

Phytochemical Analysis of Methanolic Extracts of Leaves of Some Medicinal Plants

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Abstract- The present investigation deals with the phytochemical studies of leaves of different medicinal plants like *Andrographis paniculata* (Burm. f.) Wall ex Nees of the family Acanthaceae, *Bauhinia acuminata* Linn. of the family Caesalpiniaceae, *Clerodendrum indicum* (Linn.) O. Kuntze syn. *C. siphonanthus* R. Br. of the family Verbenaceae, *Nerium odorum* Soland. of the family Apocynaceae and *Sida humilis* Cav. Syn. *S. veronicaefolia* Lam., syn. *S. cordata* (Burm. f.) Borss. of the family Malvaceae. Methanolic (90%) extracts of leaf powders have been screened for qualitative determination of different secondary metabolites like starch, alkaloids, flavonoids, tannins, reducing sugars, amino acids and lignins by specific chemical color reaction tests.

Index Terms- Medicinal plants, Methanolic extracts
Phytochemical study, Secondary metabolites.

I. INTRODUCTION

Nature has provided a complete store house of remedies to cure all ailment of mankind. Use of plants as a source of medicine has been inherited from the onset of human civilization and is an important component of the healthcare system. The aims of this paper are to evaluate the preliminary phytochemical characters such as determination of pharmacognostic principals of some medicinal plants of different families. In recent years, chemical analysis and biological assays have begun to play an important role in ethnobotanical studies (Jana et al., 2009). In several cases, such analyses have led to the discovery of novel bioactive phytochemicals.

In the present investigation, an attempt was made by some microchemical tests to study the phytochemicals of some medicinally important plants like *Andrographis paniculata* of the family Acanthaceae which is used to treat infections and some diseases (Anand et al., 2011); *Bauhinia acuminata* of the family Caesalpiniaceae is reported as medicinally important in traditional system of medicine and are used extensively for the treatment of inflammation, headache, fever, tumors, skin infections etc. (Kumar et al., 2010); *Clerodendrum indicum* of the family Verbenaceae, which is reported to use as medicine for the treatment of asthma, pyreticosis, cataract etc. (Chandrashekar and Rao, 2012); *Nerium odorum* of the family Apocynaceae is also used in manifests as nausea, vomiting, colic etc. (Patel et al., 2010) and *Sida cordata* of the family Malvaceae can be effectively used in curing the bacterial diseases, bronchial asthma, cold etc. (Kalaiarasan and John, 2010).

II. MATERIAL AND METHODS

The leaf samples of *Andrographis paniculata*, *Bauhinia acuminata*, *Clerodendrum indicum*, *Nerium odorum* and *Sida humilis* (Figure-1) were collected from the medicinal garden of Rampurhat College, Rampurhat, Birbhum, located in the lateritic belt of West Bengal. The selected plant species have carefully identified with the help of different floras (Paria, 2005; Maheswari, 2000; Panigrahi and Murthy, 1989; Varma, 1981).

The leaf samples of selected plant species were carefully separated, cleaned, shade dried, mechanically grinded and coarsely powdered. Finally, the leaf powders were extracted (Soxhlet extraction) with 90% methanol and those extracts were used for different chemical color reaction tests for identification of different phytochemical groups. Phytochemical screening was carried out to assess the qualitative chemical composition of crude extracts using commonly employed precipitation and coloration reaction to identify the major natural chemical groups such as starch, alkaloids, flavonoids, tannins, reducing sugars, amino acids and lignins. General reactions in these analysis revealed the presence or absence of these compounds in crude extract tested (Brindha and Saraswathy, 1981).

