



AkiNik

Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

J
P
P

Journal
of
Pharmacognosy
and
Phytochemistry

ISSN 2278-4136
ISSN 2349-8234
JPP 2014; 2 (5): 123-125
© 2013 AkiNik Publications
Received: 06-12-2013
Accepted: 25-12-2013

Aqib Sayyed

Department of Botany Abdul Wali
Khan University Mardan, Pakistan
Email: aqib.sayyed@yahoo.com

Mohib Shah

Department of Botany Abdul Wali
Khan University Mardan, Pakistan
Email: 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.

6. Acknowledgement

The authors are thankful to the Department of Botany, Abdul Wali Khan University Mardan for providing full support and encouragement during course of study.

7. References

- Ahad HA, Babu UA, Nagesh K, Kiran DS, Madhavi KB. Fabrication of glimepiride *Datura stramonium* leaves mucilage and poly vinyl pyrrolidone sustained release matrix tablets: *in vitro* evaluation. Kathmandu university journal of science, engineering and technology 2012; 8(1):63-72.
- Akharaiyi FC. Antibacterial, Phytochemical and Antioxidant activities of *Datura metel*. International Journal of Pharm Tech Research 2011; 3(1):478-483.
- Berkov S, Zayed R, Doncheva T. Alkaloid patterns in some varieties of *Datura stramonium*. Fitoterapia 2006; 77(3):179-182.
- Biswas KR, Khan T, Monalisa MN, Swarna A, Ishika T, Rahman M *et al*. Medicinal Plants Used by Folk Medicinal Practitioners of Four Adjoining Villages of Narail and Jessore Districts, Bangladesh. American-Eurasian Journal of Sustainable Agriculture 2011; 5(1):23-33.
- Devi MR, Bawari M, Paul SB, Sharma GD. Neurotoxic and Medicinal Properties of *Datura stramonium* L. – Review. Assam University Journal of Science & Technology 2011; 7(1):139-144.
- Dwivedi S, Dwivedi A, Dwivedi SN. Folk Lore Uses of Some Plants by the Tribes of Madhya Pradesh with Special Reference to Their Conservation. Ethnobotanical Leaflets 2008; 12:763-71.
- Gachande BD, Khillare EM. *In-vitro* evaluation of *Datura* species for potential antimicrobial activity.

- Bioscience Discovery 2013; 4(1):78-81.
8. Gaire BP, Subedi L. A review on the pharmacological and toxicological aspects of *Datura stramonium* L. Journal of Integrative Medicine 2013; 11(2): 73-9.
 9. Guarrera PM. Traditional antihelmintic, antiparasitic and repellent uses of plants in Central Italy. Journal of Ethnopharmacology 1999; 68(1-3):183-192.
 10. Gul H, Qaisrani RN, Khan MA, Hassan S, Younis N. Antibacterial and antifungal activity of different extracts of *Datura stramonium* (branches and leaves sample). Journal of Biotechnology and Pharmaceutical Research 2012; 3(9):141-148.
 11. Ivancheva S, Nikolova M, Tsvetkova R. Pharmacological activities and biologically active compounds of Bulgarian medicinal plants. Phytochemistry: Advances in Research 2006; 87-103.
 12. Khan J, Khan R, Qureshi RA. Ethnobotanical Study of Commonly Used Weeds of District Bannu, Khyber Pakhtunkhwa (Pakistan). Journal of Medicinal Plants Studies 2013; 1(2):1-6.
 13. Khan SW, Khatoon S. Ethnobotanical studies on some useful herbs of Haramosh and Bugrote valleys in Gilgit, Northern areas of Pakistan. Pak J Bot 2008; 40(1):43-58.
 14. Mwine J, Damme PV, Kamoga G, Kudamba, Nasuuna M, Jumba F. Ethnobotanical survey of pesticidal plants used in South Uganda: Case study of Masaka district. Journal of Medicinal Plants Research 2011; 5(7):1155-1163.
 15. Nain J, Bhatt S, Dhyani S, Joshi N. Phytochemical screening of secondary metabolites of *Datura stramonium*. International Journal of Current Pharmaceutical Research 2013; 5(2):151-153.
 16. Njoroge GN. Traditional Medicinal Plants in Two Urban Areas in Kenya (Thika and Nairobi): Diversity of traded species and conservation concerns. Ethnobotany Research & Applications 2012; 9:329-338.
 17. Oseni OA, Olarinoye CO, Amoo IA. Studies on chemical compositions and functional properties of thorn apple (*Datura stramonium* L) Solanaceae. African Journal of Food Science 2011; 5(2):40-44.
 18. Pretorius E, Marx J. *Datura stramonium* in asthma treatment and possible effects on prenatal development. Environ Toxicol Pharmacol 2006; 21(3):331-7.
 19. Rahmatullah M, Das AK, Mollik AH, Jahan R, Khan M, Rahman T *et al.* An Ethnomedicinal survey of Dhamrai sub-district in Dhaka district, Bangladesh. American-Eurasian Journal of Sustainable Agriculture 2009; 3(4):881-888.
 20. Rahmatullah M, Islam R, Kabir Z, Rashid H, Jahan R, Begum R *et al.* Folk Medicinal Practices in Vasu Bihar Village, Bogra District, Bangladesh. American-Eurasian Journal of Sustainable Agriculture 2010; 4(1):86-93.
 21. Reddy BU. Antimicrobial activity of *Datura stramonium* L. and *Tylophora indica* (Burm. F.) Merr. Pharmacologyonline 2009; 1:1293-1300.
 22. Savithramma N, Sulochana C, Rao KN. Ethnobotanical survey of plants used to treat asthma in Andhra Pradesh, India J Ethnopharmacol 2007; 113(1):54-61.
 23. Shagal MH, Modibbo UU, Liman AB. Pharmacological justification for the ethnomedical use of *Datura Stramonium* stem-bark extract in treatment of diseases caused by some pathogenic bacteria. International Research of Pharmacy and Pharmacology 2012; 2(1):016-019.
 24. Shah GM, Khan MA. Common Medicinal Folk Recipes of Siran Valley, Mansehra, Pakistan. Ethnobotanical Leaflets 2006; 10:49-62.
 25. Sofawora A. Medicinal Plants and Traditional Medicine in African. John Wiley and sons Ltd, New York, 1982, 6, 14, 55, 142-177, 191, 234-251.
 26. Soni P, Siddiqui AA, Dwivedi J, Soni V. Pharmacological properties of *Datura stramonium* L. as a potential medicinal tree: An overview. Asian Pac J Trop Biomed 2012; 2(12):1002-1008.
 27. Stace C. New Flora of the British Isles. Cambridge University Press, 1997, 532.
 28. Vijendra N, Kumar KP. Traditional knowledge on ethnomedicinal uses prevailing in tribal pockets of Chhindwara and Betul Districts, Madhya Pradesh, India. African Journal of Pharmacy and Pharmacology 2010; 4(9):662-670.
 29. Wang S, You L. Allelopathic Potential in Different Polarity Phases of *Datura stramonium* L. Advance in biomedical engineering 2012; 6.
 30. Wazir SM, Dasti AA, Shah J. Common medicinal plants of Chapursan valley, Gojal II, Gilgit, Pakistan. Journal of Research (Science) 2004; 15(1):41-43.
 31. Zargari A. Medicinal Plants. Edn 1, Tehran University Press, 1989, 637-639.