

A Study of Poisonous Plants of Islamabad Area, Pakistan

Saleem Ahmad

Pakistan Museum of Natural History, Garden Avenue, Islamabad, Pakistan

(received June 15, 2010; revised October 1, 2012; accepted October 8, 2012)

Abstract. Poisonous plants growing wild and cultivated in Islamabad area were studied. A total of 45 taxa belonging to 30 families are reported here from the study area. These include 6 trees, 12 shrubs and 27 herbs. Twenty species are found wild in the area, another 20 species are cultivated, while 5 species are found both cultivated and naturally occurring. Besides taxonomic details, poisonous parts, chemical constituents responsible for poisoning, and the human specific physiological effects of poisoning in relation to each plant are presented in a tabular format. The harm caused by these poisonous plants is often not serious, and is primarily restricted to gastrointestinal irritation or mild nervous system effects, that is curable. However, there have been cases of death resulting from the consumption of parts of highly poisonous plants in the area.

Keywords: poisonous plants, vegetation taxonomy, environment, Islamabad

Introduction

A strict definition of a poisonous plant is not easily constructed, since the boundaries between harmful and harmless plants are frequently blurred. A poisonous plant is usually defined as one whose consumption in a certain amount gives rise to abnormal or impaired functions in the human physiology (Cooper and Johnson, 1984; Lewis and Elvin-Lewis, 1977). These effects are due to the presence of certain toxic chemicals within a plant, which may be ingested, injected, absorbed or contacted through the skin. Some plants have evolved secondary metabolites through the course of evolution, which are not directly involved in their typical growth functions, but rather they serve a protective role for plant. For instance, presence of some of these substances makes a plant slightly to highly poisonous for animals, thus serving as a deterrent to herbivory.

Poisonous plants can be classified on the basis of the chemicals they possess such as alkaloids, glycosides (including saponins), nitrates, bitter principles, oxalates, tannins, phenols, and volatile oils. Alkaloids are the most important group of chemical bases that have an alkali-like reaction, with over 4000 distinct compounds that have been discovered to date. Nicotine, colchicine, morphine, ephedrine, and atropine (among others) are common alkaloids that are most familiar to the general public. These have a bitter taste and show pharmacological activity that often effect the gastrointestinal tract

E-mail: drsaisl@gmail.com

and the central nervous system (Frohne and Pfander, 1984). Families like Amaryllidaceae, Apocynaceae, Buxaceae, Asteraceae, Euphorbiaceae, Fabaceae, Liliaceae, Papaveraceae, Ranunculaceae and Solanaceae are particularly rich in alkaloids.

Glucosides and glycosides form a group of chemicals that upon splitting give rise to a carbohydrate and one or more other products called aglycones. Although many of these chemicals are not toxic, some cause poisoning by releasing toxic chemicals on hydrolysis (e.g. cyanide or hydrocyanic acid). The majority of cyanide poisoning is caused by species belonging to the Rosaceae, Fabaceae and Poaceae. The cyanogenic glucoside amygdalin is found in bitter almonds and commonly causes cyanide poisoning. Cardiac glycosides are known for their anti-arrhythmic effects on the heart as well as their high levels of toxicity, and are found in taxa such as foxglove (*Digitalis* spp.) and oleander (*Nerium oleander* L.). Bitter principles are neutral substances present in some Cucurbitaceae, *Aloe*, *Cassia*, *Artemisia*, etc. which have a nauseous, bitter taste and purgative action. Phenols are small molecules containing one or more phenolic group. They are the most widely distributed class of secondary metabolites with several thousand different compounds identified. Most of the phenols are known to have an antioxidant activity (Dimitrios, 2006).

