



DATURA METEL: A DRUG REVIEW

Dr. Iyshwarya HS

Assistant Professor, Dept Of Agada Tantra, Sri Paripoorna Sanathana Ayurveda Medical College, Nelmangala, Karnataka, India.

Dr. Madhu Ranjan*

Assistant Professor, Department Of Panchakarma, Sri Paripoorna Sanathana Ayurveda Medical College, Nelmangala, Karnataka, India.
*Corresponding Author

ABSTRACT

Dhattura (Datura metel) is one of the Upavisha mentioned in Ayurveda. Upavisha's are less poisonous in nature. But taken in more quantity causes drastic toxic effects on our body. Among these Dhatura is also one which is a deliriant poison which is commonly used for suicide, homicide and for cattle poisoning also.. The signs and symptoms are explained in detail for diagnosis in medico legal importance. Antidote of it and treatment is mentioned by both Ayurvedic and Modern texts. When properly purified Dhatura can be used for therapeutic purpose and be useful for various ailments.

KEYWORDS : Dhatura, Datura Metel, Upavisha, Medicolegal

INTRODUCTION

Ancient scholars of Ayurveda has classified poisonous drugs into two types i.e. Sthavara (plant origin) and Jangama (animal origin) visha. Sthavara visha is again classified into mahavisha and upavisha¹. Among the mahavishas only the Vatsanabha (*Aconitum ferox*) is using for medicinal purpose now. Upavishas are the group of drugs which were less poisonous in nature and also not harmful but it can cause several toxic prodrome on consumption or administration². Depending on number of upavishas different views are there in Ayurveda. Mainly upavishas include Vishatintuka (*Strychnosnux-vomica* Linn), Ahiphena (*papaver somniferum*) Jayapala (*Croton tiglium* Linn), Dhatura bija (*Datura metel* Linn.), Vijaya (*Cannabis sativa* Linn.), Gunja (*Abrus precatorius* Linn.), Bhallataka (*Semecarpus anacardium* Linn.f.) Arka (*Calotropis gigantea* Linn.) Snuhi ksheera (*Euphorbia ligularia* Roxb.), Langali (*Gloriosa superba* Linn), Karaveera (*Nerium oleander* Linn)³. Ayurveda also states that sometimes strong poisons serve as the best medicine but used only after proper Shodhana (Detoxification), provided in a proper therapeutic dose and formulation. On the contrary a good medicine may affect adversely unless it is used for proper person with proper dose⁴. Datura is well known and commonly used drug for treating various ailments and it is an ingredient in most of the formulations in Ayurveda which is in practical use now. It is commonly known as 'devil's trumpet' and it was first described by Linnaeus in 1753. In some places it is prohibited to buy or sell or cultivate Datura plants. The main chemical composition of Datura are tropane alkaloids hyoscyne, hyoscyamine and atropine alkaloids⁵. This review article is a sincere attempt to synopsise the information concerning about poisonous drug Datura (*Datura metel* Linn) described in Indian system of medicine

Botanical Name: *Datura metel* Linn⁷

Family: Solanaceae⁷

Kannada : Unmathi⁷

Hindi Name : Datura⁷

English Name: Thorn Apple, Jimson Weed⁷

Malayalam: Ummam

Marati: Dhatra

Gujarati: Dhaturu Tulu- Umbe

Tamil: Emanamam

SCIENTIFIC CLASSIFICATION⁸

Kingdom Plantae

Clade Angiosperms

Clade Eudicots

Clade Asterids

Order Solanales

Family Solanaceae

Subfamily Solanoideae

Tribe Datureae

Genus Datura

Classification

Ayurveda: upavisha¹¹

Modern medicine: under deliriant type of cerebral poison¹²

Ayurvedic view of Datura

In Charaka Samhitha Acharya Charaka delineated Datura in the context of visha chikitsa and in kushta chikitsa, he described thrice in the name kanaka¹⁶.

Susrutacharya and Vagbhatacharya mentioned it as Datura in the context of alarkavisha^{17,18}.

