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Biochemical And Nutritional Assessment Of Guava (Psidium Guajava)

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Abstract: *Guava (Psidium guajava) is an evergreen shrub or small tree in the family Myrtaceae grown for its edible fruits. Analysis of proximate principles of guava was carried out and nutritional profiles of white and red pulp guava were established.Proximate analysis indicated that the carbohydrate content in the white pulp guava was found to behigher than the red pulp guava. The protein content varied significantly with more amount of proteins in the red pulp guava. The amount of crude fibres in red pulp guava was found to be more as compared to white pulp guava. The results for moisture content indicated that the red variety contains less amount of water. The mineral elements analysis indicated that the red pulp guava fruit was significantly higher in Calcium, Sodium and Phosphorous. The white variety was found to be rich in potassium. Sodium content in white guava was in very minute quantity and hence was not detectable. The value of ascorbic acid was higher in red guava, which indicated that the red pulp variety is richer in vitamin C.Isolation of pectin displayed that the white variety of guava exhibited more amount of pectin than the red one.There are a number of citied documents to prove the nutritional significance of guava, but in order to test this significance and hold between the two, most commonly found varieties of this fruit i.e. the white pulp and the red pulp guava, makes it an interesting topic to compare the nutritional status between the two. Hence the aim of the research was to carry out the biochemical assessment of both the varieties of Psidium guajava and to compare the nutritional status of both.*

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I. Introduction

Guava is an evergreen shrub or small tree in the family Myrtaceae grown for its edible fruits. The guava fruit is a true *berry*. In *botany*, a berry is a fleshy or pulpy indehiscent *fruit* in which the entire ovary wall ripens into a relatively soft pericarp, the seeds are embedded in the common flesh of the ovary, and typically there is more than one seed. Guava has a slender trunk with smooth green to red-brown bark. The trunk may be branched at the base and the branches droop low to the ground. The plant possesses oval or elliptical leaves which are smooth on the upper surface and hairy on the lower surface. Guava produces solitary white flowers and a berry fruit. The fruit is oval in shape and green to yellow in colour. The flesh inside can be white, yellow, pink or red in colour and contains numerous yellowish seeds. Guava can reach grow to 10 m (33 ft) in height and lives for approximately 40 years. Guava may also be referred to as common guava and its origin is unknown although it grows native in parts of tropical America.

There are several varieties of guavas, some of the few varieties include common guava**,** or apple guava (*Psidium guajava*) which has the largest fruits of all and is the type generally available at the supermarket. "Homestead" is a popular pink-fleshed variety from Florida that is very sweet. "Ruby," a red-flesh variety, is known for its exquisite flavour and tropical aroma. Apple guavas have a firm texture, so they work well to slice and include on fruit platters. Strawberry guavas (*Psidium cattleianum*) which typically have smaller leaves and fruits than the common guava and a more shrub-like form. Lemon guava which is the most common variety, known for its yellow skin and excellent flavour, and pineapple guavas (*Feijoa sellowiana*) which are cold and hard than the other varieties, tolerating temperatures to 15 degrees or lower. They have an altogether different flavour, as their name suggests, and are a popular landscape plant in California.

Guava has been nomenclature by many nutritionists as a "SUPER FRUIT" due to its easy cultivation, availability and a countless list of health benefits. The medicinal properties of guava fruit, leaf and other parts of the plant are also well known in traditional system of medicine. Since, each part of guava tree possesses economic value; it is grown on commercial scale.

A very well-known nutritional benefit of consumption of guava is its rich Vitamin C content performing varied immune functions and protecting the body from free radicals. Apart from this, a high level of manganese, folate, and fibre have additional benefits that are associated with guava. The principle aim of this

research was to determine and compare the proximate principles of guava (white pulp and red pulp) and to determine the gradation of nutrient values of both and to project a comparison between the two.

II. Materials and Methods

Guavas (both varieties) were collected from local market, washed, peeled, seeds were removed and the flesh was used for quantitative tests.

Preparation of Ash Solution

Incineration of Sample

A predetermined amount (usually 2g -5g) of the sample was taken into a clean, dry, pre-weighted empty silica crucible. The crucible was placed in the incinerator to allow ashing of the sample. The sample was incinerated until a white ash residue was left behind. The crucible was cooled in a desiccator.

