



Review Article

THE AMAZING THERAPEUTIC PROPERTIES OF *DHATURA*-A SHORT REVIEW**Dinesh kumar kumawat^{1*}, Anita Sharma², Vinod kumar Gotecha³**¹P. G. Scholar, ²Associate Professor, ³Professor, P. G. Dept. of Agadtantra, National institute of Ayurveda, Jaipur, India.**Article info****Article History:**

Received: 28-03-2015

Accepted: 24-05-2015

KEYWORDS: *Dhaturo*, *Datura metel* linn., Pharmacognostical properties, Therapeutic properties.**ABSTRACT**

Plants have always played a major role in the treatment of human traumas and diseases worldwide. *Dhaturo* is a widespread annual plant from the Solanaceae family. The species of *Dhaturo* can be found throughout the world. The plant grows in sandy flats, plains, areas up to 2, 500 feet above sea level. *Dhaturo* is one of the widely well known folklore medicinal herb. *Dhaturo* is a plant with both poisonous and medicinal properties and has been proven to have great pharmacological potential with a great utility and usage as folklore medicine. In Ayurvedic text it is established as a poisonous plant but having good therapeutic properties after *Shodhan* process. After *Shodhan* process its poisonous properties are diminished but therapeutic properties get improved. So in most of the Ayurvedic preparations we use the *Shudha Dhaturo*, *Shudha vatsanabha*, *Shudha Bhangra* etc. There are so many generic preparations available in old text to treat various diseases like sanity, gastric ulcer, fever, rhinitis, Bronchial asthma, seizures etc., having *Dhaturo* as a main constituent. The phytochemical investigations showed the presence of saponins, tannins, steroids, alkaloids, flavonoids, phenols and glycosides. Atropine and scopolamine are competitive antagonists of muscarinic cholinergic receptors and are central nervous system depressants. This paper presents an exclusive review work on the traditional uses, Ayurvedic purification process, phytochemical, pharmacological actions of *Dhaturo*.

Corresponding Author*Dr. Dinesh kumar kumawat**

P. G. Scholar

P. G. Dept. of Agadtantra, National institute of Ayurveda, Jaipur, India.

Mob: +919950809306

Email:

drdkbhorodiamd29@gmail.com**INTRODUCTION**

Dhaturo is commonly known as thorn apple, jimson weed, locoweed and devil's weed. It is a member of the Solanaceae family. Commonly found species of *Dhaturo* are *D.stramonium*, *D.fastuosa*, *D.atroxa* and *D.metel*. *Dhaturo* is a poisonous herbal plant, also known as *Kanaka* in *Ayurvedic samhitas* and has been commonly used in *Ayurvedic pharmacopoeia*.

The plant is described under the "*Upavisa Vargas*" of *Rastarangani*^[1], and *Rasratna Samuchya*^[2] etc., but in *Sushrut samhita* it is included in *Sthavara phala visha*. It has been used successfully in the management of several diseases after proper *Shodhana* process. The species of *Dhaturo* can be found throughout the world. The plant grows in sandy flats, plains, areas up to 2, 500 feet above sea level. ^[3]

Vernacular Names ^[4,5]

Arabian	:	Datur
Assamese	:	<i>Dhaturo</i>
English	:	White Thorn apple
Farsi	:	Tatur

Gujrati	:	Dhanturo
Hindi	:	<i>Dhaturo</i>
Kannada	:	Ummatti, Madagunaki, Dathura
Malayalam	:	Umman, Ummatt, Ummattu
Marathi	:	Dhotra
Oriya	:	Dudura
Punjabi	:	<i>Dhaturo</i>
Tamil	:	Umattai
Telugu	:	Tella-ummetta
Urdu	:	<i>Dhaturo</i>

Sanskrit Synonyms: *Kanaka*, *Matul*, *Shivpriya*, *Kantakphala*, *Shivashekar* and its fruit is called *Matulputral*.

Binomial Name: *Datura metel* linn.

