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Evaluation of Guava (*Psidium Guajava* L.) Leaves of Various Varieties For Preparing Leaf Tea

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Abstract

Guava (*Psidium guajava* L.) is one of the major fruit crops of India and is capable of growing wide range of soil and climatic condition. Guava fruits are very nutritious and contain lot of medicinal properties. Besides this, guava leaves also possess the several medicinal properties which can be exploited by making herbal tea by young guava leaves. Farmer can sell guava leaves after some processing for generating extra income. Guava leaves contains many polyphenol, tannins, flavonoids and antioxidants. Guava leaf tea is beneficial for person suffering from diabetes and diarrhoea. It helps in lowering Cholesterol, promoting weight loss, fighting cancer and boosting immunity. In present study, the new young leaves of four different varieties of guava viz. Allahabad Safeda, Hisar Surkha, Lalit and L-49 were collected and evaluated. The leaves were plucked at early morning from the Guava orchard of Lovely Professional University, Phagwara during the month of June and August, 2019. Terminal leaves from these varieties were collected. To assess the quality of the leaves for making guava tea chemical analysis was done to estimate the quantity of tannins, total phenols, protein, flavonoids, antioxidant activity and total sugars. Finding reveals that for most of the quality parameter, collection of guava leaves during June month was found superior than that of August month. Among all of the four varieties, leaves of the L-49 guava variety was found superior for making guava leaf tea, followed by Allahabad Safeda, Hisar Surkh and Lalit.

Keywords: Antioxidants, Guava, Herbal tea, Leaves, Medicinal value

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Introduction

Guava (*Psidium guajava* L) is one of the major fruit crops of India and is capable of growing wide range of soil and climatic condition. Guava fruits are very nutritious and contain lot of medicinal properties. Besides this, guava leaves also possess the several medicinal properties which can be exploited by making herbal tea by young guava leaves. Farmer can sell guava leaves after some processing for generating extra income. Guava leaves contains many polyphenol, tannins, flavonoids and antioxidants. Guava leaf tea is beneficial for person suffering from diabetes and diarrhoea. It helps in lowering Cholesterol, promoting weight loss, fighting cancer and boosting immunity. Guava leaves are oblong to oval in shape. They are 7-15 cm long & 3-5 cm wide. The leaves are grown in an opposite manner means that two leaves can grow at the same point of the stem. They are aromatic when crushed have a scent similar to guava fruit. The leaves are available throughout the year. Guava leaves have several anti-inflammatory properties. Young leaves are traditionally preferred for medicinal purpose. Guava leaves contains quercetin, ferulic acid, protocatehuic acid, guavin B, asiatic acid and β-carotene that has been known to have antioxidant activity (Liang *et al*., 2007). The pharmacological research, in vitro and in vivo is widely used in convincing way to demonstrate the potential of guava leaves extracts for the co-treatment of different diseases: a large population worldwide, upholding the drugs in cases such as diabetes mellitus, cardiovascular disease, cancer, infectious and parasitic diseases (Elixabet*et al*., 2017)

Guava leaves are having many medicinal properties. It contains polyphenol, which regulates the absorption of dietary carbohydrate from the intestine. The person who is at a risk of diabetes, it is advisable to take guava leaf tea to suppress the rapid increase of blood sugar level. Small farmer can sell guava leaves after some processing for extra income. Other uses of guava leaf tea are controlling Diarrhea, lowering Cholesterol, promoting weight loss, fighting cancer, boosting immunity. There many compounds present in the plants which provides pharmacological effect in plants. Generally, the metabolism in plants is not carried out by the active compounds present in the plants. So, they are named as secondary metabolites (Stepp and Moerman, 2001; Liu *et al*., 1998). Secondary metabolites are important in various medical therapies they are also called as anti-cancer and anti-bacterial compounds (Cragg, 1997). Apart from giving fruits two or three

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times in a year, guava leaves may be another source of income for small and marginal farmers. Therefore, in order to know best time and variety for making guava leaves, present investigation was undertaken. Guava leaf tea is rich in various secondary compounds that have enormous health benefits. The important active ingredients of the tea are polyphenols, mainly flavonoids. The lack of research work on the chemical composition and biological activity of the different varieties of guava leaves leads to less aware its consumers about the potential health benefits from its ingredients. For this reason, we performed this study and demonstrated the biochemical composition and antioxidant activity locally available four guava leaf tea varieties AllahabadSafeda, Hisar Surkh, Lalit and L49.

