

RESEARCH ARTICLE

Preliminary phytochemical analysis of *Amaranthus spinosus* leaves

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ABSTRACT

Medicinal plants have biologically compounds which are used for treating various human diseases and also play an important role in curing. Phytochemicals have two categories i.e., primary and secondary constituents. Primary constituents involve chlorophyll, proteins sugar and amino acids whereas secondary constituents contain terpenoids and alkaloids Phytochemicals are certain non-nutritive plant chemicals which have some disease preventive properties. The given five extract aqueous, acetone, chloroform, ethanol and methanol extracts of leaves of the fresh *Amaranthus spinosus* were screened for the presence of different phytochemical by standard procedure. The present study indicates that the fresh plant contains different classes of secondary metabolites such as alkaloids, steroids, flavonoids, terpenoids, saponins, cardiac glycosides, tannins etc. the presence of these secondary metabolites signifies the potential of *Amarantus spinosus* as a source of therapeutic agent. Therefore, it is of interest to investigate the phytochemical constituents of the Indian medicinal plant *Amaranthus spinosus*

Key words: *Amaranthus spinosus*, Phytochemicals, flavonoids, saponins, alkaloids

INTRODUCTION

Phytochemistry or Plant chemistry (the Greek word "Phyto" meaning plant) is the branch of chemistry, deals with chemical nature of the plant or plant products (chemistry of natural products). Phytotherapy acts as a source of treating and improving certain diseases by using the beneficial effects of medicinal plants. Phytochemicals are the bioactive, natural chemical compounds, found in plants. The plant contains a wide variety of chemical compounds and they are broadly classified into two types, primary and secondary constituents. Primary constituents involve chlorophyll, proteins sugar and amino acids whereas secondary constituents contain terpenoids and alkaloids. Due to the presence of these secondary constituent's medicinal plants show antifungal, antibacterial and anti-inflammation

activities. Different parts such as leaves, bark, seeds, roots, flowers and pods of plants also have different quality and quantity of active constituent.

Amaranthus derived from the Greek word “amarantos” which means “unfading” a reference to the persisting color of certain Amaranth flowers. Ethno medicinally the plant is used as a source to treat several disorders, boils and burns. The juice of the root is used to treat fevers, urinary troubles, diarrhea and dysentery. The seed is used as a poultice for broken ribs.

Natural's product is a source of synthetic and traditional herbal medicine and is still the primary health care system. Plants consist of a number of biologically active ingredients therefore they are used for the treatment of a large number of infectious disease. These biologically active ingredients are alkaloids, flavonoids, glycosides, tannins and phenolic compound.

The medicinal value of plants lies in some chemical substances that produce a definite physiologic action on the human body. The most important of these bioactive compounds of plants are terpenes, alkaloids, flavonoids, glycosides, tannins and phenolic compound. Knowledge of the chemical constitutes of plants is desirable, not only for the discovery new source of such economic materials as tannins, oils, gums, precursors for the synthesis of complex chemical substances.

Plants provide a variety of resources that contribute to the fundamental needs of food, clothing and shelter. Among plants of economic importance medicinal and aromatic plants have played a vital role in alleviating human sufferings.

Plants are utilized as therapeutic agents since time immemorial in both organized and unorganized (folk, tribal, native) form. The healing properties of many herbal medicines have been recognized in many ancient cultures. The natural resources how so ever large are bound to diminish hence need effective strategy is needed for sustainable utilization. Cultivation of medicinal and aromatic plants is constrained due to lack of suitable technology, which has led to low yield and poor quality. Consequently, medicinal herbs are predominantly harvested in sufficient quantities from the wild in an unregulated manner.

MATERIAL AND METHODS

Collection of samples

Fresh plant leaves of *Amaranthus spinosus* were collected from Ahmednagar. The leaves are thoroughly washed through tap water and dried under shade for 3-5 days. The dried leaves are ground to fine powder and stored in polythene bags for further use.

Preparation of extracts

2 grams of dried powder of *Amaranthus spinosus* leaves was packed in five separate round bottom flask for sample extraction using five solvents namely aqueous, acetone, ethanol, methanol and chloroform. The extraction was conducted with 20ml of each solvent for a period of 24 hours. At the end of the extraction the respective solvents were concentrated under reduced pressure and the crude extracts were stored in refrigerator

Phytochemical analysis

Various chemical tests are conducted to identify represented of different phytochemicals terpenes, alkaloids, flavonoids, glycosides, tannins and phenolic compound based on the protocols available in the literature.