Oxalates found in the form of oxalic acid and its salts are common in many plants but their abundance causes

toxic effects, especially in members of the Oxalidaceae, Geraniaceae, Araceae and Polygonaceae. Nitrogenous compounds including certain proteins, peptides and amino acids also cause poisoning and are found in certain plants. Toxic proteins or toxalbumins have been found in Fabaceae, Euphorbiaceae, etc. and cause agglutination of the red blood corpuscles. Essential or volatile oils, which impart the characteristic odour in plants have sharp burning taste and can be toxic internally affecting the GIT and CNS. These are abundantly present in Lamiaceae, Asteraceae, Rutaceae, Apiaceae, Myrtaceae, etc. Tannins are non-nitrogenous derivatives having an astringent action, some of which are toxic if taken in large amount. These are common in many plants. Resins form a heterogeneous group of complex and variable chemical substances. Some of these cause poisoning due to their purgative or irritant properties as in certain species of the Cucurbitaceae, Convolvulaceae and Euphorbiaceae (Tampion, 1977; Nasir and Ali, 1970; Dymock *et al.*, 1890-1893).

Islamabad is situated on the north eastern part of the Potohar plateau and is located between latitudes 33°36' and 33°49' N and longitudes 72°20' and 73°24' E. It covers an area of 382 km² of undulating topography and the altitude varies from 503 to 610 m. The mean maximum and minimum temperatures in the summer are 34.2 °C and 24.4 °C; those in winter are 16.7 °C and 3.4 °C, respectively. Rainfall occurs in the monsoon season and winter, with the annual average being 1143 mm. Rawal and Simli Dams are the main water reservoirs, and several small streams are running from north to south in this area. The original vegetation of the site is subtropical scrub forest type (Champion *et al.*, 1965), which has been considerably modified by the introduction of large number of cultivated trees (Ahmad and Khattak, 2001). The flora of the area is an extension of the Mediterranean type (Stewart, 1957).

Among all the cities of Pakistan, Islamabad has the richest vegetation, both in terms of the total number of plants as well as the number of species. The green belts provide habitat for not only many cultivated taxa, but also for a large number of wild herbs and grasses which thrive throughout the seasons (Ahmad and Khattak, 2001). While most of these plants have a beneficial effect on the environment of the area, a few harmful species also get the chance to grow and proliferate. Because of their proximity with the population, they are certainly likely to come with human contact and

may lead to poisoning if consumed out of inquisitiveness or a self-medication effort.

Some pertinent references on poisonous plants have been published in the USA and Europe (Connor, 1997; Cooper and Johnson, 1984; Frohne and Pfander, 1984; Tampion, 1977; Kingsbury, 1964). There has also been ample discussion of poisonous plants in several books and encyclopaedias dealing exclusively with medicinal plants (Heywood and Chant, 1982; Grieve, 1979; Stuart, 1979; Lewis, and Elvin-Lewis, 1977; Anderson, 1967). Likewise, regionally focused information on Indian poisonous plants have been provided in several Indian literature sources (Chopra *et al.*, 1984, 1956; Pandey, 1984; Modi, 1945; Dymock, *et al.*, 1890-1893). In contrast, only a few references are available on the specific poisonous plants of Pakistan (Baquar, 1989; Ikram and Hussain, 1978; Baquar and Tasnif, 1967).

Materials and Methods

Specimens of plants known to cause poisoning were collected from various areas of Islamabad during 2008-2009 and prepared following standard herbarium procedures. Specimens were identified with the help of floras and manuals (Polunin and Stainton, 1985; Willis and Airy Shaw, 1985; Stewart, 1972; Nasir and Ali, 1970; Hooker, 1875-1888). Voucher specimens were deposited in the Herbarium of the Pakistan Museum of Natural History (PMNH). Rare specimens were consulted in the Herbarium of Quaid-i-Azam University, Islamabad and National Herbarium Rawalpindi, Pakistan. All taxa were listed in tabular format, and include the following information: scientific, common, and local names, occurrence, growth habit and duration, poisonous parts, chemicals constituents responsible for poisoning, and the human specific physiological effects of poisoning in relation to each plant.

