



PRELIMINARY PHYTOCHEMICAL ANALYSIS OF *CLAUSENA AUSTRALINDICA*

**B.C. STONE AND K.N. NAIR, *MURRAYA PANICULATA* (L.) JACK AND
ATALANTIA RECEMOSA WT. (RUTACEAE)**

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ABSTRACT

The preliminary phytochemical analysis of *Clausena austro-indica*, *Murraya paniculata* and *Atalantia recemosa* were investigated. The biologically active compounds like alkaloids, flavonoids, tannins and phenolic compounds were identified in aqueous, chloroform and ethanolic extracts.

Keywords: Phytochemical, Biological Compounds, *Clausena austro-indica*, *Murraya paniculata*, *Atalantia recemosa*

INTRODUCTION

Medicinal plants act as raw material base for the elaboration of more complex semi-synthetic chemical compounds. Many of these isolations from the medicinal plants are based on the uses of the agents in traditional medicine. During the last few decades, there has been an increasing interest in the study of medicinal plants and their traditional uses [1]. There has been resurgence in the consumption and demand of medicinal plants. Traditional medical knowledge of medicinal plants and their use by indigenous cultures are not only useful

for the conservation of cultural traditions and biodiversity but also for community healthcare and drug development in the future. Now there is a growing interest in correlating each phytochemical constituent of a plant with its pharmacological activity [2]. The biologically active compounds like alkaloids, flavonoids, tannins and phenolic compounds are the main reason for the medicinal value of plants that produce a definite physiological action on the body if it is administered [3]. The present study investigates the preliminary phytochemical

analysis of *Clausena austro-indica*, *Murraya paniculata* and *Aatalantia recemosa*.

MATERIALS AND METHODS

Plant Collection

The plant materials *Clausena austro-indica*, *Murraya paniculata* and *Aatalantia recemosa* were collected from Palni Hills of Eastern Ghats, Tamilnadu. Taxonomic identification of these plants was carried out by S John Britto, Director and Head, The Rapinat Herbarium, St. Joseph's College, Tiruchirappalli. A voucher specimen of each experimental plant was deposited at the Rapinat Herbarium bearing the following numbers: *Calusena austro-indica* (RHT 56222), *Murraya paniculata* (RHT 56226) and *Aatalantia recemosa* (RHT 56230).

Plant Descriptions and Ethnomedicinal Uses

Aatalantia recemosa

Shrubs or small trees ca. 4 m tall; bark brownish, smooth; blaze yellowish; branches with long spines; branchletsterete, glabrous; leaves simple, alternate, spiral; petiole 0.5-1 cm long, planoconvex in cross section, glabrous, articulate; lamina 4.5-9 x 2.5-5 cm, elliptic to elliptic-ovate, apex emarginate, base acute to rounded, margin entire, coriaceous, glabrous, glandular punctate, drying olive green; midrib raised above; secondary nerves 10-18 pairs; tertiary nerves admedially ramified;

inflorescence axillary short cymes; flowers white; pedicel 0.4 cm long; stamens connate and berry globose, to 1.9 cm long; seeds 4.

Ethnomedicinal Uses

Several parts of *A. recemosa* have been used in medicine for several purposes such as the treatment of rheumatoid pain and grandular swelling [4]. The root is believed to be antispasmodic whereas a decoction of the leaves is often applied for itching and other skin complaints.

Murraya paniculata

It is a small tree with a spreading crown and short, often crooked, trunk; rather corky, fragrant. Leaves alternate, imperipinnate, 10-17 cm long; leaflets usually 3-5, mostly 3-7 cm long, ovate orellyptic-lanceolate or rhomboid, glossy and darker above, gland-dotted, base cuneate or rounded.

Ethnomedicinal Uses

The leaves are stimulant and astringent; they are reportedly used in the form of an infusion to treat diarrhoea and dysentery in the Philipines. The powder leaves are applies to cuts to promote healing; there decoction is taken internally to treat dropsy. Among the Baigas of north eastern Madhya Pradesh, the crushed leaves are made in to a paste and mixed with molasses to make tablets that are taken orally to treat joint pain; the leaves, cooked with mustard or sesame oil along with dried ginger, are

applied externally to relieve inflamed joints [5].

Clausena austro-indica

Unarmed, aromatic *shrub to 5 m* Leaves alternate, imparipinnate, to 30 cm; petiole to 6 cm; leaflets 3-4 pairs, alternate, lanceolate to obovate, 6-12 × 5-7 cm, base oblique, margin irregularly crenate, apex obtuse, subcoriaceous, with immersed glands; petiolule 0.4 cm. *Panicles* thyrsoid, (sub) terminal or axillary, to 14 cm; peduncle to 2 cm *Flowers* 0.5 cm wide; pedicel 5 mm; bracts. *Calyx* copular, glabrous; lobes 5, each with an apical gland; margins ciliolate. *Petals* 5, cream elliptic-obtuse, 4 × 2 mm, imbricate. *Stamens* 5 + 5; outer (ante-petalous) whorl longer. *Ovary* subglobose, 5-celled, seated on gynophores; ovules 2 or 4 per cell, collateral. *Berry* globose, 1 cm wide; seed 1, ovoid, 8 × 5 mm.

