ABSTRACT

Datura, a genus of medicinal herb from the Solanaceae Family, is credited with toxic as well as medicinal properties. The different plant part of Datura species, mainly D. Stramonium L. Datura stramonium contain biologically Active Substance like, Atropine, sopolamine, tannin, carbohydrate and protein. The plant show Various types of activities such as Antiperspirant activity, Antiasthmatic activity, Antimicrobial Activity, Antidiabetic effect. That may due to presence of active chemical constituents. The Current review highlight the chemical constituents, pharmacological Activity and traditional useses of Datura stramonium

KEYWORDS: Datura stramonium, Chemical constituents, pharmacological Action, Medicinal plant.

INTRODUCTION

The world Health Organization estimates that 4 bilion people 80% of the world Population presently use herbal medicine for some aspect of primary health care.[1]

A gradually increase is observed in these recent years in the use of medicinal plants as they are recognised in term of natural resources.[2] These plants with their bioactive Compounds (Phytoconstituents) used in pharmacological And remedial perspective. Nowadays with negligible Harmful effect, plants made drugs or phytomedicines has Highly in practice by the pharmaceutical companies to Inhibit negative outcome from the disease.[3] The god Lord Shiva was Known to smoke Cannabis and Datura. People still provide The small thorn apple during festivals and special days as Offerings in Shiva icons at temples[4] Datura a widespread annual plant from the Solanaceae family. It originates in the America but is found around the world including North, Central and South America, Europe, Asia and Africa
Datura stramonium contains different types of phytochemical including Saponins, Tannins, Steroids, Alkaloids, Flavonoids, Phenols and Glycosides. Its leaves and branches extracts show high anti-fungal and anti-microbial activities. The seeds of D. stramonium are useful in treating acne and bronchitis. Many other parts are used for treating diseases such as piles, diabetes and jaundice. Traditionally, D. stramonium has been used for mystic and religious purposes, and as an herbal medicine with narcotic effects or to treat asthma. In addition, Datura spp. has also been used against animal bites such as snake bites, which helps relieve pain.

**Classification of datura**

Kingdom – Plantae  
Subkingdom – Tracheobionta  
Superdivision – Spermatophyta  
Division – Magnoliophyta  
Subdivision- Angiospermae  
Class – Magnoliopsida  
Subclass – Asteridae  
Order – Solanales  
Family – Solanaceae  
Genus – Datura L.  
Species – stramonium 13th

**Various species of datura**

Datura metal  
Datura stramonium  
Datura Alba  
Datura fastuosa  
Datura candida (Pers) Saff
Datura ferox L  
Datura leichhardtii Benth  
Datura reburra Barclay Datura inoxia Mill  
Datura inoxia Mill  
Datura kymatocarpa Barclay  
Datura ceratocaula Ortega  
Datura discolor Bernh  
Datura dolichocarpa (Lagerh) Saff  
Datura wrightii Regel 14th

Datura  
Synonyms= Thornapple, moon flower, hell's bells, devil's trumpet, devil's weed,  
tolguacha, Jamestown weed, stinkweed, locoweed, pricklyburr, false castor oil plant,  
and devil's cucumber.15th  
Family= Solanaceae 16th  
Biological source= Datura herb consists of the dried leaves and flowering tops of Datura  
metel Linn and Datura metel var. 17th  
Geographical source=It is found in India, England and other tropical and sub-tropical  
countries.

Morphology of datura  
Colour=Flower colour white, leaves colour green  
Odour= Pungent  
Taste=The leaves have a bitter and nauseating taste 18th  
Size =The leaves are about 8 to 20 cm (3–8 in) long  
Shape=The root is long, thick, fibrous, and white. The stem is stout, erect, leafy, smooth, and  
pale yellow-green to reddish purple in color. The stem forks off repeatedly into branches and  
each fork forms a leaf and a single, erect flower. The leaves are, smooth, toothed,soft, and  
irregularly undulated. The upper surface of the leaves is a darker green, and the bottom is a  
light green., which is imparted to extracts of the herb, and remains even after the leaves have  
been dried.19th 20th.
Fig. 2: Morphological features of Datura stramonium var. stramonium. A. Leaves and white flowers with 5 petals. B. Leaves and white flower with 6 petals. C. Flower with 5 stamens. D. Flower with 6 stamens. E. Immature and mature capsules. F. Seed. (photos taken by Rania A. Hassan[ 21st].)

