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Determine the Nutritive Value in the Bark of Common Trees in the Family Myrtaceae

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Abstract: **India is endowed with a wide variety of plants both wild and domesticated which contribute not only to the diet of its people but obtain several valuable products like medicines , dyes, etc. nutritional contribution and the nutritive value of fruits and leaves has been already studied extensively for the intake to local population. Barks of trees have not been used in many plants specially the common trees. Although the nutritive value of these plants are not precisely known, since most indigenous trees are not cultivated on farms These are good source of macronutrients, micronutrients, etc. for determining the NV the macronutrients namely proteins, sugars and lipids have to be detected and quantified. Here the analysis has been done for Myrtaceae family as it has number of commonly seen trees.eg. Jamun, Guava, etc Jamun are the common avenue trees. Psidium guajava (guava) has been analysed to contain maximum proteins and sugars as compared to Syzgium cumini (jamun). While the lipids are very low in both the cases. Due to this the NV of guava is significantly high hence it is called "poor man's apple of the tropics''. The results suggest that the bark could be used significantly to the nutrient intake of local population specially the third world countries in the alternative medicines**

Keywords: **Psidium guajava, Syzgium cumini, macronutrients, Nutritive Value, alternative medicine.**

I. INTRODUCTION

Present work is an effort to know the NV or content of these trees .The present study has been planned to study the barks of two common trees of the Myrtaceae family of NCR like the Jamun, guava. These trees are commonly seen in these areas.

In this family Jamun tree is taken known as *Syzygium cumini.*. This tree is an evergreen tree with dense foliage. The wood is strong and water resistant. The different parts of the plants are used for number of ailments like diabetes, blood pressure, gingivitis, stomaches, etc. according to the Medicinal Plants Journal. The fruits contain number of macronutrients like reducing sugars- 3.70%, fats –0.311% protein- 0.39%. Similarly the leaf contains 9.1% of proteins and 4.3% fats (Shahnawaz M et al 2009). . Indrayan et al determined the NV

Another plant from this family is the common guava tree ot *Psidium guajava*. It is a low evergreen tree with wide spreading and crooked branches and downy twigs. Anthony Dweck found out that all parts of the tree is astringent, the fruit is a laxative. Nadkarni et al 1999 isolated tannins and calcium oxalate crystals. While Burkil 1993 isolated macronutrients like proteins, carbohydrates and salts from seeds and essential oils from the leaves.

Human body requires these nutrients like proteins, carbohydrates, etc. Indian literature mentions the use of plant in treatment of various human ailments. The whole plant is claimed to possess medicinal properties. Though ample literature on therapeutic application of medicinal plants and its application is available, but the proximate composition of common plants is scarce specially with the bark part. The search for raw materials containing potent nutrients continues to attract attention of researches.

To achieve nutrition and income security for the people trees are highly importance. The nutritional value of majority of wild trees is not known, but most food obtained from them have high nutritional value eg. *Aegle*, Ziziphus, etc. many of

them provide soil cover, fuel wood, fodder, wind protection also. However they are often undervalued and under utilised since some exotic fruits are accessible. There is a only a scant and dispersed knowledge about the nutritional value of these plants. Present work is an effort to know the NV or content of these trees.

Carbohydrates these are also called sugars. Only the reducing sugars take part in the reactions. They provide the necessary calories required or they are energy compounds. They are very important in our diets as they also promote utilization of fats and proteins. They are also Fats necessary as they are energy source and required for production of hormones .Proteins these are the building blocks of every organism, they carry out the various metabolic reactions with the help of enzymes in all cells. They also form the structure of various cells.

These macronutrients form the Nutritive Value (NV) of Plants. NV is finally determined by

NV= 4 x % of protein +9% of fats + 4 % of carbohydrate

II. MATERIALS AND METHOD

Collection of Barks-

Two different common plants given above namely Guava(*Psidium guajava)*, Bael (*Aegle marmelos)*, Jamun (*Eugenia cumini* or *Syzygium cumini*) were taken and there barks were removed using a scalpel from the green belt and parks in Sector 35 NOIDA Uttar Pradesh in the month of September 2011 and kept in plastic containers.

Drying and Grinding of the barks

The barks which were collected were later on washed with deionised water and then were dried in a hot air oven . When they dried the excess tissue which had come out when removing the bark was scrapped and removed using blade and a forcep. The rest of the bark was broken into small pieces in a pestle and mortar and then finally was made into a powder using a electric grinder. The powdered barks were then stored in containers, which would be used for performing different tests as samples.