Results and Discussion

The poisonous plants of Islamabad are summarized in Table 1. It gives knowledge of poisonous plants at a glance and severity of poison of each plant included in this list.

Yellow Oleander (*Thevetia peruviana*) was planted in gardens and roadsides in Islamabad for its attractive flowers. But, its fruit is poisonous, consumption has lead to multiple deaths. Lantana or *Panch Phuli* (*Lantana camara*) was planted as an ornamental bush in Islamabad, but has spread very much and formed

Table 1. Summary of poisonous plants of Pakistan (in alphabetical order by genus).

Scientific name and family	Local / Common Name	Growth Habit and Duration	Parts causing harm	Chemical constituents	Harmful effects	Occurrence
<i>Agave americana</i> L. (Agavaceae)	<i>Vilayati Kaitalu</i> , Century Plant	Perennial herb with spine-tipped leaves	Roots and leaf- juice	Acrid volatile oil, oxalic acid, saponin-side	Diarrhea, menorrhagea, diuresis.	Often cultivated in homes and gardens.
<i>Anagallis arvensis</i> L. (Primulaceae)	<i>Dhabbar</i> , Blue Pimpernell	Small annual herb with blue flowers	Entire plant	Glucosidic saponins	Taken internally it produces intense headache and nausea.	A common wild herb.
<i>Asclepias curassavica</i> L. (Asclepiadaceae)	<i>Kakatundi</i> , Blood weed, Silk weed,	Erect shrub with small flowers	Entire plant, especially juice and roots	Asclepione, which contains 3 cardioactive glucosides	Constriction of blood vessels later; dyspnoea, vomiting and diarrhea.	Cultivated in gardens and self- grown.
<i>Butea monosperma</i> (L.) Taub. (Papilionaceae)	<i>Dhak</i> , Flame of the Forest	Wild tree in the foothills	All parts, especially the seeds	A fixed oil in the seeds and glucoside butrin of the flower sap	Retching, pain in the abdomen, and occasionally vomiting and giddiness.	Foothills of Margalla.
<i>Calotropis procera</i> (Ait.) Ait.f. (Asclepiadaceae)	<i>Ak</i> , Milkweed	Undershrub with purple flowers	The latex	A neutral principle calotropin	Internally digestive disorders, nausea and kidney-inflammation. Conjunctivitis and harm to the cornea.	In dry places.
<i>Cannabis sativa</i> L. (Cannabaceae)	<i>Bhang</i> , <i>Charas</i> , Indian Hemp, Marijuana	Erect annual herb with small, green flowers	Flowering shoots, leaves, especially of female plant	Tetrahydrocanna- binols, found in the resin	Firstly excitement, visual hallucination, rapid pulse, euphoria, secondly narcosis with dilated pupils.	Very common wild herb.
<i>Capsicum frutescens</i> L. (Solanaceae)	<i>Mirch</i> , Chillies, Cayenne	Perennial herb	Fruits and seeds	The pungent principle capsaicin	Large doses cause difficulty of swallowing, inflammation of the oesophagus and stomach; causing locally skin irritation.	Cultivated for consumption.
<i>Catharanthus roseus</i> (L.) G. Don (Apocynaceae)	<i>Sada Bahar</i> , Madagascar Periwinkle	Perennial herb bearing pink flowers	Leaves	Indole alkaloids vinblastine and vincristine	Effects the heart, acting as a cardiac poison.	Cultivated as an ornamental.

