

UPAVISHA DHATTURA (*Datura metel* Linn. *Syn. D. fastuosa* L) -A REVIEW

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ABSTRACT

Dhattura is a well known poisonous plant in Indian system of medicine. It is included in *Upavisha* by *ayurveda* texts. Being a poisonous plant, *Dhattura* has been using since the ancient times by *Ayurveda* physicians, spiritual purposes, holy men and its use in modern medicine drugs. *Dhattura* is a popular deliriant poison. Even today also many people in India use *Dhattura* as stupefying agent. All the species of *Dhattura* are poisonous in nature. This review article includes the overall information about the poisonous plant *Dhattura*, its, Toxicological aspect, Medicolegal aspect and therapeutic uses mentioned in *Ayurveda* and in other systems of medicine.

Keywords: *Dhattura*, *Upavisha*, Therapeutic uses, deliriant poisons.

INTRODUCTION

Dhattura is used in rituals and prayers to lord Shiva and Ganesha. It is also known as Jimson Weed, Locoweed, Angel's Trumpet, Thorn Apple, Devil's Trumpet is a hallucinogenic plant found in the urban and rural areas, along roadsides, in cornfields and pastures. The range of toxicity of *Datura* is highly variable and unpredictable. It occurs when ingested, smoked and absorbed topically, in particular through mucous membranes. Toxicity may vary between leaves, plants and from one season to another.

Dhattura distribution-

Initially, *datura* was found in United States of America but now it is spread all over the world. In United States, *datura* is generally found in Southern America and Mexico. It grows wild in the tropical as well as temperate climate where it is found in the road side area as well as medicinal plant nursery. In Europe, it grows as weed on the wasteland and

garbage. It is distributed throughout India, common as weed growing in waste places and road sides. Common in tropical parts of India to temperate parts of Himalayas.

Parts Used- seeds, Flower, Root Bark, Leaves.

Botanical Name-

Datura metel Linn. (*Datura fastuosa* L; *Datura Alba* Nees;).

Family- Solanaceae (Kantakari Kula)

Vernacular Names-

Hindi Name- Sada Dhatura

English Name- Thorn apple, Devil's trumpet

Telugu Name- Ummetta

Tamil Name- Ummettangini/ Vella- ummathai

Bengal Name- Dhatura

Gujarati, Marathi Name- Dhatura

Kannada and Malayalam Name- Unmatta, Dhatura

Arabian Name- Datur

Farsi Name- Tatur

Sanskrit Synonyms-

Dhuttura, Kanaka, Kanakahvya (goldan Yellow Colored Seeds), Dhurta, Umatta, Matula – having hallucinating effect

Shivapriya- Its flowers are used in worshipping Lord Shiva.

Matulaputraka.



DESCRIPTION-

An erect, succulent, spreading annual herb or shrub, a metre or more in height with divaricate, often purplish branches.

Root- Cylindrical with lateral branches, brown coloured, rough due to fissures and root scars; fractures, splintery; odour, not characteristic; taste, bitter.

Stem- Dichotomously branched, Cylindrical, blackish dark to purple color, intermode very short; fractures, splintery; odour, not characteristic; taste, bitter.

Leaf- Petiolate, pubescent; 6 to 11 cm long, 2 to 8 cm broad; ovate, acute, repand and dentate, but sometimes entire, base unequal; odour, not characteristic; taste, bitter.

Flower- Stalked, stalk finely pubescent, calyx upto 10 cm long, tubular, lobes acuminate; corolla purple or purple tinged outside, upto 15 cm long, usually double, sometimes triple (3 whorls), funnel- shaped, lobes 5 for each whorl; stamen-5, epipetalous with connivent anthers, anthers 10 to 12 mm long; gynoecium-bicarpellary, carpels placed obliquely in relation to mother axis, placentation axile, placenta swollen, ovule numerous.

Fruit- Capsule, ovate to obovate with persistent reflexed calyx; about 4 cm long, 3 cm wide, covered with short, stout, spines; taste, bitter and acrid.

Seed- Light brown, reniform, compressed, flattened, 0.4 to 0.5 cm long and 0.4 cm wide, foveate, surface finely pitted; taste, bitter and acrid (Poisonous).

Types-

Usually there are two varieties of Dhatura Viz.

Shveta- White variety- *Datura stramonium* and

Krishna- Black variety- *Datura metel*.