Extraction of Sample

The ash residue in the crucible was extracted by dissolving it in 1.0mL of 1:1 HCl and transferred into a 50mL standard flask. Further, three washings of 0.5mL of 1:1 HCl each were given to completely extract the residue. This extract was used for estimation of mineral content.

Proximate Analysis

The flesh was cut, chopped and weighed and this was subjected to further chemical modifications depending upon the method used. This sample was used for the proximate analysis of nutrients.

The proximate principles of the nutrients analysed included

- Total carbohydrate content by Anthrone Method
- Total proteins by Folin Lowry Method
- Total Crude fibre content
- Moisture Content
- Ascorbic acid by Chlorophenol – Indophenol dye method
- Calcium by EDTA Method
- Sodium by Flame Photometry
- Potassium by Flame Photometry.

➢ In addition, isolation of pectin from both the varieties was carried out.

III. Results

Comparison between white and red guava

Fig.1Estimation of Total Carbohydrate Content

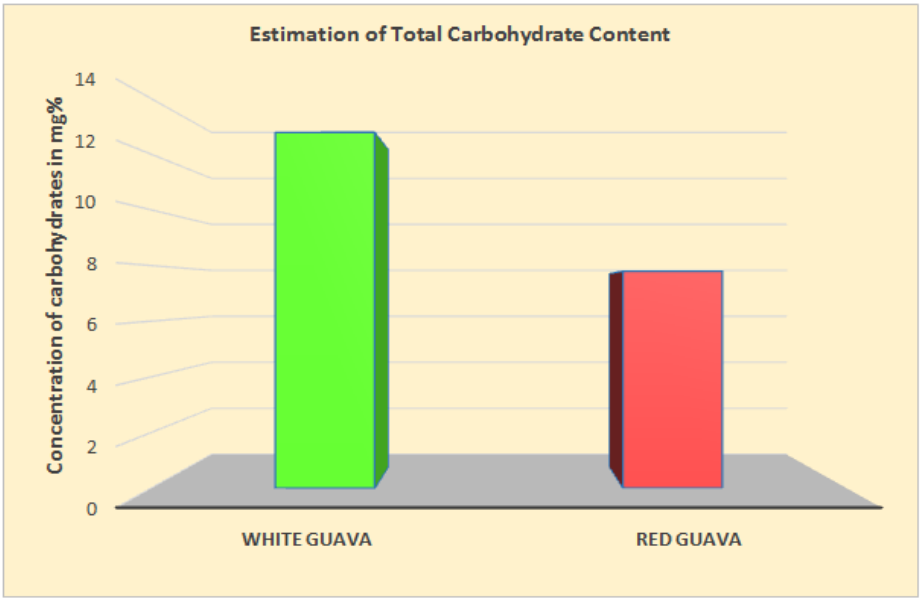


