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## *Sarcostemma acidum* : An Overview



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### **ABSTRACT**

Nowadays traditional system of medicine plays a significant role in health care system of the population. Medicines obtained from plant species are widely accepted by most of the population because of their Great efficacy, low cost and little or no side effects. The present paper provides the Pharmacognostical and Pharmacological review of one of the Indian traditional medicinal plant *Sarcostemma acidum* (roxb) voigt belongs to the family Asclepiadaceae, commonly known as somalata. There was an extensive literature about ethnopharmacological uses of the plant and studies carried out to provide pharmacognostic details and phytochemical evaluation of the somalata plant. Similarly, the studies which also elaborates about morphology, chemical composition of the same plant. Likely the ethyl acetate extract of *Sarcostemma acidum* gives its better effect on Psycho Pharmacological Activity and it also be considered as a CNS inhibitory activity. Moreover, the study recommends more and more research on this plant to investigate its various medicinal properties.

## INTRODUCTION

When there is a healthy Brain, then there will be a Healthy Society. What really interested me was human intelligence and still inventing knowledge about Natural Medical Science. By the way, the Traditional Plant (soma) was identified as Medicinal Plant *Sarcostemma acidum* (somalata). A mythological belief was that the plant was used to prepare Som-ras, a rejuvenating drink. Generally, the plant was grown in dry and semi-dried rocky places with low rainfall, shade and moisture conditions. It is widely distributed in various parts of India. Also found in Pakistan, Europe and dry rocky places of Bihar, Bengal, Tamil Nadu, Madhya Pradesh, Maharashtra and Kerala.<sup>[1,2]</sup>

## PLANT PROFILE<sup>[3,4]</sup>

*Sarcostemma acidum* (Roxb.) Voigt

<b>Kingdom</b>	Plantae
<b>Order</b>	Asterids
<b>Family</b>	<i>Asclepidaceae</i>
<b>Genus</b>	<i>Sarcostemma</i>
<b>Species</b>	S.acidum

Synonyms: *Asclepiasacida* Roxb., *Cynanchum acidum* (Roxb.) Oken, *Sarcostemma brevistigma* Wight & Arn.

Vernacular name:

English : Moon Plant, Moon Creeper

Hindi : Soma, Somlata

Sanskrit : Soma, Somalata, Somavalli

Bengal : Kula Thar, Soma, Somlatha

Gujarati : Somvel

Kannada : Hambu Bali, Hambukkalli, Soma balli, Somalate, Somalatha, Vasukaanthi

Malayalam	: Somam, Somavalli, Vayastha
Marathi	: Ransher, Somvel
Oriya	: Borohwi, Notasiju, Somolata
Tamil	: Kodikkalli, Somamum
Telugu	: DustappaTiga, Kaadujemmudu, Kondapaala, Padmakaashtamu, Somalatha.

### ETHNOMEDICINAL USES

Due to the unique medicinal properties and easy availability, the plant *Sarcostemma acidum* has been used by Ethnic communities in India. The Ethnic communities are Rural tribes, Irula tribes, Yanadi tribes, Yerukala tribes, Koyas tribes, Paliyan tribes, Paderu tribes, local community, Chenchus tribes, Kani tribes, Kadugolla tribes, etc. There are 40 different types of ailments were treated using this plant by these communities.<sup>[1]</sup>

### TRADITIONAL USES IN DIFFERENT AREAS OF INDIA <sup>[5]</sup>

- Latex is applied in wounds and cuts in Bidhar District of Karnataka. <sup>[6]</sup>
- Three drops with honey thrice a day for chronic ulcer in Andhra Pradesh, Sirumalai Hills.<sup>[7]</sup>
- Milky latex is prescribed to lactating mother in Puriliya District of West Bengal. <sup>[8]</sup>
- The stem is used to cure bone fracture in Madhya Pradesh.<sup>[9]</sup>
- Stem juice mixed with water is given in arthirits and joint pain in Nemar region of Madhya Pradesh.<sup>[10]</sup>
- Stem juice is used as Ear drops during ear ache.<sup>[11]</sup>
- Roots in snake bite and taken as infusion in dog bite.<sup>[12]</sup>
- Used as eye drops in Nallamala forest of Andhra Pradesh.<sup>[13]</sup>
- Water solution of pulpy mesocarp given as nasal drops in Epilepsy in cuddadapah District in Andhra Pradesh. <sup>[14]</sup>

According to the survey, the percentage of parts of the plant used by these communities are listed below.<sup>[1]</sup>

29%- Whole plant

15% - Stem

24% - Latex

10% - Roots

17% - Leaves

5% - Flowers

Therefore, the ethnomedicinal knowledge about the plant was helpful in drug discovery and development of health care system for poor and rural people and gaining knowledge about the curative application of the plant. Also used for further scientific studies.

#### **MORPHOLOGY AND CHEMICAL COMPOSITION**

A plant with perennial leafless, fleshy, glabrous, jointed shrub with green colour, milky white latex, length 2 to 4 meter and diameter 0.5 to 1cm, cylindrical shape, twinning branches (see in figure 1). The flowers white or pale greenish white with fragrant odour between July to February, taste bitter, root is brownish in colour.