**Standards**

1. Stem, flower, fruits – not more than 20%
2. Foreign organic matter – not more than 2%
3. Acid-insoluble Ash – not more than 4% 22rd

**Chemical tests**

1. Vitali-Morin test:
2. The tropane alkaloid is treated with fuming nitric acid, followed by evaporation to dryness and addition of methanolic potassium hydroxide solution to an acetone solution of nitrated residue. Violet colouration takes place due to tropane derivative.
3. On addition of silver nitrate solution to solution of hyoscine hydrobromide, yellowish white precipitate is formed, which is insoluble in nitric acid, but soluble in dilute ammonia 22nd

**Chemical constituents**
The preliminary phytochemical investigation was performed on methanolic and hydroalcoholic extract of Datura fastuosa dried seeds revealed the presence of alkaloids, tannins, cardiac glycosides, flavonoids, Carbohydrates, amino acids and phenolic compounds 23rd. The most Important natural tropane alkaloids are (-)-hyoscyamine and (-)-scopolamine (also known as hyoscine). High Concentrations of these alkaloids have been found particularly in Datura species. Hyoscine [(-)-Scopolamine] Represented tropane alkaloid in Datura fastuosa (Datura metel) 24th

![Fig. 3: Important phytochemicals in Datura, as well as their chemical structures 25th.](image)

<table>
<thead>
<tr>
<th>Plant parts</th>
<th>Alkoldia content(%)</th>
<th>Main constituents</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves</td>
<td>0.426-</td>
<td>Atropine, hyoscyamine and scopolamine, 1-oxo-21,24S-epoxy-(20S,22S-witha-2,5,25-trienolide,</td>
<td>Dabur et al., 2005; Rastogi and Mehrotra, 1993, Siddiqui</td>
</tr>
</tbody>
</table>

Table 1: 26th.
<table>
<thead>
<tr>
<th>Part</th>
<th>Active Components</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed</td>
<td>Hyoscyamine, daturanolone and fastusic acid and many other tropane alkaloids</td>
<td>Ghani, 2003</td>
</tr>
<tr>
<td>Roots</td>
<td>Hyoscyamine, daturanolone and fastusic acid and many other tropane alkaloids</td>
<td>Ghani, 2003</td>
</tr>
<tr>
<td>Flowers</td>
<td>Withanolide (baimantuololine A, B, and C and withafastuosin E and withametelin C), withametelins I, J, K, L, M, N, O, P, 12β-hydroxy-1,10-secowithametelin B and 1,10-seco-withametelin B</td>
<td>Agharkar, 1991; Manickam et al., 1993; Yang et al., 2010a</td>
</tr>
<tr>
<td>Fruits</td>
<td>β-sitosterol, triterpene, daturanolone and daturadiol</td>
<td>Ghani, 2003</td>
</tr>
</tbody>
</table>

**Pharmacological effects**

**Antiperspirant activity**

Anticholinergic compounds have antiperspirant action (Mac Millan et al., 1964). Various Compounds have been Studied and esters of cholinergic compounds have been Found to be More effective. Scopolamine hydrobromide is Found to be most effective due to its skin Penetration Ability. 27th

**Antiasthmatic activity**

D. Stramonium contains variety of alkaloids, including atropine and scopolamine, having Anticholinergic and bronchodilating activity With mild airway obstruction, Datura stramonium cigarette worked as good bronchodilator for asthmatic patients 28th

**Antimicrobial activity**

The methanol extracts of D. stromonium and Datura inoxia showed activity against Gram positive bacteria in a dose dependent manner. Little or no antimicrobial activity was found against Escherichia coli and Psuedomonas aeruginosa 29th The methanol extracts of aerial parts of D. stramonium Showed the bactericidal activity against Gram-positive Bacteria in a dose-dependent manner. However, little or no Antibacterial activity was found against Escherichia coli And Pseudomonas aeruginosa 30th

**Antidiabetic effect**

The seed powder of the plant was tested for its hypoglycemic activity in normal and alloxaninduced diabetic rats. 25, 50 and 75 mg/kg, of the seed powder orally produced
significant reduction in blood Glucose at the 8 h in both normal and diabetic rats. The effect was found to be dose dependent 31st

**Pesticide toxicity**
Extract of D. stromonium was effective in countering the toxicity of the cypermethrin pesticide toxicity 32nd

**Deleterious frontal cortex effect**
A study of aqueous leaf extract in adult Wistar rats Caused deleterious effects on the frontal cortex of adult albino Wistar rats, with dose-dependent Vacuolations in the stroma of the brains of Treatment group 33rd

**Antioxidation activities**
The antioxidant activity of Datura extracts can also be attributed to the presence of Phytochemical compounds, which act as potent free radical scavengers and help pre-Vent cellular damage 34th. Analysis of Datura plant extracts for antioxidant character-Istics revealed its ability to cure various health disorders, including cancers, since an-Tioxidants are known to inhibit cell damage, the general pathway for cancers, aging, And several other diseases 35th

**Antioxidant activity**
The aqueous extracts of leaf, stem bark and Roots of D. metel showed phytochemical and Antioxidant activities. The aqueous extract of The plant displayed antioxidant activity of Between 49.30-23.82% and can consider the Plant as a natural source of antioxidants 36th