Guna-dharma (pharmacognostical properties):

The "*Vrhattri*" of *Ayurveda*, only indicates the plant in some of its *Yogas* besides going into its pharmacognostical properties but various *Nighantus* of medieval and modern era described *Dhaturo's* detailed pharmacognostical properties as well.

Table 1: Showing Guna-dharma of *Dhatura* as mentioned in *Nighantus* [10], [16-21]

<i>Nighantu</i>	<i>Rasa</i>	<i>Guna</i>	<i>Virya</i>	<i>Vipaka</i>	<i>Prabhava</i>
<i>Bhavaprakash Nighantu</i>	<i>Kashaya, Madhura, Tikta</i>	<i>Guru</i>	<i>Usna</i>	<i>Katu</i>	-
<i>Kaidev Nighantu</i>	<i>Kashaya, Madhura, Tikta</i>	<i>Guru, Tikshana</i>	<i>Usna</i>	-	-
<i>Raj Nighantu</i>	<i>Katu</i>	-	<i>Usna</i>	<i>Katu</i>	-
<i>Dhanvantri Nighantu</i>	<i>Katu</i>	-	<i>Usna</i>	<i>Katu</i>	<i>Jwaraghn</i>
<i>Nighantu Adarsh</i>	<i>Katu</i>	-	<i>Usna</i>	<i>Katu</i>	<i>Jwaraghn, Madakari</i>
<i>Ras trangini</i>	<i>Katu</i>	-	<i>Usna</i>	<i>Katu</i>	<i>Jwaranashan (Visheshat)</i>
<i>Priya Nighantu</i>	<i>Tikta</i>	-	<i>Usna</i>	-	<i>Madakari</i>
<i>Dravyguna hastamalak</i>	<i>Kashaya, Madhura, Tikta, Katu</i>	<i>Guru, Tikshana</i>	<i>Usna</i>	<i>Katu</i>	-
<i>Dravyaguna vigyan</i>	<i>Tikta, Katu</i>	<i>Laghu, Ruksha, Vyavayi, Vikashi</i>	<i>Usna</i>	<i>Katu</i>	<i>Madaka</i>

Therapeutic properties

Acharya sushruta described *Dhatura* in five different *Yogas* indicated in *Alarkvisha*, *Karan-roga* and *Visarpa-nadi roga*.

While *Acharya Vagbhatta* indicates it in *Yogas* of *Alarkvisha* as well as *Khalitya*, *Harita*: in *Arsha*, *Cakardutta*: in *Unmada*, *Vipadika*, *Stan-pida* and *Nadi-roga*; *Nighantus* also mentions range of indications which are as follow.

Table 2: Show indications of *Dhatura* as mentioned in *Nighantus* [2] [10], [16-21]

S.No.	INDICATIONS	B.N	R.N	R.T	P.N	D.N	K.N	M.N.	<i>Dravyagun Hastamalak</i>	R.R.S.
1.	Fever	+	+	+	+	+	+	+	+	+
2.	Leprosy	+	-	+	+	+	+	+	-	-
3.	Anti-Lice	+	-	-	-	-	+	-	-	-
4.	Scabies	+	+	+	-	+	+	+	-	-
5.	Anti- helmintic	+	-	+	+	-	+	+	+	-
6.	Anti-toxin	+	-	-	+	-	+	+	-	-
7.	Anti-inflammatory	-	-	+	-	+	-	-	-	-
8.	Skin disease	-	+	+	-	+	-	-	+	-
9.	Gout	+	-	-	-	+	-	-	-	-
10.	Pain killer	-	-	+	+	+	-	-	+	+
11.	Asthma	-	-	+	+	+	-	-	+	-
12.	Rabies	-	-	+	-	-	-	-	+	-
13.	Measles	-	-	+	-	-	-	-	-	-
14.	Cholera	-	-	-	-	-	-	-	+	-
15.	Syphilis	-	-	-	-	-	-	-	+	-
16.	Tuberculosis	-	-	-	-	-	-	-	-	+
17.	I.BS	-	-	-	-	-	-	-	-	+
18.	Rheumatoid Arthritis	-	-	+	-	-	-	-	-	-

