

**NARAVELIA ZEYLANICA: A REVIEW**

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*Corresponding author e-mail: manasabarlanka@gmail.com**ABSTRACT**

Plants are the principal source of raw materials for plant based medicine since ancient times. The traditional herbal medicines are receiving great importance in the health care sector. In Indian system of medicine i.e, ayurveda, one of the plant *Naravelia zeylanica* (Linn) DC belonging to family ranunculaceae has been used in the treatment of helminthiasis, dermatopathy, leprosy, rheumatagia, odontalgia, colic inflammation, wounds and ulcers. It is distributed throughout india mainly in warm regions of Eastern Himalayas, Assam, Bengal, Bihar and greater parts of Deccan Peninsula. The aerial parts of *Naravelia zeylanica* traditionally used in vitiated vata, pitta, inflammation, skin diseases. The present review on *Naravelia zeylanica* is to know its importance with respect to pharmacognosy, pharmacology and phytochemistry in detail.

Keywords: *Naravelia zeylanica*, Beriberine, medicinal uses, antioxidant, phytochemistry**INTRODUCTION**

Plants are the principal source of raw materials for plant based medicine since ancient times. The traditional herbal medicines are receiving great importance in the health care sector. India has a century's old tradition of using medicinal plants and herbal medicines for the alleviation of various diseases and ailments [1]. A large section of the rural population living far away from urban area still relies on traditional herbal medicine for their health care needs. This is because of the lack of primary health care centers and transportation facilities. Besides, medicinal plants are easily formulatable and cost effective with negligible or no side effects [2]. According to WHO, today about 80 % of people in developing countries still rely on traditional medicine for primary health care. About 500 plants with medicinal use are mentioned in ancient literature and around 800 plants have been used in indigenous systems of medicine. India is a vast repository of medicinal plants that are used in traditional medical treatments. The various indigenous systems such as Siddha, Ayurveda, Unani and Allopathy use several plant species to treat different ailments. The use of

herbal medicine is becoming popular due to toxicity and side effects of allopathic medicines. This led to sudden increase in the number of herbal drug manufactures. The practices continue today because of its biomedical benefits as well as place in cultural beliefs in many parts of world and have made a great contribution towards maintaining human health [3].

In recent years, many plants from various genus, species and families were evaluated scientifically. Many active phytoconstituents were isolated and evaluated for their role in prevention and treatment of many diseased conditions. Many studies were reported with underlying the mechanism of action of active principles and various biological and pharmacological activities of traditional plants but the results and data obtained are not still satisfactory and the lack of updating database at regular intervals leads to loss of scientific information on specific plants. Thus more valid scientific data and collective information supports the therapeutic uses of traditional plants and further detailed research [4]. The present review on *Naravelia zeylanica* is to know its importance with respect to pharmacognosy, pharmacology and phytochemistry.

TAXONOMY [5]

Domain - Eukaryote.
 Kingdom - Plantae.
 Subkingdom - Viridiplantae.
 Phylum - Trachophyta.
 Subphylum - Euphyllophytina.
 Infraphylum - Rasiatopses.
 Class - Magnoliopsida.
 Subclass - Ranunculidae.
 Superorder - Ranunculanae.
 Order - Ranunculales.
 Family - Ranunculaceae.
 Subfamily - Ranunculoideae.
 Tribe - Anemoneae.
 Genus - *Naravelia*.
 Species - *zeylanica* - DC.
 Botanical name - *Naravelia zeylanica* DC.

NARAVELIA SPECIES

Naravelia antonii, *Naravelia Axillaris*,
Naravelia Dasyoneura, *Naravelia Eichleri*,
Naravelia Finlaysonian, *Naravelia Laurifolia*,
Naravelia Lobata, *Naravelia Loheri*, *Naravelia*
Pauciflora, *Naravelia Philippinensis*, *Naravelia*
Pilulifera, *Naravelia Siamensis*, *Naravelia Zeylanica*.

