and its enormous commercial and social importance is obvious. Today, in the quest to get healthy, more and more people choose fruit juices, being recognized as a source of nutrient compounds, including essential elements.(Welna, and Madeja , 2014).They are widely accepted as good sources of vitamins and minerals, including vitamin C, folate, potassium, magnesium and antioxidants. (Krejpcio1, 2005). Different types of fruit juices are preferred due to positive effects on the health and nutrition. Juice, nectar and still drinks are three categories of drinks with so many variants that all consumers, regardless of age, lifestyle and taste preferences whom they can find their favorite type. Fruit juice was defined as the liquid that is naturally constrained in fruits or vegetable tissue and prepared by mechanically squeezing or macerating fruit or vegetable flesh without the application of heat or solvent by (Holis, et al,2009) the human body overwhelmingly need vitamins and minerals, this can be naturally met by eating fresh fruits and vegetables. In addition to this vitamins and minerals, fruits contain phytochemicals that carry out important preventive and healing functions (Chuku, and Chinaka, 2014). Fruits are generally high in fiber, water and sugars,

although sugar varies in traces as in the case of lime orange while fresh weight of date fruits is about 61% (Hulme, 1970). Nigeria has in abundance, different variety of fruits which are highly rich sources of mineral and nutrients to the teeming population (Bello, et al., 2008). Natural fruit juices are the fastest and best way to obtain nutrient which are necessary for wellness (Sify food, 2007). It is interesting to note that fruits juices processed under a hygienic condition could play very important role in enhancing consumer's health through inhibition of breast cancer, congestive heart failure (CHF) and urinary tract infection (Denison, 1996; Saenz et al., 2001).

Materials and Methods

Sample Collection

A total of 4 different orange species were purchased from Lokoja Old Market in Kogi State, north central Nigeria. The samples are: Grape, Lime, Lemon and Orange.

Sample Preparation

All the samples were thoroughly washed using distilled water, peeled, rewashed after which the juice of each sample species was squeezed using a manual juice squeezer to obtain the juice. The juice was sieved using a plastic sieve, to eliminate the seeds and pulp, stored in the refrigerator to prevent spoilage prior to instrumental analysis.

Analysis of Sample

pH Determination

The pH was determined with the aid of glass electrode pH meter, Bulk scientific previously standardized. The pH meter probe was inserted into a 50ml of the juice in an Elhmeyer 100ml below and swirl gently and continuously. The values were obtained in triplicate. All these determination were carried out according to AOAC (1990).

Determination of Mineral Elements

The wet digestion method was used for the samples preparation, while the mixed acid digestion (Agua regia) digestion procedure was carried out on the sample to liberate the organo - metals into their different ionic forms prior to instrumental analysis using AAS. Two grams of the sample of juice were used in all cases. AAS Bulk Scientific Model 210 was used for the instrumental analysis.to Mineral analysis were carried out according to (Martin-Prevel, et al.1984)

Protein Determination

Crude protein was determined by the Kjedahl method (Chang, 2003 and James, 1995). In which Nitrogen content was determined by the lucievation gravimetric method.

Results

Table 1.0: showing the pH Level of Four Selected Species in Triplicate.

Lemon	2.30	2.39	2.40
Orange	4.69	4.78	4.61
Grape	3.33	3.49	3.30
Lime	2.03	2.9	2.11

Table 2.0 showing the Mean and standard deviation for pH of Four Selected Species

Lemon	2.36±0.06
Orange	4.693±0.081
Lime	2.07±0.06
Grape	3.373 ±0.1

Table 3.0: showing the Protein Level g/100(%) of Four Selected Species in Triplicate

Lemon	0.91	0.87	0.80
Orange	0.53	0.51	0.54
Lime	0.63	0.65	0.63
Grape	0.96	0.99	0.92

Table 4.0: showing the Mean and standard deviation for Protein g/100(%)

