

Short Communication

Comparative study on phytochemical screening of different extracts of *Bacopa monnieri*

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ABSTRACT

The crude extract of *Bacopa Monnieri* in three different solvents ethanol, methanol and distilled water were produced and finally analyzed for the presence of various phytochemicals. Alcoholic extract was found to possess alkaloids, tannins, saponins, phytosterols, steroids and flavonoids while aqueous extract possesses alkaloids, tannins, saponins, phytosterols, steroids and cardiac glycosides while no extract showed the presence of anthraquinone and phenolic compounds. The identification of various phytochemicals in crude extracts of *Bacopa monnieri* allows for further extraction of principal active constituents having profound medicinal activity which can be determined by various reported tests.

1. INTRODUCTION

Herbal plants from centuries were popular in preventing different kinds of diseases. The knowledge of pharmacological activities of such medicinally active plants was acquired by various ancient civilization of world passed from generation to generation and becomes the appropriate cause for higher demand of herbal drugs. Herbal drugs are generally favorable over other synthetic drugs due to their minimal side effects. India is a country where practice of Ayurveda was successful from ages, helps in discovering various types of herbal drugs which are useful for treating various life threatening diseases. *Bacopa Monnieri* is also one of the herbal drug known as Brahmi, Bacopa, Thyme, Leaved gratiola and Indian water hyssop. The use of this plant use was common in India from ages as Medhyarasayana, a drug which was used for improving memory and intellect (Medhya) as brain tonic as reported in Indian Meteria Medica (1500 AD) [1]. The plant is also useful for various respiratory functions in cases of bronchoconstriction as well as a cardiogenic, digestant, curative for ulcers, inflammation, anemia, scabies, leucoderma, epilepsy and asthma [2]. The plant also shows antimicrobial

resistance activities effective for curing various bacterial infections and many researchers had evaluated its antimicrobial bioactivity against the serious infectious organisms [3]. *Bacopa monnieri* (synonym: *Lysimachia monnieri* L. Cent.) [4] belongs to family Schrophulariaceae, mostly found in all parts of India and other tropical countries mainly in wet soil, shallow water and marshes as small creeping herb with numerous branches, small oblong leaves and light purple flower. The entire plant is generally used medicinally [5]. “Brahmine” alkaloid was the first compound isolated from the plant and then other alkaloids like Herpestine and Nicotinine were isolated. The major active compound responsible for the memory facilitating action is Bacosides A [3-(α -L-arabinopyranosyl)-O- β -Dglucopyranoside-10,20-dihydroxy-16-keto-dammar-24-ene] [6]. The other active compounds present in Brahmi are triterpenoid saponins, saponins A, B and C, betulinic acid, d-mannitol, β -sitosterol, stigmasteral and pseudojubogenin glycoside designated as bacosides I and bacosides II [7,8,9,10].

In present study the leafy part of the plant was selected for aqueous and ethanolic extraction for final phytochemical screening.

2. MATERIALS AND METHODS

Bacopa monnieri plant was collected from local nursery and other chemicals methanol, ethanol from local vendor.

2.1 Extraction of dried leaves

The collected plant leaves were thoroughly cleaned and disinfected. Weighed quantities of cleaned leaves were then treated with methanol, ethanol and distilled water individually for gentle heating on water bath for obtaining the extract. The extract obtained was filtered and the filtrate was evaporated to obtain the dry product of extract. The dried product was then stored under controlled condition for further use.

The weighed quantity of prepared sample was then dissolved in 20 ml of different solvents such as methanol, ethanol and distilled water. The solution was then kept for 72 hours and after incubation of sample for 72 hours the sample was filtered by whatman filter paper and filtrate was centrifuged at 25,000 rpm for 15 – 20 minutes and the supernatant was used for phytochemical screening.

2.2 Phytochemical Screening

Phytochemical screening of the prepared samples was performed as per standard methods [11].

2.2.1 Detection of Alkaloids

Different extracts produced were dissolved individually in dilute hydrochloric acid and filtered. The filtrate were then treated with Mayer's reagent, formation of yellow colored precipitate indicates the presence of alkaloids.

2.2.2 Detection of Saponins

Different extracts were diluted with 20 ml of distilled water and shaken for 15 minutes, formation of froth indicates the presence of saponins.

2.2.3 Detection of Tannins

Different extracts were treated with 1% gelatin solution containing sodium chloride and formation of white precipitates indicates the presence of tannins.

2.2.4 Detection of Flavonoids

Extracts were treated with few drops of lead acetate solution, formation of yellow color precipitate indicates the presence of flavonoids.

2.2.5 Detection of Cardiac Glycosides

Different extracts produced were detected for presence of cardiac glycosides by treating 2 ml of extract with 1 ml of glacial acetic acid containing one drop of ferric chloride solution. Brown ring at the interface indicates the presence of deoxysugar on addition of 1 ml of sulphuric acid.

2.2.6 Detection for Phenolic

Different extracts in 2 ml of quantity were treated with 1 ml of ferric chloride a blue or green color indicates the presence of phenolic compound.

2.2.7 Detection of Phytosterols

Different extracts were treated with chloroform and filtered. The filtrates were treated with few drops of concentrated sulphuric acid, shaken and allowed to stand. Appearance of golden yellow color indicates the presence of triterpenes.

2.2.8 Detection of Steroids

Different extracts in 1 ml quantity were treated with 10 ml of chloroform to which 10 ml of concentrated sulphuric acid was added carefully for the appearance of colored layer. Turning of upper layer in red color and sulphuric acid layer to yellow with green fluorescence indicates the presence of steroids.

2.2.9 Detection of Anthraquinone

Different extracts in 0.5ml of the quantity was boiled with 10ml of sulphuric acid and filtered while hot. The filtrate was then shaken with 5 ml of chloroform. The chloroform layer was then pipetted in to another test tube and change in color was observed.

3. RESULTS AND DISCUSSION

Herbal drugs generally possesses various active constituents with profound medicinal activity and the presence of such agents can be detected by the presence of various phytochemicals for which three different solvents medium were selected for extraction of phytochemicals and finally screened by various reported tests to detect their presence.

Table 1. Analyses of three extracting medium for phytochemical screening

S. No.	Phytochemical Tests	Extracting medium		
		Ethanol	Methanol	Distilled water
1.	Alkaloid	+	+	+
2.	Saponins	+	+	+
3.	Tannin	+	+	+
4.	Flavonoids	+	+	-
5.	Cardiac Glycosides	-	-	+
6.	Phenolic compounds	-	-	-
7.	Phytosterols	+	+	+
8.	Steroids	+	+	+
9.	Anthraquinone	-	-	-

+ Presence of Phytochemical; -Absence of Phytochemical

3.1 Phytochemical Studies

The three different extracts produced using three different solvents as methanol, ethanol and distilled water were analyzed for phytochemical testing and it was revealed that the leafy extract of *Bacopa monnieri* showed the presence of alkaloids, tannins, saponins, phytosterols and steroids in all three extracts produced. presence of Cardiac Glycoside was showed in aqueous extract while presence of Flavonoids only in alcoholic extracts and no extract showed the presence of Phenolic compounds and Anthraquinone.

4. CONCLUSION

The study confirmed that the leafy extract of *Bacopa monnieri* using different extraction medium contains different phytochemicals in different solvent medium and in this way further processing can be done to obtain main active constituents for which medicinal activity can be determined by performing different tests.

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