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PJBS

ISSN 1028-8880

Pakistan Journal of Biological Sciences

ANSInet
Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Pakistan Journal of Biological Sciences 17 (4): 590-593, 2014
ISSN 1028-8880 / DOI: 10.3923/pjbs.2014.590.593

Phytochemical Comparison Between Pet Ether and Ethanolic Extracts of *Bacopa monnieri, Evolvulus alsinoides* and *Tinospora cordifolia*

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Abstract: *Bacopa monnieri*, *Evolvulus alsinoides* and *Tinospora cordifolia* are established ayurvedic herbs having neuropharmacological effect. In present study is aimed to Phytochemical Comparison between Pet ether and Ethanolic extracts of *Bacopa monnieri* (BME), *Evolvulus alsinoides* (EAE) and *Tinospora cordifolia* (TCE). To identify the presence (+) or absence (-) of different phytoconstituents in Pet ether and Ethanolic extracts of BME, EAE and TCE by using various phytochemical testing methods. Phytochemical investigation showed the presence of various phytochemical constituents in Pet ether and Ethanolic extracts of BME, EAE and TCE. When comparison between Pet ether and Ethanolic extracts of BME, EAE and TCE; Ethanolic extracts of these plants showed more phytoconstituents as compared to Pet ether extracts of these plants. From present investigation, it can be concluded that phytochemical comparison is subsequently momentous and useful in finding chemical constituents in the plant substances that may lead to their quantitative evaluation and also pharmacologically active chemical compounds.

Key words: *Bacopa monnieri*, *Evolvulus alsinoides*, *Tinospora cordifolia*, phytochemical comparison, phytoconstituents

INTRODUCTION

Medicinal plants compose the most important resource of novel pharmaceuticals and health care products (Ivanova *et al*., 2005). Curative plants are natural source of medicine molecules since they have active compounds, properties of which are useful to humans. Since, primeval times, medicinal flora has attracted researchers for detection of active biomolecules having significant biological actions (Aiyelaagbe and Osamudiamen, 2009).

Phytochemical studies have concerned the awareness of plant scientists suitable to the development of novel and sophisticated techniques. These techniques played a momentous role in giving the resolution to systematic problems on the one hand and in the search for supplementary resources of raw materials for pharmaceutical industry on the other hand. Plants synthesises number of chemical compounds with different chemical and pharmacological property. Thus the awareness of the chemical constituents of plant origin is desirable for discovery of curative agents (Pandith, 2012). For the identification of different chemical groups and chemical compounds several researchers has reported Phytochemical screening of various plants (Parekh and Chanda, 2007; 2008).

According to World Health Organization (WHO), more than 80% of the world's population relies on traditional medicines for their most important health care requirements. The medicinal value of plants lies in few chemical substances responsible for several definite physiological actions in human. Such chemical group includes alkaloid, flavonoids, tannins and phenolic compounds (Singh, 2012). Awareness of the chemical constituents of plants is pleasing, not only for the invention of curative agents but also for the renaissance of the lost information about these valuable plants (Mojab *et al*., 2003).

Presently 120 active compounds have been isolated from the higher plants out of which 80% show an optimistic correlation between their traditional use and therapeutic uses (Fabricant and Farnsworth, 2001). The Phytochemical interaction and trace components may change the drug response in ways that cannot presently be replicated with a grouping of few purative active ingredients. Pharmaceutical researchers noted that the clinical trials may be used to evaluate the effectiveness of a particular herbal preparation (Izhaki, 2002).

So the present study was undertaken to evaluate phytochemical Comparison between Pet ether and Ethanolic extracts of *Bacopa monnieri*, *Evolvulus alsinoides* and *Tinospora cordifolia*.

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MATERIALS AND METHODS

Selection, collection and authentication of plants: Plants were selected on the basis of the literature survey, information collected from standard books and also from traditional medicine system practitioners. Plants were collected from the hills of Solan region of Himachal Pradesh (HP), India. These plants were authenticated in department of forestry Dr. Y.S. Parmar University, Solan, Himachal Pradesh (HP), India. The samples of plants were linked to UHF-Herbarium with Field book number 12547, 12548 and 12549 for *Bacopa monnieri*, *Evolvulus alsinoides* and *Tinospora cordifolia*, respectively.

