



## Phytochemical Analysis And Uv Protective Property Of Psidium Guajava(L.) Leaves Extract

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### ABSTRACT

*This paper reports an investigation of the phytochemical constituents present in the methanolic leaves extract of P. guajava as well as its UV protective property. Methanolic extract of P. guajava (guava) was prepared by using soxhlet extraction method. The UV absorbing and SPF value was studied by using UV spectrophotometer. The results revealed that the methanolic extract contains phytochemicals such as flavonoids, tannin, saponin and phenol. It was also observed that the P. guajava extract exhibited SPF value of 22.4. The sun protective property of methanolic leaves extract of P. guajava can be used for the development of sunscreen and protective textiles.*

**KEYWORDS :** Psidium guajava, Sun protection factor, phytochemicals, UV protective property

### INTRODUCTION

Ultraviolet radiations are electromagnetic radiations which constitutes 5% of the total incident sunlight on earth surface (visible light 50% and Infra Red radiations 45%). UV radiations consist of UVA, UVB and UVC radiations. Due to depletion of ozone layer and high exposure to UV rays, problems such as sunburn, premature skin ageing, skin cancer and eye disorders are increasing (Das, 2010). Natural products are a source of new chemical diversity and are the choice of today's world. The sources of natural product are plants, animals and microorganisms. Among them plants and its products are more reliable for its renewability and therefore, considered as catalyst for human welfare (Mahesh *et al.*, 2011). Plants have their own self defense mechanism and protect themselves from UV rays due to the presence of substances known as phytochemicals such as flavonoids, tannin (Ramu *et al.*, 2012). The present study was undertaken to evaluate the presence of phytochemicals and UV protective property of methanolic leaves extract of *Psidium guajava* Linn, commonly known as guava.

### MATERIAL AND METHODOLOGY

#### Preparation of plant extract

The fresh leaves of *Psidium guajava* was collected from Haryana Agricultural University, Hisar. They were shade dried, crushed into fine powder and extracted through soxhlet apparatus using methanol as solvent, at 55-60° C for 4-5 hours. The extract obtained was filtered and concentrated in rota-vapor. The dried extract was stored in air tight container at 4° C for further study.

#### Qualitative phytochemical screening

Freshly prepared methanolic leaves extract of *P. guajava* was subjected to phytochemical analysis by using methods described by Gopinath *et al.*, 2012; Vermani *et al.*, 2013; Saidulu *et al.*, 2014 Tiwari *et al.*, 2011.

**Detection of Alkaloids:** Extracts were dissolved individually in dilute Hydrochloric acid and filtered.

**Wagner's test:** To the acidic solution, Wagner's reagent (iodine in potassium iodide) was added. Brown precipitate indicates the presence of alkaloids. (I<sub>2</sub> = 1.27gm, KI = 2gm+5ml, H<sub>2</sub>O final makeup 100ml)

#### Detection of Tannins

**Ferric chloride test:** To the filtrates, a few drops of ferric chloride solution were added. A blackish precipitate indicates the presence of tannins.

#### Detection of Flavonoids

**Lead acetate test:** Extracts were treated with few drops of lead acetate solution. Formation of yellow color precipitate indicates the presence of flavonoids.

#### Detection of Saponin

**Foam test:** 0.5gm of extract was shaken with 2ml of water. If foam produced persists for ten minutes it indicates the presence of saponin.

#### Detection of phenolics compounds

**Ferric chloride test:** Extracts were treated with 3-4 drops of ferric chloride solution. Formation of bluish black color indicates the presence of phenols.

**Analysis of Sun protection factor:** Analysis of UV absorption and sun protection factor was done by using double beam UV-Vis Spectrophotometer. 10 mg of extract was weighted accurately and dissolved in 1 ml of solvent, to prepare 10mg/ml solution. The UV absorption property of prepared solution at wavelength range i.e. 290-320 was noted. Formulae given by Mansuet *et al.*, 1986 and values given by Sayre *et al.*, 1979 were used and sun protection factor value was calculated by using following equation:

$$SPF = CF \times \sum_{290}^{320} EE \times I \times Abs$$

Where EE (λ) – Erythral effect spectrum, I (λ) – solar intensity spectrum, Abs – Absorbance of sunscreen product, CF – correction factor (=10). The value of EE × I are constant and predetermined as shown in table 1.

**Table 1: Values of EE\*I used in the calculation of SPF**

Wavelength (λ nm)	EE*I (Normalized)
290	0.0150
295	0.817
300	0.2874
305	0.3278
310	0.1864
315	0.0839
320	0.0180
<b>Total</b>	<b>1</b>

EE – erythral effect spectrum; I – solar intensity

## RESULT AND DISCUSSION

Table 2 shows the summarized phytochemical screening of methanolic leaves extract of *P. guajava*. (guava) which indicated the presence of tannin, flavonoids, saponin, phenols and absence of alkaloids. The results are in argument with the study conducted by Egga et al., 2014 which reveals the presence of tannin, saponin, flavonoids, phenols including alkaloids in *P. guajava* extract. The difference in the results may be due to the biochemical variations within species, geographical locations, methods or modes of extraction and solvent used.

**Table 2: Qualitative phytochemical analysis of methanolic leaves extract *P. guajava***

Phytochemicals	Methanolic extract of <i>Psidium guajava</i>
Alkaloids	-
Tannin	+
Flavonoids	+
Saponin	+
Phenols	+

## UV absorption and Sun protection factor

The UV absorption activity and Sun protection factor (SPF) of *P. guajava* was studied by using double beam UV spectrophotometer at 10mg/ml concentration. In the present study it was found that *guajava* extract exhibited SPF of 22.4 (table 3), which is considered acceptable by Sun Cancer Foundation for protection from UV rays (Henry et al., 2012). This UV absorbing activity may be attributed to the presence of flavonoids, which is reported to exhibit many biological activities such as antioxidant, anti-inflammatory as well as UV absorption (Pieta., 2000; Saewan N and Jimtaisong A., 2013)

**Table 3: SPF values of *P. guajava***

S. no.	Wavelength ( $\lambda$ nm)	10mg/ml
1	290	2.313
2	295	2.274
3	300	2.242
4	305	2.246
5	310	2.231
6	315	2.204
7	320	2.158
Sun Protection Factor (SPF)		22.4

## CONCLUSION

Based on the results obtained, the leaves of *Psidium guajava* (guava) contain biologically active compounds such as flavonoids that may be responsible for exhibiting UV protective property. Thus, *guajava* exhibit potential to be used for sunscreen and development of protective textiles by using different textile finishing techniques.

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