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Review on Traditional and Pharmacological applications of Indian Medicinal Herb *E. neriifolia* (Indian Spurge tree): Herb with potential therapeutic value

A. Adhi Meena[*1], J.Indrakumar[2], R. Gnanasundari[3], R. Madhavan[4]

*[1]P.G Scholar, Department of Nanju Maruthuvam, National Institute of Siddha, Tambaram Sanatoruim, Chennai 600047, Tamil Nadu, India.
[2]Jayam Siddha Varma Clinic, Papparapatti,Dharmapuri District636809, Tamil Nadu, India.
[3] Thirumoolar Siddha Clinic, Adambakkam, Chennai 600088, Tamil Nadu, India.
[4] Head, Department of Nanju Maruthuvam, National Institute of Siddha, Tambaram Sanatoruim, Chennai 600047, Tamil Nadu, India.
Corresponding Author: Dr. J.Indrakumar, Jayam Siddha Varma Clinic, Papparapatti, Dharmapuri District 636809, Tamil Nadu, India.

Abstract

Herbs becomes the integral part of siddha system of traditional medicine, as it encompasses the potential therapeutic benefits the mankind since several centuries. Herbs have been used as core ingredients for its ability to express the versatile pharmacological activity by its structural diversity on phytocomponents. Siddhars called as ancient physician who understand the real therapeutic benefits of various herbs have formulated the compendium of siddha medicine integrated with polyherbal and single herb preparations against several dreadful diseases and disorders. *Euphorbia neriifolia* (family Euphorbiaceae)is one such potential herbs which plays vital role as ingredient in most of the siddha preparations. The main objective of the present study is to explore the therapeutic benefits of this medicinal herb by systematic review on its pharmacognostical, pharmacology and phytotherapeutic approach. It was evident from the present review that *Euphorbia neriifolia* used as a carminative and expectorant, as well as in the treatment of tumours, abdominal and skin problems, leprosy, asthma, and kidney stones. Further *E. neriifolia* exhibits antibacterial and antifungal activity. Several diterpenes isolated from stem bark of E. neriifolia exhibit anti-HIV-I activity. Roots are used as symptomatic treatment of snake bite, scorpion sting and antispasmodic. In conclusion this present review provides a broad spectrum of source, active components and recent research outcome of this herb. This could be of more useful in identification and isolation of active phytocomponents from the herb towards specific disease of interest through modern analytical techniques.

Keywords: Herbs, Siddha, Phytocomponents, *Euphorbia neriifolia*, Pharmacology, Phytotherapeutic approach.

1. Introduction

Herbs have been used in folk medicine since many years and the use of herbal-derived natural products as a therapeutic tool has been increasing considerably [1,2]. However, several herbal-derived natural compounds significantly affect cellular mechanisms and evidence of the beneficial effects of herbal-derived natural products in inflammatory pulmonary diseases has been increasing [3].

Complementary and alternative medicine (CAM) for the treatment of various diseases is gaining popularity globally, at a faster pace since the past two decades [4,5] and the studies revealed a worldwide market for herbal supplements for the management of diseases, which is presently at around 83% and is expected to reach 95% in the forthcoming years [6,7].

Many terrestrial plants have been subjected to chemical and pharmacological screening, in order to evaluate their potential as drugs in medicine. Natural products are important sources for new pharmaceutical compounds. The ethnomedicinal approach represents an important method for identifying biologically active plant-based natural products as well as a means of documenting and preserving local knowledge [8].

2. Scope of *Euphorbia* species

The *Euphorbiaceae* family includes trees, succulents and herbaceous plants [9].Different species of *Euphorbia* grow all over the world, either wild, or as cultivated specimens in the house or garden.Plants belonging to the genus *Euphorbia* are also of the great interest in the matter of their antimicrobial activity [10,11]. In fact, these plants are also widely used in the traditional medicine in the microbial infections [12,13], and some *Euphorbia* plants are believed to be a promising source of phytochemicals used in the pharmacy and food industries [14]. Since consumers prefer healthy products without synthetic raw materials, the constantly growing interest in the natural and ecologically friendly antimicrobial agents is still being observed, and therefore research on the antimicrobial activity involving *Euphorbia* species is relevant.

3. *Euphorbia neriifolia*

Euphorbia neriifolia (*E. neriifolia*) Linn. sp. belonging to the family Euphorbiaceae. It consists of 5 sub-families, 49 tribes, 317 genera and 800 species [16].

There are about half dozen species of Euphorbia genus are under the name of snuk and it synonyms. The latex of *E. neriifolia* is an active ingredient of many traditional formulations like Abhaya lavana, Avittoladi bhasma, Citrakadi taila, Jatyadi varti, Snuhidugdhadi varti, Snuhi ghrta and Jalodarari ras. *E. neriifolia* has been traditionally indicated in Vatavyadhi, Gulma, Udara, Sula, Sotha, Arsas, Kusta and Medoroga [16].

