A review: **Neeli: An integral drug in the management of Visha**

**Divya KM, Shanti R Nair, Rukma CK and Ittoop J Ancheril**

**Abstract**

*Neeli* or Indian indigo is an Ayurvedic herb used in the management of *visha* (poison) and its related conditions. Many references regarding the *visha hara* (anti-toxic) property of the drug is available in the classics. It forms the ingredient of various *Agada yogas* (formulations for the treatment of poison and toxic conditions) and other commonly practiced formulations. In addition to the *brihat trayis* (three main treatise in Ayurveda classics), the drug is frequently mentioned in *Keralaeeya visha chikitsa granthas* (Classic books followed in Kerala for the treatment of poisonous conditions) like *Prayogasammucchayam*, *Kriyakauumudi*, *Kodasherymargam* etc which highlights its potency and the important role played by *Neeli* even in the management of high potent poisons like *mandali visha* (viper bite). Proper evaluation of the drug and its properties with genuine research studies may help practitioners of *Agadatantra* to tackle the innumerable ailments arising due to exposure to various toxins, seen in the present era, with a better and cost effective treatment. In this article, an attempt is made to throw light on the significance of the anti toxic property of the drug *Neeli* and its potency in treating various poisonous conditions including snake bites.

**Keywords:** Agadatantra, *Neeli*, *Indigofera tinctoria*, visha, mandali, lootha, *Keralaeeya Visha chikitsa*

**Introduction**

*Neeli* or *Neelini* known by the botanical name *Indigofera tinctoria* is an ayurvedic herb widely used in the management of various ailments especially in the treatment of *visha* (poison). The plant is commonly called as Indian Indigo as it was used for the extraction of dye to color cloths. Hailing from Fabaceae family, the plant is identified as a branching shrub growing upto 2 m high, possessing leaves with 7-13 leaflets which are green when fresh and turns greenish black on drying. The tender branches are bluish red in colour and the flowers are many in nearly sessile biennial, or perennial depending on the climate in which it is grown.

**Distribution:** Throughout India, mainly as an escape from cultivation. It may be an annual biennial, or perennial depending on the climate in which it is grown.

**Parts used:** whole plant.

**Properties and uses:** The roots, stems and leaves are bitter, thermogenic, laxative, trichogenous, expectorant, anthelmintic, tonic and diuretics, and are useful for promoting the growth of hair and in gastropathy, splenomegaly, cephalalgia, cardiopathy, chronic bronchitis, asthma, ulcers and skin diseases. The juice expressed from the leaves is useful in the treatment of hydrophobia. An extract of the plant is good for epilepsy and neuropathy. The plant possesses anti – toxic property.

**Properties & action of root of *Indigofera tinctoria*: [2]**

a) **Macroscopic:** Tap root having lateral roots with pale yellow to light yellowish brown colour. The roots are hard, woody, cylindrical, nearly smooth except for a few having scattered lenticels. The odour is not distinct and has a slightly bitter taste.

b) **Microscopic:** Roots show a narrow zone of cork, consisting of 4 – 10 layers of tangentially elongated, rectangular, thin – walled cells with lenticels. It has a narrow zone of secondary cortex consisting of rectangular to polygonal, thin – walled cells containing rhomboidal to hexagonal crystals of calcium oxalate. There are groups of fibres and secondary phloem which compose of usual elements. The secondary xylem consists of xylem parenchyma, vessels, fibres and rays. Fibres are large aseptate with pointed end and vessels are solitary or 2-4 in groups having simple pits.
The medullary ray is 1-4 cells wide and prismatic crystals of calcium oxalate is present in the secondary cortex, phloem, xylem parenchyma and rays. There are oil globules present in the cortex and phloem parenchyma. Starch grains are simple and round to oval in shape and are present in the cortex, phloem, xylem parenchyma and rays.

T.L.C [2].
T.L.C of alcoholic extract of the drug on Silica gel ‘GF 254 + Silica gel ‘G’ (1.3 w/w) plate using Chloroform: Ethylacetate (6:4) show under U.V. (366 nm) ten fluorescent zones at Rf. 0.14 (blue), 0.30 (bluish green), 0.40 (blue) 0.47 (blue), 0.58 (blue), 0.63 (bluish green), 0.75 (blue), 0.81(blue), 0.86 (green) and 0.91(blue). On exposure to iodine vapour, thirteen spots appear at Rf. 0.06, 0.10, 0.14, 0.27, 0.33, 0.40, 0.50, 0.58, 0.63, 0.75, 0.80, 0.86 and 0.91 (all yellow). On spraying with 5% Methanolic Sulphuric acid reagent and heating the plate at 110 °C for 10 minutes fourteen spots appear at Rf. 0.06, 0.10, 0.14, 0.21, 0.27, 0.33, 0.40, 0.50, 0.58, 0.63, 0.75, 0.81, 0.86, and 0.91 (all grey).

