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## A review on some poisonous plants and their medicinal values

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### ABSTRACT

The aim of this review is to provide a report on poisonous medicinal plants using for various treatments. Medicinal plants have been used for centuries, and numerous cultures still rely on indigenous medicinal plants for their primary health care needs. Poisonous medicinal plants are used for various ailments such as Antidiabetic, Anticancer, Antibacterial, Antifungal, and Cytogenetic effect. The review reveals that wide numbers of phytochemical constituents have been isolated from the various medicinal plants which possess activities like diuretic, purgative, laxative, anti-allergic and various other important medicinal properties. This information is most important for pharmaceutical companies could formulate drug.

## 1. Introduction

In India use of the different parts of several medicinal plants to cure specific ailments has been in vogue from ancient times. The indigenous system of medicine, namely, Ayurvedic, Siddha, and Unani, have been in existence for several centuries. Some drugs from Ayurveda approaching modern diseases, have already reached the market place[1]. The World Health Organization (WHO) estimated that 80% of the population of developing countries relies on traditional medicines, mostly plant drugs, for their primary health care needs[2]. Also, modern pharmacopoeia still contains at least 25% drugs derived from plants and many others which are synthetic analogues built on prototype compounds isolated from plants. Siddha system is one of the oldest systems of medicine in India. The Siddha system is capable of treating all types of disease (especially chronic diseases) other than emergency cases.

In Siddha medicinal system use of poisonous plants helps to cure some disease. It is important to have an awareness regarding the poisonous plants which when used in the proper, prescribed dose, acts as potent therapeutic agents. Toxins are molecules that are harmful to living organisms. It is a fact that virtually any substance can be harmful at high

enough concentrations—as Paracelsus (1493–1541) said in the sixteenth century, “the dose makes the poison”. Poisons include both naturally produced compounds and chemicals manufactured by humans. Natural poisons are produced by species of bacteria, fungi, protists, plants, and animals.

There are several species which are poisonous or injurious to human body and can be found in the garden or planted by the forest department as a roadside tree with or without the knowledge about their effects on human body system. Poisoning can be by contact causing skin irritation, ingestion causing internal poisoning, absorption (by the skin) and inhalation (in the respiratory system). Some plants which are considered as harmless are actually not so. Many plants are used in some way or the other in medicines especially in homeopathic pharmacology[3]. This review article has the basic details such as the Botanical, Family names, Common names, toxic parts of the plant, chemical constituents, signs and symptoms of toxicity and its use in Traditional Indian Systems of Medicine.

## 2. General properties of toxic plants

### 2.1. *Abrus Precatorius (Fabaceae)*

*Abrus precatorius* commonly known as jequirty, gunji, crabs eye, rosary pea, precatory pea or bean, Indian licorice[4]. The plant is best known for its seeds, used in percussion instruments. Plant is toxic due to the presence

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of abrin, is a dimer containing two protein subunits A and B. Protein B facilitates abrin entry into a cell by bonding to certain transport proteins on cell membranes. Protein A prevents protein synthesis by inactivating 26 s subunit of the ribosome. One molecule of abrin inactivates 1 500 ribosome/ s.

### 2.1.1. Symptoms

During inhalation: Breathing difficulty, fever, cough, nausea and tightness in the chest. Heavy sweating followed by fluid building up in the lungs (pulmonary edema). This would make breathing even more difficult, and the skin might turn blue.

During ingestion: Vomiting and diarrhea, severe dehydration, low blood pressure, blood in urine, seizures and hallucination. Within several days, the person's liver, spleen, and kidneys might stop working, and the person could die[5]. The fatal dose of abrin is approximately 75 times smaller than the fatal dose of ricin. Abrin can kill with a circulating amount of less than 3 mg. Abrin has an estimated human fatal dose of 0.1–1  $\mu$  g/kg. Ingesting the intact seeds typically results in no clinical findings, as they pass through the gastrointestinal tract due to their hard shell[5].

### 2.2. *Agave sisalana* (Asparagaceae)

The sap from agave leaves produces an irritant contact dermatitis, swelling and irritation of the tissues of the mouth and throat when ingested.

#### 2.2.1. Symptoms

Skin contact with the sap from the cut leaves produce burning, redness, itching and swelling, followed in several hours by blistering, which heals within 2 weeks. When the sharp leaf tips puncture near bone may cause granuloma reaction resembling a neoplasm[6].

