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QUALITATIVE ANALYSIS OF PHYTOCHEMICAL CONSTITUENTS OF CERTAIN ETHNOMEDICINAL PLANTS IN BHADRAVATHI TALUK OF SHIVAMOGGA DISTRICT, KARNATAKA

S. P. Kavya * and N. Mallikarjun

Department of Studies and Research in Microbiology, Sahyadri Science College, Kuvempu University, Shivamogga - 577203, Karnataka, India.

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Correspondence to Author:

Ms. S. P. Kavya

Research Scholar,
Department of Studies and Research
in Microbiology, Sahyadri Science
College, Kuvempu University,
Shivamogga - 577203, Karnataka,
India.

E-mail: kavyasp07@gmail.com

ABSTRACT: Medicinal plants are an abundant source of bioactive compounds, which have been used for thousands of years against different diseases because plants have antibacterial, anti-inflammatory, and antifungal activities. All of the medicinal plants that may be found on earth today have specific therapeutic use and importance. Our research work is based on the qualitative phytochemical studies of extract obtained from leaves of *Tinospora cardifolia*, *Punica granatum*, *Moringa oleifera*, *Momordica charantia*, *Annona squamosa*, *Eugenia jambolana*, and *Carica papaya* were collected from Bhadravathi taluk of Shivamogga district. These leaf extracts were prepared using various solvents like methanol, acetone, chloroform, and aqueous. Phytochemical screening of these medicinal plants showed the maximum amount of alkaloid, flavonoid, phenol, terpenoid, and tannin in all the extracts. However, methanolic extracts showed good results when compared to other solvent systems. The phytochemical screening of these medicinal plants is commercially very significant and is very important for producing new medication for the treatment of different diseases.

INTRODUCTION: India is an abundant source of medicinal plants. In ancient Indian literature, the medicinal properties of many herbal plants have been recorded, and the preparation is considered efficient in treating diseases¹. The usage of medicinal plants in many countries around the world still plays an important role in the primary health care system. The quest for a new pharmacological active agent in the plant extract contributed to the discovery of many clinically beneficial drugs which play a prominent role in the treatment of several diseases of a human beings.

Currently, medicinal plants have become a vital subject of intensive research on their survival and possible pharmacological effects². Medicinal plants are of great importance for the well being of human population because of the medicinal plants produce a specific physiological effect on human being by producing certain chemical compounds like alkaloids, flavonoids, phenolic compounds, glycosides, tannins and steroids are the most common of these bioactive plant constituents³.

The *Tinospora cardifolia* belong to the Menispermaceae family and are used to treat many diseases such as anti-inflammatory, arthritis, antidiabetic, antioxidant, antiallergic, antileprotic, antiperiodic, antimalarial, antineoplastic⁴. *Punica granatum* belongs to the Lythraceae family, and it is used for diabetes, diarrhea, cough, asthma, bleeding disorders, fever, malaria, and ulcer⁵. *Moringa oleifera* belongs to the Moringaceae

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family and is used to treat various ailments such as diarrhea, common cold, toothache, and oedema ⁶. *Momordica charantia* belong to the Cucurbitaceae family and are used medicinally to treat many diseases like piles, leprosy, jaundice, diabetes, and snake bite ⁷.

Eugenia jambolana belongs to the Myrtaceae family, which treats many infections, mainly diabetes mellitus and stomach disorders ⁸. *Annona squamosa* belongs to the Annonaceae family and is used as an antidiabetic, antitumor, antioxidant, antilipidemic, and anti-inflammatory ⁹.

Carica papaya belongs to the Caricaceae family and is used as a remedy for various ailments such as fever, asthma, colic, beriberi, and jaundice ¹⁰.

The main objective of our research was to analyze the presence or absence of different phytochemicals in the selected medicinal plants from Bhadravathi taluk of Shivamogga district, Karnataka, India, used for healing and curing various diseases.

MATERIALS AND METHODS:

Collection and Identification of Plant Material:

The leaves of medicinal plants were collected from the Bhadravathi taluk of Shivamogga district, Karnataka, India. The collected leaves were cleaned thoroughly with tap water, and sterile distilled water shade dried and was mechanically powdered and used for further work.¹¹The collected plant leaves were identified with the help of faculty, Department of Botany, Sahyadri Science College, kuvempu University. Shivamogga.

