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Research Article

# EVALUATION OF PHYSICOCHEMICAL & PHYTOCHEMICAL PARAMETERS OF *AMARANTHUS CAUDATUS* LEAVES

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**ABSTRACT**
The present study was carried out to provide physicochemical and phytochemical detail about the plant *Amaranthus caudatus*. The physicochemical results obtained can be used for the identification of the powdered drugs. In the phytochemical screening different type of extracts were prepared to find the presence of secondary metabolites. The results revealed the presence of carbohydrates, glycosides, saponins, proteins, amino acids, tannins, and phenolic compounds in the plant. *Amaranthus caudatus* belongs to the family Amaranthaceae .The Amaranthus plants are spread throughout the world, growing under a wide range of climatic conditions and they are able to produce grains and leaves edible vegetables. Traditionally it has been used nutritionally for infants, children, pregnant and lactating woman, as it is comparable to the properties of milk; it was also used in countering heavy menstrual bleeding and vaginal discharge. It helps control dysentery and diarrhea. The roots were used to cure kidney stones, leaves used to cure cuts, leprosy, boils, burns, fever and decoction of the stem used in jaundice. The plant has cooling effect, laxative, diuretic, stomachic and antipyretic, anti-diarrheal, anti-hemorrhagic. The leaves, roots, bark, stem, seeds have medicinal value.
**KEYWORDS:** Physicochemical, Phytochemical, *Amaranthus caudatus*, Leaves , Extract

## INTRODUCTION

Natural products have been our single most successful source of medicines. Each plant is like a chemical factory capable of synthesizing unlimited number of highly complex and unusual chemical substances. Over 50% of the best-selling pharmaceuticals in use today are derived from natural products[1].WHO has been promoting traditional medicines as a source of less expensive, comprehensive medical care, especially in developing countries. Eighty percent of the world's population relies on medicinal plants for their primary health care[2]. Such herbal medicines are easily available, cheaper, time tested and considered safer than some of modern synthetic drugs. Recently WHO introduced guidelines on research and evaluation of traditional medicine and practice. This guideline has a major objective of developing traditional medicine leads into standardized and scientifically validated drugs, it aims to ensure quality and safety of botanicals before being evaluated for its efficacy[3].

*Amaranthus caudatus* belongs to the family Amaranthaceae. The Amaranthaceae family consists of hardy, weedy, herbaceous, fast-growing, cereal-like plants[4]. *Amaranthus caudatus* is used as anti-diarrheal, anti-hemorrhagic, astringent, emmenagogue, nutritive, tonic, galactogogue, diuretic. *Amaranthus caudatus* is also used as anthelmintic and the mild flavored leaves are rich in vitamins and minerals[5-6].It is used as vegetable for enriching iron deficiency[7].

## MATERIALS & METHODS

### Plant Material Collection

The plant material were collected from local market, Bangalore and authenticated by Mr Rajanna, Professor(curator),Botanical garden and Herbarium, Department of forestry and environmental science, University of Agricultural sciences, GKVK, Bangalore. The leaves were shade dried, powdered and stored in air tight containers for further use.

### Extraction of plant drug

The powdered plant material was subjected to hot continuous extraction in a soxhlet apparatus. The powdered plant drug was successively extracted with petroleum ether, chloroform, acetone, methanol and water as solvent. The liquid extracts were collected in a tarred conical flask. The solvent was removed by distillation. Last traces of solvent being removed under vacuum. The extracts, obtained with each solvent, were weighed to a constant weight and percentage of yield (w/w) was calculated.

### Phytochemical screening[8]

Phytochemical screening was done to investigate the plant material in terms of its active constituents. In order to detect the various constituents present in the different extracts of *Amaranthus caudatus* leaves, these were subjected to the qualitative test analysis using standard methods.

### Physicochemical parameters[9]

The powder of *Amaranthus caudatus* leaves was subjected to evaluate its total ash, acid insoluble ash, water soluble extractive value, alcohol soluble extractive value and moisture content. Each determination was carried out three times and the average value was taken. Each result is reported in table form.

### Ash Values

Total ash value was found by incinerating at temperature 450°C until freed from carbon and then cooled. The weight of total ash was taken and the percentage of it was calculated with reference to the air dried drug.

### Water soluble ash

The total ash obtained was boiled with water and the insoluble matter was collected on ash less filter paper, washed with hot water and ignited. The difference in weight represents the water soluble ash. The percentage of water soluble ash was calculated with reference to the air dried drug.