There are 5 sepals, petals and stamens each and 2 ovaries. Androecium and Gynoecium are joined together with 5 stigma and bears fruits with flat and ovate seeds.<sup>[15,16,17]</sup>



**Fig 1: *Sarcostemma acidum*.**

## Chemical composition

1. The plant *Sarcostemma acidum* in warm places contains sucrose, malic acid, succinic acid, alkaloids, phytosterols, tannins, alpha and beta amyryns, beta sitosterol.<sup>[18,19]</sup>
2. Powdered leaves of *Sarcostemma acidum* contains alkaloids, phenolics, triterpenes, tannins, flavonoids, saponins and carbohydrates.<sup>[20]</sup>
3. The plant extract of *Sarcostemma acidum* contains carbohydrates and glycosides, alkaloids, tannins, flavonoids, proteins and free amino acids, steroids and triterpenoids, fixed oils and fats, mucilages, gums and waxes.<sup>[21]</sup>
4. The plant *Sarcostemma acidum* stem decoction contains sucrose, terpenes, phytosterol and saponins.<sup>[17]</sup>
5. The plant *Sarcostemma acidum* of Chinese origin contains sacidumlignan-A, B, C and D, degraded derivatives of lignans such as sacidumol-A, B, perforatic acid, pinoresinol, 9 alpha hydroxyl pinoresinol, peucinin and 7 o methyl ether.<sup>[22]</sup>
6. Ethanol extract of *Sarcostemma acidum* contains reducing and non reducing sugar.<sup>[17]</sup>
7. Chloroform extract of *Sarcostemma acidum* contains steroids and triterpinoids.<sup>[17]</sup>
8. Aqueous fraction of ethanol extract of *Sarcostemma acidum* contains sarcidumitol.<sup>[23]</sup>
9. Dried flower of *Sarcostemma acidum* contains rare flavanol glycoside.<sup>[24]</sup>
10. Methanol solvent of *Sarcostemma acidum* shows fatty acids, carotenoids, tannins, saponins, coumarins and anthracene glycosides.<sup>[25]</sup>
11. Hexane extract of *Sarcostemma acidum* contains alkaloids, steroids, carotenoids, tannins and anthrocyanins.<sup>[25]</sup>

## PHARMACOGNISTIC DETAILS

Usually, the pharmacognistic details are used for standardization of the crude drug. It deals with Macroscopic, Microscopic and various Physiochemical properties.

Macroscopic characters are also known as morphological characters.

Microscopic parameters of *Sarcostemma acidum* are outer layer, cortex and vascular bundles-epidermis, collenchymal cells without intracellular space and endodermis cells seen in cortex and vascular bundles. Cambium cells are seen in xylem and phloem tissues. Medullary rays and pith were found in central part of the stem. Anomocytic or ranunculous stomata were seen in L.S of bark. Two guard cells and five subsidiary cells were seen. [5]

Physiochemical properties of *Sarcostemma acidum* are moisture content, ash value, total ash-acid insoluble-3.06% and water soluble-4.09%, Extractive values-alcohol soluble, water soluble-11.9%, ether soluble, ethanol soluble-6.0%, methanol soluble-5.9%, petroleum ether soluble-5.0% and ethyl acetate soluble extractive-6.2%. [26]

These pharmacognostic studies are performed as per Indian pharmacopeia methods and it is used for standardization, identification and authentication of the plant. These values are used as a reference for further studies and also used to find out adulterants and substituent for maintaining the quality and efficacy of natural drugs.

#### **PHYTOCHEMICAL SCREENING**

There are different molecules in a compound possess different biological activities. The new knowledge about this molecules leads to advancement in medical sciences.

By using soxhlet apparatus, *Sarcostemma acidum* leads to various preparations of extracts and the extract was subjected to preliminary phytochemical screening. The extraction done with water, ethyl acetate, petroleum ether, and ethanol.

Aqueous and ethanolic extract of *Sarcostemma acidum* shows presence of alkaloids, carbohydrates, glycosides, proteins, tannins, amino acids and steroids.

Petroleum ether extract of *Sarcostemma acidum* shows carbohydrates, glycosides, tannins, proteins, amino acids and steroids.

Ethyl acetate extract contains carbohydrates, proteins, tannins, alkaloids and steroids which are screened by Molisch, biuret, bromine water, Mayers and Salkowski reagent respectively. [27]

## PSYCHOPHARMACOLOGICAL AND PHARMACOLOGICAL ACTIVITIES

### PSYCHOPHARMACOLOGICAL ACTIVITY

#### CNS INHIBITORY ACTIVITY

Sibi P. Ittiyavirah (2013) reported that Ethyl acetate extract of *Sarcostemma acidum* (650mg/kg) showed CNS inhibitory activity. Basal locomotor activity scores were noted by actophotometer and reduction in locomotor activity indicates CNS depressant property of the extract.<sup>[28,29]</sup>

#### ANTIPSYCHOTIC ACTIVITY

Sibi P. Ittiyavirah (2013) reported that Ethyl acetate extract of *Sarcostemma acidum* (650mg/kg) significantly enhance the latency period to climb the pole and cataleptic scoring indicates its suppression on CAR activity by using pole climbing and bar test respectively.<sup>[28,30]</sup>