VERNACULAR NAMES OF NARAVELIA ZEYLANICA

Telugu - Pulla bachala, karupippala, mukkupeenasa teega.
 English - ----
 Malayali - Vatakkodi [11], Poytalachi, karuppakkodi.
 Hindi - Vatanasini.
 Sanskrit - Dhanavalli.
 Bengali - Chagalbati.
 Assamese - Goropchoi.
 Nepali - Ras gagri.
 Siddha - Vathomkolli.
 Tamil - Neendavalli, kattukodi [1]
 Meg - Jyrmailasam, Behalisham.

AYURVEDIC MEDICINAL PROPERTIES

Rasa - kashaya, Tikta, Madhura.
 Guna - Guru, Snigdha.
 Virya - Samaseetoshna.

MONOGRAPH

Naravelia zeylanica (Linn.) DC is a woody stout climbing perennial shrub with tuberous roots and long tendrils belonging to the family ranunculaceae [Figure 3] [6]. Commonly called as Eerabelli, vahna [7]. It is believed that the plant when grown inside their compound bad spirits cannot

disturb them. It is distributed throughout India mainly in warm regions of Eastern Himalayas, Assam, Bengal, Bihar and greater parts of Deccan Peninsula. It is a climbing shrub with long tendrils, stem is serrate, leaves are pinnately compound opposite, entire margin, trifoliate, terminal leaflet is modified into a three branched tendril [Figure 1]. Leaflets are ovate-lanceolate serrate. Inflorescence is panicles, flowers are yellow with fragrance, spreading, sepals 4, petals 8-12, narrow, linear-clavate, stamens numerous, pistils hairy, single ovule per ovary, styles persistent, pedicel is 1-1.5cm basally pilose. Fruits are achenes red in color which are slender, shortly stipulate ending in feathery tail [Figure 2]. Seeds are small with abundant endosperm and minute embryo [8].

TRADITIONAL MEDICINAL USES

In Indian system of medicine ayurveda, the plant *Naravelia zeylanica* (Linn) DC has been used in the treatment of pitta, helminthiasis, dermatopathy, leprosy, rheumatism, odontalgia, colic inflammation, wounds and ulcers [9]. From the ethnomedical reviews, it has been observed that the aerial parts of *Naravelia zeylanica* traditionally used in vitiated vata, pitta, inflammation, skin diseases. The leaves when crushed give a pungent odour which is inhaled to cure cold, all type of headaches including migraine. While root and stem paste is applied externally for psoriasis, itches and skin allergy. In Kerala, it is used as a source of drug for intestinal worms, skin disease, leprosy and toothache. The traditional medicine practitioners residing in Karnataka, are using the leaf and stem juices for treating psoriasis and dermatitis. The root and stem have a strong penetrating smell and is used to relieve malarial fever and headache. For treating wounds and worm infections, whole plant paste is applied externally on affected part for 2-3 days [1]. In case of rhinitis, the stem is dried, powdered tied in a clean cloth and the aroma from the cloth bag is gently inhaled [10]. For treating rheumatism leaves are boiled in water and used for bathing [11]. Many pharmaceutical industries in India are engaged in the production of skin ointments from this plant.

PHYTOCHEMISTRY

The main constituents of *Naravelia zeylanica* include carbohydrates, tannins, flavonoids, alkaloids, phytosterols, fixed oils, fats, gums, mucilages, proteins, terpenoids [12]. The ethanolic extract of *Naravelia zeylanica* yielded three important benzamides i.e., 3, 4-methylenedioxybenzamide, 4-methoxybenzamide and 4-hydroxy-3-methoxybenzamide. Beriberine, an alkaloid is

isolated from methanolic extract of leaves of *Naravelia zeylanica* which has antimutagenic, anticancer, antimicrobial activity, diarrhea, intestinal parasite infections, ocular trachoma infections and lowers low density lipoproteins [13].

