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Pharmacognostic and preliminary phytochemical profile of *Cynanchum sarcomedium* Meve & Liede

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Abstract

Cynanchum sarcomedium Meve & Liede is a xerophytic plant belonging to family, Apocynaceae. Pharmacognostic profile is essential to ensure the purity and quality of the plant from adulterants. The present study draws a preliminary insight to the pharmacognostic and phytochemical evaluation of an important medicinal shrub, *Cynanchum sarcomedium* Meve & Liede. Standard procedures were followed for pharmacognostic and phytochemical evaluation. Anatomical and powder studies revealed the presence of inclusions, laticiferous tubules (LT), fibres, stone cells (ST) etc. Higher extractive value was found with water than using alcohol (10.3%). Phytochemical constituents like alkaloids, terpenoids, tannins etc. were screened in aqueous plant extract and they may have supported the medicinal properties of the plant. The present pharmacognostic and preliminary phytochemical evaluation helps in the standardization and quality assurance of the promising medicinal plant *Cynanchum sarcomedium*.

Keywords: *Cynanchum sarcomedium*, pharmacognostic evaluation, powder analysis, phytochemical screening.

1. Introduction

Nowadays, current ayurvedic market scenario experiences a great paradigm shift towards the use of herbal products in modern system of medicine; this increasing popularity in herbal products has opened up new dimensions in the area of natural products for the greater demand in international market. Plants and their derived products are always an exemplary source of drugs to treat various diseases. Adulteration and substitution are a major concern which may result into inconsistent quality, poor efficacy and safety of drugs. Hence, quality has to be assured at all stages – herbal raw materials collection, processing and finished herbal medicines^[1]. So, it is a mandatory practice to standardize the plant materials along with their efficacy evaluation. Herbal drugs play a key role in healthcare programmes. However, the key obstacle is the hindrance in the acceptance of these drugs due to the lack of documentation. With this backdrop, it becomes important to make an effort towards the standardization of the plant material to be used as a medicine.

Sarcostemma R. Br. commonly known as moon plant (Apocynaceae) and considered by some as the “soma” mentioned in the Veda. It is a perennial leafless, jointed trailing shrub with green, cylindrical, fleshy glabrous, twining branches having milky white latex. The plant is bitter, acrid, cooling, alternate, narcotic, emetic, antiviral and rejuvenating. Molecular analyses have demonstrated that as *Sarcostemma* is deeply nested in the predominantly Madagascan stem-succulent clade of *Cynanchum* L. Hence the genus has been treated as a synonym of *Cynanchum*. Some of the former *Sarcostemma* species have been transferred to *Cynanchum* in the course of various Flora treatments, and some new species belonging to this group have been described under *Cynanchum*^[2].

Here, an attempt was done to carry out the preliminary pharmacognostic standardization and phytochemical screening of *Cynanchum sarcomedium* Meve & Liede that may partly contribute to lay down their monograph.

Materials and Methods

Plant material

Cynanchum sarcomedium Meve & Liede was collected from Wayanad, Kerala, India (Coordinates: 11.605 °N 76.083 °E). The specimen was authenticated and the voucher specimen (CALI No. 123741) was deposited at Herbarium of Department of Botany, University of Calicut, Kerala, India.

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Extraction and sample preparation

Extraction of the plant material was done in water using soxhlet apparatus for 6 h. Extracts were filtered, evaporated to dryness and stored at 4 °C for further use.

Pharmacognostic studies

Macroscopic studies

Morphological studies were done using a stereo microscope.

Organoleptic screening

The organoleptic characters such as colour, odour and taste of the plant material were determined.

Microscopy

Freehand sections were used for the anatomical studies. These sections were stained with safranin, mounted in glycerin and observed under the 40X objective of the light microscope.

Powder analysis

The dried leaves and stems were powdered and sieved to obtain a coarse powder. The powder thus obtained was analysed under bright field microscope for powder characteristics like inclusions and other detailed anatomical characters. Examination of the powder was carried out using the method [3] with slight modifications.

Physico-chemical parameters

Physico-chemical constants like total ash value, water soluble extractive value, alcohol soluble extractive value and loss on drying were determined.

Total ash value

About 3 g each of powdered parts were accurately weighed and taken separately in silica crucible, which was previously ignited and weighed. The powder was spread as a fine layer on the bottom of the crucible. The powder was incinerated gradually by increasing temperature to make it dull red hot until free from carbon. The crucible was cooled and weighed. The procedure was repeated to get constant weight. The percentage of total ash was calculated with reference to the air-dried powder [4].

