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A Review on Phytochemical, Pharmacological, and Pharmacognostical Profile of *Cadaba trifoliate.*

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Review Article

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ABSTRACT

Cadaba trifoliata (Capparaceae) in the folk system of medicine. It is locally called as Purna and Viluthi (in Tamil) and possesses anti-rheumatic, emmenagiague, anthelemintic and antibacterial properties. The leaf juice of this plant is used as remedy for fevers. The plant is used for the treatment of syphilis, sores and as an antiphlogistic, deobstruent, emmenagogue, anthelmintic etc. Recent studies are involved in the identification and isolation of new therapeutic compounds of medicinal importance from higher plants for specific diseases. The leaf contains alkaloids, tannins, glycosides, phenolic compounds, steroids, flavonoids. The ash contains alkaline chlorides, sulphates and carbonates. The phytochemical compounds are present in the plant Namely Propane,1,1,3-triethoxy, 2-Cyclohexylpiperidine, Hexadecanoic acid, ethyl ester, Phytol, 9,12-Octadecadienoic acid, Oleic acid, Phenol, 2,4-bis(1-phenylethyl), 1,2-Benzenedicarboxylic acid, diisooctyl ester etc. Leaves of *C.trifoliata* reported to possess antimicrobial activity, Antipyretic Activity, Antibacterial activity and Antihelminitic activity.

INTRODUCTION

Cadaba trifoliata (Capparaceae) in the folk system of medicine. This family of flowering plants containing 28 genera and about 700 species of annual or perennial herbs, sub-shrubs, shrubs or trees. The plant is an unarmed branched shrub up to 3 m height. Leaves are palmately trifoliata and the leaflets are oblong or lanceolate [1]. It is locally called as Purna and Viluthi (in Tamil) and possesses antirheumatic, emmenagogue, antihelminitic and antibacterial properties [2,3]. The leaves of this plant are used in traditional medicine to treat various ailments. The plant is used for the treatment of syphilis, sores and as an antiphlogistic, deobstruent, emmenagogue, antihelmintic etc [4]. Leaves of *Cadaba fruticosa* reported to possess antimicrobial activity [5]. The leaf juice of this plant is used as remedy for fevers [6]. *Cadaba trifoliata* is an unarmed branched shrub. Leaves of this plant possess antirheumatic, anthelmintic and antibacterial properties [7]. cadabalone, cadabicine were isolated from the leaf part of the plant [8]. Recent studies are involved in the identification and isolation of new therapeutic compounds of medicinal importance from higher plants for specific diseases [9,10]. Knowledge of the chemical constituents of plant is helpful in the discovery of therapeutic agent as well as new sources of economic materials like oil and gums. The most important bioactive constituents of these plants are alkaloids, tannins, flavonoids and phenolic compounds [11].

Taxonomy [12]

Kingdom:	Plantae
Subkingdom:	Viridaeplantae
Phylum:	Tracheophyta
Subphylum:	Euphyllophytina
Class:	Magnoliopsida
Subclass:	Rosidae
Order:	Brassicales
Suborder:	Capparineae
Family:	Capparaceae

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Genus: Cadaba
Specific epithet: trifoliata- Wight &Arn.
Botanical name: *Cadaba trifoliata* Wight &Arn.

Table 1: Vernacular names of *Cadaba trifoliata* [13-14]

S. No.	Language	Vernacular name
1	Arabic	Asal,Sarah
2	English	Indian cadaba
3	Tamil	Purna,Velivi,Villuttu,Viluthi, Manudukurundu.
4	Telugu	Chikondi, Mallaguru, Chekonadi, Chimurundu, Nallagara, Kori-Chikondi, Peddasiva-konita.

Description

It is an evergreen forest plant, grows about 5-10m on dry or plain land. The plant grows at an altitude of 120m which needs an average rainfall of 300-1300mm.It grows in dry and hot climatic conditions at 15-40^{0}c [15].

Figure 1: Cadaba trifoliata plant.

Microscopical characteristics of leaf

- A part of the leaf passing through midrib was cut.
- Watch glass was taken with small amount of water and the section was placed in it with the brush.
- The section was washed with little amount of water.
- Staining was done by using dilHClandPhloroglucinol. They were mounted on slide in glycerin and studied under microscope
- Microphotographs of sections were documented using microscope with camera.
- Powder examination:Slide for powder microscopy was prepared for determination of powder characteristics of leaf.

