

Preliminary phytochemical analysis of *ashodhita* and *gomutra shodhita datura beeja* (*datura alba* linn.)

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Abstract- *Datura* is a well-known and frequently used drug in Ayurveda. Since its seeds are considered to be highly toxic, Ayurveda advocates specific procedures called *Shodhana* (purification procedures) before rendering it into a safe therapeutic drug. *Datura* is botanically identified as *Datura alba* Linn. And it is considered one among the *Upavisha* *varga*. Any *upavisha* group like *Datura* of drugs can be used in the treatment very effectively only after subjecting to some specific purification processes known as *Shodhana* (purification). In this present study a Comparative analysis of Phytochemical constituents of *ashodhita* and *gomutra shodhita datura beeja* is done to know the chemically active principles. The phytochemical analysis is very effective to see the active principle of a plant to check its therapeutic value. The present study will evaluate the same through phytochemical parameters in *ashodhita* (unpurified) and *Shodhita datura beeja*. After the analysis, decrease in the extractive values of *Shodhita datura beeja* as compared to the *Ashodhita datura beeja* is seen. The extract from the samples of *datura beeja* was done for primary phytochemical analysis and was found to have less toxic chemical constituents compared to *ashodhita datura beeja* and with safe and more therapeutic value.

Key words: *Datura beeja*, phytochemical constituents, *gomutra*, *shodhana*

INTRODUCTION

Datura alba Linn. belonging to family Solanaceae is distributed worldwide, which includes 85 genera and about 2,800 species in the world. There are approximately 25 different species of *Datura* throughout the world, they are often called as Jimson weed or 'Thornapple'. The name *Datura* comes from the early Sanskrit *Dustura* or *dahatura*¹. Common names of *datura* are numerous, some of the most common ones being reving nightshade Thorn apple, Stinkweed, Devil's apple, Jimson weed and angel's trumpet². *Datura* is a well known easily available, cheap and frequently used drug in Ayurveda. Different parts of *Datura* are used for various human ailments when applied both locally and through oral administration. It shows various types of activities such as analgesic, anti-inflammatory, anti-viral and anti-diarrheal³.

Datura is a deliriant poison, mentioned under *upavisha*.⁴ Its seeds are highly toxic but after *shodhana samskara* (purification) it attains medicinal value and widely used in medicine. According to Ayurveda any potent poison can be utilised in treatment as an excellent medicine if used judiciously⁵ Seeds of *Datura* are reported to be highly toxic which is evidence by various Animal study^{6,7} All the parts of *Datura* contains dangerous level of tropane alkaloids which are highly poisonous and may be fatal. If ingested, it can produce symptoms like dryness of mouth, nausea, vomiting, dysphasia, dysarthria, diplopia, delirium, hallucination, dry and hot skin (due to inhibition of sweat secretion) and red (due to dilatation of cutaneous blood vessels) skin especially in the face / chest, drowsiness & later it can be lead to coma then death.⁸

To reduce the toxicity of a noxious drug Ayurveda mentions *samskara* (procedure) known as *shodhana* (purification) before rendering it into a safe therapeutic drug.⁹ It is the process by which the unwanted impurities are removed from the drug, thus increasing the potency and efficacy of the drug.¹⁰

The word 'phyto' in Greek means plant. Phytochemicals also known as phytonutrients are natural non-essential chemical compounds found in plants. They occur in vegetables, grains, legumes, beans, fruits, herbs, nuts, roots, leaves and seeds. These are compounds which give the plant their color, flavor and smell. These are responsible for the medicinal properties and health benefits of medicinal herbs. In addition, phytochemicals also include poisonous and toxic chemicals found in plants¹¹.

Gomutra is mentioned as *shrestha* under *mutra varga* in *charaka samhita*. It has *thikshna guna*, *usna virya*, *katu vipaka*. Alkaline nature of *Gomutra* helps in extraction of toxic alkaloid of *Datura*.¹²

MATERIALS AND METHODS

The drug is collected and authenticated. *Gomutra shodhana* was done for one sample. Later the extraction of *ashodhita* and *gomutra shodhita datura beeja* was done and phytochemical analysis is performed.

Preliminary phytochemical tests¹³

Test for alkaloids:

Wagner's test: About 1ml of leaf extract and 1ml of Wagner's reagent (dilute iodine solution) were added and mixed. Formation of reddish brown precipitates indicates the presence of alkaloids.

Dragendroff's test: To a few milligrams of extract dissolved in alcohol, a few drops of acetic acid and dragendroff's reagent were added and shaken well. An orange red precipitate formed indicates the presence of alkaloids.

Mayer's test: To a few milligrams of extract dissolved in acetic acid, a few drops of mayer's reagent was added. A dull white precipitate formed indicates the presence of alkaloids.

Test for carbohydrates

Fehling's test: A few milligrams of extract were mixed with equal quantities of Fehling's solution A and B. The mixture was warmed on a water bath. The formation of a brick red precipitate indicates the presence of carbohydrates.

Benedict's test: To 5 ml of Benedict's reagent, a few milligrams of extract was added, and boiled for two minutes and cooled. Formation of a red precipitate indicates the presence of carbohydrates

Test for steroids

Liebermann Burchard test: To the extract dissolved in chloroform, 1 ml of acetic acid and 1 ml of acetic anhydride were added, then heated on a water bath and cooled. Few drops of con.H₂SO₄ were added along the sides of the test tube. Appearance of bluish green color indicates the presence of steroids.

