



A COMPARATIVE STUDY OF PHYTOCHEMICALS INVESTIGATION OF ANDROGRAPHIS PANICULATA AND MURRAYA KOENIGII

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ABSTRACT

Among ancient civilisations, India has been known to be rich repository of medicinal plants. The traditional medicine involves the use of different plant extracts or the bioactive constituents. This type of study provides the health application at affordable cost. The study such as ethno medicine keenly represents one of the best avenues in searching new economic plants for medicine. A comparative study of phytochemicals was made on leaf extracts of two herbal plants- *Andrographis paniculata* and *Murraya koenigii*. The leaf extracts were prepared with six different selected solvents for each plant to adjudge the major active principles in the solvent that have value in rational drug design. The qualitative analysis of phytochemicals encompasses steroids, alkaloids, flavonoids, triterpenoids, tannins, saponins, quinone, coumarin, protein, sugar and gum. The presence of these various phytochemicals shows the importance of *A.paniculata* and *M.koenigii* which could be used to cure various ailments.

Keywords: *Andrographis paniculata*, *Murraya koenigii*, Phytochemicals.

INTRODUCTION

Human beings have been utilizing plants for basic preventive and curative health care since time immemorial. Plant extracts or bioactive herbal compounds have been reported scientifically for their biological activities. Phytochemicals may protect human from a host of diseases. Phytochemicals are non-nutritive plant chemicals that have protective or disease preventive properties. Plant produces these chemicals to protect itself but recent research demonstrates that many phytochemicals can protect humans against diseases. There are many phytochemicals in fruits and herbs and each works differently¹. *Andrographis paniculata* (Burm. f.) Nees (Acanthaceae) (*A. paniculata*, *Chuanxinlian*), native to Taiwan, Mainland China and India, is a medicinal herb with an extremely bitter taste used to treat liver disorders, bowel complaints of children, colic pain, common cold and upper respiratory tract infection. It grows erect to a height of 30–110 cm in moist, shady places, locally it is known as Nilavembu, Sirunangai, Siriyangai. *A. paniculata* is having a number of bioactivities such as anti-inflammation, anti-cancer, immunomodulation, anti-infection, anti-hepatotoxicity, anti-atherosclerosis, anti-diabetes and anti-oxidation².

Murraya koenigii is an aromatic more or less deciduous shrub or a small tree up to 6m in height and 15-40 cm in diameter found throughout India up to an altitude of 1,500m commonly in forests often as gregarious under-growths. The Plant *Murraya koenigii* belongs to family Rutaceae, commonly called "Curry leaf plant" in English and locally known as "Karivepu". It is cultivated for its aromatic leaves. The plant used as Tonic, stomachic and carminative. Fresh juice of the root is taken to relieve pain associated with kidney. Leaves are used internally in dysentery and diarrhoea cases. Root and bark are stimulant and are applied externally for skin eruptions and poisonous bites³.

MATERIALS AND METHODS

Collection of plant materials:

Based on the documented ethnopharmacological knowledge on the use of medicinal plants in the treatment of pathological diseases, fresh leaves of *Andrographis paniculata* and *Murraya koenigii* were collected during the month of January from an herbal garden in trichy and washed 2-3 times in distilled water then dried in shade and grinded into fine powder, stored in closed container separately with proper labelling for further use. Powdered plant leaves were subjected to organic fraction collection based on polarity, crude alcohol extraction and aqueous extraction.

Organic fraction collection

100g of powdered plant leaves were successively extracted with cold petroleum ether, chloroform, ethyl acetate and methanol. Containers containing plant powders were immersed in the solvent individually for 72 hours and the fractions were collected. Fractions were dried by evaporation at room temperature for complete dried fraction collection and stored in sterile containers.

Crude alcohol and aqueous extraction

100g of powdered plant materials were taken in two separate containers and 250ml of ethyl alcohol and water added in individual containers. The materials held for 72 hours to collect the extract and dried.

Preliminary phytochemical screening

The extracts thus obtained were subjected to preliminary phytochemical screening following the standard protocols^{4,5}.

Phytochemical screening procedure

Test for steroids

One gram of the test substance was dissolved in a few drops of acetic acid, acetic anhydride, warmed and cooled under the tap water and drop of concentrated sulphuric acid were added along the sides of the test tube. Presence of green colour indicates the presence of Steroids.

Test for alkaloids

Test substance shaken with few drops of 2N HCL. Aqueous layer formed, decanted and to which one or two drops of Mayer's reagent added. Formation of white turbidity or precipitate indicates the presence of alkaloids.

Test for flavonoids

Shinado's test: To the substance in alcohol, a few magnesium turnings and few drops of concentrated hydrochloric acid were added and boiled for five minutes. Red coloration shows the presence of Flavonoids.

