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Determination of Nutritional Values and Elemental Contents From Guava Fruit

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Abstract

In this study, Guava fruit *(Psidiumguajava,* L.) was collected from GayanYwarThit village, Letpadan Township in Bago Region. Water content was determined by oven drying method. Ash content was determined by Muffle furnace method and fibre content was determined by digestion method. Fat content was determined by Soxhlet extractionmethod and protein content was determined by Macro Kjeldahl method. The total carbohydrate content was determined by the difference between 100 and the sum of percentage (%) of water, ash, fibre, fat and protein. Vitamin C content was determined by redox titration method. The elements present were determined by Atomic Absorption Spectroscopy Technique(AAS). The elements of calcium, iron, magnesium and sodium were observed in guava fruit. In this research work, the nutritive values of guava fruit contain 37.50% of water, 1.01% of ash, 2.60% of protein, 4.01% of fibre, 0.35% of fat and 54.53% of carbohydrate. Vitamin C content of fresh sample 0.208% andof boiled sample 0.123%were found. The elementssuch as 0.690 ppm of calcium, 1.126 ppm of magnesium, 0.197 ppm of iron and 9.725 ppm of sodium.

***Keywords*:** Guava fruit, nutritive values, vitamin C, AAS.

Introduction

Guava (*Psidiumguajava,* L) is a tropical fruit rich in antioxidants and vitamin C. It is a member of the Myrtaceae family, which has more than 80 genera and 3000 species distributed throughout the tropics and subtropics. The consumption trend of fresh tropical fruits and their products is increasing steadily due to consumer's education about their exotic flavors, nutritive value and phytochemical content with potential health benefits.

Botanical description of guava fruit

Family	- Myrtaceae (myrtle)
Genus	- *Psidium*
Species	- Guajava
Botanical Name	- *Psidiumguajava*
Myanmar	- Malaka
English name	- Guava

Figure 1: Guava Plant

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Figure 2: Guava Fruit (*Psidiumguajava)*

Chemical composition of guava fruit

The chemical composition of the fruit varies with the stage of development, variety and season. The titratable acidity (TA) reported as citric acid content ranges from 0.08 to 2.20% by weight. The TSS/ acidity ratio varies between 6.2 and 53.9 and the pH ranges from 4.1 to 5.4. Guava fruits consist of about 20% peel, 50% flesh (pericarp) and 30% seed core. The fruit contains approximately 84% moisture, 26% dry matter, 1.5% protein, 0.7% lipids and 1% ash. Carbohydrates are the principal constituents of guava. They consist of 59%, 34%, and 5% fructose, glucose and sucrose respectively. Guava is the second highest in content of vitamin C, containing up to five times the concentration found in orange. The vitamin C concentration fluctuates between 37 mg and 1,000 mg of ascorbic acid per 100 g of guava fruit (Damodaram, 2008) Guava fruits have some elements such as Na, Mg, Ca and Fe (Cowam, 1995).

Health benefits of guava fruit

Guava fruits are important components of a healthy diet and are one of the main sources of antioxidants. Consumption of Guava fruit is beneficial for prevention of cancer, heart disease and other age-related diseases. Vitamin C is commonly used to boost our immune system to fight cold and flu. In addition, it works as an antioxidant, destroying free radicals that can cause cancer and other diseases in the body (Gary, 1999). They concluded that the consumption of guava could result in improved antioxidant status and lipid profile, reducing the risk of disease caused by free radical activities and high cholesterol in blood.

Aim and Objectives

The aim of this research work is "to determine of nutritional values and elemental contents of Guava Fruit".

Objectives

To determine the water and ash contents

To determine the fat, fibre, protein and carbohydrate contents

To determine the vitamin C content and the phytochemical test

To determine the elemental contents on sample by (AAS)

Materials and Methods

Guava fruit sample was collected from GayanYwarThit Village, Letpadan Township, Bago Region. The collected samples were cleaned, washed and cut into small pieces. The collected samples were dried at room temperature and powdered. Water content was determined by oven drying method. Ash content was determined by Muffle furnace method and fibre content was determined by digestion method. Fat content was determined by Soxhlet extractionmethod and protein content was determined by Macro Kjeldahl method. The total carbohydrate content was determined by the difference between 100 and the sum of

percentage (%) of water, ash, fibre, fat and protein. Vitamin C content was determined by redox titration method. The elements present were determined by Atomic Absorption Spectroscopy Technique.

Results and Discussion

Determination of Nutritional Values of Guava Fruit

Water, ash fat, fibre, protein and carbohydrate contents in sample were determined by using appropriate reagents. The observed data are listed in Table 1.Determination of water is important because the calculation can be made on a dry basic and meaningful comparisons of the result can be made.Determination of ash is a rough measure the amount of inorganic salt present in sample.Determination of fat is the most concentrated source of food energy.The fibre content is lower the blood cholesterol.Protein can work together to achieve a particular function and they often associate to form stable complexes.Carbohydrates content supply the major portion of the daily energy requirements of the normal individual: on an ordinary diet more than half of the total daily calories usually come from this source. In this study, research work can be found in vitamin C content was found 0.208% in fresh sample and 0.123% in boiled sample. So, vitamin C content in fresh sample is more than inboiled sample. According to theseresults, vitamin C decreases and increases in temperature. Thus Vitamin C content gradually loses the when temperature rises.