III. RESULTS

The preliminary phytochemical screening carried out on methanolic extracts of *Andrographis paniculata*, *Bauhinia acuminata*, *Clerodendrum indicum*, *Nerium odorum* and *Sida humilis* leaves revealed the presence of phytoconstituents such as starch, alkaloids, flavonoids, tannins, reducing sugars, amino acids and lignins (Table-1). The chemical color reaction tests for chemical constituents of leaf extracts of the investigated plants are shown in Figure-2. Methanolic extracts of the leaf of five above mentioned plants have shown positive results for starch, alkaloids, amino acids and lignins. But flavonoids are absent in *Andrographis paniculata* and *Sida humilis*. Tannins are absent in *Andrographis paniculata*, *Bauhinia acuminata* and *Sida humilis*. Reducing sugars are absent in *Sida humilis* only. Leaf extracts of *Nerium odorum* gives faint coloration for starch, alkaloids, flavonoids, tannins and reducing sugars which indicates presence of these in very low quantity (Table-1, Figure-2). On the other hand *Sida humilis* gives light coloration for alkaloids, amino acids and lignins. From Table-1 it is observed that tannins are present in low quantity in the plant *Clerodendrum indicum*.

IV. DISCUSSION AND CONCLUSION

Andrographis paniculata, *Bauhinia acuminata*, *Clerodendrum indicum*, *Nerium odorum* and *Sida humilis* plants were traditional plants, used in herbal medicine. Chemical analysis and biochemical assays are very important aspects in pharmacognostic evaluation of medicinal plants (Choudhury et al., 2009; Harborne, 1973). Through the chemical tests in the methanolic extracts of leaves of the five investigated plants, it is found that the important phytochemical groups (starch, alkaloids, amino acids and lignins etc.) are present in all the cases which actually confirms their medicinal properties (Chandrashekar and Rao, 2012; Anand et al., 2011; Kalaiarasan and John, 2010; Kumar et al., 2010; Patel et al., 2010; Sugumaran and Vetrichelvan, 2008).

It was also found that *Andrographis paniculata* have antimicrobial activity (Anand et al., 2011). It is also observed by Sugumaran and Vetrichelvan (2008) that tannins are absent in ethyl acetate extract of *Bouhinia purpurea* Linn. leaves. In the study prototype results were observed in *B. acuminata*. The leaves of *Clerodendrum viscosum* possess flavonoids, alkaloids, carbohydrates, tannins (Chandrashekar and Rao, 2012), which is similar to the results of chemical analysis in *Clerodendrum infortunatum*. In the present findings, the methanolic extract of leaves of *Sida humilis* revealed that the absence of flavonoids, tannins and reducing sugars in contrast with the result of Kalaiarasan and John (2010), in *Sida cordifolia*.

However, further studies are required in this direction for its comprehensive analysis including qualitative or semi qualitative analysis, characterize its chemical structure and assess its biological activities.

It may be concluded that the above five plants are very useful plant. These plants may be used to cure some common and other various diseases. It is necessary of exploration of maximum potential of these plants in medicinal field and pharmaceutical sciences for their appropriate application.

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Table-1: Phytochemical analysis of leaves of some selected plant species

Sl. No.	Microchemical Tests	Coloration	Selected Plant species				
			<i>Andrographis paniculata</i>	<i>Bauhinia acuminata</i>	<i>Clerodendrum indicum</i>	<i>Nerium odorum</i>	<i>Sida humilis</i>
a.	Starch by weak Iodine solution	Blue black	+++	+++	++	+	++
b.	Alkaloids by Wagner's reagent	Dark brown	++	+++	++	+	+
c.	Flavonoids by 10% NaOH solution	Yellowish brown	-	++	+++	+	-
d.	Tannins by 10% aqueous Lead acetate solution	Light yellow ppt.	-	-	+	+	-
e.	Reducing sugars by Benedict's reagent	Brick red	+++	++	+++	+	-

f.	Amino acids by Ninhydrin reagent	Lemon yellow	++	++	+++	++	+
g.	Lignins by Phloroglucinol reagent	Yellowish orange	+++	+++	+++	+++	+

(+, ++, +++ represent degree of intensity of color change i.e. presence of phytochemical groups and

– represents no change of color i.e. absence of phytochemical groups)



Figure-1: Photographs of investigated medicinal plants



Figure-2: Chemical color reaction tests of leaf extracts of some medicinal Plants.

a: Starch (Blue black), b: Alkaloids (Dark brown), c: Flavonoids (Yellowish brown), d: Tannins (Light yellow ppt.), e: Reducing sugars (Brick red), f: Amino acids (Lemon yellow), g: Lignins (Yellowish orange)