### 2.3. *Arum maculatum* (Araceae)

Attractive red to orange berries are extremely poisonous. The berries contain oxalates of saponins which have needle-shaped crystals which irritate the skin, mouth, tongue, and throat, and result in swelling of throat, difficulty breathing, burning pain, and upset stomach. It has an acrid taste coupled with the almost immediate tingling sensation in the mouth. It is one of the most common causes of accidental plant poisoning based on attendance at hospital A & E departments[7].

### 2.4 *Cannabis sativa* (Cannabaceae)

Tetrahydrocannabinol (THC) is the compound most toxic to the nervous system. Animals were rarely poisoned due to the low palatability of the plant. Cattle, horses, pigs, ferrets and dogs were susceptible to intoxication after exposure. THC concentrations were highest in flowers and leaves. All parts were toxic, greatest in flower. Cannabinoids were rapidly

absorbed from smoke and more slowly absorbed post-ingestion. They were rapidly metabolized by the mixed function oxidase system in the liver. Toxic effects were mainly in the central nervous system, respiratory system and endocrine system. It causes exhilaration, hallucinations, delusions, blurred vision, poor coordination, stupor and coma[8].

### 2.5. *Citrullus colocynthis* (Cucurbitaceae)

The main clinical presentation was dysenteric diarrhea. The colonoscopic observations were mucosal congestion and hyperemia with abundant exudates, but no ulceration or pseudopolyp formation, which disappeared within 14 d in all patients (Goldfain). Most frequently reported complications such as colic, diarrhea, hematochezia, nephrosis, vomiting, and liver impairment[9].

### 2.6 *Cleistanthus collinus* (Phyllanthaceae)

*Cleistanthus collinus* (Karra) is a plant poison also called "oduvan" (Tamil). Ingestion of its leaves or a decoction of its leaves causes hypokalemia (Kaliuresis and cardiac arrhythmias)[2], metabolic acidosis, hypotension and hypoxia[10], probably due to distal renal tubular acidosis and toxin induced vasodilatation[11–13]. Hypokalemia and acidosis probably also induces rhabdomyolysis resulting in myoglobinuric renal failure and neuromuscular weakness[14]. Its effects were probably mediated by injury to the distal renal tubules, pulmonary epithelium and peripheral blood vessels due to glutathione depletion[15].

### 2.7. *Gloriosa superba* (Colchicaceae)

This plant is poisonous, toxic enough to cause human and animal fatalities if ingested. It has been used to commit murder, to achieve suicide[16] and to kill animals (royal botanical garden). Every part of the plant is poisonous, especially the tuberous rhizomes. As with other members of the Colchicaceae, this plant contains high levels of colchicine, a toxic alkaloid. It also contains the alkaloid gloriocine. Within a few hours of the ingestion of a toxic amount of plant material, a victim may experience nausea, vomiting, numbness, and tingling around the mouth, burning in the throat, abdominal pain, and bloody diarrhea, which leads to dehydration[17]. As the toxic syndrome progresses, rhabdomyolysis, ileus[16], respiratory depression, hypotension, coagulopathy, haematuria, altered mental status, seizures, coma and ascending polyneuropathy are caused[17]. Long term effects include peeling of the skin and prolonged vaginal bleeding in women[16].

### 2.8. *Nerium oleander* (Apocynaceae)

*Nerium oleander* has historically been considered a poisonous plant because some of its compounds may exhibit toxicity, especially to animals, when consumed in high amounts. Among these compounds are oleandrin and oleandrigenin, known as cardiac glycosides, which are

known to have a narrow therapeutic index and can be toxic when ingested.

Toxicity studies that have been conducted in dogs and rodents administered oleander extracts by intramuscular (IM) injection indicated that on an equivalent weight basis, doses of an oleander extract with glycosides ten times in excess of those likely to be administered therapeutically to humans are still safe and without any severe toxicity observed<sup>[18]</sup>. Symptoms can include drowsiness, tremors or shaking of the

muscles, seizures, collapse, and even coma that can lead to death. Oleander sap can cause skin irritations, severe eye inflammation and irritation, and allergic reactions characterized by dermatitis<sup>[19]</sup>.

## 2.9. *Aconitum ferox* (*Ranunculaceae*)

Marked symptoms may appear almost immediately, usually not later than one hour, and with large doses death is almost

**Table 1**

Toxic plants and its parts with some medicinal properties.