Extractive value determination

Coarsely powdered air-dried material (4 g) was placed in a glass-stoppered conical flask and macerated with 100 ml of solvents (water and ethanol) separately shaken frequently, and then allowing it to stand for 18 hours. It was rapidly filtered through Whatman No. 1 filter paper, taking care not to lose any solvent. Twenty-five ml filtrate was filtered to flat-bottom dish and evaporated solvent on a water bath. Dried at 105 °C for 6 hours, cooled in a desiccator for 30 minutes and weighed it immediately. The content of extractable matter in percentage of air-dried material was calculated [5].

Phytochemical screening

Aqueous extracts were subjected to phytochemical analysis for the presence of various secondary phytoconstituents using standard chemical tests [6, 7].

Results and Discussion

Thick cuticle, the presence of stone cells, numerous anomocytic stomata, pith region containing LT *etc.*, express

the xerophytic nature of the plant (fig.1). Powder study of the plant material revealed phloem fibres, vessels with spiral thickening, LT, ST (fig. 2). Physicochemical parameters are important in detecting adulteration and are adopted to confirm the purity and quality of the drug (table 1). s

Ash value is a particularly important parameter as it shows the presence and absence of foreign matters like metallic salts or silica *etc.*, which estimates the total amount of material that remains after ignition and the amount of heavy metals and inorganic compounds and it includes both the "Physiological and non-physiological" ash, which is the remainder of the extraneous matter that adheres to the plant surface. The estimation of the residue left upon combustion is of great practical value for the medicinal drugs. For, every portion of the plant furnishes an amount of ash which fluctuates with in definite and often narrow limits. The weight of the same may therefore afford information whether an adulteration with other vegetable or inorganic materials has taken place. In the present study, the total ash value was found to be 6.2% (table 1). Extractive values of the plant with different solvents give a preliminary idea of the percentage of the compounds extracted. Water and alcohol yielded 10.3 and 5.7% extractive (table 1), among these water is more efficient to extract most of the phytoconstituents from the plant. The aqueous extract is the common and effective method for most of the medicinal plant based preparations of drugs [8, 9].

Preliminary qualitative phytochemical studies of plants are an integral part of pharmacognosy (table 2). It gives a preliminary insight into various compounds present in a plant, based on which further study towards the biological activities of the compounds can be tracked. Also, the study yields information on the purity of the drug as well as the genuineness of the drug. The presence of alkaloids, phenols, terpenoids, flavonoids *etc.*, plays a vital role in defense mechanisms and various bioactivities like antioxidant and antimicrobial activities [10].

Table 1: Physico-chemical parameters of *Cynanchum sarcomedium*

Physico-chemical parameter	Mean (% w/w)
Total Ash Value	6.2±0.02
Water soluble extractive	10.3±0.04
Alcohol soluble extractive	5.7±0.0.87
Moisture content	6.4±0.043

Table 2: Phytochemical constituents of *Cynanchum sarcomedium*

Phytochemical component	Aqueous extract
Alkaloids	++
Carbohydrates	++
Glycosides	+++
Protein & amino acids	+++
Sterols	-
Fixed oil & fats	-
Phenolics	++
Terpenoids	+++
Saponins	-
Flavones & flavonones	++
Phlobatannins	-
Tannins	-
Anthraquinone	-
Gums & mucilage	+

