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Preliminary Phytochemical Screening of *Gardenia latifolia* Ait. and *Gardenia gummifera* Linn.

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ABSTRACT

Preliminary phytochemical screening of *Gardenia latifolia* Ait. and *Gardenia gummifera* Linn. Belonging to the family Rubiaceae was carried out successive extraction from petroleum ether, ethyl acetate, methanol, ethanol and aqueous. The extracts showed the presence of various phytocompounds like glycosides, phytosterols, fats and oils, phenols, resins, tannins, flavonoids, tannins and terpenoids.

Keywords: *Gardenia latifolia*Ait., *Gardenia gummifera* Linn., Rubiaceae, phytochemical, glycosides, phytosterols, fats and oils, phenols, tannins, flavonoids and terpenoids.

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INTRODUCTION

Plants are used as medicines since time immemorial. Many of the natural products in plants of medicinal value offer us new sources of drugs which have been used effectively in traditional medicine. There is an increased consciousness regionally and globally in production and use of plants with healing property [1].

According to world health organization, more than 80% of the world's population relies on traditional medicines for their primary health care needs. The medicinal value of plants lies in some chemical substances that produce a definite physiologic action on the human body. The most important of these bioactive compounds of plants are alkaloids, flavonoids, tannins and phenolic compounds. The phytochemical research based on ethno-pharmacological information is generally considered an effective approach in the discovery of new anti-infective agents from higher plants [2].

The medicinal value of plants lies in naturally occurring phytochemical constituents that produce a definite physiological action on the human body [3].The secondary metabolites like alkaloids, tannins, saponins, flavonoids, phenolic compounds, glycosides, tri-terpenes etc. present in plants are of great pharmaceutical interest. Though the secondary metabolites have significant biological role including antioxidant, anti-inflammatory and anti-cholinesterase effects [4],but their definite active constituents of many crude drugs are still unknown. Thus, it is anticipated that phytochemicals with adequate biological activities will be used for the treatment of microbial infections [5].

The present study describes the preliminary phytochemical screening of *Gardenia latifolia*and *Gardenia gummifera* Leaf extracts. These plants are belongs to the family Rubiaceae, which parades a long list of plants of medicinal importance.

*Gardenia latifolia*is commonly known as Indian boxwood or Ceylon boxwood, is a densely foliaceous small tree that occurs throughout the greater parts of India common in deciduous forests along the streams [6]. The stem bark and fruits are reported to be used in the treatment of various ailments such as snake bite, skin diseases, stomach pains, caries, haemorrhage in humans and ephemeral fever in live stocks [6-8]. Fruits are used for making perfumes [9].

Gardenia gummifera is commonly known as gummy gardenia. It is found in dry forests of Karnataka, Tamil Nadu, Andhra Pradesh and Kerala. *Gardenia gummifera* is claimed to have a number of medicinal properties which include anthelmintic, antispasmodic, carminative, diaphoretic, expectorant, potentiation of pentobarbitone induced sleep, Antiepileptic, peripheral and central Analgesic, Cardiotonic, Antioxidant, and Antihyperlipidemic. It is also claimed to be useful in dyspepsia, flatulence for cleaning foul ulcers and wounds, and to keep off flies from wounds in veterinary practice [10-12].

Considering the growing importance of medicinal plants, the need of the day as to promote more and better organized studies, the present investigation is designed to explore the preliminary phytochemical analysis of *Gardenia latifolia* and *Gardenia gummifera* leaves for their pharmacological properties.

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MATERIALS AND METHODS

Plant materials

The leaves of *Gardenia latifolia* were collected from Chamundi hill, Mysore district, Karnataka and the leaves of*Gardenia gummifera* were collected from Melkote, Mandya district, Karnataka. The plant was identified based on its floral description given in the literature.

Processing of plant material

The leaves of *Gardenia latifolia* and *Gardenia gummifera* were washed with running tap water and shade dried. The dried material was powdered using mechanical method and resulting powder is sieved with sieve of 0.3mm aperture size and stored in the airtight container.

Extraction of plant material

The powdered plant leaf material was subjected to successive solvent extraction taking from non-polar to polar solvents like petroleum ether, ethyl acetate, methanol, ethanol and water. 50gms of powdered plant material was subjected to soxhlet extraction for 12-16 hrs with 300ml of the various solvents. The extracts obtained were later kept for evaporation to remove the excessive solvents. These extracts were stored in a cool dry place for the analysis for the presence of preliminary phytochemicals.

Preliminary phytochemical analysis

All the plant extracts were screened for the presence of various bioactive compounds such as alkaloids, carbohydrates, glycosides, saponins, phytosterols, fixed oils and fats, resins, phenols, tannins, flavonoids and terpenoids by using following standard methods [13-15].

RESULTS AND DISCUSSION

Phytochemical analysis conducted on the plant extracts revealed the presence of constituents which are known to exhibit medicinal as well as physiological activities [13]. The phytochemical constituents of *Gardenia latifolia* and*Gardenia gummifera* tested were summarized in the table-1.

The petroleum ether extract of both the plants were found to contain glycosides, phytosterols, fats and oils, resins, phenols and triterpenes. Flavonoid was found to be present in *Gardenia latifolia* and not in *Gardenia gummifera*. Alkoloids, carbohydrates, saponins, tannins, proteins, amino acids and diterpenes were absent in both the plants.

Ethyl acetate extracts of the plant was found to contain glycosides, phytosterols, resins, phenols, flavonoids and triterpenes. Alkoloids, carbohydrates, saponins, fats, oils, tannins, proteins, amino acids and diterpenes were absent in both the plants.