In Haritha samhitha, it has been mentioned in the context of vataja netra roga chikitsa as aningredient in an anjanayoga¹⁹.

while moving through nighantu kala in Dhanvantari nighantu and Sodhala nighantu it included under karaveeradi varga^{20,21},

Madanapala nighantu quoted under abhayadi varga²², Bhavamisra described it under guduchyadi varga²³

USEFUL PART

Part used Root, fruit, seed, flower, leaf¹⁵

HABITAT

Habit and Habitat A sub glabrous spreading herb, sometimes shrubby. Common in waste places throughout India and occasionally in gardens¹³

MORPHOLOGY

Plant description It is an herb, pubescent. Leaves are large, entire sinuate or toothed bar unequal. Flowers are erect, whitish purple, calyx long tubular, 5-toothed at apex, corolla long tubular to funnel shaped. Fruits are capsule globose or ellipsoid spinous 4- valved or irregularly breaking up, seeds are compressed rugose and brown¹⁴. Major chemical constituent Datura contains mainly tropane alkaloids. Scopolamine, hyocyanine, hyosine Daturadiol, -sitosterol, Daturanalone, fastusinine¹⁵

VARIETIES

Bheda (variety) of Datura¹⁰

There are two main varieties, Rajadatura and Krishna Datura Depending on colour of flowers -sita, nila, Krishna, lohitha, pita

TIME OF COLLECTION⁴¹

Ripened Seed Pods

The datura seed pod turns from green to brown as it ripens and matures. The outside becomes brittle. Once the pods are ripe, a crack develops. This is the time when the pod should be collected from the plant. If the pod is left on the vine, it will split into three or four sections and broadcast the seeds in a wide area around the parent plant. It is difficult to gather the seeds once the pod has opened.

Gathering Seed Pods

You can watch for the seed pods to ripen and gather them from the plant as the cracks develop. Timing is crucial when you gather seed pods in this manner. An easier solution is to tie a small paper bag around the seed pod once it starts turning

brown. The seeds will drop into the bag once the pod ripens and splits open. Simply cut the stem and remove bag and all. Open the bag and remove the seeds. Separate the chaff from the seeds.

Storing Datura Seeds

The ripened seeds must be dried before storing. The viable seeds are either dark brown or black, and are rounded on three sides with an indent on the fourth, similar to the shape of a kidney. Discard seeds that are misshapen or off color. Broken seeds should also be discarded. You can lay the seeds on a drying screen or paper towels to dry. After the seeds have dried completely, they should be stored in an airtight container in a cool, dark place.

GUNA KARMA

	Rasa	Guna	Veerya	Vipaka	Prabhava	Doshakarma
Dhanwantari Nighantu ²⁰	Katu	-	ushna	-	Jwarahara	
Sodhala Nighantu ²¹	-	-	-	-	-	Pittakara
Madanapala Nighantu ²²		Guru	Ushna	-	-	Kaphahara
Bhava prakasha ²³	Kashaya, madhura, tiktha	Guru	Ushna	-	-	Kaphahara
Raja nighantu ²⁴	Katu		Ushna	-	-	-
Kaiyadeva Nighantu ²⁵	Kashaya, madhura, tiktha	Guru	-	-	-	Kaphahara
Nighantu Adarsa ²⁶	Katu	-	Ushna	katu	Jwaragna, madakari	Kaphavatashamaka
Priya Nighantu ²⁷	Tikta	-	Ushna	-	-	-

ROGAGNATA

Jwaranashana, twakdoshashamana krimigna, shothahara, kanduhara, swasa prashamana, kamashoola nibarhana, vedanahara²⁸

heated with cow milk in a dolayantra for three hours. Then pottali is opened and Datura seeds are washed with hot water. These pure Datura seeds are then used in the formulations. **Second Method:** New Datura seeds are heated in cow urine with the help of dolayantra and dried in the sun. These seeds are powdered & filtered through cloth. Then it is used for therapeutic purpose³¹.