Main constituents: Glycoside (Indican) [2].

Rasa panchaka of Neeli moola [2],
Rasa : Katu, Tikta
Guna : Sar\a
Virya : Usna
Vipaka : Katu
Karma : Kapha vata hara, Kesya, Rechani,, Bhrama Mohahara.

Therapeutic uses: Gulma, Kasa, Pliharoga, Udavarta, Uduraroga, Vatarakta, Vishavikara, Amavata, Krimiroga [2]

Dose of Root: 48 gm of drug for decoction [2].

A glance into the classics in the field of Agadatantra will reveal the administration of different parts of the plant, either alone or in combinations, to manage wide range of toxic conditions

Classification according to various ayurvedic texts:
The drug has been mentioned by brihat trayis and nighantukaras and nighaharatwa has been quoted as one of its cardinal property [1].

Classification by various classics

<table>
<thead>
<tr>
<th>Classifications</th>
<th>Classified under :</th>
<th>Charaka samhita</th>
<th>Virechana gana in Apanarga tunduleeyam adhyayam Of Sutra sthana [1]</th>
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<tbody>
<tr>
<td>Kavyadeva Nighantu</td>
<td>Ooshadi varga, [3]</td>
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<td>Bhavaprakasha Nighantu</td>
<td>Guluchyadi varga [5]</td>
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<td>Dharwanwanti Nighantu</td>
<td>Guluchyadi varga, [6]</td>
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<td>Raja Nighantu</td>
<td>Shatalvadi varga. [7]</td>
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Synonyms by different nighantukaras [1].

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<th>Sivadatta Nighantu</th>
<th>Bhavaprakasa Nighantu</th>
<th>Raja Nighantu</th>
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<td>Neelika</td>
<td>Neelini</td>
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<td>Neela patra</td>
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<td>Sarapun-ga dala</td>
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<td>Bahu shimba</td>
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<td>Kaala kesi</td>
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<td>Neela pushpa</td>
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Properties of neeli according to different nighatukaras [1]

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<td>Rasa</td>
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<td>Guna</td>
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Karma (action)

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<tr>
<th>Classes</th>
<th>Bhedini (purgative)</th>
<th>Rechani (induces drastic purgation)</th>
<th>Kati vata kaphapaha</th>
<th>Mitigates vata localized in lumbar region &amp; kapha</th>
<th>Keshya Kaphanuth (mitigates kapha)</th>
<th>Keshya</th>
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<td>Sleshma anilapaha (mitigates kapha and vata)</td>
<td>Kesha(yagood for hair growth)</td>
<td>Mitigates vata localized in lumbar region &amp; kapha</td>
<td>Kesha</td>
<td>Keshyaa Kapham jayeth (mitigates diseases caused by kapha)</td>
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<td>Brahamahapah (mitigates giddiness)</td>
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Different from the above nighantu references, the text Hridaya priya claims the drug to be, vata pitta hara (mitigates vata and pitta) and kandu vrana vinushini (relieves itching and cures ulcers) [1].

Neeli has a wide range of therapeutic indications. Some of which include, external application in palitha (premature greying of hair) due to its keshya and kesharanjaka property (helps in hair growth and induces good colour to hair).

Internal intake of the root with aja ksheera (goat’s milk) to mitigate mutra kririca (dysuria) as explained in Vaidya manoram. [1].

**Few references regarding neeli in visha chikitsa**

Susruta acharya has mentioned the intake of ‘sa sarpsishkam niliniphalam’ (intake along with ghee) to induce virechana (purgation) in the management of pakswasaya gata visha (visha located in lower Gastro Intestinal Tract) [8].

Raja marthanda has indicated the intake of neeli moolam (root of Neeli) grinded in tandula jalam (prepared by soaking pounded rice grains in water) for the management of mandali visha (viper bite). [10] A similar reference, regarding the intake of neeli moolam kale in warm water along with its application at the damsha sithana (bite site) of mandala(viper), is available in Prayoga sammucchayam, a keralayee visha chikitsa grantha (Classic text books followed in Kerala for the treatment of poisonous conditions) [9].