Cont'd

Table 1 Cont'd)

<i>Centella asiatica</i> (L.) Urban (Apiaceae)	<i>Brahmi Booti</i> , Indian Pennywort	Prostrate herb with round leaves	Entire plant	A bitter principle vellarine, resin, indocentello-side, asiaticoside	In large doses it is a stupefying narcotic, producing giddiness, vertigo and coma.	In wet places.
<i>Cestrum nocturnum</i> L. (Solanaceae)	<i>Raat ki Rani</i> , Night Jessamine	Bushy shrub	All parts	Water-soluble steroidal glycosides	Nervous and muscular excitement, hallucinations, tachycardia, salivation, dyspnoea, paralysis.	Commonly cultivated as an ornamental.
<i>Citrullus colocynthis</i> Schrud. (Cucurbitaceae)	<i>Tumba</i> , <i>Indrayan</i> , Bitter Apple, Colocynth	Prostrate annual herb with yellow flowers	Pulp of the fruit	Resinous material elatrin, phytosterol hentra aconit.	Violent gripping, prostration, sometimes bloody discharge resulting in death.	Throughout the drier parts of the country.
<i>Colchicum luteum</i> Baker (Colchicaceae)	<i>Sarinjan talkh</i> , Meadow Saffron	Small annual with root tuber & yellow flowers	All parts, particularly the corn and seeds	Alkaloid colchicine	Burning of mouth and throat, abdominal pain, violent vomiting, diarrhoea, shock, collapse.	Occasionally found in early spring.
<i>Consolida ambigua</i> (L.) Ball & Heywood (Ranunculaceae)	Larkspur	Erect annual herb bearing blue flowers	All parts, particularly the seeds	Alkaloids delphinine and ajacine	Vomiting, abdominal pain, blurred vision, agitation, dilation of pupils, respiratory paralysis.	Commonly cultivated as ornamental.
<i>Conyza canadensis</i> (L.) Cronq. (Asteraceae)	<i>Paleet</i> , Canadian Fleabane	Erect herb bearing small, green flowers	The leaves	An essential oil called oil of fleabane	Dermatitis on external contact; taken internally sore throat, aching of extremities and colic.	Very common in disturbed or unused places.
<i>Datura fastuosa</i> L. <i>D. innoxia</i> Miller <i>D. stramonium</i> L. (Solanaceae)	<i>Dhatura</i> , Thorn Apple	Bushy herbs bearing large white flowers	All parts especially juice and seeds	Alkaloids hyoscyamine, hyoscine	Burning stomach pain, lack of coordination, fever, dilated pupils, weak pulse, delirium, hallucinations, respiratory failure.	Occasionally found on disturbed or fallow land.
<i>Diffenbachia seguine</i> Schott (Araceae)	Dumb Cane	Perennial herb bearing large, variegated leaves	Plant juice	Calcium oxalate crystals	Inflamed mouth, swallowing difficulty, swelling of tongue, inability to talk.	Cultivated as ornamental.
<i>Duranta repens</i> L. (Verbenaceae)	Golden Dewdrop	Bushy shrub with small, blue flowers	Fruits	A saponin	Insomnia, fever and convulsions, sometimes fatal.	Cultivated as hedge plant.
<i>Epilobium hirsutum</i> L. (Onagraceae)	Great Hairy Willow Herb	Erect herb with small, pink flowers	Entire plant	Tannin	Epileptiform convulsions.	Occasional on fallow land.

Cont'd

Table 1 Cont'd)

