

## ANTI-ASTHMATIC PROPERTY OF DHATURA (DATURA STRAMONIEUM) - A DRUG REVIEW

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### ABSTRACT

*Datura* is a genus of nine species of poisonous flowering plants belonging to the family Solanaceae. They are known as angel's trumpet, and commonly known as *datura*. They are also sometimes called moonflowers. It is highly valued from time immemorial because of its vast medicinal properties. *Datura stramonium* (Solanaceae), used frequently as for asthma treatment. *Datura Stramonium* contains a variety of alkaloids including atropine and scopolamine. This plant has contributed various pharmacological actions in the scientific field of Indian systems of medicines like analgesic and antiasthmatic activities. *Datura stramonium* have a *bronchiodialator* property due

to *Tikt* and *Katu rasa* and *kaph vatashamak property* and due to *ushn virya* use in bronchial-asthma. Present review article analyze the classical reference & medicinal use on the basis of various available text.

**KEYWORDS:** *Datura*, *Thorn apple*, *Datura stramonium*, *Anti-asthmatic property*, *Kaphvatshamak*.

### INTRODUCTION<sup>[1,2,3]</sup>

*Datura* is an herbaceous perennial plant, which is grown in temperate and tropical region of the globe. There are so many species of *datura* like *Datura metal* and *Datura inoxia* out of some species are too much poisonous. Some are aphrodisiac too. The seeds and flowers are more poisonous in nature. Sometimes, *Datura* is termed as witches weeds and shows properties like deadly nightshade and henbane. *Datura* has been using since the ancient times by *ayurveda* physicians, spiritual purposes, holy men.

**Botanical Description**<sup>[1,2,3]</sup>

- Erect, annual herb or biennial, suffruticose herb with an unpleasant odour, 0.5-2.5m high.
- **Stem** – Vinaceous purple, or green, with-out or with various shades of puple colour.
- **Leaves**- Simple, alternate petiole 3-7 cm long.
- **Lamina** ovate in outline
- **Calyx** –tubular ,purplish, or green
- **Corolla**- funnel shaped

**Chief Charactars**<sup>[2,3]</sup>

- An perennial, 60-120cm. high.
- Stems woody below, purplish towards the tips.
- Leaves broad, ovate, acute or acuminate, sinuate or repand dentate.
- Flowers solitary, erect, pedicelled, funnel-shaped, violetor purplish outside, white within.
- Fruit capsule, globose, dehiscent irregularly, covered with short spines or blunt tubercles.

**Distribution**<sup>[17]</sup> - *D. stromonium* is probably originated in Caspian Sea territories and spreaded to Europe in the first century. At present it grows in waste places in Europe, Asia, America and South Africa. *D. stromonium* is cultivated in Germany, France, Hungary, South America and throughout the world.

**Cultivation and Collection**<sup>[15,16,17]</sup> - Thorn apple is easily cultivated, growing well in open, sunny situation. It flourishes in most moderately good soil but grows best in calcareous rich soil. Seeds are sown in open in May. In August the plant reaches to a hight of 1 meter and bears flowers and fruits. In the end of August stems with leaves and flowering tops are collected and dried as soon as possible at 45°C to 50°C. The leaves should be gathered when the plant is in full bloom and carefully dried. They are generally harvested in late summer. In August, the crop is cut by the sickle on a fine day in the morning, after the sun has dried off the dew, and the leaves are stripped from the stem, dried carefully as quickly as possible.

**Vernacular Names of Baringtonia Actangula**<sup>[1,2,3]</sup>**Table 1**

English	Thorn apple, Devils`s trumpet, Metel
Hindi	Sada dhatura
Marathi / Gujarati	Dhatura
Sanskrit	Dhatur
Bengali	Dhatura
Malayalanus / Kannada	Ummatta, Dhatura

**Taxonomical Classification**<sup>[1,3]</sup>**Table 2**

<i>Kingdom</i>	<i>Plantae</i>
<i>Division</i>	<i>Magnoliophyta</i>
<i>Class</i>	<i>Magnoliopsida</i>
<i>Order</i>	<i>Solanales</i>
<i>Family</i>	<i>Solanaceae</i>
<i>Genus</i>	<i>Datura</i>
<i>Species</i>	<i>Stramonium</i>

