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Review Article

KUCHALA (*STRYCHNOUS NUXVOMICA* LINN) - KNOWN AS TOXIC AND LESS KNOWN AS AN EFFECTIVE MEDICINAL HERB

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ABSTRACT

Strychnous nuxvomica Linn, known as *Kuchala* in Ayurveda is a well known poisonous herb that consists of multiple health benefits in Indian system of medicine. In Ayurveda, it is said as *Upavisha* and used *as* a popular folk medicine from ancient times. This *Kuchala* is still being used in rural India in the medicinal form. Strychnine is a main contain of *Kuchala* which was first used in 1540 for the purpose of medicine and continued to be used in many stimulants, tonics and cathartics. It includes constituents like alkaloids with flavonoids, iridoids and phenolic glycosides. Research studies have reported its anti-allergic, anti-inflammatory, antimicrobial, anticancer, antipyretic, gastroprotective, antidiabetic, antialcoholic, hepatoprotective, antioxidant, antinociceptive, anti-snake venom and neuropharmacological properties. Though considered as an extremely poisonous plant, but has enormous medicinal properties.

INTRODUCTION

Ayurveda Acharyas believe that even a poisonous drug can be advantageous and provide more therapeutic benefits if it is properly administered, and similarly a medicinal plant or a drug, if not administered properly may act like a poison. [1] This concept of *Visha* and *Upavisha* is dealt in Agada tantra branch of Ayurveda. *Kuchala* is an Indian medicinal plant described in Ayurvedic science that has vast therapeutic benefits. It is also called as *Kupilu* or *Kuchila* and is included under the upavisha varga or the sub division. [2] The groups of drugs that are having less toxic potency and are less lethal but produce certain toxic symptoms on administration are called as *Upavishas*. [3] According to ancient texts of Ayurveda, the *Upavishas* or the drugs that have toxic properties can be used for therapeutic purposes after purifying (*Sodhana*) it in a systematic manner. [4] These herbs have been used in various formulations of Ayurveda in the management of diseases. [5] One such drug is *Kuchala* or the *Strychnos nux-vomica* that is found abundantly in India also cultivated in countries like US, Europe etc. *Kuchala* is also known as *Kupilu* or *Kuchila* that is a poisonous deciduous tree as per ancient texts. [4] Hence in the current study, we have made an exploration of *Kuchala* in detail with its therapeutic, toxicity and medico-legal aspects.

Table 1: Properties of *Kuchala* [6]

S.No	Botanical name	*Strychnos nux-vomica* Linn
1.	Family	Loganiaceae
2.	Common names	Nux-vomica, poison nut, snakewood
3.	Synonyms	*Kupeelu, Kuchala, Kakatundika, Kakapiluka, Karaskara visha-tinduka*
4.	*Rasa*	*Katu, Tikta*
5.	*Guna*	*Laghu*
6.	*Virya*	*Ushna*
7.	*Vipaka*	*Katu*
8.	*Karma*	*Kapha-Vata hara, Grahi, Vishaghna*

In traditional and folklore medicines, this *Kuchala* has been extensively utilized as the seeds and bark possess a wide variety of therapeutic benefits and indications. This is rich in indole

alkaloids, strychnine and brucine. Studies have reported a wide range of pharmacological and biological activities besides its toxic properties. It is used as an appetite suppressant, purgative and as a constituent of nerve toxin along with its uses as rodenticide, respiratory stimulants, killing stray dogs.[7]

Botany

Strychnos nux-vomica is a medium sized deciduous tree with dense, white wood is dense and close grained.

Trunk: The trunk is tall, thick, straight and cylindrical covered with yellowish-grey to dark grey, smooth and thin barks. [8]

Branches: Irregular and covered with smooth ash coloured bark and shiny dark green young shoots. **Leaves:** Simple and entire, smooth, short-stalked broad, opposite leaves with blade orbicular to broadly elliptical or ovate, base rounded to cordate. Its features with apex shortly acuminate or acute, glabrous and shiny above, minutely hairy especially on veins beneath, 3–5 veined from the base. [8]

Inflorescence: Featured with many-flowered and appears with young leaves at the end of branchlets or on axillary shoots. Terminal cymes with hermaphrodite flowers, actinomorphic, homogamous, greenish-white coloured, small in size, nectariferous, funnel-shaped and emits unpleasant odour. [8]