TABLE 1: PLANTS SELECTED FOR THE STUDY

Specimen No	Botanical name	Common name	Part used	Accession Number
01	<i>Tinospora cardifolia</i>	Gurjo	Leaves	SSCMB-26
02	<i>Punica granatum</i>	Pomegranate	Leaves	SSCMB-27
03	<i>Moringa oleifera</i>	Drumstick	Leaves	SSCMB-28
04	<i>Momordica charantia</i>	Bitter gourd	Leaves	SSCMB-29
05	<i>Eugenia jambolana</i>	Java plum	Leaves	SSCMB-30
06	<i>Annona squamosa</i>	Sugar apples	Leaves	SSCMB-31
07	<i>Carica papaya</i>	Paw paw	Leaves	SSCMB-32



FIG. 1: *TINOSPORA CARDIFOLIA*



FIG. 2: *PUNICA GRANATUM*



FIG. 3: *MORINGA OLEIFERA*

FIG. 4: *MOMORDICA CHARANTIA*FIG. 5: *EUGENIA JAMBOLANA*FIG. 6: *ANNONA SQUAMOSA*FIG. 7: *CARICA PAPAYA*

Collection of Different Plant Leaves for the Study:

Preparation of Plant Extract: 10gm of grinded plant material was dissolved for 48 hours in 100ml organic solvent (methanol, acetone chloroform, and distilled water. Hi media Pvt, Ltd, Bombay). At the end, the extract was filtered through Whatman filter paper No. 1. The filtrate was collected and evaporated under low pressure, and final extract was stored at 4°C for further work¹²⁻¹³.

Phytochemical Screening:

Alkaloids Test: The extract was collected in a test tube and add 0.2ml of diluted HCl. Then 1ml of Meyer's reagent was added. A yellowish coloration suggests the existence of alkaloids¹⁴.

Flavonoid Test: Two ml of 2% NaOH mixture was mixed with leaves extract, formation of concentrated yellow color and this color disappears when we add 2 drops of diluted acid to the mixer, this result indicates the flavonoid presence¹⁵.

Steroids Test: Plant extract were taken in test tube, dissolved with chloroform (10ml), and added equal amount of concentrated sulfuric acid to the test tube

by the side. The upper layer of the solution was converted into red, and sulfuric acid layer showed yellow with green fluorescence. It shows the existence of steroids in the leaf extracts¹⁶.

Terpenoid Test: Chloroform (2ml) was mixed with 5ml of plant extract, and 3ml of conc H₂SO₄ was carefully applied to create a layer. In order to show a positive result for terpenoids, a coloration of reddish brown was developed¹⁷.

Tannin Test: About 5ml of the leaf extract was taken in a test tube, adding 2ml of 5% of the solution FeCl₃. A greenish-black precipitate suggests the presence of tannin¹⁴.

Glycosides Test: A small amount of extract was taken in a test tube, and add 1ml of water and a few drops of aqueous NaOH; a yellowish coloration indicating the presence of glycosides¹⁴.

Phenol Test: About 0.2g of plant extract was weighted and treated with 5% ferric chloride and observed for the formation of deep blue color, which indicates the presence of phenol¹⁸.

Carbohydrate Test: 0.5ml of Benedict's reagent was treated with 0.5ml of plant extract, then incubated in a water bath for 2-4 minutes. The distinctive red color shows the presence of reducing sugar¹⁷.

Amino Acid Test: Plant extract of 0.2g was weighted and treated ninhydrin solution and noted for a distinctive purple color suggesting the presence of amino acid¹⁸.

Protein Test: Few drops of the biuret reagent were added to the leaves extract, boiled for a few minutes and observed violet precipitate formation, suggesting the protein presence.

RESULTS AND DISCUSSION: In the present study, phytochemical screening was carried out with methanol, chloroform, acetone, and aqueous extracts of leaves (*Tinospora cardifolia*, *Punica granatum*, *Moringa oleifera*, *Momordica charantia*, *Annona squamosa*, *Eugenia jambolana*, and *Carica papaya*). In our study in medicinal

plants, leaves were abundant in flavonoids, alkaloids, terpenoids, tannins, and steroids. Traditionally, these medicinal plants in rural areas were used for the recovery of inflammation, wound healing, carminative, expectorant antiseptic and for certain fungal infections of candidiasis¹⁹⁻¹. **Table 2** shows the result of phytochemical screening of the medicinal plants' methanol, acetone, chloroform and aqueous extract. The seven chosen medicinal plants demonstrates that phytochemical compounds such as flavonoids, alkaloids, terpenoids, steroids, glycosides, amino acids, carbohydrates, and protein are either present or absent in these plants. Our study shows that alkaloids, flavonoids, steroids, terpenoids, glycosides and carbohydrates are present in the different solvent extracts of *Tinospora cardifolia* and similar findings were reported⁴. *Punica granatum* plant extract contains terpenoids, steroids, phenols, alkaloids, flavonoids, glycosides, carbohydrates, and protein in different solvent extracts; the same findings were reported by²⁰.

