



Review Article

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BIOLOGICAL, BOTANICAL AND THERAPEUTIC SIGNIFICANCE OF *UPVISH KUCHALA*

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Abstract

Kuchala (*Strychnous nuxvomica* Linn) is a widely recognized toxic plant within the various system of medicine, listed in *Upavisha* category by Ayurvedic philosopher. Strychnine, derived from *Kuchala*, has been employed as a folk medicine and in rural area *Kuchala* is used in medicinal practices. According to *Charaka*, the proper utilization of poisonous material can transform it into a remedy. While acknowledged as a vegetable poison in both Ayurveda and modern science, *Kuchala* finds its place in various medicinal formulations across Ayurveda and other related medical disciplines. Strychnine, a principal component of *Kuchala*, was initially utilized for medicinal purposes as therapeutic stimulants, tonics and cathartics, etc. This review article aims to provide comprehensive information on the toxic plant *Kuchala*, encompassing its toxicological and medico-legal aspects.

Key-Words: *Ayurveda, Kuchala, Strychnous nuxvomica, Upavisha*

Introduction

Kuchala (*Strychnous nuxvomica* Linn) is a renowned plant utilized extensively in various formulations due to its significant therapeutic properties. It is well known that poisons can serve as medicines when subjected to *Shodhana*, administered in appropriate doses and incorporated into suitable formulations. In Ayurvedic literature *Kuchala* also categorizes under the heading of *Upavisha* category. *Upavisha varga* substances exhibit lower toxicity and lethality but induce specific toxic symptoms upon consumption. Although *Kuchala* is categorized under the sub-poisonous group, its seeds have been successfully employed in diverse formulations to address various diseases after undergoing proper *Shodhan sanskar*.

Ayurveda have successfully integrated *Kuchala* and its preparations into the treatment of various diseases, after the proper purification processes. Several Ayurvedic formulations including *Laxmivilasarasa*, *Agnitundirasa*, *Shulnirmulanarasa*, *Vishatinduka* and *Suptivaatarirasa*, etc. feature *Kuchala beej* as a main ingredient.

The primary content of *Kuchala*, is strychnine, which has been popular in folk medicine. *Nuxvomica* initially found use as a rodenticide, strychnine, first employed medically as stimulants, tonics and cathartics. The seeds are mainly recognized for their appetizer, anti-periodic, aphrodisiac, digestive, stimulant and purgative properties. They are also utilized in conditions such as asthma, anemia, bronchitis, malaria and fever, etc. The major chemical constituents of plant includes; Brucine, Strychinine, Vomocine, Kajine, Novocain, Isostrychnine, Cuchiloside and Loganic acids. These constituents contributed towards the biological action of plant.

Scientific Classification:

- ✓ Kingdom: *Plantae*
- ✓ Order: *Gentianales*
- ✓ Family: *Loganiaceae*
- ✓ Genus: *Strychnos*
- ✓ Species: *S. nuxvomica*

The other names of *Kuchala* are *Mushti*, *Vittulu*, *Kunchila*, *Jherkuchala*, *Zerkochala*, *Kaajjeel*, *Ajaraki*, *Kuchelaka*, *Kuchila*, *Kuchil*, *Tindu*, *Vishatinduk*, *Karaskara*, *Kupaak*, *Vishamushti* and *Kaalkuta*, etc. in different languages. In Ayurveda it is categorized as *Sthavara Vanaspatik vish Upavisha*, *Bbeeja visha*. In modern science it is categorized as neurotoxin spinal excitant poison.

Geographical & Botanical Consideration:

Widespread in tropical India, this plant thrives up to an elevation of 360 m and can be found in regions such as Bihar, Uttar Pradesh, Andhra Pradesh, Karnataka and Orissa, etc. The plant boasts a dense, robust structure with a hard, white and close-grained composition. Irregular branches are adorned with a smooth ashen bark, while young shoots exhibit a deep green hue with a glossy coating. Leaves are arranged oppositely, possess short stalks, and feature an oval shape, characterized by a lustrous coating on both sides. Approximately 4 inches (10 cm) in length and 3 inches (7.6 cm) in width, the leaves contribute to the plant's distinctive appearance. The small, funnel-shaped flowers exhibit a pale green coloration.