Fig. 2Estimation of Total Protein content

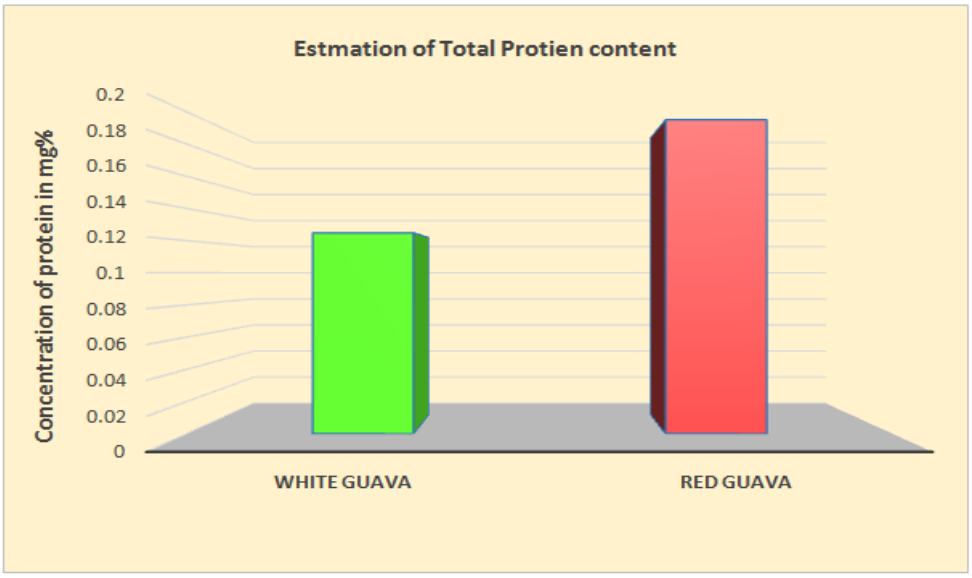


Fig.3Estimation of Crude Fibre

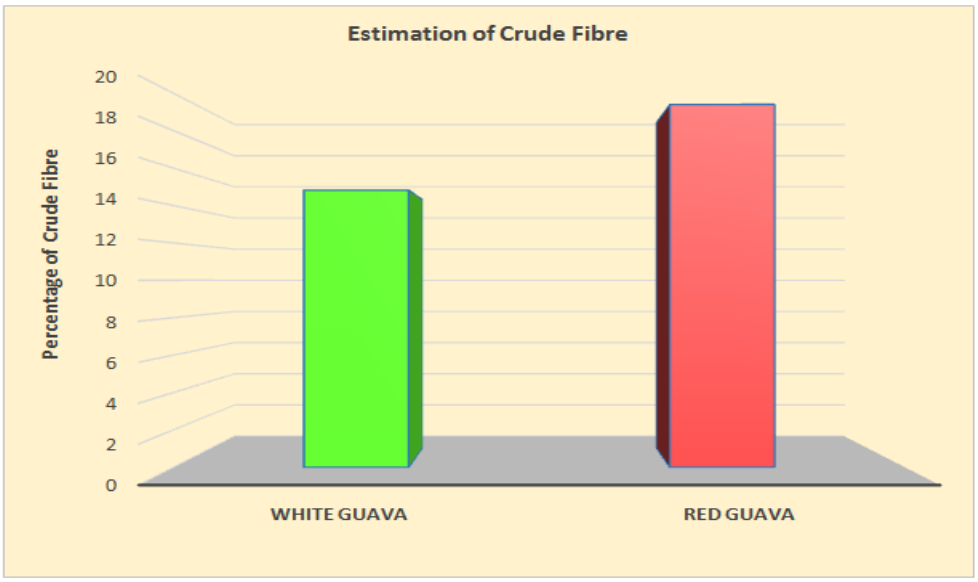


Fig.4Estimation of Moisture Content

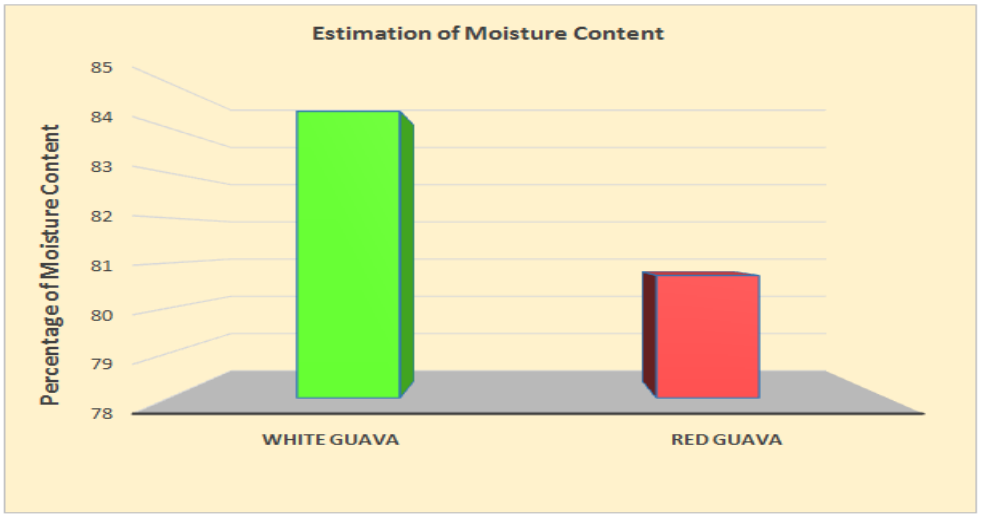


Fig.5Estimation of Sodium Content

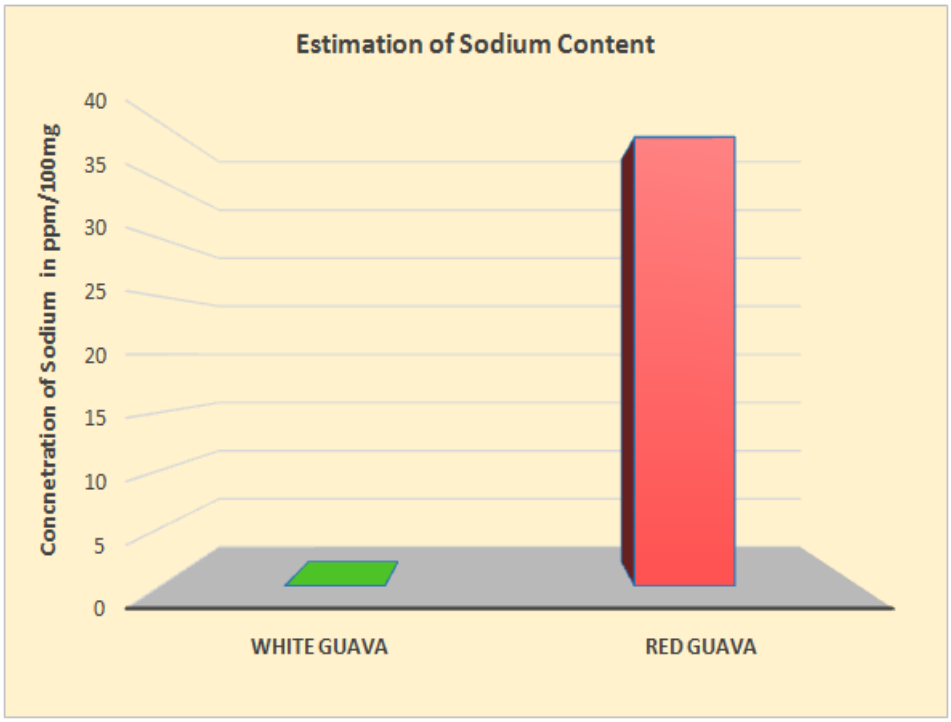