<i>Lycopersicon esculentum</i> Miller (Solanaceae)	<i>Tamatur</i> , Tomatto	Suberect herb bearing the tomatoes	Green parts	Steroidals glyco-alkaloids like solanine and others	Irritation in the throat, headache, vomiting, severe diarrhea, in some cases fever and circulatory collapse.	Widely cultivated.
<i>Melia azedarach</i> L. (Meliaceae)	<i>Bakain</i> , <i>Dhrek</i> Persian Lilac	Tree bearing hanging berry-like fruits.	Fruits	A resinous poison	Vomiting, constipation or diarrhoea, breathing difficulty, cardiac weakening, CNS disturbance, paralysis.	Cultivated in the plains and foothills.
<i>Mirabilis jalapa</i> L. (Nyctaginaceae)	<i>Gul-e-Abbas</i> Four O' Clock	Perennial herb bearing tubular, pink flowers open at afternoon	Entire plant	Alkaloid trigonelline	Consumption of the plant parts causes gastroenteritis	Commonly cultivated and found as an escape.
<i>Narcissus tazetta</i> L. (Amaryllidaceae)	<i>Nargis</i> , Narcissus	Bulbiferous herb bearing white-yellow flowers	Entire plant, particularly the bulbs	Alkaloid narcissine	Salivation, abdominal pain, vomiting, diarrhoea, dizziness, central paralysis and collapse.	Often cultivated for its flowers.
<i>Nerium oleander</i> L. (Apocynaceae)	<i>Kaner</i> , Oleander	Erect shrub bearing attractive pink or white flowers	Entire plant	Cardiac glycosides of the cardenolide type.	Severe gastroenteritis, with dizziness, high pulse rate, weak heart beat, unconsciousness, coma and death.	Cultivated as ornamental, also found wild on stream sides.
<i>Oxalis corniculata</i> L. <i>Oxalis pes-caprae</i> L. (Oxalidaceae)	<i>Khatti booti</i> , <i>Amlika</i> , Yellow Sorrel	Small, delicate herbs bearing trifoliolate leaves and yellow flowers.	Entire plant	Oxalic acid and oxalates	Hypocalcaemia, trembling, staggering. Prolonged use of small quantities causing deposition of calcium-oxalate in the kidney.	First one is a vary common herb; the other is cultivated as ornamental.
<i>Papaver somniferum</i> L. (Papaveraceae)	<i>Post</i> , Opium poppy	Erect annual herb bearing pretty red or white flowers	Latex from unripe fruits and other parts	Alkaloids morphine, narcotine, codeine, papverine, thebaine	Narcotic state, extremely slow respiration, pin-point pupils, death due to respiratory failure.	Cultivated as ornamental in most parts of the country.
<i>Parthenium hysterophorus</i> L. (Asteraceae)	Congress weed	Erect perennial herb bearing small, whitish flower heads in groups	Entire plant	Parthenin and other phenolic acids	Contact dermatitis, severe itching, eczema, photosensitivity.	Common on roadsides and fallow land/

Table 1 Cont'd)

<i>Eucalyptus globulus</i> Labille (Myrtaceae)	<i>Sajeda</i> , Blue Gum	Tall with light grey trunk	Oil of the plant	Eucalyptol	Epigastric burning, vomiting, dizziness, convulsions, can be fatal.	Cultivated on roadsides and parks.
<i>Euphorbia helioscopia</i> L. (Euphorbiaceae)	<i>Chatri Dhodak</i> Sun Spurge	Erect herb with umbrella-like upper leaves	Latex	Diterpene 12-Deoxypharbol	Burning of the mouth, oesophagus and stomach, vomiting, convulsions, oedema of lung, coma, death.	Common on roadsides and fallow land.
<i>Euphorbia pulcherrima</i> Willd. (Euphorbiaceae)	Poinsettia	Shrub bearing red petal-like bracts	Leaves and latex	Water-soluble caoutchouc.	Vomiting, purgation, delirium, externally blistering of the skin.	Cultivated as an ornamental.
<i>Ipomoea purpurea</i> (L.) Roth (Convolvulaceae)	Morning Glory	Climber with purple, bell-shaped flowers	Seeds	D-lysergic acid	Disorientation, blurred vision, hallucinations, permanent psychological disturbances, death	Cultivated and found as an escape.
<i>Justicia adhatoda</i> L. (Acanthaceae)	<i>Bhaiker</i> , <i>Basaka</i> , Malabar Nut	Undershrub bearing white, 2-lipped, flowers.	Entire plant	Alkaloid vasicine and essential oils	Fall of blood pressure followed by a rise to normal, increase in heart beats amplitude and slow rhythm.	Common in sub-Himalayan tract, upto 4000'
<i>Lantana camara</i> L. (Verbenaceae)	<i>Panch Phuli</i> , Wild Sage	Large bush bearing multi-coloured, flowers and berry-like fruit	fruits especially when unripe	Pentacyclic triterpenes, lantadene A and B	Gastroenteritis, diarrhoea and failure of blood circulation, photosensitivity may also occur.	Cultivated/ self-grown in most parts of the country.
<i>Ligustrum lucidum</i> Ait. (Oleaceae)	<i>Chaora Sanatha</i> , Privet	Shrub or small tree bearing small white flowers	All parts, especially the berries	Glycoside ligustrin	Gastric irritation, vomiting, purging, death in severe cases; leaves can cause severe dermatitis.	Grown as a hedge plant.
<i>Lolium temulentum</i> L. (Poaceae)	<i>Mochmi</i> , Darnel	Erect grass bearing green spikes on a straight axis	Seeds	Alkaloids temuline, temulentine and lolin, and fungus infection may be involved	Contaminated flour cause trouble in GIS, CNS, cardiac weakness.	A wild grass