Test for triterpenoids

Noller's test: The substance was warmed with Tin and Thionyl chloride. Purple coloration indicates the presence of Triterpenoids.

Test for tannins

The substance mixed with basic lead acetate solution. Formation of white precipitate indicates the presence of Tannins.

Test for saponins

The substance shaken with water, foamy lather formation indicates the presence of saponins.

Test for quinones

To the test substance, sodium hydroxide was added. Blue green or red colour indicates the presence of Quinone.

Test for coumerin

To the test sample 10% of sodium hydroxide and chloroform were added. Formation of yellow colour indicates the presence of Coumerin.

Test for protein

To the test solution the Biuret Reagent is added. The blue reagent turns violet in the presence of proteins.

Test for sugars

The substance was mixed with equal volume of Fehling's A and B solutions, heated in water bath. Formation of red colour is the indication of the presence of sugar.

Test for gum

To the substance, add few ml of water and shake well. Formation of swells or adhesives indicates the presence of gum.

RESULTS

In the present investigation, preliminary phytochemical screening has been done in the various extracts of *Andrographis paniculata* and *Murraya koenigii* leaves and comparison made between each other. It showed the presence and absence of various phytochemical constituents (Table 1).

Table 1: The analysis of phytochemicals in the different organic extracts of *Andrographis paniculata* and *Murraya koenigii*

Phytochemicals	Petroleum ether		Chloroform		Ethyl acetate		Alcohol		Methanol		Water	
	A	B	A	B	A	B	A	B	A	B	A	B
Steroids	+	+	+	+	-	+	+	+	+	+	-	-
Alkaloids	-	+	-	+	-	+	-	-	-	-	-	+
Flavonoids	-	-	-	-	-	-	-	+	+	-	-	-
Triterpenoids	+	+	-	-	-	-	+	+	-	-	-	-
Tannins	+	+	-	+	-	+	-	-	-	-	-	-
Saponins	+	+	-	-	+	+	-	-	-	-	-	-
Quinone	-	-	-	-	-	-	-	-	+	-	-	-
Coumarin	-	+	-	-	-	+	-	+	+	-	-	-
Protein	+	+	+	+	+	+	+	+	+	+	-	-
Sugar	+	+	+	-	-	+	+	+	-	+	-	-
Gum	-	-	+	-	-	+	+	+	-	-	-	-

A = *Andrographis paniculata*; B = *Murraya koenigii*; + = Presence; - = Absence

DISCUSSION

Studies on the native or folk medicinal use of medicinal plants are important from the scientific point of view in that it enables rapid scientific studies towards finding and development of newer drugs from centuries old practical use-derived knowledge of medicinal plants. Green plants represent a reservoir of effective chemicals, the rapetants and can provide valuable sources of natural pesticides⁶. Herbal extracts contain different phytochemicals with biological activity that can be of valuable therapeutic index. In the present study, it was observed that the plants *Andrographis paniculata* and *Murraya koenigii* on which scientific studies have been conducted are validated in their uses by the various parts of India.

The medicinal value of these plants lies in some chemical substances that have a definite physiological action on the human body. Different phytochemicals have been found to possess a wide range of activities, which may help in protection against chronic diseases. For example, Alkaloids protect against chronic disease⁷. Saponins protect against hypercholesterolemia and antibiotic properties. Steroids and triterpenoids show the analgesic properties. The Steroids and saponins were responsible for central nervous system activities¹. Phytochemical screening of the various extracts of *Andrographis paniculata* and *Murraya koenigii* leaves used to study the presence of contained alkaloids, flavonoids, steroids, saponines, tannins and triterpenoids and also have various medicinal values such as anti-inflammatory, anti-diabetic and analgesic activities and for central nervous system activity. The comparison of phytochemicals between these two herbal plants showed that *M.koenigii* is having more phytochemicals than *A.paniculata* in the various extracts examined in this study. But both of these herbs can be used to cure many diseases and the identification and isolation of the active compounds could lead to the new drug discovery of cheaper cost which would be useful for the patients.

CONCLUSION

The experimental plants *Andrographis paniculata* and *Murraya koenigii* studied here can be a potential source of useful drugs exploiting the anti-

inflammation, anti-cancer, immunomodulation, anti-infection, anti-hepatotoxicity, anti-atherosclerosis, anti-diabetes activities of these plants. This type of study provides the health application at affordable cost. Further research needs in the angle whether the phytochemicals could be useful to treat other dreadful diseases. Advanced studies are being conducted on these plants in order to isolate, identify, characterize and elucidate the structure of the bioactive compounds.

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