International Journal of Innovative Research and Review ISSN: 2347 – 4424 (Online)
An Online International Journal Available at http://www.cibtech.org/jirr.htm
2016 Vol. 4 (2) April-June, pp.1-4/Ghani et al.
Research Article

PROXIMATE COMPOSITION OF GUAVA VARIETIES COLLECTED FROM FOUR TEHSILS OF DISTRICT BHAKKAR

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ABSTRACT

District Bhakkar has extreme environmental conditions because of high temperature in summer and very low temperature during winter. The following research was carried out to check proximate value of two guava varieties (Ruby X Supreme and Hong Kong) that were grown in District Bhakkar and collected from its four tehsils i.e. Bhakkar, Darya Khan, Mankera and Kalor Kot. Results shows that Highest amount of Protein, crude fiber and dry matter contents were observed in tehsil Kalor Kot and Mankera respectively in Hong Kong variety as compared to variety Ruby X Supreme. On the other hand highest amount of crude fat, moisture, ash and carbohydrates were observed in Ruby x Supreme in tehsil Darya Khan, Kalor Kot and Bhakkar as compared to Hong Kong variety.

***Keywords*:** *Proximate Composition, Ruby X Supreme, Hong Kong Variety, District Bhakkar*

INTRODUCTION

Guava (*Psidium guajava* L.) belongs to family Myrtaceae is one of the most important tropical and subtropical fruit in the world because it is highly nutritious and can be grown under different soil as well as climatic conditions. It is widely distributed in Pakistan and bears fruit twice in a year (Bal and Dhaliwal, 2004). In Punjab province after citrus and mango cultivation guava annual yield is 446.0 thousand tones on an area of 49.4 thousand hectare (Muhammad *et al.,* 2010). As compared to other nutrients, guava is wealthier source of vitamin C than pear, citrus and apple. Guava is 100% edible fruit which is known as "apple of poor" used as a table fruit and also in jams, jelly in processing industries due to its low cost, easily available and highly nutritious (Archana and Siddiqui, 2004). It's vital role in reducing nutritive disorders which are due to insufficiency of vitamin C in humans (Muhammad *et al.,* 2010). Many researchers have investigated the nutritional quality of guava fruit under various modified atmospheric conditions. The present study was conducted to examine the proximate composition of guava fruit in four different tehsils of district Bhakkar. These Tehsils are: Bhakkar, Darya khan, Kalor Kot and Mankera. Bhakkar is a district of Punjab province and known as "Region of Thal" due to extreme weather conditions. Soil of District Bhakkar is loamy sandy.

Mathew *et al*., (2014) examine proximate composition of guava fruits showed that guava contains moisture (4%), Protein (8.05%), Crude fiber (12%), Ash (3%) and Carbohydrate (53.95%). The results of mineral contents showed that guava contain Na (2.91 mg/100g dry wt.), K (4.84 mg/100g dry wt.), Mg (3.28 mg/100g dry wt.), Ca (3.03 mg/100g dry wt.), Fe (16.00 mg/100g dry wt.), Cu (2.14 mg/100g dry wt.) and Zn (4.23 mg/100g dry wt.). Abhimanyu *et al.,* (2013) investigated the proximate and mineral composition of guava fruits. Results showed that guava contains 1.28% proteins, 7.5% carbohydrates, 166.16 mg/g potassium, 2.40 mg/g Iron, 16.46 mg/g Calcium, 15.67 mg/g Magnesium, 0.05 mg/g Zinc. Moreno *et al.,* (2014) studied composition of guava fruit such as total sugars, reducing sugars, soluble proteins, total protein, fat and fiber. Results showed that fresh guava contains 2.56±0.1 g/100g total sugar, 0.18±0.1 g/100g reducing sugar, 50±0.2 g/100g soluble protein, 4.2% total protein, 0.50±0.05 % total fat, 11.9±0.05 % crude fiber. Guava contains a lot of phytochemicals including vitamins, polysaccharides,

essential oils minerals, enzymes, proteins (Deo and Satri, 2003). In Pakistan, many local and foreign origin guava varieties are cultivated but information concerning their nutritive quality is lacking.

Sample Collection

The four Tehsils of District Bhakkar were selected for the purpose of sample collection. Fruits of two guava varieties (Ruby x supreme and Hong Kong) were collected from all four Tehsils (Bhakkar, Darya Khan, Mankera and Kalor Kot) for analysis. Each sample comprised over two replicates. Each sample was randomly handpicked, wrapped in a specific brown envelop and labeled. All samples were dried in oven at the temperature of 75°C for 3 days.

Proximate Analysis

Proximate analysis (Ash, Moisture, Dry matter, Protein, carbohydrate, fat and fiber contents) of the samples were determined. The proximate composition is determined by using AOAC (1990) method.

Statistical Analysis

Statistical analysis was carried out using Microsoft Excel 2007.

Mineral Matter (Ash)

Fruit samples were carbonized using the oxidizing flame until not any fumes produced. The samples were then burned at 600°C for 6 to 8 hours in muffle furnace to burn all the organic matter. The ash content was determined by the given formula

$$\textbf{Ash}\ (\%) = \frac{\textbf{Weight of ash}}{\textbf{Fresh Weight of sample}} \times \mathbf{100}$$

Moisture Content

For moisture content, the samples were dried in an oven at 105°C from 6 to 8 hours.