### Acid insoluble ash

The total ash obtained was boiled with 2N hydrochloric acid, filtered and the insoluble matter was collected on ash less filter paper. It was washed with hot water, ignited in tarred crucible, cooled and the residue obtained was weighed and the percentage of acid insoluble ash was calculated with reference to the air dried drug.

**Alcohol soluble extractive value**

Coarsely powdered leaves were macerated with alcohol in a closed flask, it was filtered rapidly and precautions were taken against loss of alcohol. 25ml of the filtrate was evaporated to dryness, dried at 105°C and weighed. The percentage of alcohol soluble extracts were calculated with reference to the air dried drug.

**Water soluble extractive value**

Coarsely powdered leaves was macerated with chloroform water (2.5ml chloroform in 1000ml water) in a closed flask it was filtered , and filtrate was evaporated to dryness at 105°C and weighed. The percentage of water soluble extractive value was calculated with reference to the air dried drug.

**Moisture content**

Known weight of the powdered leaves was taken and dried in oven for 30 minutes, cooled and the percentage of moisture content was then calculated with reference to the air dried drug.

## RESULTS

**Extractive values**

Extractive values obtained from *Amaranthus caudatus* leaves using different solvents were recorded in table 1.

**Phytochemical screening**

The results of phytochemical screening of different extracts of leaves were reported in table 2. From this analysis, methanolic and aqueous extract is found to have more constituents compared to other extracts.

**Physicochemical parameters**

The results of physicochemical parameters of leaves were reported in table 3.

## DISCUSSION

Preliminary phytochemical screening revealed the presence of carbohydrates, glycosides, saponins, proteins, amino acids, tannins, and phenolic compounds in different extracts of *Amaranthus caudatus* leaves. These results show that the plant has a number of chemical constituents, which may be responsible for the many pharmacological actions. The physico-chemical evaluation of drugs is an important parameter in detecting adulteration or improper handling of drugs. Moisture content of drugs could be at minimal level to avoid microbial growth during storage. Ash values are used to determine quality and purity of crude drug. It indicates the presence of various impurities like carbonate, oxalate and silicate. The presence of silicates and the earthy materials is indicated in acid insoluble ash and the inorganic elements present in the drug is indicated in water soluble ash value present in drugs. Extractive values determined which are primarily useful for the determination of exhausted or adulterated drugs. Physico-chemical parameter can serve as a valuable source of information and provide appropriate standards to establish the quality of this plant material in future study or application.

## CONCLUSION

The present work was carried out to show the phytoconstituents and provide the physical parameters which could be useful to detect the adulteration or improper handling of this plant material.

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**Table 1: Colour, nature and percentage yield of the extracts obtained from *Amaranthus caudatus* leaves using different solvents**

| Extracts | Colour | Consistency | Weight (g) | %Yield (w/w) |
|---|---|---|---|---|
| Petroleum ether | Blackish Green | Resinous and sticky | 2.87 | 3.58 |
| Chloroform | Blackish brown | Semisolid and non- sticky | 2.51 | 3.13 |
| Acetone | Dark Brown | Semisolid and non- sticky | 2.44 | 3.05 |
| Methanol | Brownish Black | Semisolid and sticky | 3.28 | 4.1 |
| Water(Aqueous) | Black | Semisolid and non- sticky | 6.79 | 8.48 |

**Table 2: Preliminary phytochemical screening of various extracts of *Amaranthus caudatus* leaves**

| Phytoconstituents | Petroleum ether | Chloroform | Acetone | Methanol | Aqueous |
|---|---|---|---|---|---|
| Alkaloids | - | - | - | - | - |
| Glycosides | - | + | + | + | + |
| Saponins | + | + | + | + | + |
| Phytosterols | - | - | - | - | - |
| Phenolics and tannins | - | - | - | + | + |
| Carbohydrates | - | - | - | + | + |
| Proteins and amino acids | - | - | - | + | + |

**(+)** Signifies present **(-)** Signifies absent

**Table 3: Physicochemical parameters of *Amaranthus caudatus* leaves**

| Physical Parameters | Values (in %w/w) |
|---|---|
| Total ash value | 5.02 |
| Water soluble ash value | 3.92 |
| Acid insoluble ash value | 1.39 |
| Alcohol soluble extractive value | 3.51 |
| Water soluble extractive value | 7.59 |
| Moisture content | 4.97 |

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