External application and internal administration of the roots of Nimba (Azadirachta indica), Neeli and Karanja (Pongamia pinnata) is said to have the power for quick mitigation of vish [10]. They are considered as the Trinity in the treatment of Visha by vishya vaidyas (Traditional Ayurvedic toxicologists of Kerala).

Quite different from the other classics, Prayogasamucchayam explains 16 types of mandali and its treatment. Neeli has been mentioned for the treatment of kumbha mandali and rakta mandali (two varieties of viper snake) [11-12].

Internal and external use of Neeli moola along with Shireesha moola (root of Albizia lebbeck) grinded in their pratra swarasa (juice extracted from leaves) helps in fast relief from lootha visha (spider bite poison) [13]. Dhara (An external therapy in which the prepared medicine is continuously poured on the affected part) and pantha (intake) of Saritha (Hemidesmus indicus) and Neeli moola kwadhittha jala (water boiled with the above mentioned two drugs) is indicated in case of lootha visha. [13]

Intake of ghrita (ghee) processed in Neeli pratra swarasa along with Tulasi swarasa (juice of Ocimum sanctum), Nirgundi swarasa (juice of Vitex negundo) and certain other drugs is also indicated in lootha visha. The same yoga is advised to be processed in coconut oil for external application which is available in the market under the name Neelidalada keram [14].

Application of Neeli dala (leaves of Neeli), made into kalka (paste) in milk, over the abdomen has been explained by acharyas as one of the earliest method of diagnosis of the site of Garavisha (A condition of latent poisoning) [15-16]. The site where the paste does not dry is considered to be the site of visha. References regarding the usage of Neeli moola (Root of Neeli) for treating Manushya visha (human poison) and lizard poisoning are available in Sahasrayoga [17-18].

Kodasseri margam, a unique keralayee visha chikitsa grantha has indicated the intake of Neeli moola in the swarasa (juice) of Dronapushpi (Leucas aspera) for the management cobra bite venom along with other drugs [19]. References regarding Thalai (treatment in which Application of medicinal paste on the vertex of head is done) and lehya yogas (lickable formulations) containing Neeli for the treatment of visha attura (A person afflicted with poison) is also available in the text [20].

Traditional visha vaidyas of Kerala use Neeli as an extra addition to classical yogas to yields better results. Similarly, Neeli pratra swarasa (leaf juice of Neeli) is used for grinding certain Agada yogas in which bhavana dravya (Medium for grinding the drugs in a formulation) is not specified by acharyas (eminent scholars), in order to enhance its potency. In the context of pratryoushdha prayoga (antidote), pantha (intake) and vilepana (external application) of Neeli is considered to be effective as a samanya pratryoushdha dravya.
(general antidote) against nana visha (various toxic conditions) [21].

Yogas
Though it forms the ingredient of many formulations used commonly in clinical practice such as, Aravindasavam, Neelibhringadi tailam, Neelimooldi gutika, Gorochanadi gutika, Chemparathyadi keram, Triphladi tailam, Mahapanchagavya ghritam etc, for the management of a wide range of diseases, the presence of drug Neeli in Agadayogas cannot be left unnoticed.

Few commonly practised Agadayogas with Neeli as an ingredient
1) Vishavilwadi Gutika mentioned in Kriyakaumudi [21] contains Neeli moola as an ingredient in addition to the Vilwadi gutika, Patha (Cyclea peltata) and Eswaramooli (Aristolochia indica). The yoga is said to have the same phala sruthi (therapeutic results) as that of Vilwadi gutika but is considered to be more potent that the latter.
2) Neelilahasyadi Kashayam explained in Prayogasamucchayam which is indicated for lootha visha [14].
3) Kottamramachadi Choorna, a lepa yoga advised to be applied in milk, mentioned in lootha samanya chikitsa (general treatment line for spider bite) in Prayoga samucchayam [15], contains Neelimoolda as one of its four ingredients.
4) Neelimooldi Lehyam explained in Kriyakoumudi, is indicated for sarva visha samanam (useful in all kinds of toxic conditions) [21].
5) Neelikaranjadi Kashayam indicated for akhu visha (Rat poison) has been mentioned in Prayoga samucchayam [24].
6) Kaivishaparihari Gutika which is used to remove ‘kativisha’ (Administered poison in traditional black magic) has been explained in Kriyakaumudi [29].
7) Neelini Ghritam, a single drug ghritha preparation using Neeli moola and patra swasara as dravadvraya (liquid medium used in medicinal ghee preparation) and Neelimoolda as kalka dravya (paste), explained as a sthavara jangama samanya chikitsa oushadha (general medicine used in both animate and inanimate poisoning) [26].

