

# Phytochemical Biochemical and Antimicrobial Activity of *Psidium Guajava* Leaf Extract

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## Abstract

*Psidium guajava* L has many medicinal properties. It showed major phytochemicals were analyzed. The bioactive components of *Psidium guajava* leaves have been evaluated. The chemical compositions of many bioactive compounds were responsible for therapeutic applications. The qualitative analysis of ethanolic and aqueous extract of *Psidium guajava* leaves showed that tannin, phlobatannins, saponin, flavonoids, steroids, terpenoids, triterpenoids, polyphenol and glycoside present in extracts. The quantitative determination of *Psidium guajava* methanolic leaves contain Vitamin C ( $36.5 \pm 0.02$  mg/g), Phenol ( $8.63 \pm 0.01$  mg/g), Tannin ( $5.20 \pm 0.03$  mg/gm), Flavonoids ( $5.85 \pm 0.02$  mg/g) and Saponin ( $3.2 \pm$  mg/g der). *Psidium guajava* leaves showed anti-microbial activity of the ethanolic and methanolic extract of the plant was studied against selected bacterial and fungal pathogens.

**Keywords** :antioxidants, ethanol, methanol, flavonoids

## INTRODUCTION

Medical Plant constitutes an important therapeutic role in alleviating ailments. Almost 80% of the world populations are fully dependant on herbal medicines because of awareness about side effects and toxicity accumulation in organs. Most of cosmetics productions are dependent on medicinal plants for meeting their health care needs<sup>[1]</sup>. The herbal medicines today symbolize safe and surety in contrast to the synthetics that are regarded as unsafe to human and environment.

India has a rich heritage of indigenous drugs from the vedic times. The ayurvedic system of medicine is purely of Indian origin and development more than 2400 remedies have been known in Indian medical flora. The extracts of roots, bark, and leaves are commonly used to treat gastroenteritis, vomiting, diarrhoea, dysentery, wounds, ulcers, toothache, coughs, sore throat, inflamed gums, and a number of other conditions<sup>[2]</sup>. Other major ethanotherapeutic uses of the plant include the treatment of malaria and as mouth rinses and gargles in the treatment of stomatitis and pharyngitis.

Guava is found to be rich in tannins, phenols, triterpenes, flavonoids, essential oils, saponins, carotenoids, lectins, vitamins, fiber and fatty acids. Guava fruit shows to be higher in vitamin C than citrus (80mg of vitamin C in 100g of fruit) and contains appreciable amounts of vitamin A. Guava fruits are rich source of pectins<sup>[3]</sup>. The fruit contains saponin combined with oleanolic acid. Morin-3-O- $\alpha$ -L-lyxopyranoside and morin-3-O- $\alpha$ -L-arabopyranoside and flavonoids, guajavarin and quercetin. The leaves of guava are rich in flavonoids in particular quercetin which shows anti diarrhoea activity<sup>[2,4]</sup>.

The leaves contain essential oil with the main components being  $\alpha$ -pinene,  $\beta$ -pinene, limonene, menthol, terpenylacetate, isopropyl,  $\alpha$ -terpinene, caryophyllene,  $\beta$ -bisbolene, caryophyllene oxide,  $\beta$ -copanene, farnesene, humulene, selinene, carydiene and curcumene<sup>[5]</sup>. The essential oil from

the leaves has been shown to contain nerolidiol,  $\beta$ -sitosterol, ursolic, catecholic and guayavolic acids have also been present<sup>[6,7]</sup>. The aim of this study was to determine the bioactive compounds present in the *Psidium guajava* (Linn) leaves extract with the aid of quantitative techniques, which may provide an insight in its use in traditional medicine.

## MATERIALS AND METHODS

The matured leaves of *Psidium guajava* were washed under running tap water and dust was removed from the leaves. The leaves were dried at shaded places for 15 days and coarsely powdered. The powder (2 gm) was extracted with 70% methanol and 100% aqueous for 48 hours. A semi solid extract was obtained after complete elimination of alcohol and water under reduced pressure. The phytochemical tests were carried out on the alcoholic and aqueous extract using standard procedures to identify the preliminary phytochemical screening following the methodology of Harborne<sup>[8]</sup>. The small portion of dried guava powder was used for moisture content by a method<sup>[9,10]</sup>. The remaining portion was subjected to dry in an hot air oven at a temperature of 55°C for 24 hours. The dried product was further used for crude protein by Lowry et.al<sup>[11]</sup>. The reducing sugar content in guava samples were determined quantitatively by using 3,5-dinitrosalicylic acid<sup>[12]</sup>. Crude fat was determined from these two potatoes by solvent extraction method<sup>[13]</sup>. Crude fibre was determined by Suzanne<sup>[14]</sup>. The cyanogenic glycosides was determined by alkaline picrate method of Oke<sup>[15]</sup>. The quantitative analysis of phenols, saponins, tannins and flavonoids were determined by Harborne<sup>[8]</sup>.