3.1. Diversification

E. neriifolia is worldwide scattered in Baluchistan, Burma, India and Malaysian Islands. Inside India, it is frequent in rocky ground throughout Deccan Peninsula and Orissa. It is habitually cultivated for hedges in villages all over India [17]. The taxonomy of plant consists of domain: Eukaryota, kingdom: Plantae, sub-kingdom: Tracheobionta, division: Magnoliophyta, super-division: Spermatophyte, class: Magnoliopsida, sub-class: Rosidae, order: Euphorbiales, genus: Euphorbia, family: Euphorbiaceae and species: neriifolia Linn [18].

Common Vernacular Names [19]

Sanskrit	:	Snoohi, vajra, vijri, patrasnuk, svarasana.
Hindi	:	Sehundu, sij, patton-ki-send-thohar.
Bengal	:	Mansasij, hij-daont, patasij.
Maharastra	:	Vayinivaduguga, thora, thor.
Thazavn	:	Mina
Arab	:	Dihuminguta.
Burma	:	Thassaung.
Telungu	:	Akujimudu
Tamil	:	Haikalli,illaikalli.
Urudhu	:	Zakum.
Uriya	:	Siju

3.2. Siddha formulations containing *Euphorbia neriifolia*

The following siddha formulation consist of ***Euphorbia neriifolia*** as a core ingredient

- Kalliadai
- Vidathariennai
- Maavilingaennai
- Veeliparuthiennai

3.3.Ethnomedicinal therapeutic Application

E. neriifolia act as antioxidant agent as this plant contained wide range of active ingredients such as

sugar, tannins, flavonoids, alkaloids [21, 22], triterpenoids, tetracyclic triterpene (nerifoliene and euphol), triterpenoidal saponins etc.,[23] which can inhibit or slow down the severity of cancer [24].These active ingredients especially flavonoids, terpenoids and saponins neutralized free radicals and intermediates of metabolism that are highly reactive since they contain a non-paired electron[25] and to be responsible for the observed protective histological effects. The present study findings provide and validate the scientific evidence to the ethnomedicinal therapeutic use of this plant.

3.4. Leaves

Leaves are brittle, heating, carminative, improve the appetite, good for treatment of tumours, pains, inflammations, abdominal swellings and bronchial infections.

3.5. Latex

Juice is used in treatment of unhealthy ulcers and scabies. Application of juice to glandular swellings can prevent suppuration. It is mixed with margosa oil for topical application to rheumatic limbs. Turmeric powder mixed with juice of E. neriifolia is useful in treatment of piles [26].

3.6. Phytochemical Profile

The leaf extracts such as chloroform, ethanol, ethyl acetate, butanol and aqueous of E. neriifolia were found phlobotannins, flavonoids, saponins, tannins, terpenoids, phenols and cardenoloids. Conversely, all these extracts were tested and showed the absence of sterols, anthraquinones and cardiac glycosides. Hydro-alcoholic extract of leaves shows presence of flavonoids, sugar, tannins, triterpenoidal saponin, alkaloids and cardiac glycosoids [27].

3.7. Roots

Root is used as symptomatic treatment of snake bite, scorpion sting and as an antispasmodic. Crushed root mixed with black-pepper is employed in treatment of scorpion-stings and snakebites both internally and externally.

3.8.Efficacy Profile and Pharmacological Activity

S.No	Pharmacological Activity
1.	Anaesthetic activity [28]
2.	Analgesic Activity, Anti-diarrhoeal and Antiulcer [29]
3.	Anti-anxiety, anti-convulsant, anti-psychotic [30]
4.	Anti-arthritis Activity [31]
5.	Anti-Cancer Property [32.33]
6.	Immunomodulatory [34]
7.	Antidiabetic [35]
8.	Anti-inflammatory/anti-thrombotic [36]
9.	Antioxidant and Anti-Microbial [37,38]
10.	Wound Healing [39]

4. Folklore Therapeutic Applications[40-42]

- The juices of the leaves are added in drops for preventing ear ache.
- The flower buds are baked and then juiceadded with sugar is given for children cough.
- KSHAARootra-A Medical thread prepared by coating latex of *E.nerifolia* alkaline powder of Achyranthesasphera and curcuma longa in treatment of fistula in ano.
- The leaf juice is used in the case of opthalmia
- The latex juice is acrid, purgative, expectorant and rubefacient, used in otalgia and opthalmia
- The roots are used for snake bite and scorpion string for this root is mixed with kali mirch paste is given internally and is also applied externally on spot of string or bite.

5. Toxicological / Harmful Effects

- Leaves and roots are used as fish poison.
- There will be inflammation of eyes and temporally blindness if the milk of plant falls to the eyes.

6. Symptomatic treatment on accidental Exposure

- Accidental Ingestion-Gastric lavage is recommended with normal saline or activated charcoal
- Exposure to Skin - Topical corticosteroids are used
- Exposure to Eyes -Anti-biotic drops are used

7. Conclusion

According to the present review the herb *E. neriifolia*has potential medicinal properties attributed to the range of bioactive phyto components present in leaf, latex, root and bark. These wide range of therapeutics present in the herbs may acts synergistically in curing specific disease at the same time application should be cautious with proper medical supervision due to its known toxicity. In spite to its potential therapeutic benefits this herbs still requires extensive research on isolation of component responsible for desired activity with proper molecular mechanism on its action.

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