WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 9, 106-117. Review Article ISSN 2277– 7105

KUCHILA (STRYCHNOUS NUXVOMICA) – A REVIEW

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Article Received on
07 March 2024,
Revised on 27 March 2024,
Accepted on 17 April 2024
DOI: 10. 20959/wjpr20249-31924

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ABSTRACT

In Indian medicine, Kuchila, or Strychnous nuxvomica Linn, is a well-known poisonous herb. Ayurvedic writings include it in Upavisha. An old-fashioned popular folk remedy is strychnine. Many people in governing India still use kuchila as a medication today. According to Charaka, if a drug is given correctly, even an acute poison can become a good drug; conversely, if a drug is given improperly, it can become an acute poison. Although kuchila is recognized as a vegetable toxin by both modern science and Ayurveda, it is yet utilized in numerous Ayurvedic and related medical treatments. One of kuchila's primary ingredients is strychnine, which was initially utilized in medicine in 1540 and is still present in many stimulants today.

KEYWORDS: Kuchila, strychnous nuxvomica, Upavisha, Visha, spinal poisons.

INTRODUCTION

Strychnous nuxvomica Linn, often known as kuchila, is a well-known plant in Indian medicine that is widely employed in several traditional formulations with important therapeutic applications. It has been unequivocally claimed that potent poisons may be the most effective treatment when taken in the right dosage and formulation, following appropriate detoxification (shodhana). Conversely, if a good medication is not taken by the right person at the right dose, it may have negative effects.[1] Rasratnasamucchaya described eleven number of Upavisha.[2] In Ayurvedic literature Upavisha are the group of drugs which were less toxic in nature and not so lethal but produce certain toxic symptoms on

consumption or administration. They are having less toxic potency.[3] Though the plant Kuchila is described under the 'Upavisha varga' (sub Poisonous group) it's seeds have been used successfully in different formulations to combat different diseases after proper Shodhan sanskar (processing of purification). Strychnine is a main content of Kuchila is popular in folk medicine from ancient period. Nuxvomica was introduced in Europe in the sixteenth century, but was not used in medicine. This alkaloid strychnine has been in use as a rodenticide at that time. It is sometime used for killing stray dogs hence the name dog buttons is used for it, being chiefly employed to poison dogs, cats, crows etc. Strychnine was first used medically in 1540 and continued to be used in many stimulants Tonics and cathartics until as recently as the 1960s.[4] The seeds are mainly used as Aphrodisiac, Appetizer, Anti-periodic, Digestive, Purgative, and Stimulant. It's also used in Anemia, Asthma, Bronchitis, and Intermittent and malarial fever. Many Ayurveda medicinal formulations like Agnitundirasa, Laxmivilasarasa, Shulnirmulanarasa, Suptivaatarirasa, Vishatinduka.[5] contains Kuchila beej as their basic ingredient. This review article is a sincere attempt to summarize the information concerning about poisonous drug Kuchila (strychnous nuxvomica Linn) described in Indian system of medicine in respect to its literary, pharmacological activity, toxicological effects, and therapeutic uses in various systems of medicines including Ayurveda.

Scientific Classification[6]

Kingdom: Plantae

Unranked: Angiosperms

Unranked: Eudicots

Unranked: Asterids

Order: Gentianales

Family: Loganiaceae

Genus: Strychnos

Species: S. nuxvomica

Botanical Name– Strychnous nuxvomica

Family–Loganiaceous, Karaskara Kula

Vernacular Names[7]

Hindi Name- Kuchila

English Name- Nuxvomica

Telugu Name- Mushini Ginjalu, Mushti Vittulu

Bengali Name- Kunchila

Marathi Name -Kajara

Gujarati Name- Jherkuchala, Zerkochala

Tamil Name- Yettikottai

Malayalam Name- Kaajjeel

Arabian Name – Ajaraki, Habbul Gurav

Parsi Name – Kuchula, Phuloosemaahi

Sanskrit Synonyms:[8] Kuchelaka,kuchel, Kuchila, Kuchil, Vishatinduk, Tindu, Tinduk, Vishatinduk, Karaskara, Ramyafala, Kupaak, Vishamushtika, Vishamushti, Kaalkuta.

