

Phytochemical Profile and Ethano Medicinal Uses Anatomy, Anti-Microbial Activity of *Datura stramonium*L.

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1. Introduction

Since ancient time, human beings have always been mostly depended on plant resources for their basic needs like food, medicine, fiber, fodder, shelter, etc. Formerly, they were directly dependent on plants, but due to modernization and with advancement of science and technology this dependence on plants as a direct source has been slightly reduced. All the same, the tribal's and other aboriginal people, who have traditionally lived in the forests, continue to remain fully dependent on plants for their survival. Living close to the nature, the people residing in and nearby forests have assimilated unique knowledge about plant utilization for different purposes through the course of their centuries old experience. Therefore, ethno botanical studies of different tribal localities may lead to find new information on unexploited natural resources and new uses of existing resources as sources of medicine, food, etc. But at some places recent changes in tribal attitude due to habitat displacement, deforestation, modernization, etc. have led to decline and even disappearance of this rich knowledge system. Therefore, it is essential to gather their entire knowledge on plant use before losing it forever. It is well understood now that in one or more ways man's life has always been intimately connected with the plants. There is practically no human activity in which plants do not play a role. Therefore, in widest sense, ethno botany has a linkage with almost every other faculty of science and field of knowledge. Today ethno botany has become an important and crucial area of research and development in medicine research, conservation of biodiversity at genetic, specific and ecosystem level and well considered in socio-economic development of the region. In the recent past there has been a global trend towards revival of interest in the indigenous system of medicine. Even the developed countries equipped with modern. Allopathic medicines, have started realizing the potentialities of traditional system of medicine. Furthermore, the searches for new herbal drugs have been strengthened by the widespread rejection of chemicals and the growing attraction for herbal remedies. There is an increasing awareness among the people about the use of herbal drugs, which are believed to be safe and do not produce undesirable side effects like most of the modern synthetic drugs and this awareness is one of the reasons, which created enormous worldwide demand for herbal drugs.

Presently, the importance of ethno botanical research mainly for medicine and food is keenly felt, as it represents one of the best avenues for searching new economic plants for food

and medicine. In recent years several workers became attracted in ethno botanical studies and a lot of information about different uses of plants prevalent among the various tribes has been gathered. The recent rediscoveries of certain remarkable uses of plants gave new life to this ancient science of ethno botany. Several plants (eg. cocoa, maize, rubber, etc.) used today, were originally identified and developed through indigenous knowledge, the chemical constituents like tranquilizers, rescinnamine and reserpine have been obtained from the roots of *Rauwolfiaserpentina*, used in India for more than a thousand years in folk medicine for snake bite (Maheshwari, 1996). A recent drug, 'Jeevani' is being produced from the plant *Trichopuzzeylanicus*ssp. *travancoricus*, which is having strong energy enhancing properties. The drug is seen as a rival to the South Korean root ginseng (*Pinax ginseng*). Other examples where ethnomedicines have provided lead in the development of drugs used in modern system of medicine are cocaine, morphine, quinine, colchicines, atropine, ephedrine, codeine, emetin, caffeine, reserpine, vinblastine, guggulin and taxol, etc. (Mehrotra Shanta, *et al.*, 1996) The importance of primitive attempts in ethnobotany for medicinal uses of plants were based on speculations only but in present age such medicinal plants have great importance due to the fact that many alkaloids and other important chemicals are being isolated from plants by using better techniques of chemical analysis and isolation methods, however, much work has still to be done, as new medicinal uses of plants are being reported continuously by several workers from different localities.

In traditional medicine *Daturastramonium* L.

- 1) It acts as an emetic and controls edema, vitilligo, hemorrhoids, suppresses aggravated disorders and skin diseases.
- 2) The plant species *Daturastramonium* L mentioned in the official pharmacopoeias of Ayurveda
- 3) The overall objectives of the present paper investigates Anatomy, Micro and Macroscopic, studies have been done to authenticate the raw material of original plant material.
- 4) This research is a best of botanical sources allied to Ayurvedic drug adulterations with pharmacognostical studies.
- 5) Plant-derived substances have recently become of great interest owing to their versatile applications. Medicinal plants are the richest bio-resource of drugs of traditional systems of medicine, modern medicines food supplements, folk medicines, pharmaceutical intermediates and chemical entities for synthetic drugs.

