

Phytochemical Studies Various Extract of *Amaranthus Tricolor* (Linn.)

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Article Info: Received: 22-08-2023 / Revised: 09-09-2023 / Accepted: 14-10-2023

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Conflict of interest statement: No conflict of interest

Abstract

Amaranthus tricolour Linn., a member of the Amaranthaceae family, is renowned for its medicinal properties in treating several conditions including cough, throat infections, toothache, eczema, piles, diarrhoea, gonorrhoea, leucorrhoea, and impotence. The current research focuses on the pharmacognostic assessment, which involves the investigation of morphological and microscopic characteristics, ash values, powder analysis, extractive values, moisture content, and fluorescence analysis. Additionally, a preliminary analysis of the plant's chemical compounds was conducted. The root's transverse slice revealed the existence of cork cells, cortex, fibres, xylem, and phloem. The percentages of total ash, acid insoluble ash, water soluble ash, ethanol soluble extractive, and water soluble extractive were 12.8%, 6.89%, 5.0%, 7.6%, and 20.0% w/w, respectively. The phytochemical screening revealed the existence of alkaloids, flavonoids, glycosides, tannins, proteins, and amino acids. This research aids in the establishment of standardised characteristics for the plant, facilitating the botanical identification of *Amaranthus tricolour* Linn..

Introduction

Herbal medications are crucial in healthcare programmes, particularly in underdeveloped nations. Ancient literature provides a comprehensive and expansive concept of medicinal plants, recognising that all sections of the plant have the potential to contain therapeutic compounds [1]. It is well-documented that 80% of the global population places trust in traditional medicines, namely plant-based pharmaceuticals, for their main healthcare needs. [2]. The primary obstacle to the acceptability of herbal medications is the absence of proper documentation and quality control measures. It is crucial to prioritise the standardisation of plant material utilised for medicinal purposes.

Amaranthus tricolour Linn., a member of the Amaranthaceae family, is widely referred to as Lal Chaulai or Joseph's coat. It is recognised to

have significant therapeutic properties according to traditional medicine. The plant is a perennial herb that reaches a height of 60-120 cm. It roots at nodes and branches above the central part. The plant has thin branches that are not spiky and frequently have a purple colour. These branches are grooved, striated, and smooth. The species is distributed in Benin, Nigeria, Kenya, Tanzania, Southern Africa, and throughout India.

From an ethnobotanical perspective, the plant is used as a blood cleanser and tonic for conditions such as dropsy. It is also used as an ascaricide and for alleviating toothaches, sore throats, coughs, and bronchitis. The roots, leaves, and stems of the plant are consumed to alleviate symptoms of bilious diseases and act as a natural laxative. The roots and seeds are used for treating leucorrhoea, impotence, colic,

gonorrhoea, and eczema. Additionally, they possess galactagogue effects. The infusion of *Cucurbita pepo* Linn. roots is used to manage post-abortion haemorrhages.[3]

Roots are regarded as demulcent and are used in the form of a decoction to treat piles and diarrhoea in children aged [4]. The plant has antioxidant, hepatoprotective, antiviral, and antiproliferative activities.[4-7]. The plant underwent screening to detect the presence of several phytochemicals, and the results indicated the presence of carbohydrates, namely free sugars, glucose, and starch. The sample contains flavonoids, including betacyanins A and B, amaranthin, isoamaranthin, and quercetin. [8-10] Several proteins and amino acids such as proline, cysteine, tryptophan, leucine, glutamic acid, arginine, lysine, histidine, methionine, phenylalanine, isoleucine, tyrosine, threonine, and valine. The following compounds are steroids (spinasterol, cholesterol, campesterol, 24-methylene cholesterol, stigma sterol, β -sitosterol, fucosterol, and isofucosterol). The compounds mentioned include, and fatty acids, namely palmitic, linoleic, lignoceric, and archidic acid.[3,9-13]

According to the literature review and scientific data, many indigenous pharmaceuticals have been studied in terms of their botany and chemistry. However, there is still a lack of systematic standardisation, including the research of Pharmacognostical and Physico-chemical properties, specifically for the roots. The current study on *Amaranthus tricolor* Linn. aims to assess certain botanical and chemical criteria that might aid in identifying the crude medicine and detecting any potential adulteration. Additionally, doing this research

will significantly contribute to the quality assurance of the final product of herbal pharmaceuticals.[14]

MATERIALS AND METHODS:

Plant Material Collection and Authentication: *Amaranthus tricolor* Linn. roots were gathered from the farms in Alwar district. The plant was verified by a botanist, and a sample was sent to the department of Pharmacognosy and Phytochemistry at Sunrise University.

