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Phytochemical analysis of some selected herbal plants of Kanjabag region of Khatima, Udham Singh Nagar, Uttarakhand, India

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Abstract
Medicinal plants are the local heritage with global heritage. Medicinal plants are known to produce certain bioactive molecules which inhibit bacterial and fungal growth. The aim of the present study was to investigate various phytochemical content of traditionally used medicinal plants of Kanjabag region of Khatima Tehsil. Four different plants were taken for analysis viz. *Alstonia scholaris, Carica papaya, Croton bonplandianus* and *Azadirachta indica.* It is found that flavonoid is present abundantly in all species. Saponins and tannins are also present in almost all species studied. It was concluded that plants studied were rich in phytochemicals with significant medicinal and pharmacological applications.

Keywords: Phytochemical, herbal plants, Kanjabag region, Uttarakhand

Introduction
Ethnoveterinary plants are a source of great economic value all over the world. Ethnoveterinary treatment from wild plants has always guided researchers to search for novel medications to develop healthy life for humans and animals. Nature has bestowed on us a good botanical wealth and large number of diverse types of plants grow in different parts of the country. Approximately 20% of known plants have been used in pharmaceutical studies, impacting the healthcare system in positive ways such as treating cancer and harmful diseases.
Plants are capable in producing a large number of diverse bioactive compounds. Plants containing beneficial phytochemicals may supplement the needs of the human body by acting as natural antioxidants. High concentrations of phytochemical which may protect against free radical damage, accumulate in fruits and vegetables. Plant products have been part of phytomedicines since time immemorial. Knowledge of the chemical constituents of plants is desirable because such information will be valuable for the synthesis of complex chemical substances.
Phytochemicals are chemicals of plant origin. Phytochemicals are chemicals produced by plants through primary and secondary metabolism. There are two kinds of metabolites synthesized in plants viz, primary and secondary metabolites. Primary metabolites are important for growth and development of plants. Secondary metabolites produced by plants are economically important in production of drugs, dyes, flavor, pigments, food additives, pesticides, fragnances, etc.
Phytochemicals present in the different plant parts are used by the local peoples for healing of certain disorders. These are non-nutritive chemicals that have protected human from various diseases. The major constituent consists of alkaloids, flavonoids, saponins, phenolic compounds, proteins and amino acids. Phytochemical constituents are the basic source for the establishment of several pharmaceutical industries.
In the present study, different plant parts such as seeds and leaves of four different plant species were qualitatively screened for phytochemicals using standard tests. These four medicinally important plant species are-*Alstonia scholaris* (Scholar Tree), *Carica papaya* (Papaya), *Croton bonplandianus* (Ban Tulsi) and *Azadirachta indica* (Neem).

1. *Alstonia scholaris* (Scholar Tree)
Taxonomic classification of *Alstonia scholaris*
Kingdom: Plantae
Order: Gentianales

Family: Apocynaceae
Tribe: Plumeridae
Sub tribe: Alstonine
Genus: *Alstonia*
Species: *A. scholaris*

Alstonia scholaris (Scholar Tree) is an evergreen tropical tree of the family Apocynaceae. It is native to southern China, tropical Asia and Australasia. It is a glabrous tree and grows up to 40 m (130ft) tall. *Alstonia scholarship* a source of a remedy against malaria, toothache, snake bites and rheumatism. The latex is used in treating fever, cough and throat sores.
Alstonia scholar's roots and bark are used in traditional medicine as an astringent tonic, alternative, antidiarrhetic, antiperiodic etc. The latex is used to clean wounds and can be used for chewing gum. The wood is too soft for making anything so it is usually used in making packing boxes, blackboards etc. Different organs of the *Alstonia scholaris* are used in medicine of both codified (viz. Ayurveda, Siddha and Unani) and non-codified drug system of India for the treatment of malaria, jaundice, gastrointestinal troubles, cancer, etc.
Alstonia scholaris has many medicinal properties like antimicrobial, antiamoebic, antidiarrheal, antihypertensive, antimalarial, febrifuge, stimulant, hepoprotective, immunomodulatory, anti-cancer, antiasthmatic, antioxidant, analgesic, anti-inflammatory, anti-fertility, anti-diabetic, etc. It is also used in the treatment of fevers, chronic diarrhoea, dysentery, ulcers, rheumatic pains, cancer, malaria, etc.