Cont'd

Table 1 Cont'd)

<i>Ranunculus sceleratus</i> L. (Ranunculaceae)	<i>Kabikaj</i> , Water Crowfoot	Annual herb bearing small yellow flowers	Entire plant	Glycoside ranunculin	Dermatitis, severe gastroenteritis, mouth and lips inflamed.	Common in wet places.
<i>Ricinus communis</i> (Euphorbiaceae)	<i>Arind</i> , Castor Oil Plant	Tall shrub bearing small flowers and dry bristly fruits	Seed coat.	Toxalbumin ricin.	Severe GIT irritation, vomiting, bloody diarrhoea, cyanosis, convulsion, circulatory collapse and death.	Cultivated and escaped.
<i>Sapium sebiferum</i> Roxb. (Euphorbiaceae)	<i>Pahari Shisham</i> , Chinese Tallow Tree	Tree with Shisham-like leaves and rounded fruits	Latex	Diterpene ester of phorbol.	Skin contact of latex causes irruption and vesication; also said to be carcinogenic.	Cultivated in parks and roadsides as an ornamental tree.
<i>Silybum marianum</i> (L.) Gaert. (Asteraceae)	Milk Thistle	Spiny herb with variegated leaves and spiny purple flowers	Entire plant	Nitrates	Severe gastroenteritis, due to the reduction of nitrates to the more highly toxic nitrites	Found in fallow land.
<i>Solanum pseudocapsicum</i> L. (Solanaceae)	Winter Cherry	Bush-like perennial herb bearing red berries.	Berries	Alkaloid solanocapsine	Retardation of cardiac impulse and sinus arrhythmias	Cultivated as an ornamental.
<i>Sophora japonica</i> L. (Papilionaceae)	Japanese Pagoda Tree	Small tree with pinnate leaves and fruiting pods	All parts, especially seeds.	Alkaloids cytisine, anagyrene	Stimulation of the respiratory centres, delirium, prolonged sleep; much dangerous to children	Sometimes cultivated in parks.
<i>Thevetia peruviana</i> (Pers.) Schum. (Apocynaceae)	<i>Peela Ganira</i> , Yellow Oleander	Small tree bearing yellow flowers and peculiar fruit	All parts	Glycosides cerebrin, neriifolin, thevetin	Burning mouth pain, numb tongue, vomiting, dilated pupils, heart block, collapse, death due to peripheral circulatory failure.	Cultivated on roadsides and parks.
<i>Xanthium strumarium</i> L. (Asteraceae)	<i>Ban Okra</i> , <i>Chota</i> <i>Gokhru</i> , Cocklebur	Branched herb bearing small bristle-covered fruits	Entire plant when fresh and seeds	Carboxytracylo- side	Diuresis, sedation, pollen causes asthma, sinusitis and dermatitis in susceptible persons.	Common in disturbed and unused places.

