

**PRELIMINARY PHYTOCHEMICAL AND PHARMACOGNOSTICAL  
EVALUATION OF *CAPPARIS SEPARIA* L.**

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**Summary**

Pharmacognosy is an important link between pharmacology and medicinal chemistry. As a result of rapid development of phytochemistry and pharmacological testing methods in recent years, new plant drugs are finding their way into medicine as purified phytochemicals, rather than in the form of traditional galenical preparations. The root of *Capparis separia* L. is accredited with febrifugal and tonic properties and also found useful for skin troubles. The present paper deals with macroscopic, microscopic, fluorescence analysis and preliminary phytochemical analysis of *Capparis separia*. Catechin is predominately present in the all the three different extracts.

**Key words:** *Capparis separia*, Pharmacognosy, Phytochemistry,

**Introduction**

Traditional healing arts are generally based on a single medicinal plant drug or multiple drugs. In such circumstances the medicinal plant used for the preparation of a drug should be authentic and genuine. The formulae used in some Ayurvedic and Siddha drug preparations are taken even from palm - leaf manuscripts. The consumers should be assured of the quality of the drugs. Hence scientific methods of standardization are needed to confirm the authenticity of medicinal plants used in the preparation of a drug. To standardize or to evaluate a crude drug means to identify it and to determine its quality and purity. The identification of a crude drug can be established by actual collection of the drug from a plant. Quality refers to the intrinsic value of the drug that is the amount of medicinal principles or active constituents present. The evaluation or standardization of a crude drug involves pharmacognostic methods.

The present study has reported pharmacognostic studies on *Capparis separia*. The medicinal plant *Capparis separia* L. (Family: Capparaceae) commonly called Sengaththari and Kattukathiri in Tamil. It is a climbing and scrambling prickly shrub of the dry lands. Root of *Capparis separia* L. has febrifuge and tonic properties and also found useful for skin troubles<sup>1-3</sup>.

**Material and Methods**

The identified plant species was confirmed with voucher specimen No: XCH 5090 available in the St. Xavier's College Herbarium, Palayamkottai, Tamil Nadu. The plant parts were soaked in 70% alcohol, free hand sections of the leaf, stem and root were

taken for detailed microscopic observations and figures were drawn by following Johansen method<sup>4</sup>. Dry powder of the leaf, stem and root was used for chemical analysis. Physico-chemical analysis was carried out as per standard procedure<sup>5</sup>. The fluorescence analysis of the powder drug under Ultra Violet was done according to the methods described by Chase and Pratt<sup>6</sup>. Brinda *et al.*,<sup>7</sup> described methods were used for the preliminary phytochemical analysis.

## Results and Discussion

### Macroscopic studies

Much branched, erect, woody climber to 4 – 5 m: branchlets zig-zag, grey – pubescent. Leaves 1.5 – 2.5 x 0.5 – 0.7 cm: elliptic to suborbicular, thin-coriaceous, acute at apex; spines recurved, 4 – 7 mm. Flowers 1 cm; pedicel 1 cm. Sepals 4, ovate or orbicular, outer pair coriaceous, inner pair membranous. Petals 4, white, spatulate, hairy. Stamens 30 – 50, free: Gynophore 0.5 – 1 cm. Ovary ovoid, glabrous. Berry globose, 0.8 – 1cm across seeds 2.

### Synonym:

*Capparis incanescens DC.*

### Vernacular Names

Sanskrit: Kakadani, Bengali: Kaliakara, Hindi: Kanthari, Marathi: Kanthar, Punjabi: Hiungarna Tamil: Karunjurai, Sengaththari and Kattukathiri, Telugu: Nallavuppi

### Microscopic Studies

**Stem:** The transverse section of the stem showed a single layer of compactly arranged epidermal cells, followed by a hypodermis of 3 to 5 layer of thin walled collenchyma cells. It was followed by many layered iso-diametric thin walled paranchymatous cortex. The endodermis which was distinct encloses by pericycle. Secondary vascular tissues were arranged in a ring. Secondary xylem was well developed. Narrow vessels occur in the wood. Secondary phloem occurred in patches above the secondary xylem. Pith is parenchymatous and large. The vascular tissue consists of separate fibres and arranged in short uniseriate row and rays are wide

**Leaf:** In the dorsiventral leaf surface, epidermis is single layered, rectangular cells, distinct cuticle covering with uniseriate, multicellular glandular trichomes with blunt tips. Trichomes are usually 2 –6 celled long. In the lower epidermis few stomata are seen. In lamina the mesophyll cells consist of single layered compactly arranged radially elongated palisade cells. It is followed by few layers of spongy parenchyma with chloroplast. In the midrib an arc shaped vascular bundle occurs in the center. Above the lower epidermis are made up of few layers of collenchyma cells. Rest of midrib filled with parenchyma. Vascular bundles are closed and xylem consists of groups of vessels, tracheids and parenchyma. Phloem has usual sieve tube tissue accompanied by large parenchymatous cells

**Root:** Transverse section of root showed irregular in outline. The outer zone of cork get peeled off consequent of secondary growth. This is followed by phellogen (1 to 3 layers) and secondary cortex (5 to 6 layers) whose cells contain abundance of starch grains. The cortex is consists of parenchymatous cells and endodermis indistinguishable due to secondary growth. The secondary phloem consists of sieve tube and phloem parenchyma. Secondary xylem occurring layer are in the centre. Vessels are scatterly arranged in the xylem

**Fluorescence analysis:** The behavior of the powdered drug in different solution and their extracts towards ordinary light and U.V light were observed and the results were recorded in Table 1. It can be used as diagnostic tool for testing adulteration if any, under fluorescent light leaf showed different colour in various extracts.