2. *Carica papaya* (Papaya)
Taxonomic classification of *Carica papaya*
Kingdom: Plantae
Clade: Tracheophytes
Clade: Angiosperms
***Clade*:** Eudicots
Clade: Rosids
Order: Brassicales
Family: Caricaceae
Genus: *Carica*
Species: *C. papaya*

Carica papaya is native to Mexico and northern South America. It has become naturalized throughout the Caribbean Islands, Florida, Texas, California, Hawaii and other tropical and subtropical regions of the world. *Carica papaya* is a small, sparsely branched tree, usually with a single stem growing from 5 to 10 m (16 to 33ft) tall, with spirally arranged leaves confined to the top of the trunk. All the parts of the plant contain latex in articulated lacticifers.
In traditional medicine, *Carica papaya* leaves have been used as a treatment for dengue, malaria, abortifacient, a purgative, or smoked to relieve asthma. It has been used widely in folk medicine for many ailments: the juice for warts, corns, cancers, tumours. The whole plant parts fruit, roots, bark, peel, seeds and pulp are also have medicinal properties.
The many benefits of papaya owed due to high content of vitamins A, B and C, proteolytic enzymes like papain and chymopapain which have antiviral, antifungal and antibacterial properties. *Carica papaya* can be used for treatment of a numerous diseases like warts, corns, sinuses, eczema, cutaneous tubercles, glandular tumors, blood pressure, dyspepsia, constipation, amenorrhoea, general debility, expel worms and stimulate reproductive organs and many as a result *Carica papaya* can be regarded as Neutraceutical.

3. *Croton bonplandianus* (Ban Tulsi)
Taxonomic classification of *Crotonbonplandianus*
Kingdom: Plantae
Clade: Tracheophytes
Clade: Angiosperms
Clade: Eudicots
Clade: Rosids
Order: Malpighiales
Family: Euphorbiaceae
Subfamily: Crotonoideae
Tribe: Crotoneae
Genus: *Croton*
Species: *Croton bonplandianus*

Croton bonplandianus is a wild species of Croton. Due to resemblance of the leaves and flower cymes to that of *Ocimum tenuiflorum*, this plant is often called Ban Tulsi (jungle tulsi). It is a small annual herb, growing up to 1-2 ft. tall. Ban Tulsi is able to kill lung cancer cells without affecting normal cells. The plant is traditionally used both as a fuel and a detergent.
Cancer has been associated with increased levels of intra-cellular free radicals. Therefore, scavenging these radicals with antioxidant supplement is considered a way to arrest the progression of cancer.
The preliminary phytochemical screening that confirmed the presence of potent free radical scavenging alkaloids, carbohydrates, flavonoids, phenols, tannins, saponins and terpenoids in the *Croton bonplandianus* leaf extract. *Croton bond analysis* a source of the organic compound phorbol and its tumor promoting esters such as 12-0-tetradecanoylphorbol-13-acetate.

4. *Azadirachta indica* (Neem)
Taxonomic classification of *Azadirachta indica*
Kingdom: Plantae
Division: Magnoliophyta
Class: Magnoliopsida
Order: Sapindales
Family: Meliaceae
Genus: *Azadirachta*
Species: *A. indica*

Azadirachta indica, commonly known as neem, nimtree or Indian lilac, is a tree in the mahogany family Meliaceae. The leaf extracts of *Azadirachta indica* were prepared using different solvents; methanol, ethanol and petroleum ether and were screened for antimicrobial active principles. The phytochemical screening of the leaf extract revealed the presence of alkaloids, flavonoids and saponins.
Azadirachta indica is as a traditional medicine for treatment of malaria and other associated diseases, in the form of decoctions, in which unspecific quantities are usually consumed without due regards to toxicological and other adverse effects. Neem products are believed by ayurvedic practitioners to be antifungal, antidiabetic, antibacterial and antiviral. Neem oil is also used for healthy hair, to improve liver function, detoxify the blood, etc.

Materials and Methods
Plant material
The required plant parts were collected from the region of

Udham Singh Nagar district, Uttarakhand, India (H.N.B.P.G Govt. College, Khatima, Udham Singh Nagar, and Uttarakhand) in the year 2019.

Extraction of plant material

The extraction of plant material was done by hot water extraction method. The plant material was allowed to dry naturally i.e. under shade drying. After completion of drying process, material was ground in a grinder and powder was kept in an appropriately labeled plastic bottle. 5gm of ground material was weighed using an electronic weighing balance dissolved in a 25 ml of sterile water and then boiled at 55-60℃ for 30 minutes on water bath. The extract was filtered through Whatman No. 1 filter paper and centrifuged the filtrate at 2500rpm for 14 minutes. Resulting extract was stored in sterile bottles at 5-9 ℃ for further analysis.

Phytochemical analysis

Preliminary qualitative screening for phytochemical of all these plant species was carried out with the following methods.

Test for flavonoids (Alkaline reagent test)

2 ml of extract was treated with few drops sodium hydroxide solution and observed the formation of intense yellow color. This yellow color becomes colorless on addition of dilute hydrochloric acid, indicating the presence of flavonoids.

Test for alkaloids (Mayer's Test)

2 ml of extract was treated with 2 drops of Mayer's reagent. Presence of white creamy precipitate indicates the positive test.

Test for tannins (Braymer's test)

3ml of extract was allowed to react with 10% alcoholic ferric chloride solution. Formation of blue or greenish color of the solution was observed. This was the indication of the presence of the tannins.