B.N.- *Bhavaprakash Nighantu*, R.N.- *Raj Nighantu*, R.T.- *Ras trangini*,

P.N.- *Priya Nighantu*, D.N.- *Dhanvantri Nighantu*, K.N.- *Kaidev Nighantu*,

M.N.- *Madhav nidan*, R.R.S.-*Ras rattan samuchya*

Morphology

D. stramonium is a foul-smelling, erect, annual, freely branching herb that forms a bush up to 2 to 5 ft tall.

Its root is long, thick, fibrous and white. Its stem is stout, erect, leafy, smooth, and pale yellow-green. The stem forks off repeatedly into branches and each fork forms a leaf and a single, erect flower.

The leaves are about 8–20 cm long, smooth, toothed, soft, and irregularly undulated. The upper surface of the leaves is a darker green, and the bottom is a light green. *D. stramonium* generally flowers throughout the summer. The fragrant flowers are trumpet-shaped, white to creamy or violet, and 6-9 cm long, and grow on short stems from either the axils of the leaves or the places where the branches fork. The calyx is long and tubular, swollen at the bottom, and sharply angled, surmounted by five sharp teeth. The corolla, which is folded and only partially open, is white, funnel-shaped, and has prominent ribs.

Its egg-shaped seed capsule is 3–8 cm in diameter and either covered with spines or bald. At maturity, it splits into four chambers, each with dozens of small, black seeds.^[6]

Phytochemistry

Main constituents of *Datura* are a large number of tropane alkaloids (hyoscyamine, hyoscyne, littorine, acetoxypine, valtropine, fastusine) a number of withanolides and various triglycol esters of tropane and pseudotropine. Calystegines the nortropine alkaloids with glycosides inhibitory activity have also been found in various *Datura* species. The root contains higher amount of atropine compared to the other parts. The aerial parts usually accumulate relatively higher amounts of scopolamine and relatively lower amounts of atropine as compared to the root of the plant.^[7]

Uses of *Datura*

Datura is internally used in relieving the spasm of asthma. It is also used in the treatment of Parkinsonism and Haemorrhoids. Its leaves, applied after roasting, are useful in relieving pain. The bitter narcotic plant relieves pain and encourages the healing process. Externally, the plant is used as a poultice in treating fistulas, abscesses, wounds and severe neuralgia. Traces of scopolamine are also found in the plant, which is a potent cholinergic-blocking hallucinogen that has been used to calm schizoid patients. Its leaves, containing hyoscyamine and atropine, can be used as an immensely powerful mind-altering drug. The seeds of *Datura* are analgesic, anti-helminthic and anti-inflammatory and as such, they are used in the treatment of stomach and intestinal pain that results from worm infestation, toothache, and fever from inflammations. The juice of its fruit is applied to the scalp, to treat dandruff and falling hair.^[8]

Its leaves are found useful to treat headache. The vapour of *Datura* leaves infusion is used to relieve arthritis such as rheumatism and gout. Its leaves are also used to treat heart problems like palpitations and hypertension. *Datura* leaves juice is used to treat earache. Boils can also be overcome by applying *Datura* leaves as poultice.^[9]

Method of *Shodhana* (purification) of *Datura* seed

As we know that *Datura* is a poisonous herb but this is used frequently in Ayurvedic preparations for a long time. In Ayurveda we have a process called *Shodhan* which is able to make poisons to use in medicines.