Flowers: Pentamerous with calyx lobes, ovate outside and hairy densely. Its corolla is 1cm long slender tube outside the glabrous with widening at the throat, having pubescence at base, lobes narrowly ovate, of 3mm long, margin thickened and minutely hairy, greenish white to white; stamens inserted at the mouth of the corolla tube, exerted altering with corolla lobes. Anthers pale cream in colour, dithecous, introrse and dehisce longitudinally. [8]

Ovary: The style is filiform with glabrous and long corolla tube with stigma capitates (head-shaped). It is designed as bicarpellary with axile placentation, superior and glabrous with ovoid shape.

Fruits: An indehiscent berry and a globose with shell both hard and smooth. Full of fleshy and jelly-like pulp containing 1-5 seeds, soft and white in colour. These seeds are orbicular or ellipsoid in shape and give a characteristic shine to the seeds by with its dense silky hairs. This seeds have two sides with concavity on one side and convexity on the other with a depression on both the sides. The inner layer Endosperm contains a small embryo and is odorless, dark greyish in colour, very hard, bitter in taste. [8]

Phyto-chemical Constituents

The *Kuchala* tree contains many alkaloids of medicinal importance but its seed is richer in these constituents as described in pharmacopeias. It is rich in alkaloids, flavonoids, tannins and triterpenoids, glycosides, lignins and steroids. [9] More than 90 chemical compounds have been isolated from different parts of nux vomica but strychnine and brucine are the principal toxic alkaloids. They occur not only in the seeds but also in roots, wood, bark, fruit pulp and hard fruit shells. **[10]** Seeds contain 2.6 to 3.0% of total alkaloids, of which 1.25 to 2.5% is strychnine and 1.5 to 1.7% is brucine. The seeds contain chlorogenic acid, a glycoside (loganin), and 3.0% of fixed oil in addition. [11]

Toxicological Significance

Action

Inhibitory neurotransmitter glycine can be antagonized with strychnine by blocking its spinal cord receptors and post-synaptic uptake by brainstem.

- The inhibiting effect of glycine is reduced and nerve impulses are triggered with lower levels of neurotransmitters.
- When there is no inhibitory effect, the motor neurons do not stop their stimulus and the victim will have constant muscle contractions (release excitation).
- Its actions mainly lies in the in Renshaw cells of the spinal cord, that is the anterior horn cells.
- GABA, the strychnine also doesn't affect the neurotransmitter of presynaptic inhibitory neurons.

Metabolism: It is metabolized mainly in the liver.

Fatal dose

- Strychnine: 15-50mg (1-2mg/kg body wt).
- 1 crushed seed.

Fatal period: 1-2 h

Signs and Symptoms

Within 15-30 min of ingestion, particular signs and symptoms can be observed and a 'conscious' seizure occurs as the characteristic presentation of strychnine poisoning.

Below signs and symptoms may be observed:

I. Bitter taste.

II. Choking sensation in throat and stiffness of the neck and face.

III. Prodromal symptoms: Restlessness, increased acuity of perception, increased rigidity of muscles and muscular twitchings.

IV. Face: Cyanosed, look is anxious, eyes are staring, eyeballs are prominent and the pupils are dilated. Mouth is filled with bloodstained froth.

V. Convulsions: The threshold for CNS stimulation is lowered with the result that any sensory stimulus (pain, touch or noise) may produce violent muscular spasm. Initially, clonic but eventually becomes tonic and affects all the muscles at the same time.

• ***Risus sardonicus*:** contraction of the jaw and facial muscles with the corners of the mouth drawn leads to this condition.

• Convulsions are most marked in anti-gravity muscles resulting in hyperextension (*opisthotonus*)

• Sometimes, the spasm of the abdominal muscles may lead to forward bending or the sideways of the body either (*emprosthotonus*) or (*pleurosthotonus*).

• Duration of convulsions is about half to 2 min.

• In between convulsions, muscles are completely relaxed. Patient looks well, but exhausted and breathing is resumed.

• One more convulsion occurs after 5-15 min with slightest impulse like current of air gently touching the patient and or that of appearance of sudden noise.