Classification

Ayurveda: Sthavara Vanaspatik vish Upavisha.[9] phala visha (beeja visha).[10]

Modern medicine: Neurotoxin spinal excitant poison.[11]

Distribution[12]

It is found throughout tropical India up to an altitude of 360 m, in Uttar Pradesh, Bihar, Orissa, Coromandel Coast, Andhra Pradesh and Karnataka. It is most common in the forests along the western coasts.

Plant Description[13]

Plant is dense, hard white and close grained. The branches are irregular and are covered with a smooth ashen bark. The young shoots are deep green color with a shiny coat. The leaves have an opposite arrangement, short stalked, are oval shaped, also have shiny coat and are smooth on both sides. The leaves are about 4 inches (10cm) long and 3 inches (7.6cm) wide.

The flowers are small with a pale

Green color with a funnel shape.

Chauhan Mitesh et al: Upavisha Kuchila (Strychnous Nuxvomica Linn) – A Review

Bloom in the cold season with a smooth and have a foul smell. The fruit are about the size of a large apple with a smooth and hard shell which when ripened is a lovely orange color. The meat of the fruit is soft and white with a jelly like pulp containing five seeds covered with a soft woolly substance. The seeds are removed from the fruit when ripe. They are then cleaned, dried and sorted. The seeds have the shape of flattened disk completely covered with

hairs radiating from the centre of the sides. This gives the seeds very characteristics sheen. The seeds are very hard, with a dark gray horny endosperm where the small.

Embryo is housed that give off no odor but possess a very bitter taste. The plant is native to south East Asia and Australia normally in tropical and subtropical areas.

Major chemical constituents[14]

- Brucine
- Strychinine
- Vomicine
- Kajine and Novocain(N-methyl pseudobrucine)
- Strychnine and Isostrychnine
- Cuchiloside
- Loganic acids

Ayurveda view of Kuchila- In Bruhat Trayi(3 basic granthas of Ayurveda i.e.Charaka Samhita, Sushrut Samhita and Vaghbhata Samhita) and Dhanvantari Nighantu did not mention Vishatinduka or kupillu. Shodhala denoted it as Visha Tinduk and included it in karveeradi varga,[15] while Bhavamishra described it as Kakatinduka or Kupilu.[16] Kaideva Nighantu quated a drug Vishamusti, which may be nuxvomica.[17] Rajanighantu described Kuchala in Prabhadradi varga.[18] He also quated five types of Vishamushti. In ethanomedicine other species of the same genus are in vogue in Telangana (a state in India). These species are used in the name of different kinds of ‘Mushini’. In modern era, due to its poisonous nature, Nuxvomica was very reluctantly introduced into the European pharmacopoeias.

Ayurvedic properties[19]

Rasa: -KatuTtikta Guna:-Rruksha, Laghu, Teekshna, Veerya:-Ushna, Vipaka:- Katu Doshaghanata: Kaphavatshamak[20] Kaphapittanashanam[21] Rogghnata[22] Sandhivata, Amavata, Vrana, Kushatha, Nadishoola, Ardhanga, Gatibhransha, Gyanabhrasnsa, Peshiposha, Kampa, Badhirya, Ardita, Pakshaghata, Andria, Amadya, Amashyastha, Amadosha Grahani, Udarshoola, Arsha, Krimi, Raktavikara,Vatarakta, Hridyashaithilaya, Hridayodara, Kasa, Phuphusshotha, Dhwajabhangha, Sheeghrapatana,Daurbalya, Kushtha, Kandu, Atisweda, Vishamajwara, Visuchika.

Karma: Shothahara, Puthihara, Vedanasthapana, Uttejaka, Nadibalya, Deepana, Pachana, Grahi, Shoolprashamana, Hridyottejaka, Kaphaghna, Kasahara, Vajikarna, Balya, Katupaushtika, Kushthaghna, Kandughana, Swedapnayana.