SHODHANA KARMA

First method: Datura seeds are tied in a pottali. This pottali is

YOGAS⁴³

Sl no	Formulation	Rogadhikara indication	Reference	% of datura	Dose
1.	Jwaramurai rasa	Jwara	BR	45.71	125
2.	Grahanikapata rasa	Grahani	BBR-2	38.46	250
3.	Pasupato rasa	Ajirna	BBR-3	38.32	125
4.	Agastisutarajo rasa	Grahani	YR	33.33	125
5.	Kaminimadavidhunana rasa	Vajikarana	BR	33.33	125
6.	Dugdhavati -pradhama	Shotha	RYS-1	33.33	12 5
7.	Mrutyunjaya rasa	Unmada	BR	25.39	125
8.	Jivananandabhram	Jwara	BBR-2	25	125
9.	Unmadagajakesari rasa	Unmada	YR	25	500
10.	Mahajwarankush rasa	Jwara	RRS	25	250
11.	Jivananandabhram	Jwara	BR	25	125
12.	Kanakasundarivati		RYS-1	25	125
13.	Sannipatabhairavo rasa-1	Jwara	BBR-5	23.07	125
14.	Sannipatabhairavo rasa	Sannipata	BR	21.42	250
15.	Aanandabhairavagitika	Sannipata	BBR-5	20	125
16.	Shankhavishodaya rasa	Vishamjwara	RT	20	125
17.	Pralapantak rasa	Agnimandya	RT	20	125
18.	Unmadagajankush	Unmada	RT	20	125
19.	Retorodhinigutikadwitiya	Vajikarana	RYS-2	18.18	125
20.	Jwararyabhram	Jwara	RYS-1	16.66	250
21.	Alpajwarankusa rasa	Jwara	BBR-1	16.66	250
22.	jwarakruntano rasa	Jwara	BBR-2	16.66	250
23.	Pramehankush rasa	Prameha	BBR-3	16.66	250
24.	Bruhatkanaksundaro rasa	Pittatisara	RSS	16.66	250
25.	Grahanikapato rasa	Grahani	RSS	16.66	250
26.	Jwararyabhram	Jwara	BR	16.66	125
27.	Kanakasundar rasa(bruhat)	Pittatisara	BR	16.66	250
28.	Sannipatasurya rasa	Jwara	BR	16.66	
29.	Jatiphaadivati(Grahanik apata rasa)	Grahani	BR	16.66	
30.	Kalpalatavati	Shotha	BR	16.66	
31.	Vruhat kanaka sundaroRasa	Atisara	BBR-4	16.66	
32.	Kanakasundaro rasa-2	Atisara	BBR-5	16.66	
33.	Vrishyarajavatipradhama	Vajikarana	RYS-2	16.66	
34.	Sarvasannipatanasaka rasa	Sannipata	RYS-2	16.66	

VISHA LAKSHANA

A person if poisoned by Datura, his visual perceptions would all become yellowish (sarvam pashyathi peetakam) and also he would develop symptoms like kampa (tremors), laala (excessive salivation), mada (intoxicated), chardi (vomiting), smruthibhramsha (amnesia) and bhrama (giddiness)³².

Modern view Toxic symptoms

Summarised in the classical phrase: "blind as a bat, hot as a hare, dry as a bone, red as a beetroot, and mad as a wet hen". The important manifestations can be better remembered as a series of D's

- Dryness of mouth, thirst, slurred
- speech Dysphagia
- Dilated pupils
- Diplopia
- Dry hot skin, with flushing
- hyperpyrexia Drunken gait (ataxia), hyperreflexia
- convulsions Delirium with hallucinations,
- agitation, amnesia, incoherence Dysuria, urinary retention, bladder
- distension Death, preceded by tachycardia,
- arrhythmias, coma, and respiratory depression³⁵

Toxic part: All parts especially seeds

VISHA VEGAS⁴²**Stages of poisoning**

In human beings the stages of poisoning are manifested in 8 different stages

1st stage: Prathama Visha Vega

Morbid thirst, Unconsciousness, tingling sensation in teeth, salivation, Vomiting, Mental fatigue

2nd Stage: Dwitiya Vishavega

Because of vitiation of blood, patients suffer from- Discoloration of skin, giddiness, tumbling, fainting, yawning, tingling sensation in the limbs, dyspnoea

3rd Stage: Tritiya Vishavega

In the third stage, because of the vitiation of Mamsa (muscle fat), the patient suffers from – circular eruptions, pruritis, oedema, urticaria

4th stage: Chaturtha Vishavega

Because of vitiation of Vata etc, patients suffers from- vomiting, burning sensation, pain in limbs, fainting.