• Lactic acidosis, rhabomyolysis and hyperthermia occurs due to increased muscle tone, hyper reflexia, agitation, restlessness and convulsions.

• Within the occurrence of 4-5 convulsions, patient cannot breathe and that leads to death. Mind remains clear and consciousness is not lost till the death, but death occurs due to medullary asphyxia, paralysis, exhaustion or due to the spasm of respiratory muscles.

Treatment

There is no antidote for strychnine poisoning.

• Maintain clear airway and adequate ventilation.

Convulsions Control: with a dark room without light and disturbance and noise. Benzodiazepines remain the first-line of treatment for strychnine induced muscular hyperactivity. Diazepam 0.1-0.5mg/kg IV slowly. If ineffective, general anesthetics and/or muscle relaxants, like gallamine should be given.

• Antidotes such as pentobarbital sodium or sodium amytal (Barbiturates) are given in the dose of 300-600mg IV.

• Gastric lavage with $KMnO_4$ may be done cautiously, if there are no convulsions. Activated charcoal is administered to adsorb strychnine and to reduce its absorption after 1 h of ingestion.

• Hyperthermia is treated by active cooling with ice water immersion, cooling blanket or mist and fan.

• Symptomatic treatment.

Postmortem Findings

• Not characteristic.

• Rigor mortis appears early.

• Signs of asphyxia.

• In the muscles, the extravasated blood may be observed.

• Viscera are congested.

Medico-legal Aspects

• One of the most deadly poisons. Death is usually accidental due to overdose, quack remedies and poison mistaken for some other harmless drug, or in children eating the seeds.

• It is used as an aphrodisiac, as cattle and arrow poison and to kill dogs and rats. [12]

Sodhana

Seeds of *Kuchala* are dried and soaked in cow's milk overnight for 20 hours and then with the help of a knife, its outer covering is scrapped and removed. Then it is cut into small pieces and boiled in cow milk for three days (about four hour each day). At the end of each days bowling, it is warmed with warm water and dried before use in subsequent days. After three days it is dried under shade and fried with cow's ghee to be used as therapeutic agent. [13]

Therapeutic Significance

• Analgesic and anti-inflammatory

• Anticonvulsant

• Anti-tumor effects

• Anti-amnesic

• Antidiarrhoeal

• Immunomodulatory effect

• Antisnake venom activity

• Hepatoprotective and anticholestatic activities. [14]

Important Formulations or *Yogas*

• *Maha Vishagarbha Taila*

• *Ekanggavira Rasa*

• *Vishatinduka Vati*

• *Krimimudgara Rasa*

• *Navajeevanrasa*

• *Agnitundirasa*

• *Laxmivilasarasa*

• *Shulnirmulanarasa*

• *Suptivaataririasa*

• *Vishatinduka Taila* [15,16,17]

DISCUSSION

The process in which poisonous drugs are converted in to life saving drugs with applications of certain *Sanskaras* (process) like *Shodhana*, *Marana* etc. and by rubbing, steaming etc so as to eliminate its harmful effects is known as *Shodhana sanskara* or purification process. [18] The concept of *Visha* and *Upavishas* and the procedure of using these drugs in medicinal preparations are followed in Ayurvedic science since centuries. The *Shodhana sanskara* or the purificatory measures helps in reduction of

harmful effects and increases its therapeutic benefits. [19]

Kuchala or the *Strychnos nux-vomica* is one of the *Upavisha* that has been explained in detail in *Rasatarangini* regarding its properties, therapeutic uses and methods of purifications etc.

In *Rasatarangini*, *Shodhana* procedure of *Kuchala* is described in three methods as

1. **First method:** In this method, the matured and dried *Kuchala* seeds are taken and kept in *Kanji* (sour gruel) for three days and after three days these seeds are taken out from *Kanji* and its external *Twak* or skin is peeled off. Later, these seeds are dried in sun and powdered. Thus *Kuchala* get purified. [20]
2. **Second Method:** In this type, the dried and matured seeds of *Kuchala* are taken and fried in a pan with ghee on low flame and fried until its outer skin becomes slight reddish (*Kapisha*) in colour. Once it gets the colour of red, then slowly its outer skin is removed and separated with its hot inner part removed. This method can be followed in case of rapid purification of *Kuchala*. [21]
3. **Third method:** In this method, the dried and matured *Kuchala* seeds are taken and tied in a *Pottali*. This *Pottali* of *Kuchala* seeds is placed in a *Dolayantra* that is filled with cow milk. This is heated for three hours and after three hours, the seeds are removed out. After the process of heating, its skin is separated and removed. With the help of iron *Kharal* it is powdered and by this way the *Kuchala* seeds are purified. [22]