Sample preparations

Take 1 gm of the powdered bark of each sample separately, and add phosphate buffer at pH 4.7 and macernate it in a pestle and mortar for 5 minutes, leave it in the incubator at 37°C f. Next centrifuge the same. Take out the supernatent with a pipette. Store it in closed tubes in refrigeration for analysis.

Quantification of proteins using Biurette test

For standard curve use a known sample of protein eg. casein and of different concentrations to it add biurette reagent. Kept it in an incubator and then saw Optical density (OD) with a colorimeter at 540 nm using a blank to set it. Now plot a graph using the concentration of proteins and OD.

Similarly repeat the same as above for the unknown bark extracts and OD was taken.

Using the standard graph we can take out the concentration of proteins in the unknown samples.

Quantification of reducing sugars using DNS (Di Nitro Salicylate) method

A known standard of maltose was used. Then different concentrations of the known standard were prepared. Now add DNS agent. Put them in a hot water bath To the warm test tubes, add potassium sodium tartrate tetrahydrate. Then we cooled the tubes and read the OD at 540 nm by colorimeter. We plotted a graph using the sugar concentration and the OD values. Similarly, performed the above tests for the unknown samples and calculated the quantity of sugars in the unknown samples by using the standard known graph.

Quantification of lipids using Gravimetric method

We took one gram of powdered unknown sample in a pestle and mortar and covered it with aluminium foil. To this, we add hexane and isopropanol in the ratio 7:2 respectively. Macerenated it still covered and then put it in a hot air oven. Cooled it to room temperature and then we centrifuged it. We removed the supernatant in a pre weighed beaker and

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leaved it to evaporate. Reweighed the beaker post evaporation. The difference in the weight of the beaker is the amount of lipids present in the samples. Repeated this for all other unknown samples.

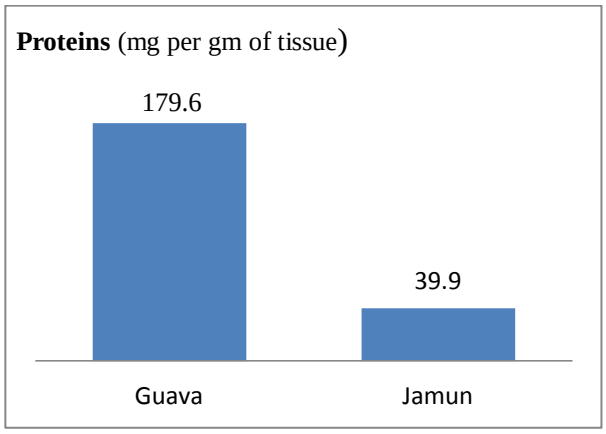
III. RESULTS

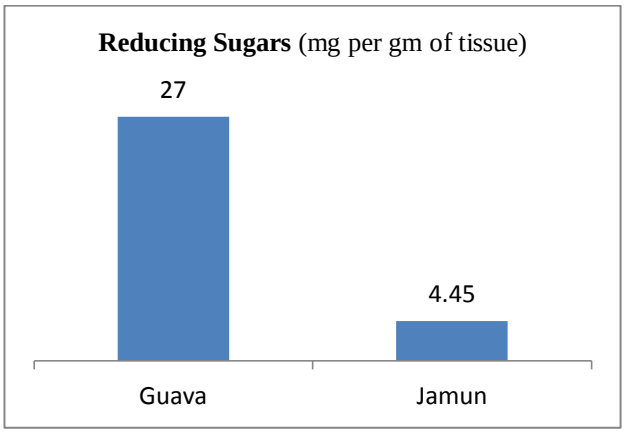
The results given below demonstrate the nutritional composition in the bark of the two common trees Macronutrients given in **mg/gm** of tissue