Preparation of Extracts: The obtained sample underwent a complete washing, drying, and serial extraction with several solvents, including petroleum ether, chloroform, ethyl acetate, and ethanol, in order to get the corresponding extracts. Each extract was filtered separately, then dried using the rotary evaporator and weighed. The percentage yields were computed, and the colour and consistency of the extracts were inspected.

Physicochemical Parameters and Phytochemical Evaluation: Among its physicochemical properties were the moisture content, total ash, water soluble ash, acid insoluble ash, alcohol, and water soluble extractive values. [13, 16.] Using conventional protocols, phytochemical analysis was performed on petroleum ether, chloroform, ethyl acetate, and ethanol extracts to determine the presence of different secondary phytoconstituents. [17, 18, 19]. Using n-butanol, glacial acetic acid, and water (4:1:5) as the solvent system and ninhydrin solution (0.2%w/w) as the spray reagent, amino acids were examined using paper chromatography[20].

RESULTS AND DISCUSSION:

Table 1: percentage yield, color and the consistency and fluorescence nature of the successive extracts of roots of *amaranthus tricolor* linn.

Solvent used	% yield (% w/w)	Consistency of extracts	Color of extract		
			Under Visible Light	Under Short Wavelength	Under Long Wavelength
Petroleum Ether	0.45%	Sticky Semisolid	Yellowish brown	Green	Brown
Chloroform	0.96%	Solid	Reddish brown	Greenish brown	Black
Ethyl-acetate	0.64%	Semisolid	Reddish brown	Reddish brown	Brownish black
Ethanol	8.21%	Sticky Semisolid	Reddish brown	Brown	Black

Table 2: fluorescence analysis of powder of roots of *amaranthus tricolor* linn. With various chemical reagents

Powder + Reagent	Visible light	U.V. Light	
		Short Wavelength	Long wavelength
Powder as such	Yellowish brown	Light brown	Brown
Powder + 1N NaOH in Methanol	Light brown	Light brown	Yellowish brown
Powder + 1N NaOH	Brown	Dark Brown	Black
Powder + 1N HCL	Brown	Yellowish brown	Dark Brown
Powder + 50% HCL	Brown	Brown	Black
Powder + 50% HNO ₃	Brown	Dark Brown	Black
Powder + 50% H ₂ SO ₄	Brown	Dark Brown	Black

Physicochemical Parameters and Phytochemical Evaluation: Physicochemical characteristics are used to verify the purity and quality of drugs and are crucial in identifying instances of adulteration. Ash levels are a particularly significant metric since they indicate whether or not foreign materials, such as silica or metallic salts, are present. Proteins,

amino acids, glycosides, tannins, alkaloids, and flavonoids were detected by phytochemical screening. The majority of the phytoconstituents were likewise present in the ethanolic extract. The outcomes are shown in Tables 3 and 4. Paper chromatography analysis of the amino acids revealed the presence of DL-alanine and DL-iso-leucine.

Table 3: physicochemical parameters of roots of *amaranthus tricolor* linn

Physicochemical Parameters	Results (% w/w)
Total ash	12.8
Acid-insoluble ash	6.89
Water-soluble ash	5
Loss on drying	6.7
Ethanol soluble extractive Value	7.6
Water soluble extractive Value	20
Foaming Index	More than 1000

Table 4: preliminary phytochemical screening of roots of *amaranthus tricolor* linn.

Tests for constituents	Petroleum-ether extract	Chloroform extract	Ethyl-acetate extract	Ethanol extract
Alkaloids	-	+ve	-	+ve
Carbohydrates	-	-	+ve	+ve
Flavonoids	-	+ve	+ve	+ve
Tannins and Phenolic compounds	-	-	-	+ve
Amino-acids	-	-	-	+ve
Proteins	-	-	-	+ve
Gums		-	-	-
Mucilages	-	-	-	-
Steroids	-	-	-	-
Glycosides	-	-	+ve	-
Saponins	-	-	-	+ve
Fats and fixed oils	+ve	-	-	-

CONCLUSION:

It is determined that the aforementioned characteristics are very helpful in identifying and verifying the species. The current study's findings will also be beneficial for the creation of a monograph.

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