TABLE 2: RESULT OF PHYTOCHEMICAL SCREENING OF MEDICINAL PLANTS

Sl. no.	Medicinal plants	Solvent Used	A	F	S	Te	Ta	G	P	C	Aa ⁻	Pr
01	<i>Tinospora cardifolia</i>	Methanol	+	+	+	+	-	+	-	-	-	-
		Acetone	+	-	-	+	-	+	-	-	-	-
		Chloroform	+	+	-	-	-	+	-	+	-	-
		Aqueous	+	+	-	+	-	+	+	-	-	+
02	<i>Punica granatum</i>	Methanol	+	+	+	+	+	-	+	+	+	+
		Acetone	+	+	+	+	-	+	+	+	-	-
		Chloroform	-	-	+	+	-	-	+	-	-	+
		Aqueous	+	+	+	+	-	-	+	+	-	-
03	<i>Moringa oleifera</i>	Methanol	+	+	-	-	+	+	+	+	-	-
		Acetone	+	+	-	-	+	+	-	+	-	-
		Chloroform	+	+	-	-	-	-	+	-	-	-
		Aqueous	+	+	-	-	+	-	-	-	-	-
04	<i>Momordica charantia</i>	Methanol	+	+	+	-	+	+	-	-	-	+
		Acetone	-	-	+	+	-	-	+	-	-	-
		Chloroform	+	-	-	-	-	-	+	-	-	-
		Aqueous	+	-	+	+	+	-	+	+	-	-
05	<i>Eugenia jambolana</i>	Methanol	+	+	+	+	+	-	+	-	-	-
		Acetone	+	-	-	+	+	-	+	-	-	-
		Chloroform	+	+	-	+	+	-	+	-	-	-
		Aqueous	+	+	-	+	+	+	+	-	-	+
06	<i>Annona squamosa</i>	Methanol	+	+	+	-	+	+	-	+	-	-
		Acetone	+	+	+	+	-	+	-	+	-	-
		Chloroform	+	-	+	+	-	+	-	-	-	-
		Aqueous	-	+	+	+	-	+	-	+	-	+
07	<i>Carica papaya</i>	Methanol	+	-	-	-	+	+	-	-	-	+
		Acetone	+	-	-	+	-	-	-	-	-	-
		Chloroform	-	+	+	-	-	+	-	-	-	-
		Aqueous	+	+	-	-	+	+	-	-	-	+

A: Alkaloid; F: Flavonoid; S: Steroids; Te: Terpenoid; Ta: Tannin; G: Glycosides; P: Phenol; C: Carbohydrates; Aa⁻: Amino acid; Pr: Protein.

In *Moringa oleifera* extract also contains alkaloids, flavonoids, tannins, glycosides, carbohydrates, and phenol were there in different solvent extraction, our results were concurrence with ⁶. Alkaloids, flavonoids, steroids, terpenoids, tannins, phenol and protein are there in different solvent extraction of *Momordica charantia*; similar findings were reported by ⁷. *Eugenia jambolana*, *Annona squamosa*, and *Carica papaya* plant extracts show similar phytochemical constituents; similar observations were reported ^{8, 9, 21}. However, our findings concur with the previous findings; sometimes, they may differ because of geographical location and genetic variance in plants due to cross-pollination. In medicinal sciences, various phytochemical compounds detected will have beneficial significance. Flavonoids are modifiers of natural biological response because of their intrinsic ability to alter the body's reaction to allergies and Viruses and demonstrate their antiallergic, anti-inflammatory, antimicrobial and anticancer activities. It is recognized that steroids are important for their cardiogenic action and have insecticidal and antimicrobial properties, as well as they are supplemented in diet, cosmetics, and herbal medicine. Tannins are described to exhibit antiviral, antitumor, and antibacterial activities. Terpenoids are anti-inflammatory, antimicrobial, antiviral, and inhibiting cholesterol synthesis. Alkaloids are used to alleviate headaches and fever and are attributable to antibacterial and analgesic characteristics ¹⁻⁵.

CONCLUSION: Medicinal plants were chosen as sources of secondary metabolites which know to contain flavonoids, alkaloids, terpenoids, steroids, and tannins; these are used for anti-inflammatory, antibacterial, antiviral, antiseptic, anticancer, and antifungal activities. Phytochemical screening of medicinal plants is also essential and economically significant for developing new medicinal products for the recovery of different diseases; these constituents play an important role in research institutes and pharmaceutical industries, and the formulation of these constituents plays a significant role in dealing with various diseases.

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CONFLICTS OF INTEREST: The author declares no conflict of interest.

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