Ayurvedic Aspect:

Kuchala is a well-recognized plant, with a historical presence in Ayurvedic pharmacopeia dating back to ancient times. It offers enormous biological properties by virtue of its Ayurvedic properties as depicted in **Figure 1**. Various Ayurvedic texts, such as *Rasratnasamucchaya*, *Rasatarangini*, *Bhavaprakasha* and *Raj-Nighantu*, etc. provide detailed descriptions of the plant, outlining its basic properties, therapeutic applications, and medicinal preparations. However, certain key Ayurvedic texts, including the *Bruhat-Trayi* and *Dhanvantari Nighantu*, do not explicitly mention *Kuchala*. Even in the *Kalpasthanas*, *Sushruta*, while describing various types of *Visha* based on their *Adhithana* omits reference to *Fala visha* such as *Kuchala*.

Some Ayurvedic contents encompass information about *Kuchala* as follows:

- ✓ *Shodhala* identified it as *Visha Tinduk*, categorizing it within the *Karveeradi varga*.
- ✓ *Bhavamishra*, in contrast, referred to it as *Kaka-tinduka* or *Kupilu*.

- ✓ The *Kaideva Nighantu* made reference to a drug called *Vishamusti*, possibly referring to *Nux-vomica*.
- ✓ *Rajanighantu* placed *Kuchala* in the *Prabhadradi varga*.

<i>Rasa:</i>	<i>Katu-Ttikta</i>
<i>Guna:</i>	<i>Rruksha, Laghu, Teekshna</i>
<i>Veerya:</i>	<i>Ushna</i>
<i>Vipaka:</i>	<i>Katu</i>
<i>Doshaghanata:</i>	<i>Kaphavatshamak, Kaphapittanashanam</i>

Figure 1: Ayurveda properties of *Kuchala*

Therapeutic Indications:

This plant helps to treat various pathological conditions as follows:

- *Sandhivata*
- *Amavata*
- *Vrana*
- *Kushatha*
- *Ardhanga*
- *Gatibhransha, Gyanabhrasnsa*
- *Kampa*
- *Badharya*
- *Ardita, Pakshaghata*
- *Amashyastha, Amadosha, Grahani, Udarshoola*
- *Rakta-vikara, Vatarakta*
- *Hridyashaithilaya, Hridayodara*
- *Sheeghrapatana*
- *Daurbalya*

- *Kandu*
- *Vishamajwara*
- *Visuchika*.

Pharmacological actions:

The plant offers *Shothahara, Vedanasthapana, Puthihara, Uttejaka, Deepana, Pachana, Grahi, Nadibalya, Shoolprashamana, Hridayottejaka, Kasahara, Kaphaghna, Vajikarna, Balya, Kandughana, Swedapnayana* and *Kushthaghna* properties by virtues of its *Guna* and *Rasa*. It helps to lower cholesterol level thus considered beneficial in obesity. *Krumihara* effect helps in intestinal worm infestation. *Shvasahara* property relieves asthma and wheezing. *Gulmahara* property is useful in abdominal tumors and bloating. *Arshohara* action relieves hemorrhoids. *Mushikavishahara* property is useful in treating rat bites. *Agnikrut* effect enhances digestion strength. *Grahi* property is considered beneficial in diarrhea. *Kushtahara* action is useful in addressing skin disorders. *Pramehajit* is effective in urinary disorders and diabetes. The *Katu-Ttikta Rasa, Laghu* and *Teekshna Guna, Ushna Veerya* and *Katu Vipaka* imparts *Kaphavatshamak* and *Kaphapittanashanam* properties, these all together contributed significantly towards the biological action of *Kuchala*.

Role in Specific Diseases:

✚ *Kuchla for Erectile Dysfunction:*

Sudha Kuchla is believed to aid in managing sexual problems like erectile dysfunction. *Sudha Kuchla*, contributing to the proper functioning of male sexual performance due to its *Ttikta Rasa, Teekshna Guna* and *Ushna Veerya*.

✚ *Kuchla for Depression:*

Sudha Kuchla is thought to assist in managing depression symptoms by balancing *Vata*, which, according to Ayurveda, controls the nervous system. The balancing of *Vata* is believed to alleviate symptoms associated with depression.

✚ *Kuchla as an Appetite Stimulant:*

Kuchla is suggested to enhance intestinal motility and stimulate gastrointestinal activity, potentially making it useful in improving appetite.

✚ ***Kuchla* for Asthma:**

Sudha Kuchla is believed to assist in managing asthma by providing relief from breathlessness. Ayurveda attributes asthma to imbalances in *Vata* and *Kapha*, and *Sudha Kuchla's* decongestants, bronchodilator and expectorant activities are thought to be beneficial in this regard.