Test for saponins (Foam test)

2 ml of extract was taken in a test tube and 6 ml of distilled water was added to it. The mixture was then shaken vigorously. The persistence of form was observed, that indicates the presence of saponins.

Test for quinones

1 ml of extract was added to the 2 ml of dilute NaOH. Formation of blue green or red coloration confirms the presence of quinones.

Test for phenolic compounds (Ferric chloride test)

Few drops of the extract were treated with 6% aqueous ferric chloride. Formation of deep black or blue color indicates the presence of phenolic compounds.

Determination of ash content

3 gm of each plant sample was taken and weighed accurately in a clean silica dish. The dish was first heated over a low burner flame. After that the dish is transferred to a muffle furnace maintained at 300◦C-450◦C for 3-5 hours. The ash residue obtained was then cooled in desiccator and weighed. The percentage of total ash content was calculated by the formula as follows:

Total ash percent of plant sample (%) = [Weight of dry residue (g) ÷Weight of plant sample (g) ×100

Result and Discussion

Four plants *Alstonia scholaris* (Scholar Tree), *Carica papaya* (Papaya), *Croton bonplandianus* (Ban Tulsi) and *Azadirachta indica* (Neem) were screened for their phytochemical constituent and percent ash content. It is found that all the plants have considerable proportion of important phytochemicals that are easily detected by qualitative tests. The present study reveals the presence of phytochemicals like flavonoids, saponins, alkaloids, tannins, saponins, quinones and phenolic compounds. High amount of flavonoids was AISO found in *Alstonia scholaris* (Scholar Tree).

Table 1: Ethnobotanical information of selected medicinal plant species for phytochemical analysis in Udham Singh Nagar District of Uttarakhand.

S. No.	Plant species	Local name	Part used
1	*Alstonia scholaris*	Scholar Tree	Bark, Leaves and fruits
2	*Carica papaya*	Papaya	Leaves, Fruit, Bark, Latex, Peel, Seed and Pulp
3	*Croton bonplandianus*	Ban tulsi	Leaves
4	*Azadirachta indica*	Neem	Leaves, Stem, Bark

Table 2: Analytical analysis of ash content

Sr. No.	Plant sample	Ash content %
1.	*Alstonia scholaris*	15.85%
2.	*Carica papaya*	16.72%
3.	*Croton bonplandianus*	8.46%
4.	*Azadirachta indica*	10.0%

Table 3: Preliminary phytochemical analysis of screened medicinal plants species

Sr. No.	Test	*Alstonia scholaris*	*Carica papaya*	*Croton bonplandianus*	*Azadirachta indica*
1.	Alkaloids	+	+	+	+
2.	Flavonoids	+	+	+	+
3.	Saponins	+	+	+	-
4.	Tannins	+	+	+	+
5.	Quinones	-	+	-	+
6.	Terpenoids	+	-	+	+
7.	Phenolic Compounds	+	+	+	+
8.	Coumarins	+	-	-	-
9.	Anthocyanins	+	-	-	-
10.	Leucoanthocyanins	+	-	-	-
11.	Steroids	+	+	+	+
12.	Fatty acids	+	+	-	-
13.	Glycosides	+	+	-	+
14.	Phlobatannins	-	-	-	-

KEY: - =absent + =present

Conclusion

From the overall study, it is concluded that as the plants studied, found to rich in phytochemicals, are full of medicinal and pharmacological significance. Out of all secondary metabolites flavonoids found to be abundant in the everywhere almost all plant species studied. Further study required to find their potentials in the mentioned biological properties such as anti-diabetic, anti-cancer, etc.

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References

1. Bansode ST, Salakar KB. Phytochemical analysis of some selected Indian medicinal plants. International Journal of Pharma and Bio Sciences. 2015; 6(1):550-556, ISSN: 0975-6299.
2. Sheikh N, Kumar Y, Mishra KA, Pfoze L. Phytochemical screening to validate the ethnobotanical importance of root tubers of *Dioscorea* species of Meghalaya, North East India. Journal of Medicinal Plants Studies 2013; 1(6):62-69. ISSN: 2320-3862.
3. Susmitha S, Vidyamol KK, Ranganayaki P, Vijayaragavan R. Phytochemical extraction and antimicrobial properties of *Azadirachta indica* (Neem). Global Journal of Pharmacology. 2013; 7(3):316-320.
4. Ramamurthy V, Sathiyadevi M. Preliminary phytochemical screening of methanol extract of *Indigofera trita* Linn. Journal of Molecular Histology & Medical Physiology. 2017; 2:1.
5. Altemimi A, Lakhssassi N, Baharlouei A, Watson GD, Lightfoot AD. Phytochemicals: Extraction, isolation, and identification of bioactive compounds from plant extracts. Plants. 2017; 6:42.