**Species**<sup>[1,16]</sup>

- ❖ *Datura wrightii* also called Southwestern Thorn Apple
- ❖ *Datura stramonium* also called Jimson weed
- ❖ *Datura metaloides* also called sacred datura
- ❖ *Datura inoxia* named as Toloache
- ❖ *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

**Gana of Datura Stramonium is Described in Various Text Book.**<sup>[4,5,6,9,12]</sup>

**Table 3**

<i>Bhavaprakasha Nighantu</i>	<i>Guduchyadi varg</i>
<i>Kaidev nighantu</i>	<i>Oashdhi varg</i>
<i>Madanpal nighantu</i>	<i>Abhaydi varg</i>
<i>Dhanvantri nighantu</i>	<i>Karviradi varg</i>
<i>Raj nighantu</i>	<i>Karviradi varg</i>
<i>Shaligrm nighantu</i>	<i>Guduchyadi varga</i>

**Rasa Panchaka in various nighantu and classical text.**<sup>[4,5,6,7,12,13]</sup>

**Table no -4**

<i>Text</i>	<i>Rasa</i>	<i>Guna</i>	<i>Virya</i>	<i>Vipak</i>	<i>Prabhav</i>	<i>Doshkarma</i>
<i>P.V</i>	<i>Tikta, katu</i>	<i>Laghu, Ruksha, Vayavyi, Vikashi</i>	<i>Ushna</i>	<i>Katu</i>	<i>Madak</i>	<i>Kaph-Vata shamak</i>
<i>R.N</i>	<i>Katu</i>	-	<i>Ushna</i>	-		-
<i>B.N</i>	<i>Madhur, Tikta, Kashya</i>	<i>Guru</i>	<i>Ushna</i>	-	-	<i>Vatakarak</i>
<i>M.N</i>	-	<i>Guru</i>	<i>Ushna</i>	-	-	-
<i>P.N</i>	-	-	-	-		-

*Ayurvedica Properties in Nighantu*<sup>[6,7,8,9,12,14,15]</sup>

Table – 5

<i>Karma</i>	<i>R.N</i>	<i>B.N</i>	<i>P.N</i>	<i>M.N</i>	<i>P.V</i>	<i>K.N</i>	<i>Chakradata</i>	<i>Vangsen</i>
<i>Tamakshawas</i>	-	++	+	—	++	—	—	—
<i>Vishnashak</i>	-	++	++	+	++	+	—	—
<i>Kandhughan</i>	++	++	—	—	++	+	—	—
<i>Krminashak</i>	-	++	++	+	++	+	—	—
<i>Jawar-nashak</i>	+	++	+	—	—	+	-	-
<i>Varannashak</i>	+	++	—	+	—	—	—	—
<i>Kustha-nashak</i>	+	++	+	+	+	—	—	—
<i>Ashmari nashak</i>	—	-		—	++	—	—	—

**Pharmacology Action**<sup>[1,16]</sup>

*Datura* in the same way as cannabis, namely rolling and smoking it, it can have certain antispasmodic effects on the body. This is particularly effective for the treatment of asthma, as it can calm the respiratory tracts and prevent them from closing up and inducing coughing. This antispasmodic can have effects on the rest of the body as well, such as relaxing muscles.

**Action of Chemical Constituents of Dhatura**<sup>[1,15,16]</sup>**Scopolamine**

- ❖ It is used as in asthma & anti depressant and anti nausea drug.
- ❖ It is anticholinergic and antimuscarinic. Paradoxically, overdoses can produce depression.

**Atropine**

- ❖ It is also an anticholinergic, antimuscarinic drug that causes dilate pupil and increases secretion of saliva.
- ❖ A fatal dose of atropine is greater than 10 mg, whereas scopolamine is toxic at 2–4 mg. The name “belladonna” comes from Italy where it was once used to dilate the eyes of women to make them more attractive (“bella”) to men.