Clinical Studies

Anti-cancer

In the study of Rao et al, the aqueous extract of nux vomica roots was administered and has showed the dose and time dependent anti-proliferative activity against human multiple myeloma cell lines with IC50 value of 11mg/ml which indicated that the root extract induced apoptosis of myeloma cells in addition to the disruption of mitochondrial membrane potential and subsequent leakage of mitochondrial cytochrome c and these effects were likely caused by strychnine and brucine. [23]

Rhinitis

The nux vomica 6C dilution was applied in 109 children with acute rhinitis in an open, multicenter clinical trial in children with acute rhinitis and had demonstrated the usefulness of homeopathic nux vomica dilution (potency) in the treatment of acute rhinitis. Among them, 79.82% of children were completely cured and 14.68% of children were remarkably improved and while 5.50% of children improved moderately within 7 days of trail period. [24]

Insomnia

A clinical study with 10 human subjects showed significantly lowered serum cortisol levels in 38% patients with nux vomica dilutions (3C and 15C). [24]

Animal Experimentations

Anti-diabetic activity

In an animal study was conducted on healthy albino rats of both sexes weighing 150–250g, where diabetes was induced in the rats by administering 110mg/kg of alloxan intraperitoneally and kept for 24 hr fasting prior to administration. After 72 hr, the blood samples were collected and analyzed for blood glucose. Albino rats that showed more than 200mg/dL blood glucose were considered as diabetic and were used in the current study. The blood samples of these rats were collected randomly to avoid any bias. Drug was administered using oral feeding needle with distilled water as a vehicle for administration of aqueous and 50% ethanolic extract of S.nux-vomica. And this study showed that the hydroalcoholic and aqueous S.nux-vomica seed extracts, administered per os, were effective in controlling diabetes of albino rats. [26]

Hepato-protective

Oral administration of varying doses of processed seed extract for 5 days resulted in the reduction of serum levels of glutamate oxaloacetate transaminase (GOT), glutamate pyruvate transaminase (GPT), alkaline phosphatase (ALP), bilirubin and cholesterol in addition with the restoration of glutathione (GSH) and reduced lipid peroxidation in liver tissue in a vivo study demonstrated the hepatoprotective potential of processed seed extract in assays involving CCl4 - induced liver injury in rats. [27]

Anti-Allerghic

An in vivo study demonstrated that the aqueous stem extract of nux vomica significantly suppressed the induction of ovalbumin (OVA)-specific IgE antibody response in different haplotypes of mice viz. BALB/C, C57BL/6 and SWR/J without any significant change in the total IgG antibody response against OVA with intraperitoneal administration. [28]

Maha Vishagarbha Taila

This *Taila* is indicate *Vatavyadhi*, musculoskeletal disorders like joint pains, backache, sciatica, best in relieving pain. [29]

Ekangavira Rasa

Ekangveer Ras is a *Rasaushadhi* (Herbo mineral medicine) that constitute *Bhasma* as a main ingredient, most superior form of medicine. In *Vatvyadhi Prakarana* of *Nighantu Ratnakar*, *Ekangveer Ras* has been advised for the management of *Pakshaghata* and other *Vatvyadhis*. [30]

Vishatinduka Vati

Vishtindukadi vati is Ayurvedic drug mentioned in *Rasa tantra sara* and *Sidha prayoga samgraha*. The main content of *Vishtindukadi vati* is the *Kuchla*, along with *Maricha, Chincha phala* and *Phugphala*, indicated in opium addiction. [31]

Krimimudgara Rasa

Krmimudgara rasa is a unique preparation that has been successfully used by traditional practitioners for the treatment of digestive impairment and ascariasis. [32]