Rajnighantu explained five varieties of Dhatura Viz. Shveta (white), Neel (blue), Krishna (black), Rakta (red) and Peeta (yellow).

Today modern experts classify 9 species of Dhatura. (Preissels- *Brugmansia* and *Datura*-2002, P.N. 106)

- *Datura wrightii* also called southwestern Thorn Apple
- *Datura stramonium* also called jimson weed
- *Datura metaloides* also called sacred datura
- *Datura inoxia* named as Tolosche
- *Datura discolor* is also known as Moon flower.
- *Datura ceratocaula*
- *Datura ferox*: long spined thorn-apple
- *Datura leichhardtii*: Leichhardt's datura
- *Datura quercifolia*: Oak-leaf thorn-apple

Identity, Purity and Strength:

- Foreign matter - not more than 2%
- Total ash - not more than 16%
- Acid insoluble ash - not more than 4%
- Alcohol soluble extractive - not less than 4%
- Water soluble extractive – not less than 15%

T.L.C. (

T.L.C. of alcoholic extract on silica gel 'G' plate using chloroform : methanol (80:20) shows under U.V. (366nm) three fluorescent zones at Rf. 0.65 (blue), 0.67(pink) and 0.98

(pink). On exposure to Iodine vapour nine spots appear at Rf. 0.07, 0.15, 0.37, 0.48, 0.61, 0.67, 0.83, 0.89 and 0.98 (yellow). On spraying with Dragendorff reagent followed by sodium nitrite solution, two spots appear at Rf. 0.11 and 0.98 (both orange yellow).

Major Chemical constituents of Datura-

Scopolamine, Daturadiol, Hyoscyamine, Fastudine, Allantoin, Niacin, Vitamin C, Tropine, Noratropine, Metoolodine, Hyosine, Fastusic acid, in seed 12 percent oil, volatile oil in leaves 0.045% etc.

Mechanism of action:

- The alkaloids competitively inhibit the muscarinic effects of acetylcholine.
- Site of action are at all post-ganglionic parasympathetic and few post-ganglionic sympathetic (sweat glands, smooth muscles) innervations.
- Majority of the CNS actions are due to blockage of muscarinic receptors in the brain viz. vagal stimulation, decrease in heart rate. High doses cause cortical excitation, restlessness, disorientation, hallucinations and delirium followed by respiratory depression and coma.

Properties and action according to Ayurveda-

Rasa : Katu, kasaya, Madhura, Tikta

Guna : Tikshna, Guru

Virya : Usna

Vipaka: Katu

Karma : Madkari, Kaphahara, Agni, Vruddhikara, Varnya, Jangama Vishahara.

Dhattura Shodhana- Purification method for seeds of Dhattura-

Dhattura seeds are taken in a clean cloth, tied in the form of suspending pack. It is suspended and kept dipped in a vessel containing cow milk (Dola Yantra). It is boiled in cow milk for 1 prahara (3 hours). After 3 hours, the seeds are washed in hot water, dried and preserved.

Absorption, Metabolism and Excretion-

- The alkaloids are quickly absorbed from all mucus membrane and skin.
- The alkaloids are excreted by the kidneys.

Clinical features:

The clinical features are best summarized in classical phrase quoted by Morton Still “**blind as bat, hot as hare, dry as bone, red as beet and mad as hen**”. It can also remember as **Ds**. The progression of symptoms with loss of cholinergic function is dose related to Atropine.

- Dryness of mouth (dry as bone)

- Bitter taste
- Difficulty in talking
- Dysphagia
- Dilated pupils
- Diplopia
- Difficulty in vision (blind as bat)
- Dry hot skin with flushing (red as beet)
- Heperpyrexia (hot as hare)
- Drunken gait
- Hyperreflexia
- Convulsions
- Delirium, hallucinations, agitation, amnesia, incoherence, visual or auditory hallucinations (mad as hen).
- Deficit of recent memory
- Dysuria
- Distention of bladder
- Death

According to Ayurved:

By consuming Durdhuraka (Dhattura) as poison, the person sees all things yellow, develops tremors, salivation, toxicity, vomiting, loss of memory and giddiness.

Fatal dose:

Seeds – 100 to 125

Atropine – 10 to 100 mg

Alkaloids-

- Adult-60 mg
- Children-4mg

Fatal period: 24hrs

Medicinal uses according to Ayurveda:

1. Fever: The juice of dhatura leaves mixed with sugar and taken in a dose of 125 ml alleviates all types of fevers.
2. Worms: Juice of dhatura leaves is an excellent destroyer of organisms. The juice of dhatura leaves mixed with mercury or juice of heated leaves singly destroys ticks and lice by local application.

