

Review Article

ETHNOBOTANICAL, PHYTOCHEMICAL AND PHARMCEUTICAL STUDIES OF MEDICINAL PLANT, *VENTILAGO MADERASPATANA* GAERTN (RED CREEPER): A REVIEW

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ABSTRACT

Traditional plant therapies increasing in recent decade has a new wave of the research interest in plant kingdom. Scientific studies on a number of medicinal plants indicate that promising phytochemical compounds can be developed new drugs for many health problems. *Ventilago maderaspatana* (Red creeper) is medicinal plant traditionally used for the control of various diseases such as dyspepsia, leprosy, puruitis, etc. Chemical studies have shown that, stem bark contains Flavonoids, tannins etc. Some parts of its phytochemicals possess anticancer, antidiabetics and antiulcers activities. Thus, the present review made an attempt to highlight the ethno botanical and traditional uses as well as phytochemical and pharmacological studies on *V. maderaspatana* and it will help to develop new ailments for the treatment of various diseases.

Keywords: *Ventilago maderaspatana*, Ethnobotany, Pharmaceutical, Phytochemical, Pharmacology.

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INTRODUCTION

Plants have been used by the human beings since time immemorial. Plants are significant sources of medicines that are used in the treatment of various categories of human diseases. Traditional drugs derived from herbal plants are used by about 60 % of the world's population. India is a home to a variety of traditional medicine system that relies largely on native plant species for the raw drug material [1] and holds a credibility of diverse social, cultural and medical heritage with an unbroken tradition coming down across millennia [2].

Herbal medicine has been practiced worldwide and it is recognized by WHO as essential building blocks for primary health care [3]. WHO has estimated that up to 80 % of people still rely on traditional remedies [4] which are 21,000 plants around the world, among them 2500 species are in India, out of these 150 species are commercially used [5]. Phytochemicals are synthesized by primary or rather secondary metabolism of living organism. Secondary metabolites are chemically and taxonomically extremely diverse compounds with obscure function. They are widely used in the human therapy, veterinary, agriculture, scientific research and countless other areas [6]. The overall activity of herbal medicines depends on the active constituents present in them [7, 8]. Scientific studies on a number of medicinal plants indicate that promising phytochemical compounds can be developed for many health problems [9]. Many of western drugs used today also originated from natural plant sources. Researchers in the last century identified and isolated salicin a glycosides as active principle [10, 11] and Metformin, an oral precipitation glucose lowering drug for diabetes was initially derived from a flowering plant *Galega officinalis* [12]. *V. maderaspatana* (Red creeper) belonging to the family Rhamnaceae. It is considered as an important medicinal plant by the traditional people of Kolli hills, Tamilnadu. Various parts of the plants used for treatment of many diseases. Thus the present review focused on the ethnobotanical, phytochemical and pharmacological studies on *V. maderaspatana*.

Taxonomical classification

Kingdom: Plantae

Sub kingdom: Tracheobionta

Super division: Spermatophyta

Division: Magnoliophyta

Sub division: Radiatopses

Class: Magnoliopsida

Sub class: Rosidae

Order: Rhamnales

Family: Rhamnaceae

Genus: *Ventilago*

Species: *maderaspatana*

Vernacular name

Common name: Red creeper

Sanskrit: Rakfavalli, Dinesavalli

Hindi: Pitti, Kenwti, kalibel

Marathi: Sakalvel, Khandvel, Lokhandi

Tamil: Surulpattaikkodi Vempadam

Kannada: Haruge, Kanvel.

Parts used

Leaf [13], stem [14] and root [15]

Distribution

Ventilago maderaspatana is a medicinal herb belonging to family Rhamnaceae. It is distributed in forests of low elevations in South Greece, India, Indonesia, Myanmar, Sri Lanka. [16]. In South India it is distributed in Western Ghats and Eastern Ghats [17-19].

Botanical description

Ventilago maderaspatana is a large, woody, ever green climber with branches hanging down in festoon sand. It is commonly known as red creeper. Bark is dark grey in colour with vertical cracks exposing the vermilion inner bark surface. Young branches are grey. Pubescent and older branches are dark grey and glabrous. Leaves are pale green, alternate, oblong lanceolate or elliptic ovate to orbicular, pubescent beneath when young, base generally rounded, apex acute or sub-acuminate, margins or crenate; lateral nerves 4-8n pairs ascending and covering near the margin. Inflorescence is axillary and terminal panicles minutely grey pubescent, occasionally with leafy bracts. Flowers are terminal are axillary, cymose racemer or cymose, panicle across, yellowish-green, with an

Offensive odour, Unisexual flowers, 5-15 cm, calyx tube pubescent; numerous 3 to 5. Reproduction is through pollination. Fruits are subglobose nut 5 to 7 mm in diameter, yellow to grey, enclosed in a persistent calyx rim to about the middle and prolonged in to a linear pubescent wing. Seeds are globose, thin walled brown in colour [20-24].