Navajeevanrasa

The clinical study was conducted on two patients treated one group with *Navjivan Rasa* and *Ropana Tailam* and second control group treated with Diosmin 300mg BID. *Navjivan Rasa* and *Ropan* tailm possess sufficient efficacy in *Vran shodhana* and *Vran ropana* and shows better results in healing of venous ulcer. [33]

In this way, even a poisonous herb or a plant can be made into a potential medicine and applied in various medicinal preparations for the welfare of mankind. Ayurvedic methods of purification are very scientific and used even in the present day to remove the toxicity of the poisonous drugs and also to enhance the potency and efficacy of the same. This in turn makes the drug more effective in treating the disorders. Like the quote "Treasure out of Trash", we can take this opportunity to say "Treasure out of Poison" to this particular context of making a poisonous drug into a most effective drug to be applicable for medicinal purpose.

CONCLUSION

Kuchala, a *Upavisha* or a poisonous drug is very potential both as a poison and as a medicine. Being a poison, it is so powerful that it leads to death and when it is purified possesses enormous medicinal properties that can save a life of a person. With its vital phyto-chemical constituents, it has been used in various Ayurvedic formulations after proper purification method to treat various disorders successfully. More number of phyto-chemical and analytical studies including clinical studies are needed to approve its potentiality.

REFERENCES

1. Manjula Kivadasannavar, Arun Chougale. Visha & Upavisha Medicinal Plants: Their Therapeutic Significance. Global Journal for Research Analysis. Volume-3, Issue-10, Oct-2014.
2. Chauhan Mitesh et al: Upavisha Kuchala (Strychnous Nuxvomica Linn) – A Review. IAMJ: Volume 3; Issue 7; July- 2015
3. Dr.Namburi Shekhar U.R, A Textbook Of Agadtantra, Chukhambha Sanskrit Sansthan, Varanasi, Reprint2013, peg no. 16
4. Warrier PK, Nambiar VP.K, Ramankutty C. Indian medicinal plants: a compendium of 500 species, volume 5, Orient Longmann publisher, New Delhi, 2007, 202.
5. Pillay V.V.,Comprehensive Medical Toxicology, 2nd Ed, Paras Medical Publisher, Hydrabad, India, peg no.878.
6. Illustrated agad tantra, Dr.P.V.N.R Prashad. Chowkhamba Sanskrit series, Vanarasi. 2009
7. Patel DK, Patel K, Duraiswamy B. Phytochemical analysis and standardization of Strychnos nux-vomica extract through HPTLC techniques. Asian Pac J Trop Dis 2012;2: S56-S60.
8. Schmelzer, G.H. and Gurib-Fakim, A. 2008. (Ed.) Plant Resources of Tropical Africa (PROTA), Medicinal Plants-1, Backhuys Publishers, Wageningen, Netherlands. 11(1): 575-577.
9. Walter, T.M., Priya, T.S., Paargavi, A.S., Priya Devi, N.S. and Thanalakshmi, S. 2013. A review of herbs to treat skin disorders in traditional Siddha medicine, Research and Reviews: Journal of Pharmacology and Toxicological Studies, 2(1): 07-14.
10. Subbaiah, K.P.V. and Savithramma, N. 2014. Validation and characterization of silver nanoparticles from Strychnos nux-vomica– an important ethnomedicinal plant of Kurnool district, Andhra Pradesh, India. International Journal of Pharmacy and Biological Sciences, 4(1): 45-53.
11. Mohesh, M.I.G., Joy, M.A.L., Ratchagan, K. and Sundaramurthy, A. 2015.Antibacterial and antioxidant activity of Strychnos nux vomica flower extract. Journal of Chemical and Pharmaceutical Research, 7(7): 748-752.
12. Gautam Biswas, Forensic Medicine and Toxicology, Jaypee Brothers Medical Publishers (P) Ltd Second Edition: 2012
13. Dash B. Herbal Treatment for arthritis, B. Jain Publishers (P) Ltd, New Delhi, 1999, 69 .
14. Strychnos nux-vomica: A Poisonous Plant with Various Aspects of Therapeutic Significance, Maji Amal K, Banerji Pratim, 2017 Journal of Basic and

Clinical Pharmacy, Ulysses Research Foundation, Kolkata, West Bengal, India.