Kupilu – uses[23]

Hanti Meda – lowers cholesterol, useful in obesity
Krumihara – useful in intestinal worm infestation
Shvasahara – useful in asthma and wheezing
Gulmahara – useful in abdominal tumor, bloating
Arshohara – useful in hemorrhoids
Mushikavishahara – useful in rat bite
Vishtambhi – causes constipation
Rochana – improves taste, useful in anorexia
Agnikrut – improves digestion strength
Grahi – absorbent, useful in diarrhea
Kushtahara – useful in skin disorders
Pramehajit – useful in urinary disorders, diabetes
Madakrut – causes intoxication
Kanthamayahara – useful in diseases of throat

Kupilu Shodhana (Detoxification / Purification method)[24]

1. Fry Kuchila seeds with ghee in a pan on slow flame till it's outer covering become led-yellow coloured. Take these seeds and remove the outer skin of seeds and grind the hot pulp immediately. This shodhana process is useful in emergency use of Kuchila.
2. Wrap Kuchala seeds in a cloth, keep it in Dolayantra with cow's milk, and boil it for 3 hrs. After 3 hrs remove the seeds, grind it in iron Kharal, and use the churna (powder). Skin of seeds is removed. It is boiled with milk for 7 days, dried, then it is fried in ghee and powdered.
3. Medicinal Dose:-1/2 to 1 Gunja,[25] Ayurvedic preparations of Kupilu.[26]

Navjeevan Rasa, Agnitundi rasa, Laxmivilas Rasa, Shoolanirmulan Rasa, Suptivatari Rasa, Sarameha Vishapaha Yoga, Vishatinduk Taila (External use).

Modern view of kuchila:[27] Strychnine was first used medically in 1540 and continued to be used in many stimulants, tonics and cathartics until as recently as the 1960s.[28] Kuchala was

recognized in America (1830) before it was official in England, although long before this date it was a dispensatory drug. In 1799, however, it was official in the pharmacopeia borussica, and in two other continental European pharmacopeias. The dominating constituents of nuxvomica is a complex compound which in natural form, is an in valuable remedy, by means of chemical reagents it can be split into parts, embracing two intensely poisonous alkaloid products , a glucosidal and acids. These alkaloids are Strychnine, Brucine, and perhaps Igasurine (yet in doubt). The main acid is Igasuric acid, while the glycoside is named loganin. These are all colorless bodies ,the alkaloids being very bitter, and energetically poisonous, Brucine being a poison similar to strychnine, acting with less violence and more slowly, but not less surely, than strychnine. Strychnine: C21H22N2O2 this violently poisonous alkaloid is crystalline, slightly soluble in cold water the solution being alkaline and bitter. Strychnine is said to be the bitterest substance in the world. The taste is detectable even in a dilution of 1/100,000 or more. It dissolves in 7 with parts of chloroform and 150 parts of 90% alcohol. Strychnine is a terrible titanic poison, affecting the cerebro-spinal system, but it kills without producing marked anatomical changes, the muscles and nerves being scarcely altered, although brain and spinal cord may be congested, stomach and limbs intensely congested, right side of heart gorged (sometimes empty) and the lungs congested, the fatal dosed of strychnine is as low as ½ grain. Indeed, it is recorded that 1/16 grain killed a two year old child in four hours, while ½ grain killed a man in twenty minutes. Brucine: this related alkaloid is also a product of chemical action on nuxvomica. It is known to chemists as dimethoxylstrychnine Brucine- C22H26N2O4. is very bitter feebly soluble in cold alcohol. It differs in reaction from strychnine in that strong Sulphuric or Nitric acid strikes with it blood – red color, whereas with strychnine no coloration appears. Brucine is a poison which has the physiological, but in markedly less degree. Authorities differ, some considering it one sixteenth; others from one – fortieth to one fiftieth less energetic than strychnine as convulstant. The antidotes and treatment for poisoning by Brucine are the same as for strychnine.