Material and Methods

This research work was conducted to test of various constituents of guava leaves from various varieties. From this we came to know about suitable variety and suitable time of guava leaf collection is suitable for making guava leaf tea. For this research, the new young leaves of 4 different varieties *viz.* Allahabad Safeda (V1), Hisar Surkha(V2), Lalit (V3) and L-49 (V4) of Guava were taken. The leaves were plucked at morning time 7:00 AM from the Guava orchard of Lovely Professional University, Phagwara. Terminal leaves from these varieties were collected at various intervals and chemical analysis was done to assess tea making quality and heath benefit quality. Leaves were collected in the month June and August, 2019. In order to assess the quality of guava leaf for suitability of the tea various constituents likeTanins, Total Phenols, Protein, Flavonoids, Antioxidant activity, Total sugars estimation were taken and analysed.

Results and Discussion

Various research data related to phytochemical properties were collected and summarized in Table 1 and 2.

1. Tanin content: The maximum tannin content of fresh guava leaf was observed in V4 (L-49) variety i.e. 2.45mg/gm in August and 2.38mg/gm in June which were significantly higher than leaves of other verities in the respective months. It was followed by V_3 (Lalit), V_2 (Hisar Surkh)

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and V_1(Allahabad Safeda). For every variety, tannin content was observed higher in August month (2.168mg/gm) as compare to the tannin in August month (2.025mg/gm).

2. Total Phenol Content (TPC): The total phenolic content of fresh guava leaf was minimum in V4 (L-49) i.e. 72.34mg GAE/gm in June and 58.34mg GAE/gm in August. In both months it was significantly lower than rest of the varieties. Maximum phenolic content was found in V1 (AllhabadSafeda) followed by V_2(Hisar Surkh) and V_3 (Lalit). For all the variety, phenol content was observed lower during August month (84.614mg/gm) as compared to leaves collected in June month (93.024).

3. Total Flavonoid Content (mg/gm): The total flavonoid content of fresh guava leaf was maximum in V_3 (Lalit) i.e. 13.35mg/gm in June month and 12.29mg/gm in August month. It was followed by V_2 (Hisar Surkh), V_4 (L-49) and V_1 (Allahabad Safeda). For all the varieties of guava, flavonide content in leaves was higher in June month (12.793mg/gm) as compared to the leaves collect during August month (11.560mg/gm).

4. Protein Estimation (mg/100gm): The protein content of fresh guava leaf was maximum in V_1 (AllhabadSafeda) 2.189mg /gm in June and 1.84mg /gm in August. In both months, it was significantly higher than rest of the varieties. It was followed by V_4(L-49), V_3(Lalit) and V_2 (Hisar Surkh). For all the variety, protien content was observed lower during August month (1.743mg/gm) as compared to leaves collected in June month (1.981mg/gm).

5. Total Sugar (gm/100gm): The sugar content of fresh guava leaf was maximum in V_1 (AllhabadSafeda) i.e. 0.360gm /100gm in June and 0.350gm/100gm in August. In both months it was significantly higher than rest of the varieties. It was followed by V_2 (Hisar Surkh), V_3 (Lalit) and V_4(L-49). For all the variety, sugar content was observed lower during August month (0.315gm/100gm) as compared to leaves collected in June month (0.338gm/100gm).

6. Total Antioxidant Activity (%): The maximum total antioxidant activity of fresh guava leaf was found in V_4 (L-49) i.e. 64.35% RSA in June month and 59.3% in August month, which was significantly higher than rest of the varieties. It was followed by V_3(Lalit), V_1 (Allahabad

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Safeda) and V_2 (Hisar Surkh). In cases of all the varieties total antioxidant activity (%) was found higher in the month of June as compared to August month.