Lemon	0.86±0.06
Orange	0.52±0.02
Lime	0.64±0.12
Grape	0.97±0.05

Table 5.0: showing the Mineral elements in four selected species in triplicates

	Lemon	Orange	Lime	Grape
Mg	0.261	0.411	0.341	0.181
Fe	1.330	0.462	2.892	0.811
K	46.60	47.900	31.992	23.992
Ca	3.662	2.341	2.391	1.522

Table 6.0: showing the Mean and standard deviation for Minerals in four selected species

	Lemon	Orange	Lime	Grape
Mg	0.261±0.02	0.411±0.15	0.341±0.01	0.181±0.15
Fe	1.330±0.01	0.462±0.44	2.892±0.02	0.811±0.01
K	46.60±0.011	47.900±0.17	31.992±0.02	23.992±0.03
Ca	3.662±0.02	2.341±0.01	2.391±0.12	1.522±0.04

The results of these analysis are shown in Table 1 – 6, from the result obtained, it shows that the acidic level of the selected juice are high, with lime juice having the highest acidic values of 2.07±0.06, followed closely by lemon 2.36±0.06, Grape fruit juice having an acidic value of 3.37±0.1, while Orange fruit juice have the least with its pH value been 4.69±0.81as show in (Table 2.0). these pH values shows that the consumption of these varieties of fruits juice is not alarming though its consumption should be done with a greater consideration of individual health status in relationship to their effect on the gastrointestinal tract, stomach of the individual involved. The high level of the acidity content of the fruits irrespective of the varieties Table 2.0 is as a result of the presence of a mixture of organic acids whose composition varied greatly.

Iron Status in Selected Fruits.

The level of iron in the selected orange variety follow in descending order as thus represented.

Lime 2.89ppm > Lemon 1.33ppm > Grape 0.811ppm > Orange 0.462ppm, While the level of

Magnesium Status in Selected Fruits.

The level of magnesium in selected juiced are in this descending order:

Orange 0.411ppm > Lime 0.341ppm > Lemon 0.261ppm and Grape fruit 0.181ppm. However the result of this study indicates that all four fruits are highly rich in the analyzed mineral elements, and are therefore, very good source of these nutrients since these element plays very important role in metabolic processes in man.

Protein Composition

The result of the protein composition of this research work as shown in (table 4.0), the protein content of the selected fruit juice shows that the, protein content is low.

The highest percentage of protein is recorded in Grape fruit having (0.97%) while Lemon fruit followed closely with a value of (0.912 %) and least with orange fruit having the (0.53 %) e protein contents of the four fruits are in the following order.

Grape > Lemon > Lime > Orange.

This report agrees with the findings of (Chuku, and Chinaka, 2014).which reported the protein content of Lemon (2.39%), Orange (4.09 ± 0.03%) Lime (2.07± 0.16%) and Grape (3.27 ± 0.08%).

The protein content of these four selected fruit juice obtained from Lokoja market indicates that, the fruits are very safe for consumption with respect to the protein content of the fruit juice.

Mineral Element Composition

The mineral compositions of the fruits juice of each samples were reported in [Table 6.0] Potassium is the most abundant amongst the four selected fruits juice, followed by calcium, iron and magnesium in this order K > Ca > Fe > Mg respectively. The level of potassium ranges from [23.99±0.03—47.90±0.17]. While calcium has [1.52±3.66±0.02] and iron [0.46± 0.44—2.89± 0.02] and Mg [0.18± 0.15—0.411± 0.15]. Calcium level reported in this study is as follows Lemon > Lime > Orange > Grape respectively. Calcium Lemon [3.66 ±0.02] > Lime [2.39 ±0.12] > Orange [2.34±0.0] > Grape [1.522±0.04].

Conclusion

From the findings of these study, it shows, that selected orange varieties are high in pH (acidity), low in protein and very rich in the selected mineral elements and are therefore, recommended for daily consumption depending on the nature of the fruits maturity (17). The pH values been ranging from 2.03 – 4.69 for the selected fruit juices. This high level of acidity normally prevent quick and easily deterioration of this juice fruit.

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