Table 1: Fluorescence Analysis of Leaf, Stem, and Root powder of *Capparis separia* L.

S. No	Particulars of treatment	Plant part	Under visible light	Under UV light (365 nm )
1	Such as	Leaf	Pale green	Green
		Stem	Pale yellow	Light green
		Root	Red	Light green
2	Powder + 1N NaOH	Leaf	Green	Dark green
		Stem	Pale yellow	Yellowish green
		Root	Red	Green
3	Powder + Acetic acid	Leaf	Yellowish green	Light green
		Stem	Pale yellow	Pale green
		Root	Light red	Light green
4	Powder + 1N HCl	Leaf	Light green	Dark green
		Stem	Light yellow	Light green
		Root	Light red	Light green
5	Powder +Conc.HNO <sub>3</sub>	Leaf	Dark brown	Dark green
		Stem	Light brown	Green
		Root	Dark brown	Dark green
6	Powder +5% Iodine	Leaf	Dark brown	Dark green
		Stem	Brown	Dark green
		Root	Dark brown	Black
7	Powder +5% FeCl <sub>3</sub>	Leaf	Pale green	Green
		Stem	Light yellow	Yellowish green
		Root	Light red	Dark green
8	Powder + 1N H <sub>2</sub> SO <sub>4</sub>	Leaf	Pale green	green
		Stem	Light yellow	Light yellowish green
		Root	Light red	Pale green
9	Powder + Dil. ammonia	Leaf	Green	Green
		Stem	Yellowish green	Green
		Root	Red	Dark green
10	Powder + petroleum ether	Leaf	Pale green	Green
		Stem	Light yellow	Yellowish green

		Root	Light red	Pale green
11	Powder + benzene	Leaf	Pale green	Yellowish green
		Stem	Light yellow	Pale green
		Root	Light red	Pale green
12	Powder + chloroform	Leaf	Yellowish green	Green
		Stem	Light yellow	Yellowish green
		Root	Light red	Dark green
13	Powder + methanol	Leaf	Light green	Yellowish green
		Stem	Light yellow	Yellowish green
		Root	Light rose	Light green
14	Powder + acetone	Leaf	Light green	Green
		Stem	Light yellow	Light yellowish green
		Root	Light rose	Light green

**Quantitative determination:** The physico-chemical methods employed for determining the quality and purity of drugs. The determination of ash is useful for detecting low grade products, exhausted drugs which have been coated with chalk, lime or calcium sulphate. The physico – chemical parameters like total ash, acid soluble ash, water soluble ash, moisture content, extractive values were determined by standard methods and presented in Table 2.

Table 2: Comparative analysis of Physico-chemical characters of Leaf, Stem and Root of *Capparis seiparia* L.

S.No	particulars	Leaf w/w	stem w/w	Root w/w
1	Total ash	11.55	3.45	3.55
2	Water soluble ash	8.70	2.90	2.60
3	Acid insoluble ash	3.80	1.50	2.60
4	Moisture content	53.33	61.94	78.57
5	Water soluble extractive value	36.16	10.48	12.80
6	Alcohol soluble extractive value	9.04	6.72	4.80

### Preliminary Phytochemical Screening

The leaf, stem and root powders with various extracts subjected to preliminary phytochemical screening were presented in Table 3. Phytochemical screening extracts showed positive for phenol, tannin, alkaloid, amino acid, catechin and saponin in stem. Catechin is predominately present in the all the three different extracts. The presence of the secondary metabolites could justify to some extent the traditional use of these plants against infections diseases. Indeed phenol, alkaloids and saponin are known to possess antimicrobial properties<sup>8</sup>.

Table 3: Preliminary Phytochemical analysis of leaf, stem and root extract of *Capparis seiparia* L.

S.No	Phytochemicals	Extract(s)					
		Leaf		Stem		Root	
		Ethanol	water	Ethanol	water	Ethanol	water
1	Steroids	-	-	-	-	-	-
2	Triterpenoids	-	-	-	-	-	-
3	Reducing sugars	-	-	-	+	-	+
4	Sugars	+	+	+	+	+	+
5	Alkaloids	-	-	-	+	-	-
6	Phenolic compounds	-	-	+	-	+	-
7	Flavonoids	-	-	-	-	-	-
8	Catechins	+	+	+	+	+	+
9	Saponins	-	+	-	+	-	+
10	Tannins	-	+	+	+	+	+
11	Anthroquinones	-	-	-	-	-	-
12	Amino acids	-	+	+	+	+	+

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