impenetrable thickets in waste places. Its ripe fruits are harmless and are eaten by people and also used in herbal medicine, but when unripe they can cause poisoning. Oleander (*Nerium oleander*) is quite common in parks and roadsides as it has quite beautiful floral display, but contains deadly toxins. Blood weed (*Asclepias curassavica*), Madagascar periwinkle (*Catharanthus roseus*), night jessamine (*Cestrum nocturnum*), Lakspur (*Consolida ambigua*), golden dewdrop (*Duranta repens*), Poinsettia (*Euphorbia pulcherrima*), morning glory (*Ipomoea purpurea*), Privet (*Ligustrum lucidum*), four O'clock (*Mirabilis jalapa*), opium poppy (*Papaver somniferum*) are commonly cultivated in parks and gardens.

The harm caused by these poisonous plants is often not serious, and is primarily restricted to gastrointestinal irritation or mild nervous system effects, which are usually cured by a physician. However, there have been cases of death resulting from consumption of parts of highly poisonous plants. For example, several young people have died in Islamabad after eating the odd looking fruit of the yellow oleander (*Thevetia peruviana*), leaves of night jessamine (*Cestrum nocturnum*) and oleander (*Nerium oleander*). Use of the narcotic Hemp (*Cannabis sativa*), which is common in this country, has led to death of a few addicts due to overdose (Chopra *et al.*, 1984). Some of the poisonous plants like *Butea*, *Calotropis*, *Centella*, *Datura*, *Solanum* and *Withania* are used in herbal medicines in Pakistan (Nasir and Ali, 1970). The use of incorrectly prepared herbal medicines also cause poisoning, especially among rural people. Preparations for enhancing sexual performance are also commonly sold, which often contain extracts from toxic plants, animals constituents, and various minerals that cause harm to the unformed users. Green vegetative parts of commonly used "vegetables", like potatoes (tubers) and tomatoes (berries) can lead to poisoning since few people are aware of their toxicity.

Of the various plant parts, the attractive-looking fruits of cultivated or wild plants cause poisoning more frequently and victims are often children. Fruits of black nightshade (*Solanum nigrum*) locally called 'Makoh' is a common roadside plant of Islamabad. Its ripe fruits are harmless and are often eaten by children. But its unripe fruits are toxic and if consumed in large numbers can be very harmful. *Datura* species are often seen in groups and are attractive because of their large, funnel-shaped white flowers. Its prickly fruits contain a large number of seeds that are used by

Hakims in anti-asthma preparations. But used alone, the seeds can cause poisoning with hallucinogenic effects or death. Leaves and/or stems of some plants are also consumed out of curiosity, which may cause poisoning (e.g. the stem of the commonly cultivated *Diffenbachia* causes severe inflammation if it comes in contact with the mouth).

It is important that people abstain from consuming any unconventional plant parts, even if they may not appear harmful. Children at home and in parks should be kept under watch and trained not to taste plant parts. In the event of ingestion and appearance of any undesirable symptom, the child should be taken to a hospital. As a preventive measure, it is imperative that public awareness about the poisonous plants in ones vicinity be emphasized to prevent any unnecessary or even tragic events associated with local poisonous plants.