PHARMACOLOGICAL ACTIVITIES

Different parts of *Naravelia* have been reported to possess various biological activities viz. antibacterial, anti inflammatory, antihelmintic, anxiolytic, antiulcer, antiarthritic, antifungal, antioxidant activities.

Anti ulcer activity: Ashoka Shenoy M et al., (2009) evaluated the anti ulcer activity of ethanol extract of leaves of *Naravelia zeylanica* (300mg/kg) against aspirin plus pylorus ligation induced gastric ulcer in rats, HC-Ethanol induced ulcer in mice and water immersion stress induced ulcer in rats. Ranitidine used as a standard drug. The antiulcer activity was assessed by determining and comparing gastric volume, free acidity and ulcer inhibition in aspirin plus pylorus ligation induced gastric ulcer model, number of lesions in HCl Ethanol induced peptic ulcer model and mean score value of ulcer inhibition in water immersion stress induced ulcer model. The extract showed significant reduction in gastric volume, free acidity and ulcer index compared to control in Pylorus ligation model, 89.71% ulcer inhibition in HCl-Ethanol induced ulcer and 95.3% ulcer protection index in stress induced ulcer which indicates that *Naravelia zeylanica* leaves extract have potential anti ulcer activity in the three models tested [6].

Antibacterial activity: Uvarani M et al.,(2009) evaluated the antibacterial activity of chloroform and ethanolic extract of *Naravelica zeylanica* by disc diffusion method and Minimum inhibitory concentration assay method (MIC) using 4 microbial strains of *Escherichia coli*, *Salmonella typhi*, *Streptococcus pneumoniae* and *Staphylococcus aureus*. For disc diffusion method three different concentrations of extracts were used (100µg, 150µg, 200µg /disc) and the diameter of the zone of inhibition were recorded. The chloroform and ethanolic extract showed the inhibitory activity against all the four strains, but the ethanolic extract showed potent inhibition against *Streptococcus pneumoniae* and *Staphylococcus aureus* in higher concentration (200µg/disc) when compared with kanamycin. From the MIC study, it was observed that the chloroform and ethanol extract showed significant inhibitory activity. The MIC values were in the range between 3.9µg/ml to 15.62µg/ml for different organisms. The antibacterial study revealed

that both chloroform and ethanolic extract exhibited antibacterial activity and particularly the ethanolic extract exhibited moderate activity against *Salmonella typhi* and *Staphylococcus aureus*. The minimum inhibitory concentration range confirms that both the extracts may be used as antibacterial drug. The potent antibacterial activity may be due the presence of phytoconstituents such as flavanoids, triterpenoids and phenolic compounds in this plant [8].

Antihelmintic activity: Ashoka Shenoy M et al.,(2009) evaluated the petroleum ether, chloroform and aqueous extract of *N zeylanica* (50mg/ml) for antihelmintic activity using adult earthworms. Piperazine citrate was used as a standard drug. Each crude extract containing 5, 10, and 50 mg/ml, produced dose-dependent paralysis ranging from loss of motility to loss of response to external stimuli, which eventually progressed to death. 5 and 10 mg/ml of petroleum ether extract produced paralysis within 300 and 220 min. respectively. Mortality was noted with 50 mg/ml of petroleum ether extract within 180 minutes. 5 and 10 mg/ml of chloroform extract also produced paralysis at 200 and 180 minutes respectively. The mortality was also occurred with 50 mg/ml concentration within 180 minutes. With higher doses (50 mg/ml of aqueous extract), the effects were comparable with that of 3% piperazine citrate. However, there was no final recovery in the case of worms treated with aqueous extract in contrast to piperazine citrate with which the paralysis was reversible and the worms recovered completely within 5 h. The result shows that the petroleum ether, chloroform and aqueous extract possesses wormicidal activity and thus, may be useful as an antihelmintic [14]

