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Preliminary Phytochemical Screening of Two Medicinal Plants - *Annona squamosa* (L.) and *Garcinia gummi-gutta* (L.) Roxb.

	
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ABSTRACT

Phytochemicals act in numerous ways to assist the human body in combating disease and health problems. The preliminary phytochemical screening tests may be useful in the detection of bioactive principles and subsequently, may lead to drug discovery and development. The preliminary phytochemical analysis of the two medicinal plants showed the presence of carbohydrate and phenol in all the extracts of *A. squamosa*. Alkaloids, flavonoids, terpenoids, amino acids and phlobatannin were present in water extract of *A. squamosa*. In the case of *G. gummi-gutta*, terpenoids and quinones were present in water extract and oil and fat were present in ethanol extract. Plants are the valuable medicinal sources that are used in treatment of several diseases.

INTRODUCTION

Plants are being used as remedies for diseases from time immemorial. There is a tremendous increase in the consumption of herbs as an alternate source of medicine to maintain health and improve the quality of life. The chemical components in plants have diverse biological roles and are therefore of therapeutic value. Phytochemicals, the compounds present in plants are valuable source of food and medicine. They are known to have various biological activities such as antimicrobial, antifungal, antioxidant activity, etc. The important bioactive components in plants are usually the secondary metabolites such as alkaloids, flavonoids, tannins and other phenolic compounds. One of the sources of pharmaceuticals for human ailments is plants, either as totally pure compounds or as synthetic analogs. Approximately 25% of drugs prescribed in the United States are plant derived natural products and 74% of the 119 most important drugs contain ingredients from plants used in traditional medicine. Hence, it can be stated that plants could be a source for the development of new molecules. Pharmaceutical research is now extensively focusing on natural compounds, for developing active molecules of plant origin. Suneel *et al.* (2015) have determined phytochemical and phytotherapeutic properties of *Annona squamosa*, *Annona reticulata* and *Annona muricata*. Ranjani (2015) has carried out phytochemical studies on medicinal plant – *Sida cordifolia* Linn. Chemical tests performed using ethanol extract of leaves of *Sida cordifolia* showed the presence of alkaloids, flavonoids, lignin, glycosides, saponins, phytosterols and fixed oils.

Sharmila *et al.* (2015) have carried out phytochemical profile and *in vitro* antioxidant activity of *Garcinia gummi-gutta* (L.) peel extracts. The result indicated that methanolic peel extract possesses more constituents compared to ethanolic and aqueous extract. Herbs are being used for the promotion of health, prevention and treatment of diseases in India from ancient times. Phytochemicals are products of plant metabolism, mainly used by the plants for their defense. Hence, attempts have been made to use them for therapeutic purposes. Although phytochemicals are said to be useful to the human body, they may have some toxic effects as well, as seen in the case of alkaloids. Alkaloids are reported to have cytotoxic activity which may be used in treatment of cancer. Hence, it is desirable to know the phytochemical composition of the plant material before testing its efficacy for medicinal purpose (Vaishali *et al.*, 2013). The present work emphasizes on traditionally used clinically potential plants *Annona squamosa* (L.) and *Garcinia gummi-gutta* (L.) Roxb.

MATERIALS AND METHODS

Preliminary phytochemical screening procedure

The preliminary phytochemical analysis of various primary and secondary plant metabolites was carried out using the method of Harborne (1984).

Preparation of plant extract

The leaves of both the medicinal plants taken for the present study were collected, cleaned and air dried under shade for almost three weeks. After drying, the leaves were then blended using a household electric blender. This fine powder (Plate 1 & 2) was analyzed for phytochemical constituents present in it. The plant sample was soaked in water, ethanol and chloroform for overnight extraction and filtered through Whatman No.1. filter paper. Qualitative tests were conducted on these extracts.

RESULTS AND DISCUSSION

The leaves of *Annona squamosa* L. and *Garcinia gummi-gutta* (L.) Roxb. were collected from the local area Calicut district in Kerala during the month of November. The taxonomic identification of plant material was done at Botanical Survey of India, Coimbatore. The leaves were dried and used for phytochemical analysis. The following plates 1 & 2 shows the leaf powder of the two medicinal plants *Annona squamosa* L. and *Garcinia gummi-gutta* (L.) Roxb.



Plate 1

Plate 2

Leaf powder of *Annona squamosa* L. Leaf powder of *Garcinia gummi-gutta* (L.) Roxb.

Medicinal Uses of *Annona squamosa* L.

- Leaf, shoot, bark and root have been reported to have medicinal properties.
- The unripe fruit is astringent, and the root is a drastic purgative.
- The green fruit and seed have effective vermicide and insecticidal properties and are used as astringents in diarrhoea and dysentery.
- Crushed leaves are applied as an effective cure for ulcers and malignant sores.
- A poultice of fresh leaves is used for dyspepsia and when mixed with oil it is used for diseases of the scalp.