Chauhan Mitesh et al: Upavisha Kuchala (Strychnous Nuxvomica Linn)

A Review Pharmaceutical preparations: The alkaloids are sometimes prescribed in solution and have long, made into pill, tablet, or pellet form of the solutions, half solution of strychnine is an old preparation occasionally used at present. Tincture of nuxvomica: This preparation was among the first official preparation of Kuchala. It is made today by dissolving 20 grams of dried extract of nuxvomica in enough mixture of alcohol 3 volumes,

volume to make 1000cubic centimeters. This is perhaps the best known drug store preparation of nuxvomica and needs no special comment. Mode of Action[29]:- Strychnine stimulates all parts of the CNS and particularly the anterior horn cells of spinal cord causing greatly increased reflex excitability. Normal inhibition of motor cell stimulation is lost so that any slight stimulus such noise, light, or air breeze causes violent generalized muscle spasms. Pharmacological Activities[30]

Anti HIV, Hepatoprotective, Anticholestatic, Ant lipid Peroxidative property, Antiulcer, Insecticidal, NS stimulant and Strychnine showed remarkable negative chronoscopic activity on frog isolated heart and guinea pig atria and activity retained in vivo also (open chest dog). Strychnine (50mg/kg) when injected subcutaneously increased levels of acetylcholine in spinal cord and sustained convulsions in frog for 4 hr. Isostrychnine Noxide and isobrucinne N- oxide showed the most potent cytotoxicity to tumour cell lines of K562, HELA & HEP-2. Part used.[31] Seed is the most used part of this herb. Rarely, root bark is also used. It should be purified before using for medicinal purposes. Dosage.[32] Seed powder –A possible fatal dose is ½ gm [below 33 mg].

Toxic symptoms[33]

- Bitter taste
- Twitching and stiffness of muscles of face and neck
- Convulsions- initially clonic i.e. intermittent and then tonic i.e. sustained.
- Any stimulus like movements of patient, noise, touch, light or water immediately produces onvulsions.
- Muscles became rigid and stiff, so that body is thrown in to the form of arch
- Synosis
- Blood stained froth at nose and mouth
- Eyes :-prominent and staring, with dilated pupils
- Mind remains clear till end
- Death is painful

Diagnosis of Poisoning[34]

- TLC gives reliable qualitative results on gastric aspirate, urine, blood or tissues.
- Best specimens are urine and gastric aspirates
- HPTLC provides accurate quantitative data.
- Blood levels in the range of 0.1 to 0.3 mg/100ml are generally lethal.

Post Mortem Appearance

- Rigid attitudes characteristic of the clinical state may persist for a long time after death.[35]
- There may be oozing and hemorrhages are usually present in muscles.
- As in death following any violent muscular activity, the lymph in thoracic duct is bloody.
- The spasm of the muscles interferes with respiration and causes death from asphyxia.
- Early onset and disappearance of rigor mortis.
- Postmortem caloricity
- Dilated pupils.

Forensic Significance of Plant[36]

- Strychnine has been uncommonly employed in murder owing to various obvious reasons like bitter taste, dramatic nature of symptoms-that will always arouse suspicion of foul play, and easy delectability in body fluids and tissues.
- Accidental poisoning can result in children who chew on the seeds out of curiosity while playing or foraging in the countryside.
- Previously, therapeutic misadventures used to be fairly common when strychnine was an approved constituent of various over-the-counter tonics and cathartics.
- Accidental poisoning can also result from inadvertent consumption of strychnine-containing rodenticide.
- Owing to the agonizing nature of death, strychnine is rarely employed in suicide.

