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**Aqib Sayyed**  
Department of Botany Abdul Wali  
Khan University Mardan, Pakistan  
Email: [aqib.sayyed@yahoo.com](mailto:aqib.sayyed@yahoo.com)

**Mohib Shah**  
Department of Botany Abdul Wali  
Khan University Mardan, Pakistan  
Email: [mohibshah1@gmail.com](mailto:mohibshah1@gmail.com)

## Phytochemistry, pharmacological and traditional uses of *Datura stramonium* L. review

**Aqib Sayyed, Mohib Shah**

### ABSTRACT

*Datura stramonium* or jimson weed is a wild shrub belongs to family Solanaceae. It has both toxic and medicinal properties. Traditionally it is used in skin disorder, ear pain, cough, fever and asthma. Juice of fruit is used for body pain. Leaves extract are externally used for injuries, wounds bleeding and pains. Juice of fruit is applied to scalp for falling hair and as antidandruff. *Datura stramonium* contains biologically active substances like alkaloids, atropine, scopolamine, tannin, carbohydrate and proteins. It is used in many drugs due to its analgesic and antiasthmatic activities.

**Keywords:** *Datura stramonium*, Medicinal, Traditional, Solanaceae, antiasthmatic.

### 1. Introduction

*Datura stramonium* is commonly known as Jimson weed or *Datura* belongs to family Solanaceae. It is 60-120 cm or more tall, branched and pubescent plant. Leaves are 8-17x4-13 cm, ovate, sinuately dentate and minutely puberulose. The flowers are trumpet-shaped, white to creamy or violet and 6 to 9 cm long [27]. Mostly found in temperate and subtropical region [1]. Humans use different plant for treatment and still are in search of medicinal value plants. *Datura stramonium* has both the poisonous and medicinal uses [5].

From the beginning of life humans use plant for different purposes like food and medicine. Still today a large number of people use different plant for different disease treatments. *Datura stramonium* is a most important medicinal plant. Traditionally it has an important medicinal value throughout the world. Its leaves and seeds are used in different treatment recipes. The leaves of *Datura stramonium* are mixed with mustard oil for treatment skin disorder. Juice of flower petals is used in ear pain. Seeds are used as purgative, in cough, fever and asthma. Seeds are also used for smoking for its narcotic action [12]. It is often used as an analgesic plant in folklore medicine in the "Old world" [31]. The drugs obtained from medicinal plants are termed crude drug of natural or biological origin as described by pharmacist and pharmacologist [25]. *Datura stramonium* contains different type of phytochemical including Saponins, Tannins, Steroids, Alkaloids, Flavonoids, Phenols and Glycosides [23]. Its leaves and branches extracts show high anti-fungal and anti-microbial activities [10].

### 2. Phytochemistry

*D. stramonium* contains Sixty-four tropane alkaloids. Two new tropane alkaloids, 3-phenylacetoxy-6, 7-epoxynortropane and 7- hydroxyapoatropine were tentatively identified. The alkaloids scopoline, 3-(hydroxyacetoxy) tropane, 3-hydroxy-6-(2-methylbutyryloxy) tropane, 3a-tigloyloxy-6-hydroxytropane, 3,7- dihydroxy-6-tigloyloxytropane, 3-tigloyloxy-6-propionyloxytropane, 3-phenylacetoxy-6,7- epoxytropane, 3-phenylacetoxy-6-hydroxytropane, aponoscopolamine, 3a,6a-ditigloyloxytropane and 7-hydroxyhyoscyamine are reported for the first time for this species [3]. The main components of essential oil were sterols and their derivatives, and the major constituents of *Datura stramonium* essential oil are sterols and there derivatives and 5.alpha.-Ergosta-7,22- dien-3.beta.-ol (16.53%), 3-Hydroxycholestan-5-yl, acetate (14.97%), and 26,26-Dimethyl-5, 24(28)-ergostadien-3.beta.-ol (10.39%) [29]. Protein and ash are highly distributed in the seed coat than the seed. In contrast the fat, carbohydrate

**Correspondence**  
**Aqib Sayyed**  
Department of Botany Abdul Wali  
Khan University Mardan, Pakistan

and fiber contents of the seed were higher than the seed coat.

