GTRP Int. J. Biological Technology

Preliminary Phytochemicals studies on some medicinal plants of Caesalpiniaceae family

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Published: 15, December, 2012; Vol. No. 3(3): 12-14; www.gbtrp.com;

Abstract

The present study was conducted to investigate the presence of phytochemicals in the leaves of four species viz. *Bauhinia tomentosa, Cassia occidentalis, Caesalpinia bonduc* and *Parkinsonia aculeata* belonging to family Caesalpiniaceae. Three solvents such as chloroform, benzene and petroleum ether were used for extraction. The constituents screened were alkaloids, flavonoids, glycosides and tannins. The distribution of these constituents in the leaves of selected species were assessed and compared. Preliminary phytochemical screening of *Bauhinia tomentosa, Cassia occidentalis* did not reveal alkaloids while *Caesalpinia bonduc* and *Parkinsonia aculeata* revealed alkaloids. Glycosides and flavonoids were present in all the selected species of family Caesalpiniaceae. Tannin was present in *Cassia occidentalis, Caesalpinia bonduc* and *Parkinsonia aculeata* while absent in *Bauhinia tomentosa.* Saponin was present in *Parkinsonia aculeata* while absent in *Bauhinia tomentosa, Cassia occidentalis* and *Caesalpinia bonduc.*

Key words: Phytochemicals, Solvents, Bauhinia, Cassia, Caesalpinia, Parkinsonia

Introduction

Medicinal plants have been used for centuries as remedies for human diseases because they contain bioactive components of therapeutic value (Sumathi and Parvathi, 2010; Nostro *et al*.,2000).

Phytochemicals are the natural compounds and form the base of modern drugs as we use today (Tanaka *et al*., 2002; Edeoga et al.,2005; Akinmo *et al*.,2007). Phytochemicals are basically divided into two groups that is primary and secondary metabolites. Primary metabolites comprise common sugar, amino acids, proteins and chlorophyll while secondary metabolites consist of alkaloids, flavonoids, tannins etc., (Parekh Jigna and Sumitra. 2007; Kumar *et al*.,2009). Phytochemicals like flavonoids and phenols are strong antioxidants and have an important role in the health care system (Dhan Prakash et al.,2007).

Screening of active compounds from plants has lead to the discovery of new medicinal drugs which have efficient protection and treatment roles against various diseases, including cancer and alzheimer's disease (Soma *et al*., 2010). Screening of various natural organic compounds and identifying active agents is the need of the hour, because successful prediction of drug like properties at the onset of drug discovery will pay off later in drug development. Therefore, the present study was to determine the phytochemical constituents found in the leaves of *Bauhinia tomentosa, Cassia occidentalis, Caesalpinia bonduc* and *Parkinsonia aculeata.*

Materials and Methods

Collection of plant materials

The leaves of the plants have been collected. The plant samples have been air dried and ground into uniform powder. The extracts have been prepared in three different solutions viz. Benzene, Chloroform and Petroleum ether.

Test for alkaloid: Mayer's test: To the 1 ml of extract, add 1 ml of Mayer's reagent (Potassium mercuric iodide solution). Whitish yellow or Cream coloured precipitate indicates presence of alkaloids.

Wagner's test: To the 1 ml of extract added to 2 ml of Wagner's reagent (Iodine in Potassium iodide) formation of reddish brown precipitate indicates the presence of alkaloids.

Test of Glycosides: Legal's test: Dissolve the extract in pyridine and add sodium nitro prusside solution to make it alkaline. No formation of pink to red colour shows absence of glycosides.

Baljet's test: To 1 ml of the test extract add 1 ml of Sodium picrate Sol^{n} and the yellow to orange colour reveals the presence of Glycosides.