Action and Uses[37]

The root is bitter, tonic, febrifuge and useful in cholera, intermittent fever and bites of venomous reptiles. The leaves are applied as poultice in the treatment of chronic wounds and ulcers and leaf decoction is useful in paralytic complaints. The pulp of the ripe fruit is used in treating paralytic affections of palms and foot. The seeds are bitter, nerving, tonic, Alexiteric, Aphrodisiac, Appetizer, Ant periodic, Antihelminthic, Emetic, Digestive, Purgative, Diabetes, Colic, Intermittent And Malarial Fever, Insomnia, Cardio spasms, Skin Diseases, Nerve Debility, Dyspepsia, Diarrhea, Dysentery, Hysteria, Mental Emotions, Epilepsy, Chronic Constipations, Gout, Chronic Rheumatism, Hydrophobia, Spermatorrhoea, Opium or Lead poisoning, Paralysis and weakness of limbs. The wood is used in Dysentery, Dyspepsia and Fevers. Strychnous nuxvomica is also used in homeopathy.[38] It is said in Homeopathy.

"If you do not know what should be prescribed, then give Nux Vomica." It is often used as an antidote for over drugging. Nux Vomica is generally prescribed for males who are thin, irritable and lose temper by slight provocation. Also, for those who do a good deal of mental work, study a lot or handle business affairs and lead indoor life. Because of mental strain, such people often seek the help of stimulants, such as coffee, liquor, or use sedatives like opium or any other cannabis preparation. People, who take rich food, attend parties and generally overindulge themselves until late at night, often have irregular bowel movements (or have constipation). They often take laxatives like Hajmola, liver tonics, etc. Nuxvomica soothes and calms overexcited nervous system and improves digestion and bowel movement. It increases.

Appetite, vigor and gives potency to males who have ruined themselves by excessive use of stimulants. That is why it is called the medicine of "bigrey Nawab (spoilt men).It may be taken in low potency of 6 or 30 (in case of irritable, overexcited persons), and above 200 or more potency in case of habitually constipated and hard drinkers. It is one of the best remedy for mania-a-potu (acute alcoholism).Nux Vomica of 6 and 30 potency should be taken once a day before going to sleep at night. If it is 200 potency then it should be taken once a week. If it is still higher, then once a fortnight.[39]

DISCUSSION

Kuchila is a well known spinal poison to modern science. It is used in Ayurvedic pharmacopeia from ancient period. Ayurveda texts like Rasatarangini, Rasratnasamucchaya, Raj-Nighantu, and Bhavprakasha mentioned detail description of the plant, basic properties, therapeutic uses, medicinal preparations. Some Ayurveda texts like Bruhat- Trayi (3 basic granthas of Ayurveda i.e. Charaka Samhita, Sushrut Samhita and Vaghbhata Samhita) and Dhanvantari Nighantu did not mention Kuchila. Even in Kalpasthana Sushruta described types of visha according to adhisthana (a part of plant were poison resides), among it he includes fala visha (poisonous fruits), but he didn’t mention in it. Due to some properties like Ashukaritwa, Ushna, Teekshna vish dravya get spread rapidly in the body. So for the quick action of medicines many Ayurvedic formulations contain these vishadravyas like Kuchila as their ingredient. By utilizing these properties of vishadravyas medicines can be made more effective. So we found that many Rasashastra based texts are having description of poisonous drugs like Kuchila in detail. Rastarangini stated the detoxification process of Kuchila, so that purified Kuchila can get used in medicinal formulations. Modern toxicology includes it in a

deadly poison. It is categorized as Neurotoxin spinal excitant poison. Medico legally this plant is important too. Homicidal Death due to Kuchila is uncommon because of bitter taste, dramatic symptoms and easy detactability in body fluids and tissues. Accidental poisoning is common among children. Homeopathy also mentions many therapeutic uses of Kuchila. In homeopathic material medica Nuxvomica is mentioned as laxative, Digestive, Increasing vigor and vitality in male and also useful in alcoholism.

CONCLUSION

Kuchala (strychnous nuxvomica Linn) is one of the deadly poisons known to mankind. Though it is poison, it is important part of Ayurvedic and Homeopathy pharmacopeia. It is a basic ingredient of many ayurveda formulations. Due to properties like Ashukaritwa, Ushna, Teekshna vish dravya like Kuchila get spread rapidly in the body. So for the quick action they are used in medicinal formulations of Indian system of medicine and other systems.

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