Medicinal uses of *Garcinia gummi-gutta*(L.) Roxb.

- *G. gummi-gutta* seeds, roots, leaves as well as their extracts possess medicinal value.
- They are useful in the treatment of various diseases and disorders.
- It contains various compounds that are beneficial for health. Such a composition makes it very different from other fruits.
- It is used to treat abdominal pain, infections and certain liver disorders.



Preliminary phytochemical analysis of leaves of *Annona squamosa* L. and *Garcinia gummi-gutta* (L.) Roxb.

In the present study, a preliminary phytochemical screening was done to analyze the presence of various secondary metabolites such as alkaloids, flavonoids, terpenoids, quinones, oil and fats, sterols, carbohydrates, amino acids, tannins, phenols and phlobatannins in both the medicinal plants (Table 1& 2).

The dried and powdered leaves of *A. squamosa* and *G. gummi-gutta* were extracted using water, chloroform and ethanol and the extracts thus obtained were analyzed for the presence of various phytoconstituents. Carbohydrate and phenol were present in all the three extracts of *A. squamosa*. Alkaloid was present in water and chloroform extracts. Flavonoids, terpenoids, amino acids and phlobatannin were present only in water extract.

Kaladhar *et al.* (2014) have carried out phytochemical analysis of raw fruit peel crude extracts of *Annona squamosa* L. The result of phytochemical studies showed the presence of alkaloids, flavonoids, phenols and saponins. Different species of *Annona* have been used for

centuries as traditional folk medicine for the treatment of various diseases and also used as insecticides. The plants are considered to be a good source of vitamins, minerals, plant proteins, fibers, etc. as well as, the plant is supposed to have tremendous pharmacological importance (Suneel *et al.*, 2015).

In the case of *G. gummi-gutta*, only phenol was present in all the three extracts. Flavonoids, sterols, tannins and phlobatannin were completely absent in the three extracts of *G. gummi-gutta*. Terpenoids and quinones were present in water extract. Oil and fat were present in ethanol extract of *G. gummi-gutta*. Aja *et al.* (2010) have shown that the phytochemical analysis is very useful in the evaluation of some active biological compound from medicinal plants.

A study carried out by Sharma (2012) on preliminary phytochemical screening of leaf extracts of *Aegle marmelos*, *Annona squamosa*, *Ficus racemosa*, *Hibiscus rosa sinensis* and *Psidium guajava* revealed the presence of different type of compounds like alkaloids, coumarins, flavonoids and steroids that could be responsible for antidiabetic activities.

Table 1. Preliminary phytochemical analysis of *Annona squamosa* L.

Phytoconstituents	Water	Chloroform	Ethanol
Alkaloids	+	+	-
Flavonoids	+	-	-
Terpenoids	+	-	-
Quinones	-	-	-
Oil and Fats	+	-	+
Sterols	-	-	-
Carbohydrate	-	+	+
Amino acid	+	-	-
Tannins	-	+	-
Phenols	+	+	+
Phlobatannin	+	-	-

Table 2. Preliminary phytochemical analysis of *Garcinia gummi-gutta* (L.) Roxb.

Phytoconstituents	Water	Chloroform	Ethanol
Alkaloids	+	+	-
Flavonoids	-	-	-
Terpenoids	+	-	-
Quinones	+	-	-
Oil and Fats	-	-	+
Sterols	-	-	-
Carbohydrate	+	-	+
Amino acid	+	-	-
Tannins	-	-	-
Phenols	+	+	+
Phlobatannin	-	-	-

Earlier work by Gayathri and Kiruba (2014) has shown the presence of terpenoids, oil and fats, starch, carbohydrate and cellulose in four different solvent extracts of *Citrus limonum*.

G.gummi-gutta shows the presence of appreciable to moderate amounts of phytochemicals such as flavonoids, coumarins, alkaloid and terpenoids which can be correlated with the possible medicinal potential of the plant (Vijayalakshmi *et al*, 2014).

Chemical tests performed using ethanol extract of leaves of *Sida cordifolia* L. showed the presence of alkaloids, flavonoids, lignin, glycosides, saponins, phytosterols and fixed oils (Ranjani, 2015).

The phytochemical study of *S. nigrum* leaves showed the presence of almost all the secondary metabolites screened using five different solvents (Gayathri and Karthika, 2016).

Leaf, stem and flower extracts of *Sphenoclea zeylanica* has been analyzed for the presence of secondary metabolites by Gowri *et al.* (2016). In their study, they have used four different solvents for extraction and the presence of flavonoids, alkaloids, steroids, etc. have been identified.

The presence of various phytoconstituents in the powdered leaves of the two medicinal plants indicates their potential use in drug synthesis or production. The present study is only a qualitative analysis of the medicinal plants. Further studies are required to analyze the various bioactive compounds present in the two medicinal plants that could contribute significantly in drug development and benefit human life.

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