Anti-inflammatory activity: Ashoka Shenoy M et al (2009) evaluated the effect of lyophilized aqueous extract of *Naravelia zeylanica* leaves in various *in vitro* and *in vivo* inflammatory models. *N zeylanica* was studied for its *in vitro* inhibitory activity against 5-lipoxygenase (5-LO), cyclo-oxygenase (COX), leukotriene B4 (LTB4) and nitric oxide synthase (NOS). At doses 100 and 200 mg/kg, p.o. *N. zeylanica* was evaluated in acute pedal inflammation induced by carrageenan, histamine, serotonin and zymosan in rats and mice. Further, the effect of topical application of the extract (5 mg and 10 mg) on ear inflammation induced by various inflammatory agents like *-O*-tetradecanoyl-phorbol 13-acetate (TPA) or capsaicin or arachidonic acid or oxazolone or dinitrofluorobenzene (DNFB) was also investigated. *In vitro* evaluation of the extract revealed its inhibitory activity against the major

inflammatory mediators 5-LO, COX, LTB₄ and NOS. The extract significantly inhibited the pedal inflammation produced by carrageenan, histamine, serotonin and zymosan. Further, topical application of *N. zeylanica* significantly inhibited the ear inflammation induced by acute and multiple applications of TPA and acute application of capsaicin or arachidonic acid. However, the extract failed to inhibit ear inflammation induced by oxazolone or DNFB. Thus *N. zeylanica* has anti-inflammatory activity possibly mediated through 5-LO and COX pathways [15].

Sutharsingh R et al.,(2011) evaluated the chloroform and ethanolic extracts of aerial parts of *Naravelia zeylanica* (200mg/kg) for anti-inflammatory activity by Carrageenan induced paw edema method in wister albino rats. Indomethacin is the standard drug. The results revealed that the percentage increase in paw edema, reduced in both chloroform ($20.70 \pm 3.64\%$) and ethanol extract ($29.38 \pm 2.19\%$) treated animals when compared with standard Indomethacin ($22.01 \pm 4.08\%$) and control ($38.20 \pm 1.63\%$) animals. The chloroform extract of aerial part of *Naravelia zeylanica* DC possessed significant anti-inflammatory activity that may be due to its ability to prevent the production of some pro-inflammatory mediators [16].

Antiarthritic activity: Sutharsingh R et al (2011), evaluated the antiarthritic effect of chloroform and ethanolic extracts of aerial parts of *Naravelia zeylanica* (200mg/kg) in swiss albino rats using Freud's adjuvant induced arthritis model. Prednisolone (10 mg/kg p.o) is standard drug. The percentage increase in paw volume 7days and 21 days after the drug administration were noted. The results revealed that the reduction in paw volume in the right and left paw of rats treated with chloroform extract ($69.86 \pm 3.39\%$ & $50.88 \pm 2.51\%$), ethanolic extract ($66.99 \pm 3.85\%$ & $49.040 \pm 2.87\%$) and Prednisolone 10 mg/kg p.o. ($63.82 \pm 1.86\%$ & $34.90 \pm 3.00\%$) were moderately reduced when compared with control ($147.94 \pm 5.84\%$ & $111.97 \pm 8.45\%$) group animals. Further, the cordial signs of the chronic inflammatory reactions like redness, swelling, arthralgia and immobility of affected joints were significantly less in the drug treated animal than those of the control which may due to the presence of phytoconstituents such as triterpenoids and poly phenolic constituents. Polyphenols may inhibit NF- κ B, a transcription factor which stimulates the enzyme which produces the inflammatory agent nitric oxide [16].

Anxiolytic activity: Sutharsingh R et al (2011), evaluated the anxiolytic activity of chloroform and ethanolic extract of aerial parts of *Naravelia Zeylanica* (200mg/kg) in swiss albino mice using Holeboard test, Light and dark model and Elevated plus maze test. In the hole board test the number of head dips reduced in ethanol extract was significant (8.34 ± 3.40) when compared with standard (5.02 ± 2.05) and control (15.67 ± 0.62). In the light and dark model the number of entries of mice in the light chamber decreased in chloroform extract (7.83 ± 0.48) and ethanol extract (7.83 ± 0.70) and number of entries in the dark chamber increased significantly in chloroform extract and ethanol extract. The time spending in the light chamber also increased in chloroform extract (126.17 ± 5.42 s) and ethanol extract (134.83 ± 6.37 s) when compared with the standard and control. In the elevated plus maze model number of entries of mice in the open arm was moderately increased in chloroform and ethanol extract when compared with standard and control. These results revealed that both chloroform and ethanolic extract showed significant anxiolytic activity in all three methods. This anxiolytic activity may be due to the presence of flavonoids in the *Naravelia zeylanica* extract [17].