Ethnomedicinal Uses

C. austro-indica is used medicinally in Asia for a variety of conditions, including snakebite, malaria and dysentery.

Plant Extraction

The leaves of selected species were washed thoroughly with normal tap water. The leaves were dried in shade at room temperature. They were crushed to powder using grinding machine. Powders were stored in air tight container bottle with proper labeling of the experimental samples.

The powdered materials of 10 gm weighed using electronic balance and were soaked in ethanol and distilled water using separate conical flasks. The mouths of the conical flasks were closed with aluminium foil to reduce the volatilization of the solvent. The flasks were kept in rotary shaker for 5 days. After 5 days, the solvent along with solubilized components were collected and filtered through Whatman No. 1 filter paper.

Phytochemical Screenings

Preliminary Phytochemical Analysis

Qualitative phytochemical tests for the identification of alkaloids, flavonoids, steroids and terpenoids were carried out for all the extracts by the method described by Mukherjee [6].

Test for Phenol

(a) Ferric chloride test

To 1ml of the leaf extract and 1ml of tuber extract 2ml of distilled water was added followed by few drops of 10% ferric chloride. Formation of blue or black colour indicated the presence of phenols.

Test for Sterols

(a) Liebermann-Burchard test

To the test solution, 3-4 drops of acetic anhydride was added, the solution was boiled cooled and conc. sulphuric acid (3 drops) was added. A brown ring appeared at the junction of the two layers. The upper

layer turns green showed the presence of steroids.

Test for Tannins

(a) Gelatin test

To 2ml test solution, 1% Gelatin solution containing 10% sodium chloride was added to obtain a white precipitate.

Test for Flavanoids

(a) Zinc chloride reduction test

To 2ml test solution, a mixture of zinc dust (Merck, India) and conc. HCl (Qualigens, India) was added. A red colour was obtained after few minutes.

(b) Alkaline reagent test: To 2ml test solution, sodium hydroxide (Qualigens, India) solution was added to give a yellow or red colour.

Test for Alkaloids

(a) Mayer's test

To 2ml test solution, 2N HCl was added. The aqueous layer formed was decanted and Mayer's reagent (Qualigens, India) was added to it. A cream coloured precipitate indicated the presence of alkaloids.

Test for fats and fixed oils

(a) Stain test

Small amount of the extract was pressed between two filter papers; the stain on the filter paper indicated the presence of fixed oils.

(b) Saponification test

Few drops of 0.5N alcoholic potassium hydroxide was added in small quantity to the extract solution with a drop of phenolphthalein and heated on a water bath for 1-2h. The formation of soap or partial neutralization for the alkali indicated the presence of fats and fixed oils.

Test for Glycosides

To 2ml test solution, equal quantity of Fehling's solution A and B was added and solution was heated. A brick red precipitate indicated the presence of glycosides.

Test for proteins and amino acids

(a) Millon's test

To 2ml test solution, Millon's reagent was added which gives a white precipitate, which on heating changed to red.

(b) Ninhydrin test

To 2ml test solution, Ninhydrin solution was added and the solution was boiled. Amino acids and proteins when boiled with 0.2% Ninhydrin reagent showed a violet colour.

RESULT AND DISCUSSION

The extracts were examined for their physical characterization like colour, odor and consistency. The color of the aqueous extracts of the experimental samples were greenish brown to green and while ethanolic

extracts showed the colour of dark greenish to green. The color of the chloroform extracts of the experimental samples were greenish brown to green. The consistency level of all the extracts were semi-solids and the odors were characteristics in two samples and sample tuber was odorless. Presence of odor showed the presence of desired phytochemicals. The result of the above study is compiled in **Table 1**. Different chemical tests were performed to determine the nature of the chemical constituents.

The triphytochemical screening (aqueous, ethanolic and chloroform) of the extracts of *Calusena austro-indica* leaf revealed the presence of tannins, flavonoids, amino acids and proteins in all extracts. Phenols and steroids were observed in ethanolic and aqueous. Alkaloids were present only in ethanolic extract and while glycoside was present only in aqueous. Saponins was absent in all extract (**Table 2**).

The triphytochemical screening (aqueous, ethanolic and chloroform) of the extracts of *Murrayapaniculata* leaf revealed that amino acids, proteins and tannins were present in all extracts. Phenol and flavonoids were observed in ethanolic and aqueous but not in chloroform. Alkaloids were present only in ethanolic extract and while glycoside was present only in aqueous. Saponins was absent in all extract (**Table 3**).