5th stage: Panchama Visha vega

Blue vision, dark vision

6th stage: Sashti Visha Vega

Patients suffers from- hiccup

7th stage: Saptama Vishavega

Paralysis of muscles of shoulder girdle

8th stage: Ashtama Vishavega

The patients succumbs to death

THERAPEUTIC DOSE

Maatra (therapeutic dose) of Datura Maatra of Purified Datura beeja choorna is ¼ ratti (30.37mg) to ½ ratti (60.75mg) and purified Datura patra choorna is ½ ratti to 1½ ratti (182.25 mg)³¹

Alarka -Datura and sweta punarnava combination is very effective remedy³³ Krimi-Juice of Datura leaves mixed with Mercury or juice of heated leaves singly destroys ticks and lice on local application³⁰ Pitakamaya-Juice of madukaparni and paste of Datura root destroys the boils³⁰

FATAL DOSE

The fatal dose is about 50-100 Datura seeds, or about 10-100mg of atropine, however recovery has been recorded with 1000 mg of atropine³⁶.

FATAL PERIOD

In the majority of fatal cases death usually occurs within 24 hrs³⁶.

TREATMENT

Cow's milk with sugar can be given two times a day for treating Datura³².

Modern

Treat the patient in a quiet and dark environment. Treat respiratory failure with endotracheal intubation and assisted ventilation. Tidal volume should be at least 10 to 15 ml/kg. Monitor ECG, pulse, and temperature continuously. Gut decontamination-gastric lavage (after intubation), activated charcoal. Dialysis and haemoperfusion do not appear to be effective. Catheterise bladder. Administer IV fluids keeping a close watch on intake and output and renal function. Agitation can be controlled with judicious use of diazepam. Do not use phenothiazines or antihistamines, since they can aggravate anticholinergic effects.

Hyperthermia can be managed by hydration and cooling measures. Antidote- physostigmine is the antidote of choice, should be administered if the indications like, coma, arrhythmias, hallucinations, severe hypertension, convulsions, are present. The adult dose is 2mg IV, slowly repeated if required in 20 minutes. Do not give it as a continuous infusion.

Physostigmine is an effective but dangerous antidote and can give rise to convulsions, systole, hypotension, and hyper salivation and Brady arrhythmias if administered without caution.

Precaution: In the treatment of Datura poisoning, certain drugs such as antihistamines, phenothiazine, tricyclics, quinidine, disopyramide, procainamide, and morphine should be avoided.³⁷

AYURVEDIC ANTIDOTES

Changeri swarasa internally

- Administration of milk and sugar
- deliriant condition Chandana mixed with tender coconut
- water for internal administration Haridra choorna with karpasa patra
- swarasa (Gossypium herbaceum Linn.) and administer internally Mrunala (stalk of lotus) kwatha or swarasa³³
- Vishishta yogas (Ayurvedic formulations) of Datura Kanakasava, Sutashekhara rasa, Mahavishagarbhataila, Ummatta rasa³⁴

DIAGNOSIS

Even minute traces of atropine in blood can be detected by GC-MS (Gas chromatography- mass spectrometry). However, there is little or no correlation between dose of atropine, plasma concentration and observed clinical effects. Neutrophil leucocytosis is often encountered Dilated pupils-if the pupils do not constrict within 15-30 minutes after instillation of 2-3 drops of 1% pilocarpine, it is indicative of atropine or anticholinergic poisoning Cat's eye test-instillation of a few drops of the patient's urine into the eyes of a cat results in rapid mydriasis³⁷.

POST MORTEM APPEARANCES

The Datura seeds or their fragments may be found in stomach and intestine. It is therefore necessary to make a careful search for the vomited matter, stomach contents and faeces. The oesophagus, stomach and duodenum and other internal

organs are mostly congested. In rare cases mucous membrane of stomach may be found slightly inflamed³⁸.