For the *Shodhan* of *Datura*, First of all the seeds are subjected in a *Dolayantra* (hanging the drug in liquid while boiling) containing sufficient cow milk for 3 h. The level of the milk must be above the level of the *Pottali* (cloth bag in which seeds are hanging) and this level must be maintained throughout the *Swedana* process. Then they are washed with hot water. The seeds are used after removing the seed coat.^[10]

Ayurvedic preparations of *Datura*

- *Unmad gajankush ras*^[10]
- *Sutshekhhar ras*^[15]
- *Kankasava*^[15]
- *Pralapantak ras*^[10]
- *Laxmivillas ras (nardiya)* ^[15]
- *Sannipat bhairav ras*^[15]
- *Granthishothnivarika varti*^[10]

Researches and studies

Anti-bacterial Activity

The leaves extract of *Datura stramonium* exhibits antibacterial activity. The antibacterial activity against the micro-organism strains of *Salmonella typhi*, *Pseudomonas aeruginosa*, *Proteus vulgaris* in the alcoholic extract of the leaves *D. stramonium* was found to be most efficient and moderately effective against *Klebsiella pneumonia*, *Staphylococcus-aureus* and *Escherichia coli*. The different concentrations of the alcoholic extracts of *D. stramonium* was proved to be effective and concentration dependant antimicrobial activity against Gram positive and Gram negative bacteria tested.^[11]

Anti-asthmatic activity

It has anti-cholinergic properties which are highly useful in treating the asthma and chronic obstructive pulmonary disease (COPD). Its atropine is classified as competitive non-selective antagonist of muscarinic cholinergic receptors. Scopolamine is also a competitive non-selective inhibitor, mimicking Ach at the neural synapses and depressing the central nervous system, It is an antagonist of muscarinic M1, M2 and M3 receptors in airways. Anti-cholinergic treatment is

directed towards muscarinic receptors within the lung by blocking muscarinic receptors on airway smooth muscle and submucosal gland cells and by inhibiting increased tone.^[7]

Hypoglycemic activity

The seeds of *D.metel* were examined for hypoglycaemic and antihyperglycemic activities in normal wistar albino rats and diabetic rats. Seed powder of *D.metel* having blood glucose lowering effect in normoglycemic and in alloxan -induced hyperglycaemic rats.^[12]

Anticancer activity

A study done by Ahmad et al on variety of human cancer cells derived from breast (MDA-MB231), head and neck (FaDu), and lung (A549) and were exposed for 24 and 48hours to *Dhaturo* aqueous leaf extract and clonogenic cell survival as well as parameters indicative of oxidative stress were assayed. Exposure of these cells to the extract for 48 hours showed that all cancer cell lines were sensitive to cell killing induced by *Dhaturo* aqueous leaf extract exposure with some variability ($p < 0.05$).^[13]

Antioxidant activity

The aqueous extracts of leaf, stem bark and roots of *D.metel* showed phytochemical and antioxidant activities. The aqueous extracts of the plant showed antioxidant activities of between 49.30-23.82% and can consider the plant as natural antioxidants.^[14]

Anti-gout effects

D.metel was assayed for xanthine oxidase inhibitory activity which is using for gout treatment. The methanolic extract of *D.metel* have more than 50% xanthine oxidase inhibitory activity (in vitro) which was comparable with the standard anti-gout drug allopurinol Showing 93.21% inhibition at 100g/ml concentration. The methanolic extract of *D.metel* was also found effective in hypo-uricaemic activity (in vivo) against potassium oxonate-induced hyper-uricaemia in mice.^[7]

DISCUSSION

As we seen above that *Dhaturo* have many properties like Hypoglycemic, Anti cancer, Antioxidant, Anti-asthmatic, Anti-bacteria, Anti-gout established by recent researchers. These all properties have close resemblance with therapeutic properties explained in old text like *Shwashara* (Anti-asthmatic), *Updanshara*, *Visuchika hara*, *Jwarahara*, *Yakshmahara* (Anti-bacterial), *Kantikara*, *Varnakara*, *Vishahara* (Antioxidant), *Vataraktahar* (anti-gout). Above discussion shows that the old sages have very good knowledge about its pharmacological properties.