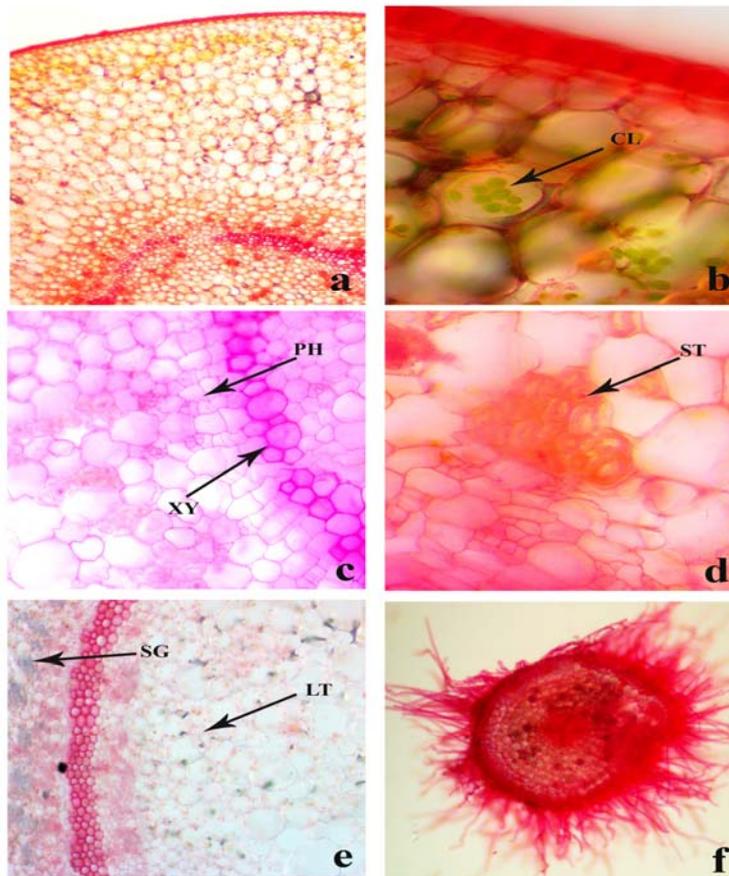


Fig 1: Anatomical characteristics of *Cynanchum sarcomedium*: a-e: A portion of TS of the stem; f: TS of the root. CL– chloroplast, XY- xylem, PH- phloem, ST- Stone cells, SG- starch grains and LT- laticiferous tubules.

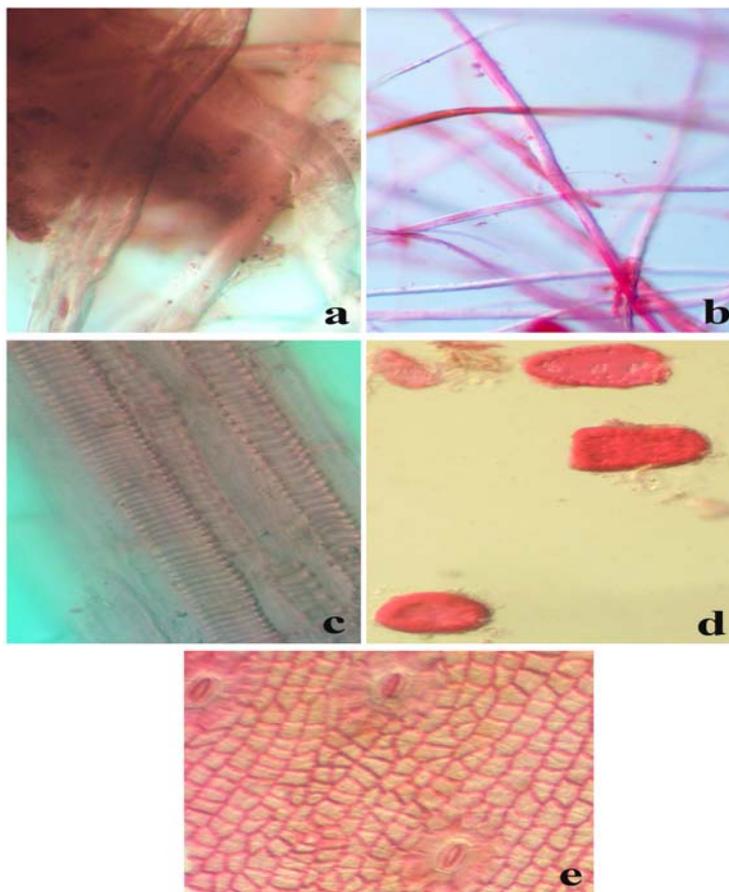


Fig 2: Powder characteristics of *Cynanchum sarcomedium*: a- laticiferous tubules; b- phloem fibres; c- vessels with spiral thickening; d- stone cells; e- anomocytic stomata.

Conclusions

The present study on the pharmacognostic standardization and evaluation of the *C. sarcomedium* which might be useful to supplement information with regard to its identification parameters, which are assumed significant for the acceptability of herbal drugs in the current ayurvedic market scenario that lacks regulatory laws to assure the quality of herbal drugs. Pharmacognostic and phytochemical constituent screening is a preliminary step to establish a quality profile of shrubs through standardization of quality parameters and thereby establishing the safety profile along with ensuring the authenticity of the plant.

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Conflict of Interests

No conflict of interest declared.

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