Extraction and preparation of combinations: The plants materials were processed and dried in shade. Dried plant materials were crushed and were extracted with ethanol using soxhlet apparatus after defating with pet ether (40:60). Ethanolic extracts were dried at 40°C using rotary vacuum evaporator and kept in air tight container till any further use.

Phytochemical screening: Detailed phytochemical testing was performed to identify presence (+) or absence (-) of different phytoconstituents (Kokate *et al*., 2006).

Test for carbohydrates

Molish test: About 2 mL of aqueous extract was treated with 2 drops of alcoholic α-naphthol solution in a test tube and then 1 mL of concentrated sulphuric acid was added carefully along the sides of the test tube. Formations of violet ring at the junction indicate the presence of carbohydrates.

Test for glycosides

General test: Add Extract 200 mg+5 mL dilute H_2SO_4 by warming on a water bath then filter it. Then neutralize the acid extract with 5% solution of NaOH and add 0.1 mL of Fehling solution A and B unit, it becomes alkaline (test with pH paper) and heat in a water bath for 2 min. Note the quantity of red precipitate formed and compare with that of formed in test B.

Keller-killiani test: To 2 mL of test solution, 3 mL of glacial acetic acid and 1 drop of 5% ferric chloride were added in a test tube. Add carefully 0.5 mL of concentrated sulphuric acid by the side of the test tube. Formation of blue color in the acetic acid layer indicates the presence of Cardiac glycosides.

Test for saponins

Froth test: The extract was diluted with distilled water and shaken in graduated cylinder for 15 min. The formation of layer of foam indicates the presence of saponins.

Test for alkaloids: To the extract, dilute hydrochloric acid was added, shake it well and filtered. With the filtrate, the following tests were performed.

Hager's test: To 1-2 mL of filtrate, few drops of Hager's reagent were added in a test tube. Formation of yellow color precipitate indicates the presence of alkaloids.

Tannic acid test: Alkaloids give buff colour precipitate with tannic acid solution.

Test for flavonoids

Alkaline reagent test: The extract was treated with few drops of sodium hydroxide separately in a test tube. Formation of intense yellow color which becomes color less on addition of few drops of dilute acid, indicate presence of flavonoids.

Shinoda test: To the extract, 5 mL (95%) of ethanol was added. The mixture was treated with few fragments of magnesium turning, followed by drop wise addition of concentrated hydrochloric acid. Formations of pink color indicate presence of flavonoids.

Zinc hydrochloride test: Add a mixture zinc dust and concentrated HCl. It gives red colour after few min.

Test for triterpenoids and steroids

Salkowski's test: The extract was treated with chloroform and filtered. The filtrate was added with few drops of concentrated sulphuric acid, shaken and allowed to stand. If the lower layers turns red, sterol are present. Presence of golden yellow layer at bottom indicates the presence of triterpenes.

Test for tannin and phenolic compounds

Lead acetate test: Some amount of extract was dissolved in distilled water. To this solution few drops of lead acetate solution was added. Formation of white precipitate indicates presence of phenolic compounds (Kokate *et al*., 2006).

RESULTS

Phytochemical screening of *Bacopa monnieri*: Phytochemical screening revealed the presence of different phytoconstituents both Pet ether and Ethanolic

Table 1: Phytochemical screening of pet ether and ethanolic extracts of *Bacopa monnieri*

Name of test	Pet ether	Ethanolic
Carbohydrates	+	+
Phenols	+	+
Glycosides	+	+
Alkaloids	-	-
Tannins	-	+
Flavonoids	-	+
Terpenoids and steroids	-	-
Saponins	-	+
Fats and oil	-	-
Amino acids	-	-
Anthraquinones	+	-

+: Present, -: Absent

Table 2: Phytochemical screening of pet ether and ethanolic extracts of *Evolvulus alsinoides*