Fig. 6Estimation of Potassiium Content

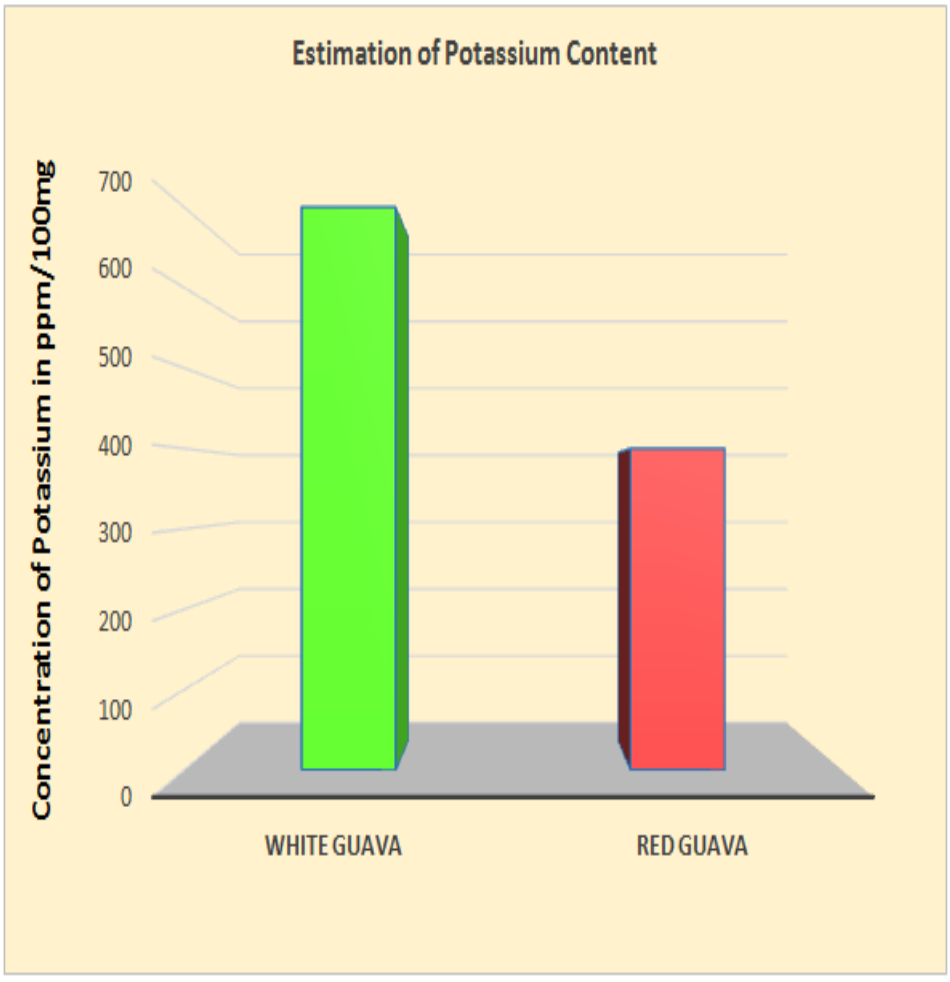


Fig.7Estimation of Calcium Content

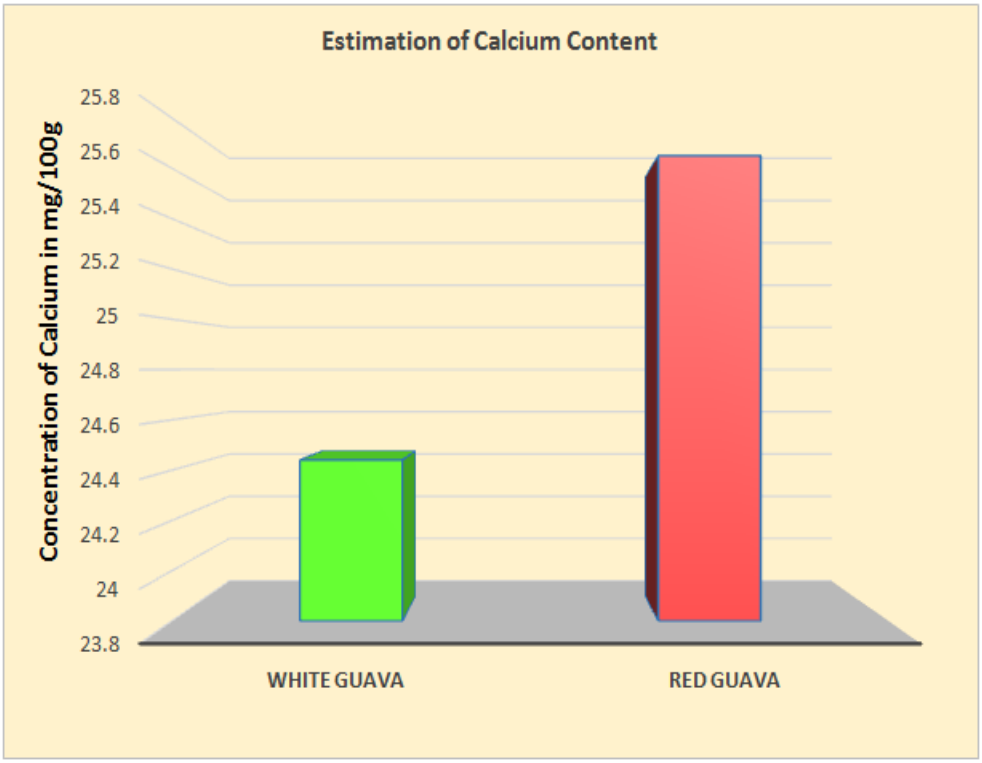


Fig.8Estimation of Phosphorous Content

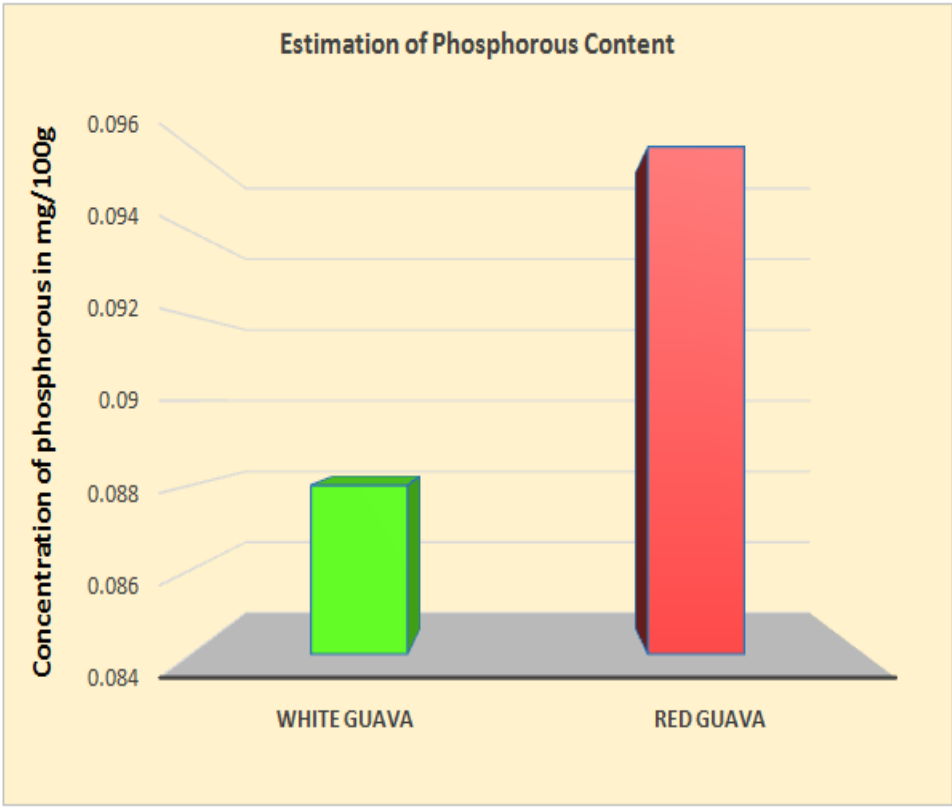


Fig.9Estimation of Ascorbic Acid content

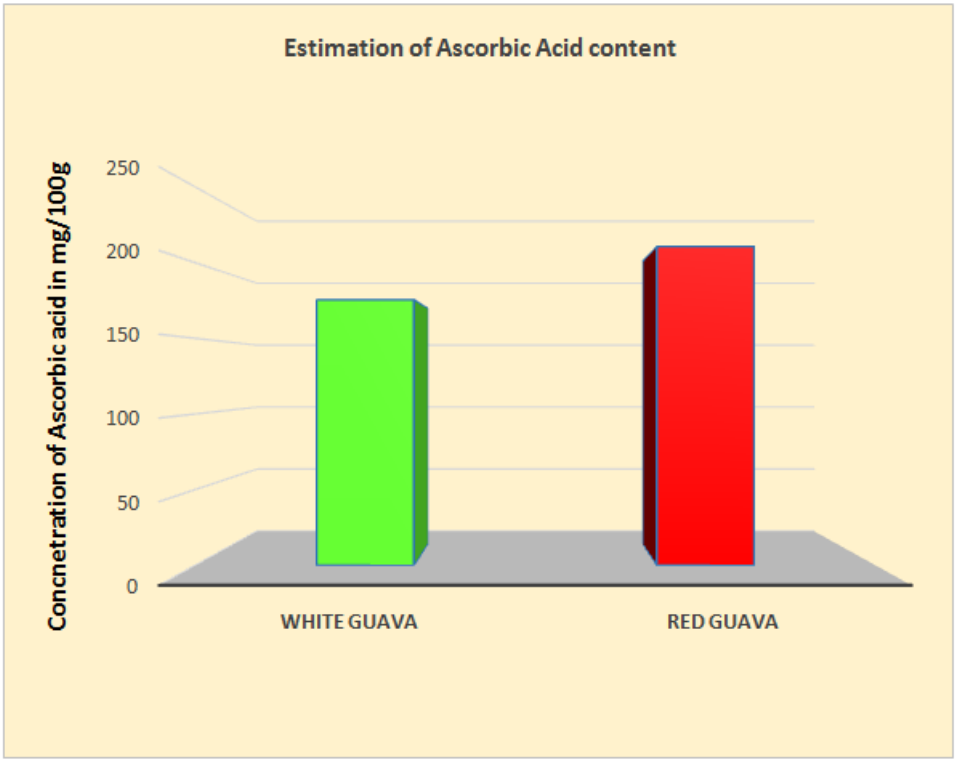
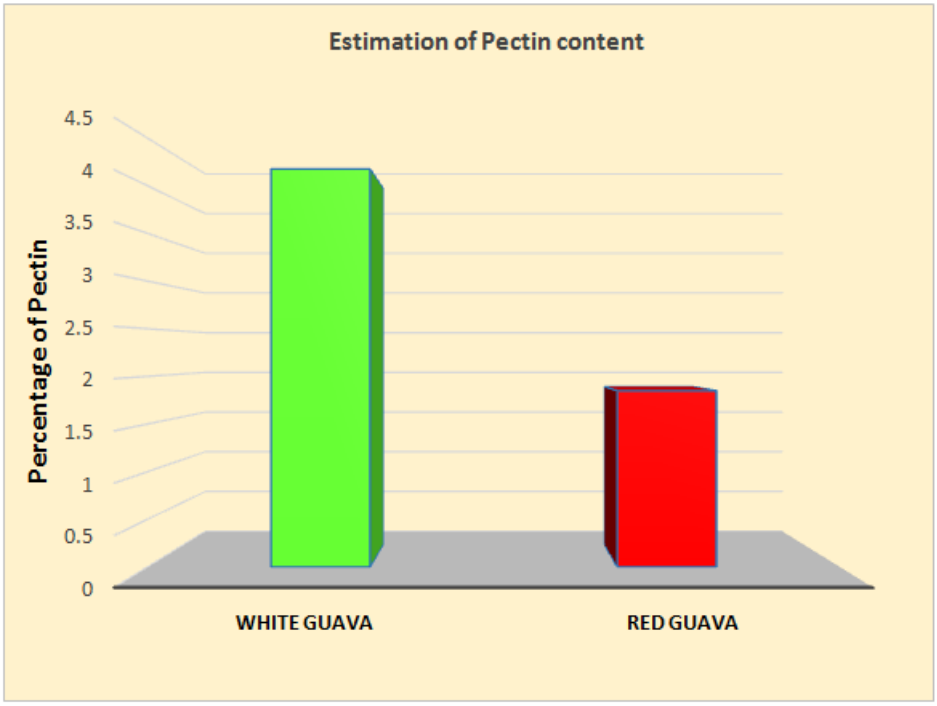


