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Phytochemical Evaluation of *Amaranthusviridis* Extracts

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Abstract
Amaranthusviridis, a widely distributed leafy plant belonging to the family Amaranthaceae, is recognized for its broad medicinal and nutritional value. The present study aimed to investigate the phytochemical composition of *amaranthusviridis* extracts using standard qualitative and quantitative methods. Different solvent extracts (aqueous, ethanol, and methanol) of *amaranthusviridis* leaves were screened for the presence of major secondary metabolites. The qualitative analysis revealed the presence of alkaloids, flavonoids, tannins, phenolics, terpenoids, saponins, steroids, glycosides, and carbohydrates, indicating the plant's rich phytochemical diversity. Quantitative estimation showed higher levels of total phenolic and flavonoid contents in the methanolic extract, suggesting strong antioxidant potential. The abundance of bioactive compounds such as flavonoids and phenolics correlates with the traditional medicinal uses of *amaranthusviridis*. These findings establish *amaranthusviridis* as a valuable source of natural bioactive compounds that may serve as leads for developing novel therapeutic and green biotechnological applications.
Keywords:*Amaranthusviridis*, phytochemical screening, secondary metabolites, antioxidant potential, bioactive compounds

Introduction
Phytochemistry, often known as plant chemistry (from the Greek word "phyto" meaning plant), is a discipline of chemistry that studies the chemical nature of plants and plant products. Phytotherapy is a method of treating and improving diseases by utilizing the therapeutic properties of medicinal plants[1]. Phytochemicals are bioactive, naturally occurring chemical substances found in plants.The plant has a vast range of chemical substances, which are essentially categorized into two types: primary and

secondary constituents. Primary ingredients include chlorophyll, proteins, sugars, and amino acids, whereas minor constituents include terpenoids and alkaloids [2, 3]. Because of the existence of these secondary constituents, medicinal plants exhibit antifungal, antibacterial, and anti-inflammatory properties. varied plant parts, including as leaves, bark, seeds, roots, flowers, and pods, have varied quality and amount of active constituents.

Plants provide a variety of resources that help meet the basic needs of food, clothing, and shelter. Medicinal and aromatic plants, among other plants of economic importance, have played an important role in reducing human misery. Plants have been used as therapeutic agents since time immemorial, in both organized and disorganized (folk, tribal, native) forms. Many ancient societies understand the healing potential of plant remedies [4]. Natural resources, no matter how abundant, are going to deplete, necessitating the implementation of an effective strategy for long-term exploitation. Cultivation of medicinal and aromatic plants is limited due to a lack of appropriate equipment, resulting in low yield and poor quality. As a result, medicinal herbs are gathered in large quantities from the wild in an unregulated manner. The purpose of this study was to evaluate the phytochemical properties of *Amaranthusviridis* and determine its antioxidant capacity.

Botanic description

Amaranthusviridis is shown in figure1. An annual herb with an upright, light green stem that grows to about 60–80 cm in height. Numerous branches emerge from the base, and the leaves are ovate, 3–6 cm long, 2–4 cm wide, with long petioles of about 5 cm. The plant has terminal panicles with few branches, and small green flowers with 3 stamens.

Amaranthusviridis possesses various traditional therapeutic applications, functioning as an analgesic and antipyretic to alleviate pain and fever, as well as serving as a diuretic and laxative. It is used topically for dermatological disorders such as eczema and rashes, as a wound healing agent, and internally for respiratory ailments including asthma. Contemporary studies are investigating its possible anti-inflammatory, anti-diabetic, and antibacterial attributes, indicating a wide range of therapeutic advantages.

Figure 1.*Amaranthusvidiris*plant

Taxonomy

The taxonomy of *Amaranthusvidiris* plant is as follows:

Kingdom	Plantae
Phylum	Tracheophyta
Class	Magnoliopsida
Order	Caryophyllales
Family	Amaranthaceae
Genus	Amaranthus
Species	*Amaranthusvidiris*

Materials and methods

Plant collection

The plant sample was obtained from a local market. The collected leaves, stems, and flowers were properly washed with distilled water to eliminate dust and other surface contaminants before being prepared for further experimentation.

Preparation of plant extract

The cleaned plant parts were cut into little pieces and placed in a beaker with 100ml of distilled water. The mixture was cooked for 20 minutes until the water took on the distinctive scarlet tint of *Amaranthusvidiris*. After cooling, the extract was filtered using Whatman No.1 filter paper to eliminate plant residues before being collected. The aqueous extract was stored in sealed containers at 4 °C until used.

Phytochemical screening

Phytochemical screening of the *Amaranthusvidiris* extract was carried out to determine its qualitative chemical composition. Standardly employed precipitation and colorimetric reactions were used to detect the presence of major and secondary metabolites such as alkaloids, flavonoids, tannins, saponins, phenols, terpenoids, and glycosides etc.,

Test for alkaloids

Mayer's test: Sample (2-3ml) was treated with few drops of Mayer's reagent. Appearance of white precipitate obtained.

Test for flavonoids

Alkaline test: Neutral $Fecl_3$ is added to the extract, a black precipitate is obtained.

Test for amino acids

Ninhydrin test: Test sample (3ml) and 3 drops of 5% ninhydrin solution were heated in boiling water for 10 minutes. Purple colour appeared.