Test for Tannins: To test extract, add strong potassium dichromate solution, a yellow colour precipitate indicates the presence of Tannins and

Phenolic compounds : Test for Flavonoids: Shinoda's test - (1) The alcoholic extract is treated with magnesium foil and concentrated HCl give intense cherry red colour indicates the presence of flavonones or orange red colour indicates the presence of flavonols.

(2) The extract is treated with NaOH, formation of yellow colour indicates the presence of flavones.

Results and Discussion

Phytochemicals are playing vital role for the treatment of different types of diseases and still are use in both traditional and modern system of medication. The present study carried out on the plant samples revealed the presence of medicinally active constituents. The phytochemical characters of the four medicinal plants investigated are summerized in Tables 1, 2, 3 and 4. Glycoside and flavonoids were present in all the four species of family Caesalpiniaceae. In Petrolium ether, Glycosides were absent in leaf extract of *Cassia occidentalis*. Tannin was present in *Parkinsonia aculeata, Cassia occidentalis* and *Caesalpinia bonduc* while absent in *Bauhinia tomentosa*. Saponin was present in *Parkinsonia aculeata* while absent in *Bauhinia tomentosa, Cassia occidentalis* and *Caesalpinia bonduc*. Alkaloid was absent in *Cassia occidentalis.* In *B. tomentosa*, alkaloid was present in benzene and petroleum ether solvents while absent in Chloroform. Glycoside was absent in Petroleum ether solvent in *Cassia occidentalis*.

Earlier literature indicated that medicinal plants are the back bone of traditional medicine and the antibacterial activity of plant extract is due to different chemical agent in the extract, which were classified as active antimicrobial compounds Plants have the capacity to synthesise a diverse array of chemicals (Joy et al.,2001).

Table- 1: Phytochemical analysis of leaves extract of *Bauhinia tomentosa* using various solvents

Phytochemicals	Benzene	Chloroform	Petroleum ether
Alkaloids	+	-	+
Flavonoids	+	+	+
Glycosides	+	+	+
Tannins	-	-	-
Saponins	-	-	-

Table – 2: Phytochemical analysis of leaves extract of *Cassia occidentalis* using various solvents

Phytochemicals	Benzene	Chloroform	Petroleum ether
Alkaloids	-	-	-
Flavonoids	+	+	+
Glycosides	+	+	-
Tannins	+	+	+
Saponins	-	-	-

Table – 3: Phytochemical analysis of leaves extract of *Caesalpinia bonduc* using various solvents

Phytochemicals	Benzene	Chloroform	Petroleum ether
Alkaloids	+	+	+
Flavonoids	+	+	+
Glycosides	+	+	+
Tannins	+	+	+
Saponins	-	-	-

Table – 4: Phytochemical analysis of leaves extract of *Parkinsonia aculeata* using various solvents

Phytochemicals	Benzene	Chloroform	Petroleum ether
Alkaloids	+	+	+
Flavonoids	+	+	-
Glycosides	+	+	+
Tannins	-	+	+
Saponins	+	+	+

Flavonoids are plant nutrients that when consumed in the form of fruits and vegetables are non toxic aldehydic and carboxylic acid groups. Flavonoids of many species are used as anti-oxidants.

Tannins are used in tanning process of animal hides to convert them to leather. They are used as healing agents in inflammation, leucorrhoea, gonorrhoea, burn, piles, and diarrhoea. These plants studied here can be seen as a potentials source of useful drugs. Further studies are going on these plants in order to identify the bioactive compounds.

Conclusion

It is concluded that the leaf extracts of selected species showed presence of important phytochemicals such as alkaloids, flavonoids, tannin, glycosides and saponins which can be used to discover the bioactive compound that may serve as leads for the development of new pharmaceutical agents. Such screening of various phytochemicals and identification of active agents is the need of the hour. These plants studied here can be seen as a potential source of useful drugs. There is need of further studies on the plant parts to quantitative analysis.

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Manuscript Progress Date
Received : 21.11.2012
Revised : 06.12.2012
Accepted : 07.12.2012