Test of Alkaloids (Wagner's Test): -

Take 1ml of plant extract and add 3-5 drops of Wagner's reagent and observe for the formation of reddish brown precipitate or colouration.

Test of carbohydrates (Molisch's test) :-

Take 1ml of plant extract and add 3-5 drops of Molisch's reagent, along with this add 1ml of conc. Sulphuric acid (H_2SO_4) down the side of the test tube. Then allow the mixture to stand for 2-3 min. Observe for the formation of red or dull violet colour at the interface of the two layers is positive result.

Test for Cardiac Glycosides (Keller Kelliani's Tests):

Take 1ml extract and treat it with 1ml of glacial acetic acid and 2-3 drops of 5% ferric chloride solution. To this mixture add 0.5ml of conc. H_2SO_4 . Observe for a brown ring at the interface shows the presence of deoxysugar characteristics of cardenolides. A violet ring may appear below the ring while in the acetic acid layer, a greenish ring may form.

Test for Flavonoids (Alkaline reagent Test): -

Take 1ml of extract and treat it with 3-5 drops of 20% NaOH solution. Observe for the formation of intense

yellow colour, which becomes colourless on addition of 0.5 ml dilute HCl indicates the presence of flavonoids.

Test for Phenols (Ferric Chloride Test): -

Take 1ml of extract and add 5-6 drops of aqueous ferric chloride solution and observe for the formation of deep blue or black colour.

Test for Amino acid and Proteins (1%Ninhydrin solution in Acetone)

Take 1ml of extract and add 2-5 drops of aqueous Ninhydrin solution and keep it in a boiling water bath for 1-2 min and observe for the formation of purple colour.

Test for Saponins (Foam test)

Take 1ml of extract and add 5ml distilled water and shake vigorously. Observe for the formation of persistence foam for 10-15 min that confirms the presence of saponins.

Test for Tannins (Braymer's test)

Take 1ml of extract and treat it with 1ml of 10% alcoholic ferric chloride solution and observe for the formation of blue or greenish colour.

Test for Terpenoids (Salkowski Test)

Take 1ml of extract and treat it with 0.5ml of conc. HCl and observe for the formation of yellow precipitate or colouration.

Test for Quinones

Take 1ml of extract and add 5ml distilled water and observe for the turbidity.

Test for Coumarins

Take 1ml of extract and add 1.5ml of 10%NaOH then observe for the formation of yellow colour which indicates the presence of coumarins.

RESULTS AND DISCUSSION

Table 1. shows the preliminary phytochemical constituents of aqueous, acetone, ethanol, methanol and chloroform of *Amaranthus spinosus* leaves. The phytochemical screening of the crude extract revealed the presence of flavonoids and saponins in aqueous and methanol and acetone, ethanol and chloroform extract remaining are absent whereas the Coumarins was absent in all the extracts. Alkaloids, carbohydrates and cardiac glycosides are present in all extracts. Phenols, Quinones and resins were present only in aqueous extract and remaining showed negative result. Amino acid and proteins are present in aqueous, methanol and ethanol and absent in acetone and chloroform. Tannins are present in aqueous and chloroform and remaining solvents showed negative result. Terpenoids present in acetone, chloroform, and methanol and absent in aqueous and ethanol.

Table 1: Preliminary phytochemical constituents of aqueous, acetone, ethanol, methanol and chloroform extracts of *Amaranthus spinosus*. leaves

Sr. No.	Phyto Constituents	Aqueous extract	Acetone extract	Chloroform extract	Methanol extract	Ethanol extract
1	Alkaloids	+++	+++	+++	+++	+++
2	Carbohydrates	+++	+++	+++	+++	+++
3	Cardiac glycosides	+++	+++	+++	+++	+++
4	Flavonoids	+++	---	---	+++	---
5	Phenol	+++	---	---	---	---
6	Aminoacids / Proteins	+++	---	---	+++	+++
7	Saponins	+++	---	---	+++	---
8	Tannins	+++	---	+++	---	---
9	Terpenoids	---	+++	+++	+++	---
10	Quinones	+++	---	---	---	---
11	Resins	+++	---	---	---	---
12	Coumarins	---	---	---	---	---

Positive +++, Negative ---

Conflicts of interest: The authors stated that no conflicts of interest.

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