CHEMICAL COMPOSITION

Seeds contain tropine, apotropine, scopine, scopolamine, hyoscyamine, hyoscine, littorine, valtropine.

MEDICO LEGAL IMPORTANCE

1. crushed or powdered seeds or an extract is used by criminals for stupefying a victim prior to robbery, rape or kidnapping (Road poison)
It is usually given in food or drinks ,Eg.,chapatis, curry, sweets, tea, liquor etc.,to travellers in railway stations, choultries, etc.
Sometimes, the seeds are mixed with incense wood, and the victim is exposed to fumes which cause lethargy.
The victim goes into temporary twilight phase and soon falls into a deep sleep and later wakes up to find his belongings lost.
He does not remember what has happened. 2.it is not taken by the suicide.
3. homicide is very rare
4. it is sometimes used as an abortifacient
5. it is believed to have aphrodisiac properties
6. accidental cases occur usually in children by eating the fruits. the seeds and leaves are mixed with tobacco or ganja and smoked in a pipe.
7. a decoction of seeds is sometimes added to liquor or toddy to increase the intoxicating property.
8. it is sometimes used as love philter. A person suffering from delirium of datura is not criminally responsible for his acts.

Mydriatic Test: A drop of the solution to be tested is put into eyes of a cat. The pupils dilate within half an hour if datura is present, due to presence of atropine.³⁹

CONCLUSION

Datura is included one among the upavisha by laghutrayees, except sharangadhara samhitha. In Ayurvedic literatures, Datura is described as a useful remedy for various diseases like jwara, kushta, krimi, visha. For the preparation of many Ayurvedic formulations like Kanakasava, Sootashekhara rasa, mahavishagarbha taila Datura is used as one of the ingredient. Improper or inadequate shodhana and Datura in high dose, can give rise to toxic problems like dryness of mouth, excessive thirst, nausea, vomiting, giddiness. The most toxic part of Datura is seeds in modern concept it is a deliriant type of cerebral poison and the main toxic principles are hyoscyamine, hyoscine, and atropine. So for getting rapid outcome in ayurvedic treatments we can use Datura like upavishas in ayurvedic formulations.

PHOTOS



REFERENCES

1. Pandit Kashinath Shastry (2004).Rasa Tarangini.Motilal Banarasidas Publications Varanasi.
2. Namburi Shekhar U.R (2013).A Textbook of Agadtantra.Chukhambha Sanskrit Sansthan Varanasi.
3. PanditKashinathShastry(2004).RasaTarangini, MotilalBanarasidasPublications
4. Acharya Yadhavji Trikamaji (2006).Charaka Samhita, Chaukhambha Sanskrit Sansthan Varanasi.
5. V V Pillay (2010).Modern Medical Toxicology,Jaypee Brothers Medical