The seeds also contained higher concentration of phytate, tannin and oxalate than the seed coat. In seed coat calcium, iron, potassium, sodium and phosphorus were higher than the seeds [17]. Extract with water and ethanol contain saponins, steroids, alkaloids, and glycosides [23]. Saponins, flavonoids, alkaloids, glycosides and phenol are common among crude aqueous and ethanol extract of the plant [2-21]. Leaves extract contain different types of secondary metabolites such as glycosides, phenol, lignins, saponins, sterols and tannins [15]. The primary biologically active substances in *D. stramonium* are the alkaloids atropine and scopolamine [11].

### 3. Pharmacological uses

*Datura stramonium* is widely growing plant and well known to have great pharmacological potential with a great utility and usage in folklore medicine folklore medicinal herbs. It contains alkaloids, tannins, carbohydrates and proteins and use in medicine due to its analgesic and antiasthmatic activities [26]. Leaves are used in asthma treatment [22-18]. The primary biologically active substances in *Datura stramonium* are the alkaloids atropine and scopolamine. Atropine has been used in treating Parkinson's disease, peptic ulcers, diarrhea, and bronchial asthma [11]. Its leaves mucilage and Poly Vinyl Pyrrolidone combination can be used as a matrix forming material for making sustained release matrix tablets [1]. *Datura stramonium* is a natural source of antioxidants and phytochemical having antimicrobial activities [2]. Its extracts show significant antimicrobial activity against *Staphylococcus aureus*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Aspergillus niger* and *Fusarium* species [21]. The secondary metabolites of *Datura stramonium* are highly effective against different types of diseases such as anti-diabetic, antiviral, etc. [15]. Water extract of show insecticidal activities [14]. *Datura stramonium* is used in Eastern medicine, especially in Ayurvedic medicine for curing various human ailments, including ulcers, wounds, inflammation, rheumatism and gout, sciatica, bruises and swellings, fever, asthma, bronchitis and toothache [8]. The ethanolic extracts show good antimicrobial activities than aqueous extracts. Extracts of leaves show better efficacy than stem and root [7].

### 4. Traditional use of *Datura stramonium*

When the leaves of *Datura stramonium* mixed with mustard oil then it is useful in skin disorders. Juice of flower petals is used in ear pain and seeds are used as purgative, in cough, fever and asthma. Seeds are smoked due to its narcotic action [12]. Leaf paste and extract is externally used for injuries, wounds, bleedings and pains. Seeds in small quantity used for asthma and tonsil problems. The extract of leaves is also used for baldness [13]. leaves used externally for management of pains [16]. *Datura stramonium* plant frequently used as antiparasitics and repellents [9]. Fruit oil is used for body pain [28]. Leaf or whole plant is Anti-inflammatory and antispasmodic [6]. Green leaves are applied for the softening of the boils. Juice of the fruit is applied to scalp for falling hairs and as antidandruff. Juice of the flower is used in earache. One drop is poured in the ear at night [24]. Paste of leaves is topically applied for skin diseases [20]. Dried leaves and seeds are used as Anticholinergic and sedative [30]. Seeds are used to make somebody unconscious [19]. Traditionally it is used for cure of Rheumatism. 75 gm rhizomes of ginger (*Zingiber officinale*), 100 gm of garlic (*Allium sativum*) and 85 gm of onions (*Allium*

*cepa*) are macerated together to extract the juice. To the juice is added 86 gm atosh (root of an unidentified plant) and an equal amount of darmuz (arsenic), mudra shankar (unidentified chemical, possibly a chromium salt) and camphor. One powdered seed of *Datura stramonium* is added to the mixture along with 400 gm of oil from seeds of *Brassica campestris*. The whole amount is boiled thoroughly, slightly cooled and applied to places where there is rheumatic pain. This is done 2-3 times daily till cure of the pain [4].

### 5. Conclusion

Studies indicated that *Datura stramonium* is a wild plant having various medicinal and pharmacological properties. Phytochemical of the plant are alkaloids, atropine, scopolamine, tannin, saponine, glycosides, phenol, sterols, lignins, fats, carbohydrates and proteins. Extract with water and ethanol contains saponine, steroids, alkaloids and glycosides. Alkaloids, tannins, carbohydrates and proteins are used in medicines due to its analgesic and antiasthmatic activities. Atropine used in treatment of Parkinson's disease, peptic ulcers, diarrhea and bronchial asthma. Water extract of *D. stramonium* show insecticidal while ethanol extract show good anti-microbial activities. Traditionally leaves past and extracts are externally used for injuries, wounds, bleeding and pain. Juice of flower petals is used in ear pain and seeds are used as purgative, in cough, fever and asthma.

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