#### ANXIOLYTIC ACTIVITY

Sibi P. Ittiyavirah (2013) reported that Ethyl acetate extract of *Sarcostemma acidum* (650mg/kg p.o) significantly increases the number of entries in to the open arm in Elevated plus maze apparatus as well as number of nose poking in Hole board apparatus which reflects increase in exploratory behaviour which indicates the anxiolytic activity.<sup>[28,29]</sup>

### PHARMACOLOGICAL ACTIVITIES

#### ANTIFERTILITY ACTIVITY

Pramodkumar Verma et al (2002) reported that Methanolic extract of *Sarcostemma acidum* stem at a dose of 50 and 100mg /kg/day indicated that suppressed sperm production as well as sperm density assessed in cauda epididymis.

The number of leydig cells was decreased and the degeneration of leydig cells was increased proportionately. There was no significant change in RBC and WBC count, hemoglobin, hematocrit, sugar and urea in the whole blood and cholesterol, protein and phospholipid in the serum. Results indicating non-toxicity of *Sarcostemma acidum* on general body metabolism in male albino rats.<sup>[31]</sup>

#### HEPATOPROTECTIVE ACTIVITY

Sandeep Pandey *et al.* (2017) reported that the ethyl acetate extract of *Sarcostemma acidum* plant flowers (shade dried) using CCl<sub>4</sub> induced hepatic damage causes elevations of serum bilirubin, serum marker enzymes and liver weight proved that the plant has hepatoprotective activity and flavanol glycoside exhibited free radical scavenging thus showed lipid peroxidation inhibition activity.<sup>[15,24,32,33]</sup>

#### ANTIOXIDANT ACTIVITY

Sandeep Pandey *et al.* (2017) reported that the ethanolic extract of plant *Sarcostemma acidum* showed increase in level of antioxidant enzymes catalase (CAT), superoxide dismutase (SOD), reduced glutathione (GSH) and various membrane bound enzymes like Mg<sup>2+</sup> ATPase, Ca<sup>2+</sup> ATPase and decrease in lipid peroxidation in pylorus ligation and malondialdehyde estimation method shows its antioxidant activity.<sup>[15,20]</sup>

#### ANTI-ULCER ACTIVITY

Sandeep Pandey *et al.* (2017) reported that the ethanolic extract of the plant *Sarcostemma acidum* using indomethacin induced ulcer model and pylorus ligation rat model showed decrease in ulcer index, volume and total acidity, and increase the pH of the gastric fluid exhibiting anti-ulcer activity mainly due to the presence of flavonoids and antioxidants.<sup>[15, 34]</sup>

#### ANTIMICROBIAL ACTIVITY

Sandeep Pandey *et al.* (2017) reported that the methanolic extract of *Sarcostemma acidum* showed good antimicrobial activity against two gram positive bacteria *Streptococcus pneumonia* and *Bacillus cereus* and two gram negative bacteria *Klebsiella pneumonia* and *Salmonella paratyphi* exhibiting zone of inhibition between 13-22mm against these organisms, justified through micro titter and tube dilution method.<sup>[15,35]</sup>

#### IN VITRO THROMBOLYTIC ACTIVITY

Ravikant Vishwakarma *et al.* (2019) reported that the aerial part of Methanolic extract of *Sarcostemma acidum* showed 16.21% clot lysis using venous blood and it was tested by Dunnett t-test analysis.<sup>[36]</sup>



#### IN VITRO ANTI ACNE ACTIVITY

Ravikant Vishwakarma *et al.* (2019) reported that the methanolic extract of *Sarcostemma acidum* showed anti acne activity against *Propionibacterium acnes*. The zone of inhibition of microorganism and activity index were found by paper disc diffusion method.<sup>[36]</sup>

#### ANTIHELMINTIC ACTIVITY

Manju Madhavan *et al* (2020) reported that methanolic stem extracts of *Sarcostemma acidum* showed maximum response against *Pheretima posthuma* earthworms similar to intestinal roundworm parasite present inside human beings.<sup>[37]</sup>

#### IN VITRO ANTIINFLAMMATORY ACTIVITY

Gupta Shailesh *et al.* (2011) reported that ethyl acetate extract of *Sarcostemma acidum* showed that significant membrane stabilizing action on human red blood cell compared to standard drug indomethacin which showed 69.6% protection of Human red blood cell in hypotonic solution using membrane stabilization method.<sup>[38]</sup>

#### INSECT ANTIFEEDANT AND GROWTH REGULATING ACTIVITIES

S. Kannan *et al* (2013) reported that methanolic extract of *Sarcostemma acidum* showed antifeedant and growth regulating activities against tobacco cutworm and *Spodoptera litura*.

Beta amyryn isolated from *Sarcostemma acidum*, a pentacyclic triterpene has antifeedant activity against *Spodoptera litura* which increases larval and pupal duration and mortality. Percent feed index were calculated by dual choice leaf disc diffusion method.<sup>[15, 39]</sup>

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