Above mentioned results indicate that for most of the quality parameters, collection of guava leaves during June month was found superior than that of August month. Among all of the four varieties, leaves of the L-49 guava variety was found superior for making guava leaf tea, followed by Allahabad Safeda, Hisar Surkh and Lalit. The variations in tannins, total phenols, protein, flavonoids, antioxidant activity and total sugars in the leaves of guava may be due to several biotic, climatic, nutritional and genetic factors. As biotic, climatic and nutritional factors are uniform for all the varieties, genetic factor is the main factor of variation in biochemical constituents in the leaves. Different varieties are having variations in genes, causing variations in protein and enzymes causing variations in biochemical variations. Most of the antioxidants are higher level in June month as compare to August month mainly due to dry weather prevailing during June which leads to higher concentrations of these elements. In the early stage of growth leaves were found to be rich in crude protein as observed in all the selections. Similar trend was also reported by Majumdar (1967). The protein content was maximum in September (Gupta *et al*., 1992), which is found to be positively related to leafiness (Paroda, 1975). In stem crude protein content increased with the growth of trees (Mendoza *et al*., 1983). Leaves have maximum accumulation of crude protein than the stem. The sugar content in leaves was found to increase with the age and growth of plant. The accumulation of sugar was maximum in V1 (Allahabad Safeda). Seasonal variations in sugar content were found to be significant. Eric *et al*., (2012) concluded that drying enhances the antioxidant property in leaves of white mulberry (*M. alba*) and laurel clockvine (*T. laurifolia*). Present investigation found that the total phenol content in the leaves of variety L-49 was higher significantly as compared to other varieties (Table-1). Lower levels of phenols in L-49, relatively, can be attributed to varietal character. Our results are consistent with manyearlierinvestigations. Tea polyphenols found to have strong antioxidant and due to the possession of a phenolic hydroxyl group attached to the flavan-3-ol structure, it also has very good radical-scavenging activity. The iron-reducing antioxidant activity of L-49 guava leaves was significantly higher as compared to the other varieties analysed. Our results are consistent with several previous reports. According to previous studies,

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our study also showed a strong correlation between total polyphenol content and antioxidant activity.

Conclusion

On the basis of present study on guava leaves, it can be concluded that collection of guava leaves during June month was found superior than that of August month. Among all of the four varieties, leaves of the L-49 guava variety was found superior for making guava leaf tea, followed by Allahabad Safeda, Hisar Surkh and Lalit. This study concluded that L-49 guava leaves have more functional properties in terms of total polyphenol, total flavonoid, tannin and total antioxidant activity. Based on these findings, it is recommended to use guava leaves for herbal tea preparation since it possessed high antioxidant activity which is beneficial for human health. Nowadays there are so many chronic degenerative diseases outbreak in industrialized and developing countries. The high cost of allopathic medicines directs to the search for herbal remedies to treat many ailments.

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Table-1: Tanins, Total phenols and Flvaonoid content in guava leaves collected during June and August, 2019

Varieties	Tanins (mg/gm)			Total Phenols (mg GAE/g)			Flavonoids (mg/gm		
	June	August	Avg	June	August	Avg	June	August	Avg
V1	1.750	1.920	1.835	110.150	102.100	106.125	11.820	10.340	11.080
V2	1.950	2.050	2.000	91.245	90.500	90.872	13.020	12.220	12.620
V3	2.020	2.250	2.135	98.362	87.514	92.938	13.350	12.290	12.820
V4	2.380	2.450	2.415	72.340	58.343	65.341	12.980	11.390	12.185
CD at 5%	0.105	0.088		6.302	7.293		0.255	0.325	

Table-2: Protien, Total sugar and Antioxidants activity (%)on guava leaves collected during June and August, 2019

Varieties	Protein Estimation (mg/100gm)			Total Sugars (gm/100gm)			Antioxidants activity (%)		
	June	August	Avg	June	August	Avg	June	August	Avg
V1	2.189	1.840	2.015	0.360	0.350	0.355	59.300	54.580	56.940
V2	1.856	1.680	1.768	0.320	0.370	0.345	56.200	52.400	54.300
V3	1.901	1.710	1.806	0.330	0.290	0.310	63.160	57.200	60.180
V4	1.982	1.740	1.861	0.340	0.250	0.295	64.350	59.300	61.825
CD at 5%	0.056	0.027		0.007	0.020		1.358	1.150	

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