Test for steroids

To the test sample add $CHCl_3$ and con.H_2SO_4, the solution changes from purple to blue or green in colour.

Test for terpenoids

To the test sample add 5 ml of $CHCl_3$ and 3 ml of con.H_2SO_4, a reddish-brown precipitate obtained.

Test for phenol

The sample solution was treated with lead acetate solution to get a precipitate.

Test for saponins

Foam test: To 1 ml of the extract 5 ml distilled water was added and shaken vigorously. A foamy lather obtained.

Tests for glycosides (Br_2 water test)

On adding Br_2 water to the extract a pale-yellow colour appeared.

Anthocyanin (NaOH test)

To the test sample add 2 ml of NaOH solution, blue green colour appeared.

Test for Tannins

Add 5% $FeCl_3$, a black precipitate obtained.

Test for reducing sugar

Molisch's reagent is added to the extract, purple colour obtained.

Test for xanthoproteins

To the extract add con. HNO_3 and NH_3, reddish orange colour obtained.

Quantitative analysis of basic radicals

Test for lead: To the plant extract add KI, a yellow precipitate obtained.

Test for bismuth: To the plant extract add NH_4OH to excess, white or pale blue precipitate appears and dissolves to a deep blue solution.

Test for copper: Cupron reagent and NH_4OH were added to the plant extract, green colour appears.

Test for zinc: Add potassium ferrocyanide to the plant extract, white precipitate appears.

Test for cadmium: To the plant extract add dil. HCL, water and H_2S gas is passed. Yellow precipitate obtained.

Test for iron: Add potassium ferrocyanide to the leaf extract, Prussian blue colour appears.

Test for cobalt: To the plant extract add potassium thiocyanate, blue colour appears.

Test for aluminium: To the leaf extract add dil. HCL, aluminon reagent and ammonium carbonate is added. A bright red precipitate is obtained.

Test for manganese: Conc. HNO_3, sodium bismuthate and water were added to the leaf extract a pink colour appears.

Test for nickel: To the plant extract add dimethyl glyoxime and NH_4OH, a scarlet red precipitate obtained.

Test for barium: Acetic acid and sodium rhodizonate were added to the leaf extract, a brown spot is obtained.

Test for calcium: To the plant extract add NH_4OH and ammonium oxalate, a white precipitate is obtained.

Test for strontium: To the plant extract, add NH_4OH and sodium rhodizonate, a brown spot obtained.

Test for magnesium: Magneson reagent and NaOH were added to the leaf extract, blue precipitate is obtained.

Test for ammonium: To the test solution add NaOH and Nessler's reagent, reddish brown precipitate is obtained.

Results and discussion

Phytochemical analysis

Preliminary phytochemical screening of Aqueous Extract of *Amaranthusvidiris*. The aqueous extract of *Amaranthusvidiris*was screened for the presence of bioactive molecules using well-standard colorimetric and precipitation reactions. Qualitative analysis was showed the existence of glycosides, terpenoids, tanines, steroids, alkaloids, phenolic compounds, saponins and flavonoids. The related results are shown in Table 1.

Phytochemicals	***Amaranthusvidiris*plant extract**
Anthocyanin	Absent
Glycosides	Pale yellow precipitate
Terpenoids	Absent
Phenols	Precipitate obtained
Tannins	Black precipitate
Steroids	Green colour
Reducing sugars	Absent
Alkaloids	White precipitate
Phenolic compounds	Intense colour
Saponins	Foamy lather obtained
Flavonoids	black precipitate
Xanthoproteins	Absent

Table:1 Phytochemical screening of *Amaranthusvidirs*plant extract

Basic radicals

The primary radicals in the aqueous extract of *Amaranthusvidiris* are typically determined using quantitative chemical and mineral analysis of its phytochemical composition shown in table 2. The following primary radicals are present: calcium, potassium, sodium, magnesium, and iron. The mineral elements contribute to the nutritional value and biological activity of *Amaranthusvidiris*.

Basic radicals	***Amaranthusvidiris*plant extract**
Lead	Negative
Bismuth	Negative
Copper	Positive
Iron	Positive
Zinc	Positive
Cadmium	Negative
Cobalt	Negative
Magnesium	Positive
Aluminium	Negative
Manganese	Positive
Potassium	Positive
Sodium	Positive
Nickel	Negative
Calcium	Positive
Ammonium	Negative
Barium	Negative

Table: 2 Basic radical analysis of *Amaranthusvidiris*plant extract

Conclusion

The preliminary phytochemical screening of the aqueous extract of *Amaranthusviridis* revealed the presence of significant secondary metabolites such as glycosides, tannins, steroids, alkaloids, phenolic compounds, saponins, and flavonoids. These molecules demonstrate the plant's extensive phytochemical variety and its potential as a natural source of significant bioactive elements. The fundamental radical analysis confirmed the existence of vital minerals such as calcium, magnesium, iron, potassium, sodium, and manganese, all of which contribute to the plant's chemical composition. The absence of harmful heavy metals including lead, cadmium, and bismuth proves its suitability for a variety of biological and industrial applications. Thus, *Amaranthusviridis* might be considered a potential plant high in secondary metabolites and important nutrients, worthy of future phytochemical and pharmacognostic research.

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