Ethnobotanical studies

V. maderaspatana is traditionally used to treat many disorders like skin problems, fever, and diabetes and also used as digestive carminative [20]. It is believed that it possess the healing effect of dyspepsia, colic disorder, leprosy, scabies, pruritis and other skin disorders and general disability [24]. The powder of stem bark mixed with gingelly oil is applied externally to treat skin diseases and itches [25]. The root bark of *V. maderaspatana* is used as a carminative, stomachic, stimulant [26, 27] and vitiated connection of kapha, colic flatulence and enysipelas. Bark paste of this plant is used to treatment of bone fracture [28]. Tender branches also used to treat vertigo [29]. Latex of this plant is used to cure edema [30]. Bark is also used to thermogenic, alexeteric, flatulence and tonic [31]. Bark and leaves are used to cure malarial fever [32]. Seeds mixed with milk or/and water has showed antidiabetic activity by taken directly [33].

Phytochemical constituents

Root bark

Root bark of *V. maderaspatana* shows secondary metabolites such as, various anthraquinones, including ventinone A and B, Chrysophanol, physcion, emodin, islandicin, xanthorin and xanthorin-5-methyl ether [34]. Naphthalene derivatives and naphthoquinones, such as ventilaginone, ventilagol, maderone, cordeauxione and isocordeauxione are also reported in root bark of this plant [35]. Root bark also has benzisochromanquinones, ventilaquinones A, B, C, D, E, F, G and H from acetone extract [36].

Whole plant

The plant *V. maderaspatana* is constitute with isofurano naphthaquinones, ventilonone-C, ventiloquinones E and G, Jelenthirin and enautiopure 1, 3, dimethyl pyranonapphtoquinones [37].

Pharmacology

Antidiabetic activity

Methanolic extract of *V. maderaspatana* leaf powder at the doses of 100, 200 and 400 mg/kg possesses significant anti-hyperglycemic and anti-hyperlipidemic activity on long term [45 d] treatment in STZ induced diabetic rats. Methanolic extract of *Ventilago maderaspatana* showed maximum activity at 400 mg/kg. It reduced cholesterol, TG, LDL, VLDL, and improved HDL in diabetic rats [14]. The root extracts of *V. maderaspatana* had also possessed anti-diabetic activity [15]. Methanolic extract of root bark of *Ventilago maderaspatana* had 56.25% of inhibitory activity against the enzyme alpha-glucosidase [38].

Antioxidant activity

Ethanollic and hydroethanollic root extracts of *V. maderaspatana* exhibited a significant antioxidant effect eliciting and increased catalase level and decreased levels of LPO and glutathione. Alcoholic extract at the dose of 500 mg/kg elicited slightly greater antioxidant activity than the hydroalcoholic extract at the dose of 500 mg/kg [15]. Methanolic extract of root bark has potential to inhibit the DPPA activity and has IC₅₀ at the dose of 60.15 kg/ml [38]. Ethnolic extract whole plant of *V. maderaspatana* possesses the anti oxidant and anti denaturation activity [39]. Root extracted with hexane of *V. maderaspatana* possessed free radical scavenging activity and also ABTS scavenging activity [40].

Antimicrobial and antibacterial activity

Different extracts of *V. maderaspatana* such as petroleum ether, benzene, ethyl acetate, methanol and ethanol extract were used to test against *Bacillus thuringiensis*, *Streptococcus faecalis*, *Staphylococcus aureus*, *Salmonella paratyphi*, *Proteus vulgaris* and *Serratia marcescens* by agar disc diffusion method. Methanolic

extract showed the maximum activity against *Serratia marcescens*. Petroleum ether extract showed maximum activity against *Proteus vulgaris*. Among the different solvents studied petroleum ether extract exhibited maximum activity against the entire tested microorganism [17].

The stem bark of *V. maderaspatana* is rich in phytochemicals which has free radicals scavenging activity and strong antimicrobial activity against various microorganisms. 100 mg/ml concentration of methanolic extract showed significant rate of inhibition in *P. vulgaris*, showing 13.98 mm inhibition zone by disk diffusion method. Further, *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Bacillus magatherium* *Klebsiella pneumonia*, *Salmonella typhi* also showed significant susceptibility to methanolic extract of stem bark [13].

Cardioprotective effect

Methanolic extract of whole plant was found to possess cardioprotective effect against Isoproterenol induced myocardial infarction [41].

Other pharmacological activities

Ethanollic extract of *V. maderaspatana* exhibit neuroproductive effect in cerebral ischemia by potentiating the antioxidant defense system of the brain [42]. Bark of this plant has hepato protective effect against CCl₄ included liver damage [43]. Emodin as a phyto compound isolated from *V. maderaspatana* possesses strong hepato productive abilities by reversal CYP activity and ultrastructure changes [44]. The root bark also has the hepatoprotective properties and as a natured antioxidants [26, 27]. The stem bark of this plant was found to possess anti inflammatory and anticancer activities [45] and also used to cure gout [46].

CONCLUSION

As the pharmacologists and pharmaceutical companies are looking forward to develop new drugs from natural sources without any adverse effects, the development of modern drugs from the medicinal plant, *V. maderaspatana* (Red Creeper) can be used for curing of various diseases. This plant contains a number of phytochemical compounds from various parts of this plants such as roots, leafs, bark, seeds, which are key factors for the various medicinal properties. They are used to cure a variety of diseases. So, it helps for developing new drug formulation which can ultimately beneficial for human being. Further, a very few pharmacological studies on this plant were carried out and thus this present review will lead to further pharmacological investigation.

CONFLICT OF INTERESTS

Declare None

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