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Table 1: Phytochemical analysis of different extracts of *Gardenia latifoliaAit.and Gardenia gummifera Linn.* leaves

Chemical constituents	Tests	*G. latifolia*					*G. gummifera*				
		P	EA	M	E	A	P	EA	M	E	A
Alkaloids	1.Mayer's test	-	-	-	-	-	-	-	-	-	-
	2.Dragendroff's test	-	-	-	-	-	-	-	-	-	-
	3.Wagner's test	-	-	-	-	-	-	-	-	-	-
	4.Hager's test	-	-	-	-	-	-	-	-	-	-
Carbohydrates	1. Molisch's test	-	-	-	-	-	-	-	-	-	-
	2. Benedict's test	-	-	-	-	-	-	-	-	-	-
	3. Fehling's test	-	-	-	-	-	-	-	-	-	-
	4.Barfoed's test	-	-	-	-	-	-	-	-	-	-
Glycosides	1.Brontrager's test	+	+	+	+	-	-	+	+	+	-
	2. Legal test	+	+	+	+	-	-	+	+	+	-
Saponins	1. Foam test	-	-	-	-	-	-	-	-	-	-
	2.Froth test	-	-	-	-	-	-	-	-	-	-
Phytosterols	1.Salkowskis test	+	+	+	+	-	+	+	+	+	-
	2.Leibermann Burchard test	+	+	+	+	-	+	+	+	+	-
Fats and oils	1.Stain test	+	-	-	-	-	+	-	-	-	-
Resins	1. Acetone water test	+	+	+	+	-	+	+	+	+	-
Phenols	1. Ferric chloride test	+	+	+	+	+	+	+	+	+	+
Tannins	1. Lead acetate Test	-	-	+	+	+	-	-	+	+	+
	2. Gelatin test	-	-	+	+	+	-	-	+	+	+
Flavonoids	1.Alkaline reagent test	+	+	+	+	-	-	+	+	+	-
	2. Shinoda test	+	+	+	+	-	-	+	+	+	-
	3.Zn-Hcl reduction test	+	+	+	+	-	-	+	+	+	-
Proteins and amino acids	1. Xanthoproteic Test	-	-	-	-	-	-	-	-	-	-
	2. Ninhydrin test	-	-	-	-	-	-	-	-	-	-
	3.Biuret Test	-	-	-	-	-	-	-	-	-	-
Diterpenes	1. Copper acetate test	-	-	+	-	-	-	-	-	+	-
Triterpenes	1. Noller's test	+	+	+	+	+	+	+	+	+	+
	2. Tshugajen test	+	+	+	+	+	+	+	+	+	+

P=petroleum ether, EA= ethyl acetate, M=methanol, E=ethanol, A=aqueous, +=present and -=absent

Methanolic extract of both the plants showed the presence of glycosoides, phytosterols, resins, phenols, tannins, flavonoids and triterpenes. Diterpenes was present in *Gardenia latifolia* and was absent in *Gardenia gummifera*. Alkoliods, carbohydrates, saponins, fats, oils, protein, aminoacids were absent in both the plants.

Ethanolic extract of both the plants showed presence of glycosides, phytosterols, resins, phenols, tannins, flavonoides and triterpenes. Diterpenes were present in *Gardenia gummifera* and not in *Gardenia latifolia*. Alkoliods, carbohydrates, sapononis, proteins and aminoacids were absent in both the plant leaves.

Aqueous extracts of both the plants contained phenols, tannins and triterpenes. Alkaloids, carbohydrates, glycosides, saponins, fats, oils, resins, flavonoids, proteins and aminoacids, diterpenes were absent in both the extracts.

Thus, the phytochemical analysis of both the plant extracts revealed the presence of phytochemicals such as phenols, tannins, terpenoids in all the extracts. Some extracts showed the presence of resins, flavonoids, glycosides and steroids. Alkaloids, carbohydrates, saponins, protein and aminoacid absent in all the plant extracts.

The phenolic compounds are one of the largest and most ubiquitous groups of plant metabolites [16]. They possess biologicalproperties such as antiapoptosis, antiaging, anticarcinogen, antiinflammation, antiatherosclerosis, cardiovascular protection andimprovement of endothelial function, as well as inhibition of angiogenesis and cell proliferation activities [17].Several studies have described the antioxidant properties of medicinal plants whichare rich in phenolic compounds [18,19]. Natural antioxidant mainlycome from plants in the form of phenolic compounds such as flavonoid, phenolic acids, tocopherols etc. [20].Tannins bind to proline rich protein and interfere with protein synthesis. Flavonoids are hydroxylated phenolic substances known to be synthesized byplants in response to microbial infection and they have been found tobe antimicrobial substances against wide array of microorganism's invitro. Their activity is probably due to their ability to complex with extracellular and soluble proteins and to complex with bacterial cell wall [21]. They also are effective antioxidant and show stronganticancer activities [22-24].Terpenoids has antitumor, anticancer, antiviral, antimicrobial and anti-inflammatory activities [25]. Steroids have been reported tohave antibacterial properties [26] and they are very importantcompounds especially due to their relationship with compounds suchas sex hormones [27]. Glycosides are known to lower the blood pressure according to many reports [28]. The results obtained in this study thus suggest the identified phytochemical compounds may be the bioactive constituents and these plants are proving to be an increasingly valuable reservoir of bioactive compounds of substantial medicinal merit.

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