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- 6) Extraction (as the term is pharmaceutically used) is the separation of medicinally active portions of plant (and animal) tissues using selective solvents through standard procedures.
 - 7) The products so obtained from plants are relatively complex mixtures of metabolites, in liquid or semisolid state or (after removing the solvent) in dry powder form, and are intended for oral. or external use. These include classes of preparations known as decoctions, infusions, fluid extracts, tinctures, pilular (semisolid) extracts or powdered extracts.
 - 8) **Antimicrobial activity** The antimicrobial activity of plant extracts were tested by agar disk diffusion method (1). Antimicrobial activity of each plant extract was tested against four bacteria: *Bacillus subtilis*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *E.coli*. The MHA (Mueller Hinton Agar) was prepared and poured in the plates after sterilization. The plates were allowed to solidify for 15 min. Then 0.1 ml of 24hr old culture of test organism was transferred in sterile MHA plate aseptically and spreaded with the help of glass spreader. Sterile 5mm what man filter paper disks were loaded with plant extract and placed over inoculated plates. The plates were then incubated at 37^oC for 24h. After incubation the plates were observe for zone of inhibition. The diameter of zone of inhibition was recorded for the positive plates.
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Objectives of Present Work

- 1) Field collection of both plant species.
- 2) To study ethno medicinal uses of both plant species.
- 3) To study phytochemical analysis.
- 4) To study antimicrobial activity.
- 5) To study anatomical characters.

2. Materials and Methods

Plant specimens (*Datura stramonium* L) Were collected using field visits in Kapurwaditalav and carried out fresh powder and anatomical sections of the plant parts were carried out for the purpose of identification and monograph preparation was done. Descriptive terms of the anatomical features were used as found in standard anatomical books of Easuan and Fahn.

Morphological Description of plant

Daturastramonium L. SP. Pl. 179. 1753; C.B.Cl. In Hook .f. FL. Brit. India 4:242: 1883: Madhusudan Rao in Singh et al. FL. Maharashtra St. Dicot. 2:496:2001. Jain, Dict. Ethno. 71.1991. Common name 'Dhotara'.

Erect, sparsely pubescent, annual herbs. Leaves ovate, obliquely cuneate at base, deeply stimulate-dentate. Flower solitary. Capsules globose, minutely tomentose, covered with numerous, sharp spines. Seeds subreniform, brown, smooth.

Fls. & Frts.: July-October

Distrib.: Frequently on waste land along stream-banks. Burhanagar Kapurwaditalav Ahmednagar.

In traditional medicine *Datura stramonium* L

3. Results and Discussion

Ethanomedicinal Uses

Daturastramonium L.

Common Name 'Dhotara'

Uses:

Med.:

- 1) *Cough: Leaves smoked to cure asthma and whopping cough.
- 2) *Wounds: Root ash with roots of *Plumbagozeylanica*, *Achyranthesaspera* and *Calotropisprocera*. Burnt to ash and applied externally with lime or *Ricinus Communis* soil until cure.
- 3) *Dog bite: Root paste mixed with turmeric is applied
- 4) *Wounds: Root ash with turmeric powder and *Ricinuscommunis* soil until cure

Anatomy

Anatomically

- 1) Presence of anisocytic stomata.
- 2) Presence of uniseriate, 3 to 5 celled nonglandular hairs.
- 3) Presence of glandular hairs with short or long stalk & multicellular, club-shaped head (clavate hair).

- 4) Presence of phloem on the inner side of the xylem known as perimedullary or intraxylary phloem.
- 5) Presence of different types of Calcium oxalate crystal.
- 6) Presence of starch sheath.