**Anti-termite/Datura**
The study evaluated The efficacy of extracts from Datura metel, Local soap, and garlic in the management of Macrotermes belicosus. The synthetic Insecticide, chlorpyrifos 0.1%, was used as Control. In the laboratory, all the treatments Had 75% - 100% repellence value with 100% Mean insect mortality. On the field, only D. Metel and chlorpyrifos were effective in Preventing upsurge and rebuilding of Termitaria. Results suggest an eco-friendly Botanical potential for the management of Termites in the field. (See leaf extract Preparation above) 37th
Anti-inflammatory activity
The ethanolic extract of D. stramonium leaf showed significant anti-inflammatory activity against carrageenan-induced paw edema in rats. In one experiment,[31] 39.43% inhibition of the edema was observed after 3 h of oral administration of 200 mg/kg extracts. Maximum activity was observed when the extract was administered in doses of 3-hour intervals. Since the extract of D. stramonium inhibited the carrageenan-induced edema that involves the release of histamine and serotonin in the first phase, the inhibitory effect of the extracts could be partly due to inhibition of mast cell mediator release. 38th

Nematicidal activity
Whole plant of Datura stramonium has noxious property and because of that aqueous leaf extract of plant stated strong nematicidal activities 39th

Contact toxicity
Habib et al demonstrated that the leaf and seed extracts of Datura stramonium has contact toxicity against Tribolium Castaneum adults 40th

Infertility in women
Datura flowers are effective treatment of infertility in women. The dried powder of Datura flowers in dosage of 120 mg is given with honey 10 days after menstruation. It is given for 5 to 7 days. This remedy is effective in infertility of unknown reason 41st

Larvicidal and Repellent effect
Datura stramonium leaves extract with ethanol for controlling the larva of Culex quinquefasciatus, AnophelesStephensi, Aedes aegypti, exhibited the lethal dose values as 86.25, 16.07, 6.25 ppm and they also possesses the Repellency effect of above three insects and provided the Values 2.73, 71.66,117.7 in min. at 1% concentration 42nd

Toxicology of datura
In addition to a number of beneficial health outcomes, the presence of such as tropane renders the Datura species toxic to the nervous system 43nd and The symptoms of toxicity include fever, dry skin, dry mouth, headache, hallucinations, Convulsions, rapid and weak pulse, acute confusion, delirium, tachycardia, coma, and death 44th 45th. D. stramonium is mostly studied for its toxicological properties. Datura poisoning is very common in India, usually
involving the seeds. Many cases of unintentional poisoning by D. stramonium species have been reported when taken accidentally, or as decoction prepared from herbal prescription 46th

![Image](image_url)

**Fig. 4: 47th.**

**Traditional use**

The dried leaves, flowers and roots were used as narcotic, antispasmodic, antitussive, bronchodilator, Anti-asthmatic and as hallucinogenic. The plant was also used in diarrhea, skin diseases, epilepsy, hysteria, Rheumatic pains, hemorrhoids, painful menstruation, skin ulcers, wounds and burns. In ayurveda, the plant was considered bitter, acrid, astringent, germicide, anodyne, antiseptic, antiphlogistic, narcotic and sedative. Parts used medicinally: Seeds, flower, root bark and leaves. 48th 49th

The weed was dried and smoked for hallucinations and total relaxation. Datura stramonium was used traditionally to treat asthma, gastrointestinal problems, aches, abscesses, arthritis, boils, headaches, hemorrhoids, rattlesnake bites, sprains, swellings, and tumors. It was used for relieving the pains of rheumatism and sciatica as an ointment, and easing spasms of Parkinsons disease 50th

The juice of the leaves is in warm milk was used to expel intestinal worms including cestodes, seeds with palm oils used externally for insect bites and stings, in Nigeria 51st 52nd

**Common side effects**

Being a toxic plant, it is strongly advocated to use or consume any part of the plant only after proper diagnosis and consultation with the doctor. Specifically, datura leaves and seeds contain a high concentration of poisonous alkaloids like Daturine and albumen in addition to
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mucilage and ash. These alkaloids contain about 25% potassium nitrate. If the plant parts are consumed raw without purification, it can be extremely lethal towards health. 53rd

Tachycardia (fast) Heart beat), a slight increase in blood pressure, Dryness of the mouth and eyes, sedation

- Early symptoms of poisoning are dilatation of The pupil, drowsiness, general weakness, with Varying degrees of hallucinations.54th
- At toxic levels, tropanic alkaloids can cause Hallucinations, delirium, mental confusion, Coma, and death.55th
- Excessive doses can cause hallucinations, Severe intoxication, and death. The window of The toxic and medicinal dose is quite small.56th
- With medium doses, recovery can occur in 12 To 24 h, however, with loss of memory and Confusion that may last for days 57th

Dosage

DS is generally administrated at a dose of 60-185mg powder for leaf and 60-120mg powder for seed 58th

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