Name of test	Pet ether	Ethanolic
Carbohydrates	+	+
Phenols	+	+
Glycosides	+	+
Alkaloids	-	+
Tannins	-	+
Flavonoids	+	-
Terpenoids and steroids	-	+
Saponins	-	-
Fats and oil	-	-
Amino acids	-	+
Anthraquinones	-	+

+: Present, -: Absent

extracts. In pet ether extracts; *Bacopa monnieri* showed different phytoconstituents like Carbohydrates, Phenols, Glycosides and Anthraquinones (Table 1). And in Ethanolic extracts; *Bacopa monnieri* showed different phytoconstituents like Carbohydrates, Phenols, Glycosides, Tannins, Flavonoids and Saponins (Table 1). When comparison between Pet ether and Ethanolic extracts; Ethanolic extract showed more phytoconstituents as compared to Pet ether extract.

Phytochemical screening of *Evolvulus alsinoides*: Phytochemical screening revealed the presence of different phytoconstituents both Pet ether and Ethanolic extracts. In Pet ether extracts; *Evolvulus alsinoides* showed different phytoconstituents like Carbohydrates, Phenols, Glycosides and Flavonoids (Table 2). And in Ethanolic extracts; *Evolvulus alsinoides* showed different phytoconstituents like Carbohydrates, Phenols, Glycosides, Alkaloids, Tannins, Terpenoids, Steroids, Amino acids and Anthraquinones (Table 2). When comparison between Pet ether and Ethanolic extracts; Ethanolic extract showed more phytoconstituents as compared to Pet ether extract.

Phytochemical screening of *Tinospora cordifolia*: Phytochemical screening revealed the presence of different phytoconstituents both Pet ether and Ethanolic extracts. In pet ether extracts; *Tinospora cordifolia*

Table 3: Phytochemical screening of pet ether and ethanolic extracts of *Tinospora cordifolia*

Name of test	Pet ether	Ethanolic
Carbohydrates	-	+
Phenols	+	+
Glycosides	+	+
Alkaloids	+	+
Tannins	-	-
Flavonoids	-	-
Terpenoids and steroids	+	+
Saponins	+	+
Fats and oil	-	-
Amino acids	-	+
Anthraquinones	+	+

+: Present, -: Absent

showed different phytoconstituents like Phenols, Glycosides, Alkaloids, Terpenoids, Steroids, Saponins and Anthraquinones (Table 3). And Ethanolic extracts; *Tinospora cordifolia* showed different phytoconstituents like Carbohydrates, Phenols, Glycosides, Alkaloids, Terpenoids, Steroids, Saponins, Amino acids and Anthraquinones (Table 3). When comparison between Pet ether and Ethanolic extracts; Ethanolic extract showed more phytoconstituents as compared to Pet ether extract.

DISCUSSION

Plants synthesises a broad range of primary and secondary metabolites with different functional groups (Sharanabasappa *et al*., 2007). The presence of phytochemicals is a marker that the plant can be a prospective source of precursors in the formation of synthetic drugs (Ayoola *et al*., 2008).

In present study it was observed that Pet ether and Ethanolic extracts of *Bacopa monnieri*, *Evolvulus alsinoides* and *Tinospora cordifolia* showed the presence of various chemical constituents (Table 1-3). When comparison between Pet ether and Ethanolic extracts of *Bacopa monnieri*, *Evolvulus alsinoides* and *Tinospora cordifolia*; Ethanolic extracts of these plants showed more phytoconstituents as compared to Pet ether extracts of these plants (Table 1-3).

CONCLUSION

From present investigation, it can be concluded that phytochemical comparison is subsequently momentous and useful in finding chemical constituents in the plant substances that may lead to their quantitative evaluation and also pharmacologically active chemical compounds.

ACKNOWLEDGMENT

We are thankful to Dr. YS Parmar University Solan (HP), India to help us in authenticating these plants and to PBRI Bhopal (MP), India for to provide us all lab facilities.

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