The moisture content was calculated by applying following formula

$$\textbf{Moisture}\ (\%) = \frac{\textbf{Weight of sample after drying}}{\textbf{Fresh Weight of sample}} \times \mathbf{100}$$

Dry Matter

The dry matter content was determined by the given formula

Dry matter content (%) = 100 – moisture contents

Fat

Dried sample was extracted with petroleum ether (40°C – 60°C) in Soxhlet apparatus. This method was used to remove the components that were ether soluble. It was dried up at 70°C in an oven until the constant weight achieved. The percentage of fat was calculated by the given formula

$$\textbf{Crude fat}\ (\%) = \frac{\textbf{Weight of oven dried sample}}{\textbf{Weight of fresh sample}} \times \mathbf{100}$$

Estimation of Crude Protein

For determination of protein first of all total nitrogen was determined by using Kjeldhal apparatus. Following reagents were prepared.

1. 4 % boric acid solution
2. 0.01 N standard Sulphuric acid
3. Bromocersol green methyl red indicator

1 g material with 3 g of digestion mixture ($HgSO_4$ + K_2SO_4 at the ratio of 1:9) and concentrated sulphuric acid (20 ml) were taken in a digestion flask and boiled for 1.5 to two hours till substances in it became clear. The material for digestion was then diluted to 20 ml. solution (10 ml) was poured in Kjeldhal flask apparatus to place on Kjeldhal ammonia distillation unit. 40 % NaOH (10 ml) was then mixed to solution and this flask was instantly linked to distillation flask. 4 % Boric acid solution (10 ml) was mixed with

100 ml alcohol mixed indicator in a conical flask. The conical flask was removed as soon as the distillate was around 40-50 ml. The distillation was turned off and chilled for few minutes. It was then titrated with 0.01 N standards H_2SO_4 until the color changed to pink. Blank was also run in the same way.
Nitrogen was calculated by using the given formula:

$$Nitogen = \frac{Volume\ used\ of\ \frac{N}{10} H2SO4 \times 0.0014 \times 250}{Weight\ of\ sample \times 10} \times 100$$

The protein contents were obtained by multiplying nitrogen to a factor of 6.25.
% Protein = % Nitrogen × 6.25
Crude Fibre
Crude fibers were determined by using the method of acid base digestion. I took 3g of oven dried sample and removed the fat by Soxhlet apparatus and digested the sample in 1.25% H_2SO_4 and NaOH separately. Then I filtered the contents and the material is washed three times by using distilled water. Then I transferred the residue in china dish placed the dish in oven at 105ºC for 24 hours, crude fibers were measured. The difference between the weights of the sample was the contents of crude fibers.

RESULTS AND DISCUSSION
Results showed that highest ash (5.35%), moisture (86.89%) and fat contents (1.56%) were found in Ruby X Supreme variety of guava in Tehsil Bhakkar, Mankera and Darya Khan respectively (Table 1 & 2). While lowest ash, moisture and fat contents were found in Hong Kong variety of Guava in Tehsil Mankera and Kalor Kot respectively. It was found that Hong Kong variety is rich in dry matter (16.77%), crude protein (1.19%) and crude fibre (3.42%) in Tehsil Mankera, Kalor Kot and Bhakkar respectively (Table 1 & 2).
Variations in proximate composition may be due to environmental changes, soil composition and available nutrients.

Table 1: Proximate Composition of Hong Kong variety of Guava (*Psidium guajava* L.) Collected from Four Tehsils of District Bhakkar

Tehsils	Ash	Moisture	Dry matter	Crude Protein	Crude Fibre	Fat
Bhakkar	4.767±0.06	84.33±0.39	15.67±0.39	1.14±0.001	3.28±0.01	0.34±0.0006
Mankera	4.667±0.02	83.23±0.05	16.77±0.05	1.11±0.001	3.42±0.01	0.35±0.0006
Darya Khan	4.74±0.04	83.75±0.50	16.25±0.50	1.17±0.001	3.19±0.002	0.44±0.0003
Kalor Kot	4.833±0.005	84.96±0.11	15.03±0.11	1.19±0.0005	3.20±0.0002	0.32±0.0002

Table 2: Proximate Composition of Ruby X Supreme Variety of Guava (*Psidium guajava* L.) Collected from Four Tehsils of District Bhakkar

Tehsils	Ash	Moisture	Dry matter	Crude Protein	Crude Fibre	Fat
Bhakkar	5.35±0.01	85.47±0.21	14.52±0.21	0.76±0.01	2.41±0.01	1.28±0.05
Mankera	5.12±0.002	84.89±0.28	15.11±0.28	0.86±0.009	2.15±0.001	1.20±0.02
Darya Khan	5.21±0.05	86.02±0.04	13.97±0.04	0.69±0.01	2.33±0.0007	1.56±0.03
Kalor Kot	5.33±0.1	86.66±0.67	13.34±0.67	0.57±0.001	2.23±0.03	1.25±0.003

Conclusion
Results shows that Highest amount of Protein, crude fiber and dry matter contents were observed in tehsil Kalor Kot and Mankera respectively in Hong Kong variety as compared to variety Ruby X Supreme. On

the other hand highest amount of crude fat, moisture, ash and carbohydrates were observed in Ruby x Supreme in tehsil Darya Khan, Kalor Kot and Bhakkar as compared to Hong Kong variety.

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