Determination of diameter of starch grains

- An eye piece micrometer was calibrated using a stage micrometer.
- A little quantity of crude dry powder was mounted in lactophenol. A drop of dilute Iodine solution was added.
- The diameter of isolated starch grains were measured by focusing on scales of eye piece of micrometer.
- The numbers of divisions covered by starch grains were noted.
- The dimensions of 50 starch grains were calculated, the divisions were multiplied by Calibration factors.
- The average value was calculated and ranges of starch grains were given.[16-17]

Parameter	Minimum	Average	Maximum
Diameter (starch grain)	11.8 µ	41 µ	54.4 µ

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Table 2: Diameter of starch grains

Parameter	Range
Stomatal index	9-11-14
Palisade ratio	13-14-16
Vein islet number	6-8-9
Vein-let termination	5-6-7

Table 3: Quantitative Microscopy of *Cadaba trifoliata* leaf

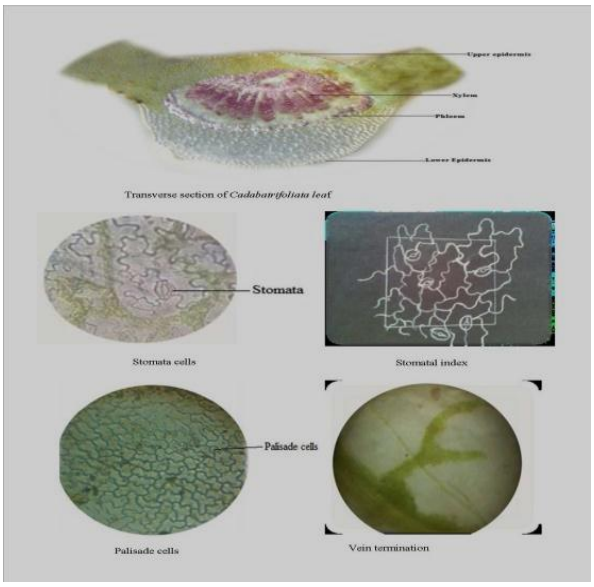

Figure 2: Microscopy of *Cadaba trifoliata* leaf.

Phytochemistry

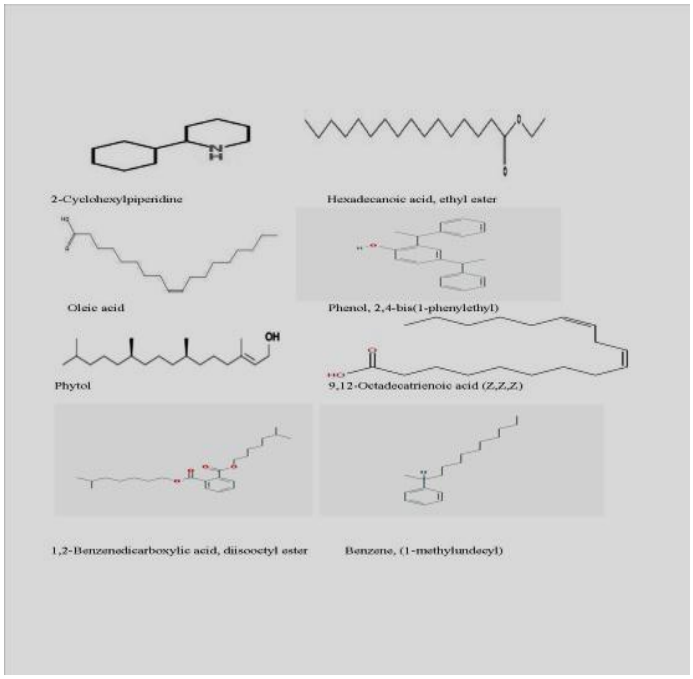

Figure 3: Phytoconstituents of *Cadaba trifoliata*.

A qualitative phytochemical test were used to detect the presence of alkaloid, tannin, saponin, flavonoid, glycoside and phenol they were carried out using standard Evans [18,19,20,21]. Identification of components were based on comparison of their mass spectra with those of Wiley and NIST Libraries and those described by Adams [22]. The leaf contains alkaloids, tannins, glycosides, phenolic compounds, steroids, flavonoids. It also contains betains (prolinebetaine and 3-hydroxy prolinebetaine). The ash contains alkaline chlorides, sulphates and