S.No	Plant	Part used/Compounds	Property	Reference		
1	<i>A. Precatorius</i>	Seeds	Anticancer	[22]		
		Leaves	Antibacterial	[23]		
		Seeds, Leaves	Antifungal	[24, 25]		
		Leaves	Antimigraine	[26]		
			Bronchodilator activity	[27]		
		Seeds	Antioxidative activity	[28]		
		Seeds	Protective effect	[29]		
		Leaves	Cytotoxic	[30]		
		Aerial parts	Antiinflammatory	[31, 32]		
		Seeds	Immunostimulant, Anti-motility	[33]		
		Seeds	Uterotonic	[34]		
		Seeds	Anti-diarrhoeal	[35]		
		2	<i>A. sisalana</i>	Leaves	Antibacterial, Antifungal	[36]
				Leaves, Leaves waste	Antibacterial, Antifungal	[37]
3	<i>A. maculatum</i>	Leaves	Cytogenetic effect	[38]		
4	<i>C. sativa</i>	Cannabinoids	Antibacterial.	[39]		
		Aerial parts	Antibacterial.	[40]		
		Cannabidiol	Anti-inflammatory.	[41]		
		Cannabinoids	Antibacterial, Antifungal, Antimalarial, Antileishmanial.	[42]		
		Cannabinoid ester	Antibacterial, Antifungal, Antimalarial.	[43]		
5	<i>C. colocynthis</i>	Aerial parts	Antibacterial	[44]		
		Leaves	Anesthetic activity	[45]		
		Fruits, Seeds	Antibacterial, Antifungal,	[46]		
			Histopathological	[47]		
		Seeds	Antibacterial	[48]		
		Fruits, Seeds	Antiinflammatory	[49]		
		Whole plant	Antihistaminic, anti acetylcholine, cardiac depressant activities	[50]		
		Whole plant	Abortifacient, use to treat constipation, edema, bacterial infections, cancer and diabetes;used as an analgesic, cures tumours, ascites, leucoderma, ulcers, asthma bronchitis, jaundice, enlargement of spleen, tuberculosis	[51]		
		6	<i>C. collinus</i>	Leaves	Insecticidal activity	[52]
				Leaves	Antifungal	[53]
Stem-Bark	Skin diseases, Antiseptic, hoof sores of cattle, Piscicidal, Larvicidal activity			[54]		
Leaves				[55]		
7	<i>G. superba</i>	Colchicine alkaloid	Antitumor agents	[56]		
		N - D e a c e t y l - N - aminoacylthiocolchicine	Antiproliferative activity	[57]		
8	<i>N. oleander</i>	Cardenolides (Stem)	Anti-inflammatory	[58]		
		Kaneric Acid (Leaves)	Cardiotonic and antibacterial properties, used in the treatment of swellings, leprosy, eye and skin diseases	[56]		
			Anti-inflammatory	[59]		
		Triterpenes (Leaves)	Anti-inflammatory,			
		Pregnanes (Bark)	Cytotoxic activity	[60]		
		Taraxasterane	Anti-inflammatory,	[59]		
9	<i>A. ferox</i>	Tuberous root	Cytotoxic activity			
			Body pain, diabetes, debility, asthma, ear and nose discharge, leprosy, paralysis, rheumatism, and typhoid. Diaphoretic, diuretic, expectorant, febrifuge, and dyspepsia	[61]		
10	<i>A. hippocastacum</i>	Seeds	Analgesic, antipyretic, narcotic, tonic, vasoconstrictor, treat backache,			
		Bark	sunburn, neuralgia, rheumatism, whooping cough and hemorrhoids.	[62]		
		Flowers	Tonic, narcotic, antipyretic Anodyne, astringent, tonic, vulnerary	[63]		

instantaneous. Death usually occurs within two to six hours in fatal poisoning (20 to 40 mL of tincture may prove fatal) (the extra pharmacopoeia martindale). The initial signs are gastrointestinal including nausea, vomiting and diarrhea, burning sensation, tingling, and numbness in mouth and of burning in the abdomen. Cardiovascular features include hypotension, sinus bradycardia and ventricular arrhythmias. Other features may include sweating, dizziness, difficulty in breathing, headache, and confusion. The main causes of death are ventricular arrhythmias and asystole, paralysis of the heart or of the respiratory center<sup>[20]</sup>. The only post-mortem signs are those of asphyxia.

### 2.10. *Aesculus hippocastanum* (Sapindaceae)

Poisonous part of *Aesculus hippocastanum* are leaves, seeds and sprouts. Glycoside aesculin, saponin aescin are toxic. Symptoms were muscle weakness and paralysis, dilated pupils, vomiting, diarrhea, depression, paralysis, and stupor<sup>[21]</sup>.

### 3. Conclusion

In this study conclude that toxic medicinal plants have some medicinal values. Certain precautions about those plants are enough to use these toxic plants as medication purpose.

### Conflict of interest statements

The authors declare that there are no conflicts of interest.

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