In this study, calcium content was found 0.690 ppm in guava fruit. It is required 0.8g per day for adults by the recommendation of National Research Council. Ca is known in human nutrition for the development and growth of skeletal e.g. bones, teeth as well as coenzyme inmetabolic regulations of biomolecules.Magnesium content was found 1.126 ppm in guava fruit. The requirement of magnesium for adults men has been estimated by balance techniques to between 200 and 300 mg per day. Magnesium has an essential role in a wide variety of physiological process. Sodium content was found 9.725 ppm in guava fruit. A safe and adequate intake of sodium ranges from 1100 to 3000 mg daily for adults. Na concentration responsible in maintenance of total body fluid needed in acid base equilibrium as well as for the osmotic regulation of the body.

Iron content was found 0.197 ppm in guava fruit. The iron content of food is a significant factor in its nutritive value, for iron plays a very important part in nutrition, being an essential constituent of the important substance hemoglobin. (Salder, 1999).Preliminary phytochemical screening for the selected indigenous medicinal fruit was carried out. In accordance with this test, variety of constituents containing in these fruit are tabulated in Table 2. The phytochemical test was observed in glycoside, saponin, polyphenol, phenolic compound, terrene, flavonoid and reducing sugar. So, they also provide health benefits for human.

Table 1:Results of Some Nutritional Values in Guava Fruit

Parameter	Value(%)
Carbohydrate	54.53
Water	37.50
Fibre	4.01
Protein	2.60
Ash	1.01
Fat	0.35

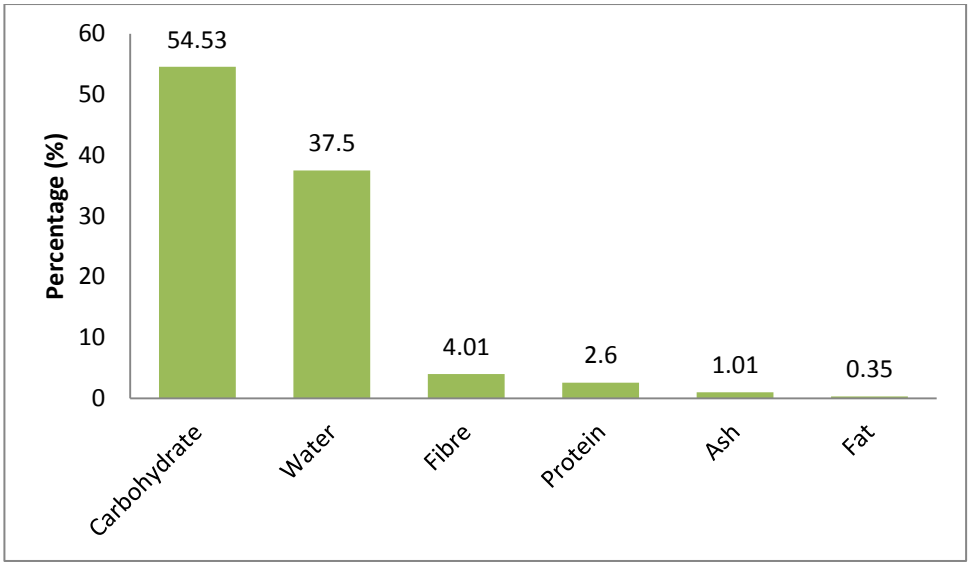

Figure 3: The amount of quantitative nutritional analysis in guava fruit sample

Table 2:Results of Phytochemical Constituents Present in Guava Fruit

No	Types of Compound	Extract	Test reagents	Observation	Remarks
1	Glycoside	H_2O	10% Lead acetate	White ppt	+
2	Reducing sugar	H_2O	Benedict's solution	Brick-red ppt	+
3	Phenolic compound	EtOH	10% $FeCl_3$ solution 5% $K_3[Fe(CN)_6]$	Blue blank solution	+
4	Polyphenol	EtOH	1%$K_3[Fe(CN)_6]$, 1% $FeCl_3$	Greenish blue solution	+
5	Flavonoid	EtOH	Mg turning, Conc: HCl	Pink color solution	+
6	Terpene	EtOH	Acetic anhydride, Conc; H_2SO_4, $CHCl_3$	Pink color solution	+
7	Steroid	EtOH	Acetic anhydride, Conc; H_2SO_4, $CHCl_3$	Colorless	-
8	Saponin	H_2O	Distilled water, shaken	Frothing	+
9	Alkaloid	1% HCl	Mayer's reagent	No ppt	-

(+) present (-) absent (ppt) = precipitate

Conclusion

The main aim of this study is to find out nutritional values and elemental contents of guava fruit sample. From the overall assessments of the present work, the following inferences could be drawn.The dried guava fruit sample was found to have (37.50%) of water, (1.01%) of ash, (0.35%) of fat, (4.01%) of fibre, (2.60%) of protein and (54.53%) of carbohydrates. So, guava fruit have highly water and carbohydrate contents. Water is necessary for the properly and regularly functioning of the physical body and carbohydrates supply the major portion of the daily energy requirements of normal individual. Glycosides,saponin, polyphenol, phenolic compound, terpene, flavonoid and reducing sugar are present. So, they also provide health benefits for human.Many elements 9.725 ppm of Na, 1.126 ppm of Mg, 0.690 ppm of Caand 0.197 ppm of Fe were found in guava fruit samples by using AAS. Na and Mg are macroelements and Fe and Ca are microelements. Na and Mg have essential roles in a wide variety of physiological process. Ca is known in human nutrition for the development and growth of skeletal. The iron content of food is a significant factor in its nutritive value, an essential constituent of the important substance hemoglobin. Vitamin C was also investigated

in both freshly prepared sample and boiled sample. The vitamin C (ascorbic acid) 0.208% of freshly prepared sample and 0.123% of boiled sample were observed. According to these results, vitamin C content of boiled sample is lower than freshly prepared sample. In conclusion, guava fruit is a rich source of vitamin C and it also has great medicinal properties. So, it is considered to be the best among all the fruits.

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