Fig. 10Estimation of Pectin content



IV. Conclusion And Future Prospects

The nutritional content of both the varieties varied significantly. Red pulp guavas are comparatively low on carbohydrate content and can be consumed by people who are trying to reduce sugars in their diet. Crude fibres is a quantitative measure of indigestible cellulose. They help in maintaining the health of the intestine by softening and enlarging the solid wastes which help them to eliminate the wastes, easily out of the body and reduce constipation. Hence a good amount crude fibres in the diet is beneficial for the body. The comparison of

the nutritional status showed more amount of crude fibres in the red pulp variety than the white variety. The value of ascorbic acid was higher in red guava, which indicated that the red pulp variety is richer in vitamin C. This indicated that guava fruit is an excellent source of ascorbic acid especially the red pulp variety. Vitamin C is essential for the synthesis and maintenance of collagen, the most abundant protein in the human body. Vitamin C protects against skin wrinkles seen in premature aging. The red pulp guava fruit was significantly higher in Calcium, Sodium and Phosphorous compared to the white pulp guava. The white variety was found to be rich in potassium. The white variety of guava exhibited more amount of pectin than the red one. Pectin is a natural fibre found in plant cell walls and it is mostly concentrated in the skin of fruits. It is water-soluble and binds with sugar and fruit acid to form a gel. Pectin has several industrial applications. Adding pectin during the preparation of jam or jelly also shortens or eliminates the cooking time, resulting in a fresher fruit flavour.

The investigated parameters showed that samples were fairly adequate in their nutrients composition but the variations in the composition may be due to environmental changes, soil composition, climatic and geographical conditions and availability of nutrients.

Guava has tremendous potential and has the capability of positively influencing various areas such as Biochemistry, Nutrition, Food science, Product Development and Pharmaceutical Sciences. Future studies and research can be carried out on the following aspects like qualitative and quantitative estimation of phytochemicals, isolation of identification fats and lipids, isolation and characterization of the enzyme ascorbic oxidase, study of the anti - bacterial and anti - microbial activity of guava leaves, development of novel recipes to be used as convenience foods and further processing of isolated pectin and its application for various purposes.

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