✚ ***Kuchla* for Heart Disease:**

Kuchla is believed to enhance blood circulation, potentially making it useful in managing various heart diseases.

✚ ***Kuchla* for Anxiety:**

Sudha Kuchla is thought to aid in managing anxiety by balancing *Vata*, as individuals with aggravated *Vata dosha* are believed to be more prone to anxiety. The *Vata*-balancing properties of *Kuchla* are presumed to reduce anxiety symptoms.

Precautions in using *Kuchla*:

- One should avoid the use of *Kuchla* during breastfeeding.
- Antipsychotic drugs should not used along with *Kuchla*.
- Avoid the use of *Kuchla* during pregnancy and just after completion of pregnancy.
- The dose and route of administration should be selected as per the recommended guideline.

Possible Side Effects:

- ✓ Restlessness
- ✓ Dizziness
- ✓ Stiffness
- ✓ Spasms of muscles
- ✓ Convulsions

- ✓ Breathing difficulty, etc.

Toxicological Attributes:

The affected individual experiences a growing sense of discomfort, marked by an impending suffocation sensation. This is followed by intense convulsions affecting all muscles simultaneously. The limbs are forcefully extended, hands clenched, head jerked forward and backward, rendering the entire body rigid due to the severity of the contractions. During this episode, the pulse accelerates, and body temperature may elevate. Auditory and visual senses become heightened.

The intermission is brief, as convulsions quickly recur, leading to a cycle of muscular tension and subsequent relaxation. The abdominal muscles become rigid, the chest fixed, the face turns livid, and the eyes stare, with facial muscle contractions. Jaw muscles remain unaffected until the end, with consciousness retained until the final moments. External stimuli, such as noise or bright light, can reflexively trigger convulsions, potentially causing the patient to be forcefully propelled from their bed. Ultimately, death may occur due to exhaustion and asphyxia, with the smallest fatal dose [16].

Toxicity Treatment:

Emetics should be employed cautiously and selectively. Subsequently, the stomach is lavaged with a dilute potassium permanganate solution, and an animal charcoal suspension is introduced to absorb any residual Strychnine, followed by removal. Patient should be promptly anesthetized and kept in complete repose in a darkened room. Large doses of potassium bromide and chloral hydrate should be administered. Physiological antidotes, such as phenobarbitone sodium, sodium amytal, mephenesin, and intravenous diazepam, may be employed. Artificial respiration, oxygen therapy, and supportive interventions may become necessary [16].

Discussion:

The rapid spread of *Vishadravyas* (poisonous substances) in the body, attributed to properties like *Ashukaritwa*, *Ushna*, and *Teekshna*, prompts the inclusion of such substances, including *Kuchala*, in many Ayurvedic formulations for quick therapeutic action. *Rasashastra*

based texts delve into detailed descriptions of poisonous drugs like *Kuchala*, emphasizing their detoxification processes to ensure their safe integration into medicinal formulations. However, modern toxicology categorizes *Kuchala* as a deadly neurotoxic spinal excitant poison. From a medico-legal standpoint, *Kuchala* holds significance, since its ingestion is uncommon due to its bitter taste, distinctive symptoms and detectability in body fluids and tissues. Accidental poisoning, particularly among children, is more prevalent. Homeopathy also recognizes several therapeutic uses of *Kuchala*, listing *Nuxvomica* as a laxative, digestive aid, enhancer of male vigor and vitality, and a remedy for alcoholism. The multifaceted exploration of *Kuchala* across traditional and modern medical systems underscores its complex nature and varied applications.

Conclusion:

Kuchala (*Strychnous nuxvomica* Linn) stands out as a potent and potentially lethal poison. Despite its toxic nature, it holds a crucial place in both Ayurvedic and Homeopathy pharmacopeias, serving as a fundamental ingredient in numerous Ayurvedic formulations. The rapid dissemination of *Vishadravyas*, such as *Kuchala*, within the body due to properties like *Ashukaritwa*, *Ushna*, and *Teekshna*, makes them invaluable for achieving swift therapeutic effects. This characteristic has led to their incorporation into medicinal formulations not only within the Indian system of medicine but also in other medical systems. Thus, while *Kuchala* is acknowledged as a deadly poison, its paradoxical significance and varied applications underscore its intricate role in traditional and alternative medicinal practices.

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