**Hyoscyamine**

- ❖ It is the levorotatory isomer of atropine and is also the precursor for the synthesis of scopolamine.
- ❖ Its actions are similar to scopolamine and atropine. Hyoscyamine is named for the genus of henbane that concentrates tropane alkaloids in the leaves and seeds.

**Chemical Composition**<sup>[1,16]</sup>

- ❖ Scopolamine
- ❖ Daturadiol
- ❖ Daturalone
- ❖ Factusiene
- ❖ Hyosiene
- ❖ Hyoscyamine
- ❖ Fastusic acid
- ❖ Fastusiedne
- ❖ Daturanolone
- ❖ Datumatine niacin and vit. C.

***Dhatura* poisoning Signs and symptoms.**<sup>[16]</sup>

It produces characteristic manifestations of anticholinergic poisoning.

1. Dryness of mouth, nausea, vomiting
2. Dysphagia
3. Dysarthria (1–3 are due to inhibition of salivation)
4. Diplopia (due to dilated pupil)
5. Dry, hot (due to inhibition of sweat secretion), and red (due to the dilation of cutaneous blood vessels) skin, especially in the face/chest
6. Drowsiness leading to coma.

**Treatment for Poisonous Effects**

Stomach is washed with Potassium permanganate solution and tannic acid solution.

**Purification of *Datura***<sup>[16,17,18]</sup>

In the purification process of *Dhattūra*, seeds are soaked in freshly collected *Gomūtra* and kept aside for 12 h. After washing, the seeds are transferred to the *dolā yantra* for *svedana* process for 3 h. The seeds are again washed with lukewarm water, allowed to dry and the seeds testa are removed. Reduction in total alkaloid content and increase in total protein content of seed were observed after *Śodhana*. Complete removal of scopolamine and partial removal of hyoscyamine reflects the importance of *Śodhana* of *Dhattūra* by means of which the toxic effects are removed.

**Pharmacological Activities**<sup>[1,15]</sup>

- ❖ Antiasthmatic activity
- ❖ Anticholinergic activity
- ❖ Acaricidal, repellent and oviposition deterrent properties
- ❖ Antimicrobial Activity
- ❖ Antiinflammatory activity
- ❖ Larvicidal and mosquito repellent activities
- ❖ Pesticide toxicit, Antifungal activity

**Ethanomedicinal Uses**<sup>[7,8,9,12,14,15]</sup>

- ❖ The leaves of *D. stromonium* L. are used for the relief of headache and vapours of leaf infusion is used to relieve the pain of rheumatism and gout.
- ❖ The smoke from the burning leaf is inhaled for the relief of asthma and bronchitis.
- ❖ The fruit juice is applied to the scalp for the treatment of falling hair and dandruff.
- ❖ Seeds and leaves of *D. stromonium* were used to sedate hysterical and psychotic patients, also to treat insomnia.
- ❖ *D. stromonium* was used as hallucinogenic drug. It is also used to relax the smooth muscles of the bronchial tube and asthmatic bronchial spasm.
- ❖ *D. stromonium* was used internally to treat madness, epilepsy and depression.
- ❖ Its leaves, containing hyoscyamine and atropine, can be used as an immensely powerful mind-altering drug.
- ❖ The seeds of *Datura* are analgesic, anthelmintic 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 inflammation.

**DOSE** – Seed Powder – 50-100 mg.

**Lethal Dose** – 100-125 seed

**Formulations of Datura**

<b>Kanakasava</b>	<b>Vishagarbha Taila</b>	<b>Dhurdhurapatradi Thailam</b>
Used in asthma, fever and bleeding disorders.	Oil used in joint disorders associated with stiffness, as in locked jaw, lower back pain and stiffness etc.	Hair oil used in treating dandruff and hair fall.

## METRIAL AND METHODS

The various classical and modern texts, research papers and material related references regarding to were collected and classified acc. to their effects.

## CONCLUSION

*Datura stramonium* (*Solanaceae*), used frequently as an *Anti-asthmatic* treatment. *Datura Stramonium* contains a variety of alkaloids including atropine and scopolamine. *Dhatura stramonium* have a *bronchiodialator* property due to *Tikt* and *Katu rasa* and *kaphvatashamak* property due to *ushn virya* use in bronchial- asthma.

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