- Publishers(P) LTD New Delhi.
6. V V Sivaraajan and Indira Balachandran (2013).Ayurvedic drugs and theirplant sources. Oxford & IBH Publishing Co. Pvt Ltd New Delhi.
 7. Neeraj Tandone and Madhu Sharma (2009).Review on Indian medicinal plants. Vol 9. Medicinal plants unit. Indian Council of Medical research New Delhi.
 8. Pandit Kashinath Shastry (2004).Rasa Tarangini. Motilal Banarasisidas Publications
 9. Brakmasankara Misra and Sri Rupalalji Vaisya. Bhavapraksha. Chaukhamba Sanskrit Sansthan Varanasi.
 10. SatishChandraSankhyadhara.SriNarahariPandit'sRaja Nighantu.Chaukhambha Orientalia Varanasi.
 11. Pandit Kashinath Shastry (2004).Rasa Tarangini.Motilal Banarasisidas Publications Varanasi.
 12. Jaising Modi (2012). Medical Jurisprudence and Toxicology. Justice K.Kannanand K.Mathiharan.Lexis Nexis Publishers Gurgaon-Haryana.
 13. Neeraj Tandone and Madhu Sharma (2009) Review on Indian medicinal plants. Vol 9. Medicinal plants unit. Indian Council of Medical research New Delhi.
 14. J.L.N.Sastry. Illustrated Dravyaguna Vijnana. Vol II.Chaukhambha Orientalia Varanasi.
 15. J.L.N.Sastry. Illustrated Dravyaguna Vijnana. Vol II.Chaukhambha Orientalia Varanasi.
 16. Acharya Yadhavji Trikamaji (2006).Charaka Samhita, Chaukhambha Samskrit Sansthan Varanasi.17.Yadavjitrikamji Acharya (2009). Sushrutasamhita. Choukhamba orientalia Varanasi.
 17. Kaviraj Atridev Gupta (2011).AstangaHridaya.Choukhamba Orientalia Varanasi.
 18. Vaidya Jaymini Pandey.Haritha Samhita.Chaukhambha bharati Academy Varanasi
 19. S D Kamat.Studies of Medicinal Plants & Drugs in Dhanwantari Nighantu. Chaukhamba Sanskrit Pratisthan Varanasi.
 20. Gyanendra Pandey.Achaya Sodhala's Sodhala Nighantu. Chaukhamba Krishnadas Academy Varanasi.
 21. J.L.N.Sastry. Illustrated Dravyaguna Vijnana. Vol II.Chaukhambha Orientalia Varanasi.
 22. Brakmasankara Misra and Sri Rupalalji Vaisya. Bhavapraksha. Chaukhamba Sanskrit Sansthan Varanasi.
 23. SatishChandraSankhyadhara.SriNarahariPandit'sRaja Nighantu. Chaukhambha Orientalia Varanasi.
 24. Priyavrat sharma. Kaiyadeva Nighantu. Chaukhambha orientalia Varanasi.
 25. Bapalala G Vaidya. Nighantu Adarsa.Vol II. Chaukhambha bharati academy Varanasi.
 26. Priyavrat Sharma (1995).Priya Nighantu.Chowkhamba surbharati prakashan Varanasi.
 27. Pandit Kashinath Shastry (2004).Rasa Tarangini. Motilal Banarasisidas Publications Varanasi.
 28. Yadavji trikamjiacharya (2009).Sushrutasamhita.Choukhamba orientalia Varanasi.
 29. J.L.N.Sastry. Illustrated Dravyaguna Vijnana. Vol II.Chaukhambha Orientalia Varanasi.
 30. Pandit Kashinath Shastry (2004).Rasa Tarangini.Motilal Banarasisidas Publications Varanasi.
 31. Shivaprasd Sharma (2012).Ashtanga Sangraha.Choukhamba Sanskrit seriesoffice Varanasi.
 32. V M Kuttikrishnamenon. Kriya kumudi.Sthavaravisha prakaranam national bookstall Kottayam.
 33. J.L.N.Sastry. Illustrated Dravyaguna Vijnana. Vol II.Chaukhambha Orientalia Varanasi.
 34. V V Pillay (2010).Modern Medical Toxicology,Jaypee Brothers Medical Publishers(P) LTD New Delhi.
 35. Jaising Modi (2012). Medical Jurisprudence and toxicology. Justice K.Kannanand K.Mathiharan.Lexis Nexis Publishers Gurgaon-Haryana.
 36. V V Pillay (2010).Modern Medical Toxicology,Jaypee Brothers Medical Publishers(P) LTD New Delhi.
 37. Jaising Modi (2012). Medical Jurisprudence and toxicology. Justice K.Kannanand K.Mathiharan.Lexis Nexis Publishers Gurgaon-Haryana.
 38. Dr.K.S .Narayan Reddy.The Essential of MedicalToxicology,Jaypee Brothers Medical Publishers (P) LTD New Delhi.
 39. lib.unipune.ac.in>handle
 40. <https://homeguides.sfgate.com/pick-seeds-datura-plant-66939.html>
42. <https://easyayurveda.com/2015/12/02/charaka-visha-chikitsa-23rd-chapter> 43. Users/Guest/Downloads/490-Article%20Text-2236-1-10-20160923.pdf 44.Prakash L.Hegde