References

- Ahmad, S., Khattak, Z. 2001. Quantitative studies on the vegetation of Islamabad. *Pakistan Journal of Scientific and Industrial Research*, **44**: 279-285.
- Anderson, E. 1967. *Plants, Man and Life*, pp. 124-135, University of California Press, Berkley, USA.
- Baqar, S.R.H. 1989. *Medicinal and Poisonous Plants of Pakistan*, 506 pp., Printas Karachi, Pakistan.
- Baqar, S.R., Tasnif, M. 1967. *Medicinal Plants of Southern West Pakistan*, pp. 7-119, Pakistan Council of Scientific and Industrial Research, Karachi, Pakistan.
- Champion, H.G., Seth, S.K., Khattak, G.M. 1965. *Forest Types of Pakistan*, pp.130-140, Pakistan Forest Institute, Peshawar, Pakistan.
- Chopra, R.N., Badhwar, R.L., Ghosh, S. 1984. *Poisonous Plants of India*, vol.1, pp. 13-23, Academic Publishers, Jaipur, India.
- Chopra, R.N., Nayar, S.L. Chopra, I.C. 1956. *Glossary of Indian Medicinal Plants*, pp. 13-63, Council of Scientific and Industrial Research, New Delhi, India.
- Connor, H.E. 1997. *The Poisonous Plants in New Zealand*. E.C. Keating (ed), pp. 14-27, 2nd edition. Government Printer, Wellington, New Zealand.
- Cooper, M.R., Johnson, A.W. 1984. *Poisonous Plants in Britain and their Effects on Animals and Man*. pp. 130-305. Her Majesty's Stationery Office, London, UK.
- Dimitrios, B. 2006. Sources of natural phenolic antioxidants. *Trends in Food Science & Technology*. **17**: 505-512.

- Dymock, W., Warden, C.J.H., Hooper, D. 1890-1893. *Pharmacographia Indica*. vol. 1, pp. 59-81, Education Society's Press, Bombay, India.
- Frohne, D. Pfander, H.J. 1984. *A Colour Atlas of Poisonous Plants*, pp. 113-291, Wolfe Publishing Ltd, London, UK.
- Grieve, M. 1979. *A Modern Herbal*. C.F. Level (ed.), pp. 170-171, Jonathan Cape, London, UK.
- Heywood, V.H. Chant, S.R. 1982. *Popular Encyclopedia of Plants*, pp. 116-117, Cambridge University Press, UK.
- Hooker, J.D. (ed.) 1875-1888. *The Flora of British India*. vols. 1, pp. 20-21, L. Reeve & Co. Ltd. Ashford, Kent, UK.
- Ikram, M., Hussain, S.F. 1978. *Compendium of Medicinal Plants*. 167 pp., Pakistan Council for Scientific and Industrial Research, Peshawar, Pakistan.
- Kingsbury, J.M. 1964. *Poisonous Plants of the United States and Canada*. pp. 9-28, Prentice Hall, Englewood Cliffs, New Jersey, USA.
- Lewis, W.H., Elvin-Lewis, M.P.F. 1977. *Medical Botany: Plants Affecting Man's Health*. pp. 11-62, John Wiley & Sons, New York, USA.
- Modi, N.J. 1945. *Textbook of Medical Jurisprudence and Toxicology* (First edition, 1920). Tripathy Ltd., Bombay, India.
- Nasir, E., Ali, S.I., (eds.). 1970. *Flora of West Pakistan/ Nos. 1-190*, PARC, National Herbarium, Islamabad and Department of Botany, University of Karachi, Pakistan.
- Pandey, B.P. 1984. *Economic Botany*. 476 pp., S. Chand & Company Ltd., New Delhi, India.
- Polunin, O., Stainton, A. 1985. *Flowers of the Himalaya*. vol. 1, pp. 11-391, Oxford University Press. Delhi, India.
- Stewart, R.R. 1972. *An Annotated Catalogue of the Vascular Plants of Pakistan and Kashmir*. 1028 pp., Fakhri Printing Press, Karachi, Pakistan.
- Stewart, R.R. 1957. The Flora of Rawalpindi District. *Pakistan Journal of Forestry*, 7: 240-300.
- Stuart, M. 1979. *The Encyclopedia of Herbs and Herbalism*. 283 pp., Orbis Publishing Ltd., London, UK.
- Tampion, J. 1977. *Dangerous Plants*, pp. 73-81. David and Charles Publication, Newton Abbot, London, UK.
- Willis, J.C., Airy Shaw, H.K. 1985. *A Dictionary of the Flowering Plants and Ferns*. 1245 pp., 8th edition, Cambridge University Press, UK.