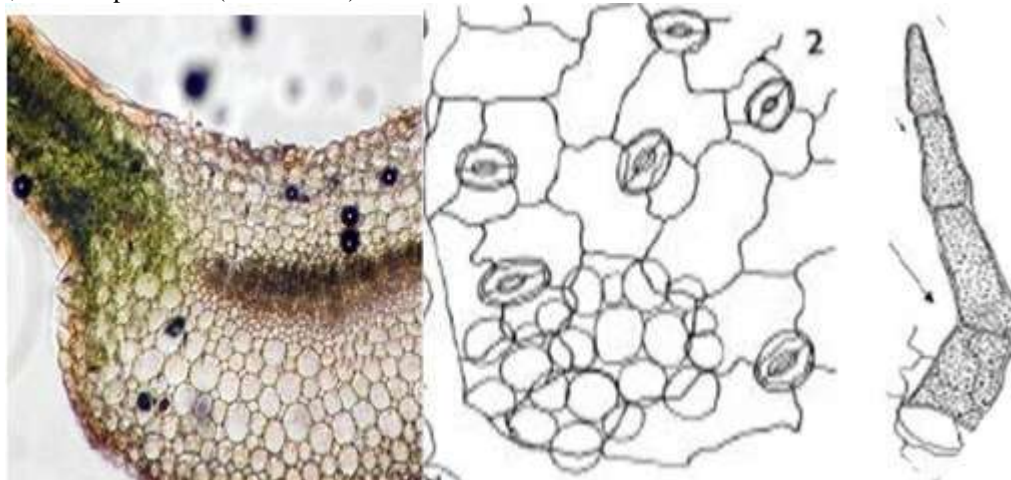


Figure 1: Anatomy and Powder Microscopy of *DaturastramoniumL.*

Table 1: Phytochemical Screening of *DaturastramoniumL.*

Sr.No.	Phytochemical Test	Name of test	Aquous extract of <i>DaturastramoniumL.</i> leaves	Ethanolic extract of <i>DaturastramoniumL.</i> leaves	Chloroform extract of <i>DaturastramoniumL.</i> leaves
1.	Alkaloids				
1.1		Mayer's reagent test	+ve	-ve	+ve
1.2		Wagner's reagent	+ve	+ve	+ve
1.3		Hager's reagent test	+ve	+ve	+ve
2.	Carbohydrates				
2.1		Molish's test	-ve	-ve	-ve
2.2		Bendicts test	-ve	-ve	-ve
3	Test for Reducing Sugar's				
3.1		Fehling's test	-ve	-ve	-ve
4	Flavonoids				
4.1		Alkaline reagent test	-ve	-ve	-ve
4.2		Lead acetate test	+ve	-ve	+ve
5	Glycoside				
5.1		Borntrager test	-ve	+ve	-ve
5.2		Legal's test	-ve	+ve	-ve
5.3		Killer- Killiani test	-ve	+ve	-ve
6.	Tannin				
6.1		Ferric chloride test	+ve	-ve	+ve
6.2		Lead Acetate test	+ve	-ve	+ve
6.3		Dilute Sulphuric acid test	-ve	+ve	-ve
7.1	Phenol		-ve	-ve	+ve
8.	Saponin				
8.1		Faom Test	-ve	-ve	+ve
9.	Test for Proteins and amino acid				
9.1		Ninhydrin test	+ve	-ve	-ve
9.2		Biuret test	+ve	-ve	+ve
10.	Test for Fats and Oils				
10.1		Solubility test	+ve	-ve	-ve
11.	Test for Diterpenoids and Steroids				
11.1		Salwonski Test	+ve	-ve	+ve
11.2		Libbermanand Burchard's test	+ve	+ve	+ve
12.	Phytosterols		-ve	-ve	+ve
13.	Xanthoproteic test		+ve	-ve	-ve

Antimicrobial activity *DaturastramoniumL.*

After 24h the plates were observed for zone of inhibition.

Table 2: Antimicrobial activity of *Daturastramonium* L

Sr. No.	Type of extract	Diameter of zone of inhibition (mm)			
		<i>E.coli</i>	<i>P. aeruginosa</i>	<i>B. subtilis</i>	<i>S. aureus</i>
1	Aqueous (Hot)	0	0	10	0
2	Aqueous (cold)	0	0	0	0
3	Petroleum ether (Hot)	0	0	0	0
4	Petroleum ether(cold)	0	0	0	0
5	Chloroform (Hot)	0	0	0	0
6	Chloroform(cold)	0	0	0	0

Out of six different extract only hot aqueous extract showed antimicrobial activity against one gram positive bacteria *Bacillus subtilis*. It produced a zone of 10 mm diameter. Other extract don't showed activity against any bacteria. This indicates that only water soluble heat stable compounds have antimicrobial activity and they are specific for *Bacillus subtilis*.

Since only single extract showed antimicrobial activity, it can be predicted that very few type of active antimicrobial compounds are present in this plant with narrow spectrum activity.

4. Conclusion

Since, ancient times, the plants have been a veritable source of drugs. Different extracts from traditional medicinal plants have been tested to identify the source of the therapeutic effects. *Daturastramonium* L (leaf) extract made in Methanol, Petroleum ether contains different secondary metabolites (Phytochemicals) with biological activity that can be of therapeutic index.

Preliminary Phytochemical screening of plant parts of *Daturastramonium* L. It is interesting to note that the action of the extracts of *Daturastramonium*L. is non toxic. The obtained result provide a support for the use of this plant in traditional medicine and suggest its further advance investigation. Phytochemical screening of the crude extracts revealed the presence of saponins, tannins, alkaloids, and other phytoconstituents which were reported during present investigation were cardiac glycosides, flavonoids, glycosides, steroids, terpenes and tannins. The consequences of this work has clarified that many active bioconstituents of and *Daturastramonium*L. consist effective qualities in its tending action. Thus it may be exploited by Scientists in the development of human medicines and drugs. Herbal medicines have been used from the earliest times to the present day. Herbal medicines exhibit a remarkable therapeutic diversity.

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