Apart from these, other various yogas (formulations) prepared from Neeli such as Neelipatradi lehyam, Neelikadi lehyam, Neelikadi ghritam, Neeli ghritam, Amari mooladi ghritam has been mentioned for various toxic conditions under the Lehataladi prayoga adhikaram of Jyotsnaka - a Keraleeya visha chikitsa grantha [27].

Research studies done on Indigofera tinctoria:
Not many research studies have been conducted on this plant. The few studies did, show the following:
1. A phytopharmacological research study shows that the plant possesses anti-toxic property along with anti-hyperglycemic, anti-bacterial, anti-oxidant, anti-inflammatory, anti-diabetic activity and also acts as an anticonvulsive agent [28].
2. An animal study conducted with the aqueous extract of Indigofera tinctoria (250, 500 mg/kg b.wt) reported that the histopathological changes in the liver showed antihapatotic efficacies against paracetamol induced liver damage in rats [29].
3. Significant nephroprotective activity was detected in cisplatin induced renal damage in wistar albino rats. A dose of 500 mg/kg of water decoction of leaves of Indigofera tinctoria was induced for the same, where remarkable changes were noted in RFT and body weight [30].

Discussion
Though various references regarding the properties of the drug is available in the classics, most acharyas opines that the plant possess tikta rasa (bitter taste), laghu ruksha guna (light to digest and dry in nature), katu vipaka (becomes pungent after digestion) usna virya (hot in potency) and is kapha vata shanama (alleviates kapha and vata). Visha is said to be attributed with avyaktarasa (undefined taste) [31] dosa pradhanya as vatapilothara (predominant with vata and pitta dosha) [32], laghu ruksha guna and usna virya [31]. Though it is said ‘samanyam vridhi karanaam (exposure to situation or materials with similar properties results in the increase of the particular substance or condition).’ [33], it can be inferred that the drug Neeli acts as vishahara due to its prabhava (unexpected unique pharmacodynamics of a drug), as Charakacharya rightly quotes. ‘vishagnamukta kath prabhavastatra karanam. (visha hara property of drugs is due to their prabhava)’ [34].

Though specific doses are not mentioned in most conditions, The Ayurvedic pharmacopoeia of India concludes the dose of Neeli pratra Kashaya (decocates of leaves of Neeli) as 50 – 100 gm and that of root as 48 gm of drug for decoction [2]. This dose may be chosen for ailments other than visha, as visha, quite different from other diseases, is considered to be atyaya (emergency) condition which demands intervention in mihurmuha: oushadakala (frequent administration of medicine) [35], and in doses which depend on the condition of the victim and the potency of the visha inflicted, as Acharya Vagbhatta quotes’ sthana vega balaabala, alochya nipunam bhudhya karmananatharam achareth… ‘(Visha condition should be treated according to the logic of the physician after carefully looking into various aspects such as the location & severity of the poison in the body, the strength of the patient etc)’ [36]. Hence the dose of Neeli to be administered in visha may vary depending on the condition of the patient and logic of the vaidya (physician).

Ayurvedic classics reveal that Neeli is widely used in the management of numerous conditions of visha. Apart from the birhat trayis and the nighantus, the drug is frequently mentioned in keraleeya visha chikitsa granhas like Prayogasamucchayam, Kriyakaumudi, Kodasherymargam etc which throws light on its easy accessibility and its efficacy even in the management of high potent poisons like mandali visha.

More research work is to be taken up in order assess the properties of each plant part to evaluate its action against any particular visha condition. The plant, with its vishahara potency and its availability in abundance, can be utilized by practitioners to advice as a household remedy as well as for clinical practice in order to treat visayukta conditions.

Conclusion
Since ancient times Neeli has been widely used for the management of various conditions of visha along with other disorders. References regarding the plant and its therapeutic uses are available in the classics and Samhitas. The drug forms the part of many Agadayogas and various Ayurvedic formulations widely used in practice by clinicians. Research work conducted on the plant reveals its anti-toxic,
hepatoprotective and nephroprotective action. More studies are to be conducted on the plant in order to widen its use in the treatment of pathological conditions arising due to exposure to various toxins, hence helping the Agadatantra clinicians to utilize this valuable drug for providing cost effective and better management in their day to day clinical practice.

Acknowledgement
Dr Arathi Rajesh MD(Ay), Associate Professor
Dr Ashish Paul Thomas MD(Ay), Assistant Professor
Faculties of Department of Agadatantra, MVR Ayurveda Medical College.

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