CONCLUSION

From the beginning of human race, the plants are being employed by the people for their therapeutic uses and still we tend to have faith in their disease

curing properties. Though *Dhaturo* is taken into account as a toxic plant, it has been used for thousands of years in Ayurvedic medication after purification. It also possesses antioxidant, anti-cancerous, Anti-asthmatic, Anti-bacterial and Hypoglycemic properties. It is additionally used in Parkinsonism, Haemorrhoids, dandruff and falling hair. It is found very effective in arthritis such as rheumatism and gout due to its pain relieving properties. However, only a few works has been done on this plant and there is a large scope of investigation for researchers to explore its potential in the field of medicinal research and pharmaceutical sciences.

REFERENCES

1. Sharma SN, Shastri KN. Rasa Tarangini, 8th edn. New Delhi. Motilal Banarasidas Publication. 2000. pg. 676.
2. shastri Ambikadata, Rasratna sammuchaya, 9th edn., Chaukhamba Amarbharti Prakashan, Varanasi, 1995.
3. Singh HB, Singh RS and Sandhu IS. Herbal Medicine of Manipur. A Colour Encyclopaedia, Daya Publishing House, Delhi.2003; 15.
4. The Ayurvedic Pharmacopoeia of India, Part- I, Volume - IV, Government of India, Ministry of Health and Family Welfare, Department of AYUSH, New Delhi. Pp.29.
5. Sharma PV, Dravyaguna Vigyana, vol-2, reprint - 1998, Chaukhambha bharati academy, Varanasi, pg-500.
6. www.wikipedia.com/herbs/*Dhaturo*
7. Mandal et al., Universal journal of pharmacy 2013, 02 (02), page 47-51.
8. www.lloveindia.com/Indian herbs/*Dhaturo* stramonium
9. www.gyanunlimited.com/health/*Dhaturo*
10. Sharma SN, Shastri KN. Rasa Tarangini, 8th edn. New Delhi. Motilal Banarasidas Publication. 2000, pg.711-718.
11. Reddy BU, Enumeration of Antibacterial Activity of Few Medicinal Plants by Bioassay Method, E-Journal of Chemistry. 7 (4); 2010: 1449-1453.
12. Murthy bk, Nammi s, kota Mk, Rao RVK, Rao NK, Annapurna A. Evaluation of hypoglycaemic and antihyperglycemic effects of *Datura metel* (Linn.) seeds in normal and alloxan induced diabetic rats., J. Ethnopharmacol., 2004, 91:95-98.
13. Ahmad IM, Abdalla MY, Mustafa NH, Qnais EY and Abdulla FA. *Datura* Aqueous Leaf Extract Enhances Cytotoxicity via Metabolic Oxidative Stress on Different Human Cancer Cells, Jordan Journal of Biological Sciences. 2 (1); 2009: 9-14.
14. Akharaiyi FC, Antibacterial, phytochemical and antioxidant activities of *D.metel*, Int. J. Pharm tech Res., 2011, 3 (1): 478-83.

15. Sharma Ramnaryan, Ayurveda sara sangraha, Shri Baidyanath Ayurveda Bhawana pvt. Ltd., Allahabada, edition-12, 2009.
16. Shri Bhavamishra, Bhavaprakash, Chaukambha Bharati Academy, Varansi, edition-10, 1995.
17. Sharma P.V., Dravya guna vigyana, Vol-II, chaukahmbha bharati academy, Varansi, edition-1998.
18. Sharma P.V, Dhanvantri Nighantu, chaukahmbha orientalia, Varanasi, first edition, 1982.
19. Mishra Banvarilal, Dravyaguna hastamalaka, sharan book dipo, Jaipur.
20. Shri Narhari pandit, Raja Nighantu, Hindi commentary by Inderdev tripathi, Krishana das academy, Varanasi, First edition, 1982.
21. Sharma P.V., Sharma guruprasad, chaukahmbha orientalia, Varanasi, first edition, 1979.

Cite this article as:

Dinesh kumar kumawat, Anita Sharma, Vinod kumar Gotecha. The Amazing Therapeutic Properties of *Dhatura*-A Short Review. AYUSHDHARA, 2015;2(2):89-93.

Source of support: Nil, Conflict of interest: None Declared