3. Cracks in feet: Mustard oil should be cooked with dhattura seeds along with alkaline water of manaka removes cracks immediately.
4. Filaria: Seeds of dhattura used in increasing dose like wardhaman pippali with cold water destroys severe filaria.
5. Chronic coryza: Pills are made of dhattura seed pounded with the decoction of kustha for 8 days each weighing about 30 mg. these act as astringent and are useful in chronic coryza.
6. Rabies: Dhattura and white punarnava are good remedies for rabies. The patient of rabies should eat cakes prepared with sharpunkha root 10gm and Dhattura 10 gm mixed in rice and pounded with rice water while covered with dhattura leaves. Fruit (seeds) of dhattura and root of kakodumbar taken with vinegar or rice water destroys rabies. The person who takes one fruit of dhattura pounded with decoction of asana root becomes free from rabies.
7. Alopecia: in alopecia the nearby vein should be puncture and the surface is scarified deeply and pasted with juice of dhattura leaves and bhallataka.
8. Skin disease: Eczema and ringworm are destroyed by local application of the juice of the leaves of dhattura , nimbi and betel separately .
9. Boils: application of the juice of mandukaparni and paste of dhattura root destroys the boils.
10. Pain in breast: application of the paste of haridra and dhattura fruit removes pain in breast.
11. Insanity: Payasa cooked with northern root of white dhattura and mixed jiggery and ghee alleviates all types of insanity.
12. Kasa, Swas, Jwara, Kustha, Vrana, Mutrakrecchra, Twak Dosa, Yika Liksa, Krmi, Alark Visa, Kandu, Indralupta, Padadaha, Stanuthita Pida, Unmada.

Important Formulations:

Kanakasawa, Ekangveera Rasa, Puspadhanwa Rasa, Tribhuvan Kirti Rasa, Sri Jayamangala Rasa, Laghu Visgarbha Taila, Vistinduka Taila, Dhattura Taila.

Treatment of poisoning:

- The stomach should be evacuated to remove the remnants of the crushed seeds by a stomach wash with either weak solution of potassium permanganate or 4 to 5 per cent tannic acid.
- Physostigmine in a dose of 1-4 mg (repeated if necessary at intervals of 1 to 2 hours) or Neostigmine (2.5 mg i.v. every 3 hours) act as physiological antidotes.
- Purgatives are beneficial and rest of the treatment is symptomatic.
- Monitor and regulate patient's temperature. Moistening of the tongue and change in the size of the pupils towards the normal are valuable guides in treatment. In

non fatal cases, recovery takes a day or two, the effect on the pupils being the last to disappear.

Treatment of poisoning according to Ayurved:

The Vagbhata said in Astangsangaraha patient should be made to vomit by using drugs of sweet taste or drink milk with added sugar.

In ayurveda text named Anupanmanjiri coated as the juice extracted from the fruit of vrntaka if consumed in dose of 1 Pala (40 ml) it eradicates the poisonous effects of Dhatura.

Autopsy Findings:

- Signs of asphyxia
- Dhatura seeds or fragments may be found in stomach
- Shows Gastrointestinal tract inflammation
- Congestion of Gastrointestinal tract
- Pulmonary oedema
- Dhatura seeds resist putrefaction and are found even when the body is decomposed.

Medicolegal- aspect with its importance:

- Accidental death may occur since dhatura seeds may be mistaken for chilly seeds.
- Suicide –rare
- Homicide
- Dhatura seeds are used as stupefying poison prior to robbery, kidnapping and rape. Robbers usually mix the dhatura seeds with food or drinks and offer to travelers. Once the passenger is stupefied, they robbed them. Thus dhatura gains popularity as road poison.
- Dhatura seeds are abused. The seeds are mixed with cigarette and belladonna and smoked as hallucinogen.
- Criminal responsibility: dhatura produces temporary insanity. Usually, the poison is administered without the victim's knowledge. Hence the individual is not held responsible for his acts under the influence of dhatura.
- Scopolamine is used as truth serum.
- Accidental cases occur:
 1. When children and adults eat the raw fruit or seeds mistaking them for edible fruits or capsicum seeds respectively.
 2. From the use of dhatura as an aphrodisiac.
 3. When the decoction of seeds is added to country liquor or toddy for a greater kick.

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