carbonates. The identification of phytochemical compounds is based on the peak area, molecular weight and molecular formula. Namely Propane,1,1,3-triethoxy (C9H2003), 1-methyl-pyrrolidine-2-carboxylic acid (C6H11NO2), Azulene, 1,4-dimethyl-7-(1-methylethyl) (C15H18), Benzene,(1-methylundecyl) (C19H32), Benzene,(1-ethylundecyl) (C19H32), 2-Cyclohexylpiperidine (C11H21N), Azulene, 1,4-dimethyl-7-(1-methylethyl) (C15H18), naphthalene, 1,6-dimethyl-4-(1-methylethyl) (C15H18), L-Serine, O-(phenylmethyl)-(C10H13N03), n-Hexadecanoic acid (C16H3202), Hexadecanoicacid,ethyl ester(C18H3602), Phytol (C20H400), 9,12-Octadecadienoic acid (Z,Z) (C18H3202), Oleic acid (C18H3402), Phenol, 2,4-bis(1-phenylethyl) (C22H220), Methanone, [1,4-dimethyl-7-(1-methylethyl)-2-azulenyl]phenyl-(C22H220), 1,2-Benzenedicarboxylic acid, diisooctyl ester (C24H3804) The identification of phytochemical compounds in very high peak area, 1, 2-Benzenedicarboxylic acid, diisooctyl ester (C24H3804) with RT 24.95 has peak area 51.86% and 1-Methyl-pyrrolidine-2-carboxylic acid (C6H11NO2) with RT 6.89 has peak area 20.58%. The main important compounds phytol (C20H400) with RT 18.95 ranks with peak area 1.21% [23].

Medicinal uses

Cadaba trifoliata (Roxb.) Wight and Arn. (Capparidaceae) “Purana”. A vapour from the boiled leaves is inhaled to relieve coughing and colds[24]. The leaves are boiled and eaten. The leaves are applied externally to cure rheumatic pains in joints. They are also credited with emmenagogic, antisyphilitic, anthelmintic and antiphlogistic properties. Their decoction is given to children in indigestion as a purgative. The ethanol extract of whole plant excluding root is reported to show diuretic activity [25]. Decoction of leaves is combined with castor oil and turmeric and found useful in amenorrhoea and dysmenorrhoea. Juice of *Cadaba trifoliata* is given in dyspepsia in children [26].

PHARMACOLOGICAL ACTIVITIES

Antipyretic Activity

This study was carried out to evaluate the antipyretic potential of aqueous and ethanol extracts of *Cadaba trifoliata* (Roxb.) Wt. and Arn. leaf, a wasteland plant, on normal body temperature and yeast induced pyrexia in Wistar albino rats. The aqueous and ethanol extracts showed significant reduction in normal body temperature and yeast induced pyrexia at 500 mg/kg body weights at 23rd hour of administration of yeast when compared to the standard antipyretic drug paracetamol (45 mg/kg, p.o.) The dose of 100 mg/kg of both the extracts produced less significant antipyretic effect [27].

Antibacterial Activity

Antibacterial activity of aqueous and ethanol leaf extracts of *Cadaba trifoliata* was evaluated by cup plate method against bacterial strains such as Staphylococcus aureus, Bacillus subtilis, Acinetobacter, Enterobacteraerogenes, Erwinia and Escherichia coli . The ethanol extract of the leaves demonstrated a high degree of activity against all the tested bacterial strains except Erwinia and Acinetobacter, whereas the aqueous extract of the leaves showed moderate activity against E. coli, B. subtilis and Staph. aureus and Enterobacteraerogenes [28].

Antihelminitic Activity

The aqueous and alcohol leaf extracts of *Cadaba fruticosa* and *Cadaba trifoliata* were evaluated for antihelmintic activity using adult earthworms. Alcohol and aqueous extracts of *Cadaba trifoliata* at 5% w/v concentration exhibited better inhibition of spontaneous motility (paralysis) and death time compared with extracts of *Cadaba fruticosa*. However, there was no final recovery in the case of worms treated with extracts. The effects of extracts of both the species were comparable with 1% piparazine extract. The results show that the alcohol and aqueous extracts possess wormicidal activity and thus, may be useful as a vermifuge [29].

CONCULSION

This article provides information about Microscopy, Phytochemistry, Pharmacological activities of *Cadaba trifoliata*. The leaf contains alkaloids, tannins, glycosides, phenolic compounds, steroids, flavonoids. The ash contains alkaline chlorides, sulphates and carbonates. The phytochemical compounds are present in the plant Namely Propane,1,1,3-triethoxy, 2-Cyclohexylpiperidine,Hexadecanoicacid,ethyl ester, Phytol, 9,12-Octadecadienoic acid, Oleic acid, Phenol, 2,4-bis(1-phenylethyl), Methanone, 1,2-Benzenedicarboxylic acid, diisooctyl ester etc. Leaves of reported to possess antimicrobial activity, Antipyretic Activity, Antibacterial activity and Antihelmintic activity.

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