Salkowski test:

The extract was dissolved in chloroform and equal volume of con. H₂SO₄ was added. Formation of bluish red to cheery red colour in chloroform layer and green fluorescence in the acid layer indicates the presence of steroids.

Test for saponins:

To a few milligrams of extract, distilled water was added and shaken. Stable froth formation indicates the presence of saponin.

Test for tannin:

To the extract a few drops of dilute solution of ferric chloride were added, formation of dark blue colour shows the presence of tannins.

Test for flavonoids :

Shinoda's test: To the extract in alcohol, a few magnesium turnings and few drops of conc. H₂SO₄ were added and heated on a water bath. Formation of red red to pink colour indicates the presence of flavonoids.

Test for glycoside: Keller Killiani test. A solution of 0.5 mL, containing glacial acetic acid and 2-3 drops of ferric chloride, was mixed with 2 mL of extract. Later, 1 mL of concentrated H₂SO₄, was added along the walls of the test tube. The appearance of deep blue colour at the junction of two liquids indicated the presence of cardiac glycosides.

Ashodhita datura beeja (table 1)

Test	Aqueous	Alcohol
Alkaloid		
Dragendorff's test	-	+
Mayer's test	-	+
Wagner's test	-	+
Carbohydrate		
Benedict's test	+	-
Fehling's test	-	-
Tannin		
Bromine	+	-
Lead acetate solution	-	+
Acetic acid		
Glycoside		
Liebermann's burchrd reaction	-	-
Borntrager's test	-	-
Steroid		
Salkowski reation and iebermann's	-	-
Saponin-foam test	-	-
Flavanoids	-	-
Mucilage	-	-

Gomutra shodhita datura beeja (table 2)

Test	aqueous	alcohol
Alkaloid		
Dragendorff's test	+	-
Mayer's test	+	-
Wagner's test	-	-
Carbohydrate		
Benedict's test	-	-
Fehling's test	-	+
Tannin		
Bromine	-	-
Lead acetate solution	+	-
Acetic acid	-	-
Glycoside		
Liebermann's burchrd reaction	-	-

Borntrager's test	-	-
Steroid		
Salkowski reation and iebermann's	-	-
Saponin-foam test	+	-
Flavanoids	-	-
Mucilage	+	-

RESULT:

Extraction of two different samples of datura beeja was done. Preliminary phytoconstituents screening of two sample extracts showed the presence of various phytoconstituents. The chemical constituents like alkaloids which are present in alcohol solution of *ashodita datura beeja* were absent in *gomutra shodhita datura beeja*. Carbohydrates and tannins like bromine which were present in *ashodita datura beeja* are absent in *gomutra shodhita datura beeja*. Saponin foam test and mucilage test are positive for *gomutra shodhita datura beeja* which were negative in *ashodita datura beeja*.

DISCUSSION:

Primarily this plant is used as an intoxicant and hallucinogen¹⁴. The whole plant, especially the leaves and seeds are used for the treatment of an aesthetic, antispasmodic, anodyne, antiasthmatic, antitussive, bronchodilator, animal bites, hallucinogenic, hypnotic and mydriatic¹⁵. In India, it is popular and widely used for the treatment of epilepsy, hysteria, heart diseases, insanity, fever with catarrh, cough, convulsion, diarrhoea, skin diseases etc¹⁶. Saponins are a diverse group of glycosides present in many families of plants. The primary effect of saponins in the rumen appears to be to inhibit the protozoa (defaunation), which might increase the efficiency of microbial protein synthesis and protein flow to the duodenum.¹⁷ Literature shows that saponins exhibit a biological role and medicinal properties such as hemolytic factor¹⁸ anti-inflammatory,¹⁹ antibacterial,²⁰ antifungal,²¹ antiviral,²² insecticidal²³, anticancer,²⁴ cytotoxic²⁵ and molluscicidal action.²⁶ In addition, saponins are reported to exhibit cholesterol-lowering action in animals and human.^{27,28,29} The mucilage may have diverse practical uses. Among these, it functions as a healing agent, casually or in the practice of traditional-folk or conventional medicine. The mucilage of some of these plants is well known to science and has been studied by pharmacologists and found to possess biologically active principles. However, they all have in common a beneficial effect on burns, wounds, ulcers, external and internal inflammations and irritations, diarrhea and dysentery.³⁰ Mucilage when taken internally acts as anti cholesterol, anti constipation, anti decomposition, anti cancer, anti diabetic, stomachic and externally when applied hydrate and protect the skin.³¹

CONCLUSION:

The present study aimed to perform a preliminary phytochemical analysis and to evaluate the role of *shodhana* in reducing the toxicity of the drug. Based on the results obtained through the analysis it shows that there is the reduction and absence of certain chemical constituents after *gomutra shodhana* of *datura beeja* which were highly toxic and fatal thus leading to more therapeutic benefits and safety compared to *ashodhita* (unpurified) *datura beeja*. And also there was the presence of chemical constituents like saponins and mucilage which were absent in *ashodhita datura beeja* which have more therapeutic value. Hence the present study shows that *shodhana* procedure helps in reducing the toxicity of a drug and also gives additional properties which are more beneficial therapeutically. Thus helps in increasing the medicinal value of the drug.

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