The triphytochemical screening (aqueous, ethanolic and chloroform) of the extracts of *Atalantia recemosa* leaf revealed that amino acids, tannins and proteins were present in all extracts. Flavonoids, phenol and glycosides were observed in ethanolic and aqueous but not in chloroform. Steroid was observed only in the ethanolic extract. Saponins and alkaloids were absent in all extract (**Table 4**).

Table 1: Physical Characteristics of the Extracts

Name of the Extracts	Name of plant	Part used	Consistency	Colour	Odor
Ethanolic extract Aqueous extract Chloroform extract	<i>Calusena austro-indica</i>	leaf	Semi-solid	dark green	characteristic
			Semi-solid	greenish brown	characteristic
			Semi-solid	greenish brown	characteristic
Ethanolic extract Aqueous extract Chloroform extract	<i>Murraya paniculata</i>	leaf	Semi-solid	dark green	characteristic
			Semi-solid	greenish brown	characteristic
			Semi-solid	greenish brown	characteristic
Ethanolic extract Aqueous extract Chloroform extract	<i>Atalantia recemosa</i>	leaf	Semi-solid	greenish	characteristic
			Semi-solid	greenish	characteristic
			Semi-solid	greenish	characteristic

Table 2: Phytochemical Test in the Leaf of Ethanolic, Chloroform and Aqueous of *Calusena austro-indica*

S.No	Phytoconstituents	Ethanol	Chloroform	Aqueous
1	Phenol	+	-	+
2	Steroids	+	-	+
3	Tannins	+	+	+
4	Flavonoids	+	+	+
5	Alkaloids	+	-	-
6	Saponins	-	-	-
7	Glycosides	-	-	+
8	Proteins	+	+	+
9	Aminoacids	+	+	+

A= Aqueous, E= Ethanolic, C= Chloroform; (+) Present, (-) Absent).

Table 3: Phytochemical test in the Leaf of Ethanolic, Chloroform and Aqueous of *Murrayapaniculata*

S.No	Phytoconstituents	Ethanol	Chloroform	Aqueous
1	Phenol	+	-	+
2	Steroids	-	-	-
3	Tannins	+	+	+
4	Flavonoids	+	-	+
5	Alkaloids	+	-	-
6	Saponins	-	-	-
7	Glycosides	-	-	+
8	Proteins	+	+	+
9	Aminoacids	+	+	+

A= Aqueous, E= Ethanolic, C= Chloroform; (+) Present, (-) Absent).

Table 4: Phytochemical test in the leaf of Ethanolic, Chloroform and Aqueous of *atalaniarecemoso*

S.No	Phytoconstituents	Ethanol	Chloroform	Aqueous
1	Phenol	+	-	+
2	Steroids	+	-	-
3	Tannins	+	+	+
4	Flavonoids	+	-	+
5	Alkaloids	-	-	-
6	Saponins	-	-	-
7	Glycosides	+	-	+
8	Proteins	+	+	+
9	Aminoacids	+	+	+

A= Aqueous, E= Ethanolic, C= Chloroform; (+) Present, (-) Absent).

CONCLUSION

In conclusion, the presence of phytoconstituents justify the use of selected species for treating different ailments and have a potential of providing useful drugs of human use. In the present study, it is seen that most of the biologically active phytochemicals were present in all extracts. The results of the present investigation

suggest that *Calusena austro-indica* (leaf) *Atalania recemoso* (leaf) and *Murraya paniculata* (leaf) yielded the presence of alkaloids, flavonoids, tannins, glycosides, protein, and amino acid and phenolic compounds.

REFERENCE

- [1] Ahmedulla M and Nayar MP, Red data book of Indian plants, Calcutta: Botanical Survey of India, 1999, 4.
- [2] Ambasta SP, A useful plant of India, Publications and Information Directorate, CSIR, New Delhi, India, 1992.
- [3] Alston RE and Turner BL, Biochemical systematic, Prentice Hall New Jersey, 1963.
- [4] Sankaranarayanan S, Bama P, Ramachandran J, Kalaichelvan PT, Deccaraman M, Vijayalakshimi M, Dhamotharan R, Dananjeyan B, SathyaBama S, Ethnobotanical study of medicinal plants used by traditional users in Villupuram district of Tamil Nadu, India, J. Med. Pl. Res., 4 (12), 2010, 1089-1101.
- [5] Goel R.K. and Gautam M.K. Exploration of preliminary phytochemical studies of leaves of *Murraya paniculata* (L.), Int. J. Pharmacy and Life Sci., 3 (8), 2012, 1871-1874.
- [6] Mukherjee PK, Quality Control of Herbal drugs, New Delhi: Business Horizons, 2002, 186-191.