15. Rasatarangini edited by Pandit Kashinath Shasti, Motilal Banarasidas, 41 U.A. Banglo Road, Jawahar Nagar, Delhi 110007, 11th edition 2012
16. JLN Sastry, Dravyguna Vijnana, Chaukhambha Orientalia, Varanasi, Third ed. 2008.
17. PV.Sharma, Dravyguna Vijnana Vol. II, Chaukhambha Bharati Academy, Varanasi, 16th ed. 1995.
18. Pandit Kashinath Shastri, Rasatarangini of Sadanand Sharma, Reprint edition, Motilal Banarsidas Prakashak, Delhi; Chapter 2/52, Paribhashavidnyaneeya; 1994. p.22.
19. Prof. K. C. Chunekar, Bhavaprakasha Nighantu of shri Bhavamisra, Revised edition, Chaukhambha Bharati Academy, Varanasi; Dhatwadivarga/205; 2010. p.621.
20. Pandit Kashinath Shastri, Rasatarangini of Sadanand Sharma, Reprint edition, Motilal Banarsidas Prakashak, Delhi; 24/172-173, Vishopvishavidnyaniyam; 1994. p.678.
21. Pandit Kashinath Shastri, Rasatarangini of Sadanand Sharma, Reprint edition, Motilal Banarsidas Prakashak, Delhi; 24/174-175, Vishopvishavidnyaniyam; 1994. p.678.
22. Pandit Kashinath Shastri, Rasatarangini of Sadanand Sharma, Reprint edition, Motilal Banarsidas Prakashak, Delhi; 24/176-177, Vishopvishavidnyaniyam; 1994. p.679.
23. Rao PS, Ramanadham M, Prasad MNV. Anti-proliferative and cytotoxic effects of Strychnos nuxvomica root extract on human multiple myeloma cell line-RPMI 8226. Food Chem Toxicol 2009; 47: 283-8.
24. Nayak C, Singh V, Singh K. A multi-centric open clinical trial to evaluate the usefulness of 13 predefined homeopathic medicines in the management of acute rhinitis in children. Int J High Dilution Res 2010; 9: 30-42.
25. Gitanjali B, Raveendran R, Rao PM. Effect of homeopathic drugs used in insomnia on Serum melatonin and cortisol levels in healthy volunteers. Indian J Res Homeopathy 2010; 4: 47-50.
26. Bhati, R., Singh, A., Saharan, V. A., Ram, V., & Bhandari, A. (2012). Strychnos nux-vomica seeds: Pharmacognostical standardization, extraction, and antidiabetic activity. Journal of Ayurveda and integrative medicine, 3(2), 80–84. https://doi.org/ 10.4103/0975-9476.96523
27. Gopalkrishna SV, Lakshmi NM, Ramachandra SS. Hepatoprotective activity of detoxified seeds of nux-vomica against CCl4 induced hepatic injury in albino rats. Pharmacologyonline 2010; 1:803-15
28. Duddukuri GR, Brahmam AN, Rao DN. Suppressive effect of Strychnos nux-vomica on induction of ovalbumin-specific IgE antibody response in mice. Indian J Biochem Biophys 2008; 45:341-4.
29. Rasatantrasaar & Siddhaprayog Sangraha, first part, Krishna Gopal Ayurveda Bhawan, Ajmer Rajasthan, page no.422.
30. Vd. Swati R. Lanjewar & Vd. Meera A. Aurangabadkar: Analytical Study on Ekangveer Ras in the Management of Pakshaghata w.s.r. to CVE (Cerebro Vascular Episode). International Ayurvedic medical Journal (online) 2016 (cited 2016 July).
31. Kumar, P., M.Porte, S., & Meena, S. (2019). A Critical Review on Vishtindukadi Vati. International Research Journal of Ayurveda & Yoga, 2(2), 71-80. Retrieved from https://irjay.com/irjay/index.php/ijray/article/view/27
32. Amruta, Nakve & Rai, Pallavi & Deokate, Uday & Khadabadi, Somashekhar. (2011). Standardization and quality control evaluation of Krimimudgara rasa using microscopic studies and HPTLC. /International Journal of Pharmacy & Technology. 3. 1537-1547.
33. Kanchan et al. Role of Navjivan Rasa and Ropana Tailm in the Management of Venous Ulcer Int J Ayu Pharm Chem Vol. 1, Issue 1, 2014.

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