Antifungal activity: Medhi Sadhana et al (2012), evaluated the antifungal property of methanol, acetone and petroleum ether extracts of *Naravelia zeylanica* (L.) DC against five phytopathogenic fungi, commonly involved in the post harvest diseases of ginger using agar cup diffusion method. Among all the tested extracts, chloroform extract exhibited promising antifungal activity with maximum inhibition zones of 39.67mm followed by methanol, acetone and petroleum ether extract. Water extract was inactive against all the fungi except *Aspergillus Niger*. Minimum inhibitory concentration (MIC) values for the most active extracts determined by broth macro dilution technique found ranging between 1.56-3.12 mg/ml. in an approach towards development for eco friendly antifungal control strategy, the obtained results hints on an existing potential of *N. Zeylanica* extracts in the control and management of post harvest fungal pathogens of ginger [18].

Antioxidant activity: Sutharsingh R et al evaluated the anti oxidant activity of chloroform and ethanolic extract of aerial parts of *Naravelia Zeylanica* by various method such as DPPH free radical scavenging activity, Nitric oxide scavenging activity, FRAP assay (Ferric reducing antioxidant power) activity, Ferric Thiocyanate (FTC) Method and Thiobarbituric Acid (TBA) Method. In the DPPH

assay the Ic_{50} value of Chloroform & ethanolic extract 95.2 $\mu\text{g/ml}$ & 57.5 $\mu\text{g/ml}$ as opposed to that of ascorbic acid 52.3 $\mu\text{g/ml}$. Both the extracts decreased the amount of nitrite generated from the decomposition of sodium nitroprusside. The nitric oxide scavenging assay showed the half maximum inhibitory concentration of ethanolic extract quite equivalent to standard. In ferric reducing antioxidant power assay a linear increase in reducing power was observed over the concentration range 20–100 $\mu\text{g/ml}$ of extracts. In FTC and TBA method the results indicated that both extracts possessed anti-oxidant activity but ethanolic extract showed moderate activity. The presence of flavonoids, Phenols and high concentration of tannin in this plant cause greater reducing power [19].

CONCLUSION

Herbs are the natural sources of drugs used to regain the alterations made in normal physiological system by foreign organisms or by any malfunctioning of the body. It is very essential to have proper documentation of medicinal plants and to know their

potential for improvement of health and hygiene through an ecofriendly system. Thus importance should be given to the potentiality of ethnomedicinal studies as these can provide an effective strategy for the discovery of medicinally active identity. The present review reveals that the plant *Naravelia zeylanica* is used for treating various ailments. The shrub is of immense medicinal value. It is used in pitta, helminthiasis, dermatopathy, leprosy, rheumatism, odontalgia, colic inflammation, wounds and ulcers, cure cold, headaches, migraine, psoriasis, itches and skin allergy, dermatitis, malarial fever and headache, rhinitis. The plant *Naravelia zeylanica* shows many pharmacological activities like antibacterial, antifungal, anxiolytic, antioxidant, anti-inflammatory, antiarthritic, antihelminthic, antiulcer and still more research is needed. It elicits on all aspects of the herb and throws the attention to set the mind of the researchers to carry out the work for developing its various formulations, which can ultimately be beneficial for the human beings as well as animals.



Figure 1: leaves of *Naravelia zeylanica*



Figure 2: Fruit (Achenes) of *N zeylanica*



Figure 3: plant of *N zeylanica*

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