## RESULTS AND DISCUSSION

The methanolic extract of guava leaves exhibit numerous phytochemicals which useful for therapeutic application. The phlobatannins were not observed in methanolic extract (Table 1) Similar results were observed in ethanolic extract of guava leaves.

**Table1: Phytochemical Analysis of *Psidium guajava* methanolic and ethanolic leaf extract**

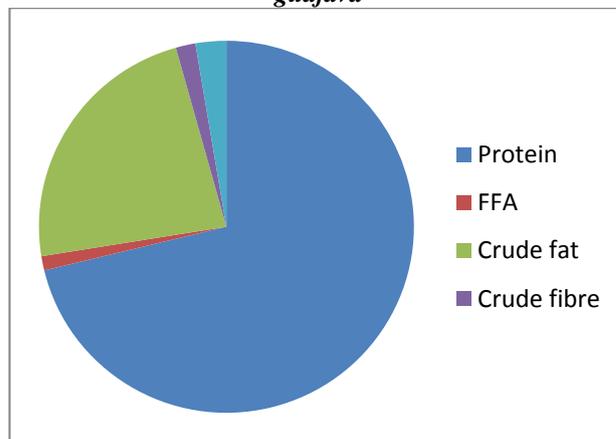
Sl.No	Phytochemicals	Methanolic extract	Ethanolic extract
1.	Alkaloids	+++	++
2	Saponins	-	-
3	Tannins	+	+
4	Steroids	-	-
5	Anthocyanines	+	-
6	Flavonoids	+	++
7	Anthraquinones	-	-
8	Phenolic flavonoids	++	++
9	Ascorbic acid	+++	++++
10	Cardiac glycosides	+	-
11	Tri-terpenoids	+++	-
12	Phlobatannins	-	-

The anti-nutritive components of guava leaves were qualitatively analyzed in Table 1. The maximum concentration of alkaloids, ascorbic acid and phenolic flavonoids were present in methanolic extract. Saponins are present in plants having anticarcinogenic property]. Saponins were only identified in guava leaf extract. The concentration of alkaloids and saponins in leaf extract was found to be 0.54mg/g and 3.2±0.03mg/g respectively. Similar studies were carried out in ethanolic extract exhibit saponins(3.67±0.01mg/g) and flavonoids(6.42±0.01 mg/g).

Tannin is one of the important secondary metabolite which reduces the risk of coronary heart diseases. Tannin was slightly observed in ethyl acetate extract of tubers. Anthocyanins were found to be low. Suresh et.al reported that methanol preserves the extracted anthocyanin in their original form. It should be solvent of choice for quantitation and analysis of anthocyanins. Anthocyanins are potential therapeutic role of cardiovascular diseases, cancer, AIDS, nerve disorders and behavioural disorders<sup>[16]</sup>. This can be useful in controlling oxidative stress during pregnancies<sup>[17]</sup>. There are many natural antioxidants present in different parts of plants in the form of phenolic compounds such as flavonoids,phenolic acid and tocopherols. These compounds are potential antioxidants and free radical scavengers<sup>[18]</sup>. Phenolic flavanoids and were moderately present in methanol extract of guava in the form of 2.38±0.01g. Cardiac glycosides were absent in leaf extract. Terpenoids were found to be high in methanolic,extract and Phlobatannins were completely absent. Ascorbic acid was found to be present more in methanolic extract than aqueous extract, found to be 36.5±0.02 mg/g. *Psidium guajava* was found to be rich in lycopene, quercetin and other polyphenols also act as antioxidants which neutralize the free radicals generated in our body.

All essential nutrients and crude fibre were highly observed in guava plant parts(Figure1) Due to rich fibre content which showed low glycaemic index. It prevent the development of diabetes.It contains many therapeutic applications of wound healing. The methanolic extract of guava leaf exhibit antibacterial and antifungal activity(Table2). The leaf extract showed maximum

antifungal activity than antibacterial activity in 100µl methanolic extract and its activity was rapidly declined in 250 µl extract. Guava leaf was very helpful in relieving cough and common cold .Due to *Staphylococcus aureus* inhibitory action, leaves were used to control diarrhoea . It also prevents the breast,prostate and oral cancer<sup>[19,20]</sup>

**Figure 1; Physicochemical constituents of *Psidium guajava*****Table 2: Antimicrobial Analysis of *Psidium guajava* methanolic and ethanolic leaf extract**

S.no	Name of the organism	Zone of inhibition (mm)			
		25µl	50µl	100µl	250µl
1	<i>Aspergillus niger</i>	8	15	28	14
2	<i>Bacillus subtilis</i>	2	4	5	1
3	<i>Citrobacter diversens</i>	6	9	17	4
4	<i>Staphylococcus aureus</i>	8	16	22	9

### CONCLUSION:

Chewing of guava leaves are commonly used in rural areas for therapeutic applications. This implies many phytochemicals were identified in medicinal plant *Psidium guajava* L. by using standard qualitative and quantitative methods.The anti-microbial activity of the aqueous and methanolic extract of the plant on the selected bacterial and fungal pathogens were identified. Guava fruit is recommended to take daily for good health.

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