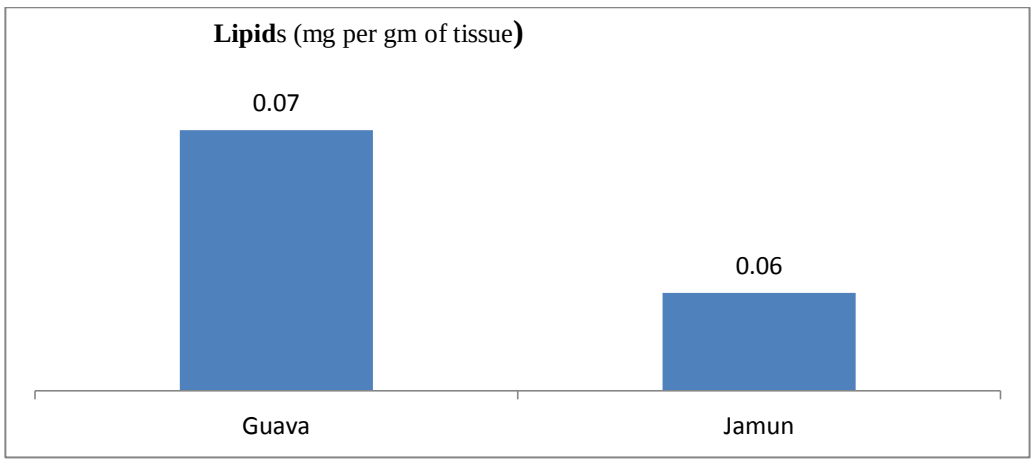
Plants / Nutrients	Guava *(Psidium sps.)*	Jamun *(Syzygium sps.)*
Proteins	179.6	39.9
Reducing Sugar	27	4.45
Lipids	0 .07	0.06

Nutritive values in **calories/100gm**

Plants	**Guava**	**Jamun**
(NV)	145.66	71.66







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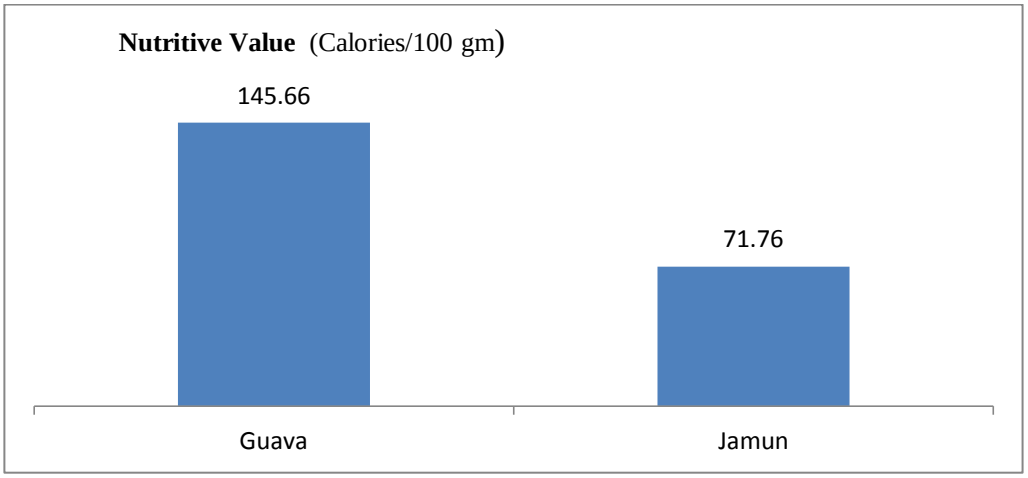

From the results of macronutrients of the two plant materials have been given in the table and graphical representation above.

The protein content was high in *Psidium sps*. That is 179.6mg/gm of bark and only 39.9mg/gm in *Syzgyium sps.* Similarly the carbohdrates which was in form of reducing sugars as they take part in the reaction were high in *Psidium sps*. 27 as compared to 4.5 mg/gm in *Syzgyium sps*. The crude fat content was very less and marginally different in the two ie. 0.07 in *Psidium* and 0.06mg/gm in *Syzgyium sps*.

If we see the NV based on the formulae given *Psidium* has higher value of 145.66calories/100gm and *Syzgyium* had 71.76 calories/100 gm

From the results we see that the significance of fruits of these plants are well known but by determining the nutritive value of barks can give other direction to exploit them and use for welfare of mankind. As there are no major reports in literature on detailed proximate composition and energy value of these plants parts, this paper can be considered as contribution to that course, being far from the knowledge of the common tree barks.

IV. DISCUSSION

The present investigation has revealed that *Psidium guajava* is an excellent source of proteins and reducing sugars. Hence, they can provide a dietary supplement as well as a commercial opportunity. These plants can also be used for treating malnutrition viz. protein and energy deficiencies so prevalent in our country. They can also be utilized in the preparation of protein isolates and hydrolysates for further use in the food industry. The different species of plants can be experimented on for use in the herbal pharmaceutical manufacturing, especially in the cosmetics and dermatological arena. Nevertheless, more research needs to be carried out in order to highlight the feasibility of commercial usage, as the major thrust of the whole pharmaceutical industry is focused towards design and development of new innovative/ indigenous plant-based drugs.

Hence, the present work could serve as a vital resource for further research studies on these common plants under pharmacological activities, toxicological effects, alternative medicine, neutraceutical industry.

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