

POISONOUS PLANTS AROUND THE HOME

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THE VERSATILITY of plants and plant products in furnishing human needs is unbounded. From the dawn of civilization, plants have provided all the essentials for human existence, and though civilization has progressed to the complexity of industrial development and space exploration, plants still are major sources of chemicals required by our technology. We all are familiar with the medicinal aspect of plant products. Many of the so-called miracle drugs such as aspirin, quinine, penicillin (from mold which is a plant), and streptomycin (soil fungus — also a plant), originated from plant sources. Today in our fight against cancer the major efforts of many scientists are still concentrating on finding the right molecule from plant sources to cure this disease. *Camptotheca acuminata* (camptothecin) is one promising source of an anti-cancer drug now under clinical tests.

Plants can provide what we need in all aspects of life. They produce starch, sugars, protein, fats, oils, spices and vitamins for our food, fibers for our clothing, wood for our dwellings, furniture and tools, dyes and fragrances for our appreciation, and antibiotics and drugs for preventing and curing infection. Furthermore, it may be recognized in the future that molecules from plants may give us peace of mind, a feeling of inward satisfaction, a desire for creativity, or some genuine wisdom. All these starches, sugars, proteins, and the rest, involve a variety of chemical substances, many of them still unknown to mankind. The formation of these chemical substances takes place in plant tissue. The process is complicated by many different steps of biochemical synthesis re-

sulting in the formation of intermediate products or byproducts of a different chemical nature. Such multiplicity of chemical substances existing in different plant species provides rich resources for our utilization. It is no surprise that among so many chemical substances quite a few are poisonous or toxic to humans and animals. Some plant species or plant parts contain high levels of these poisonous chemicals; they are thus referred to as poisonous plants.

MEDICINES AND POISONS are hardly well-defined separate items; the determination depends mainly on the application. The same substance used by a physician to save a life can also be used to take a life. It is an old saying that medicines are substances which make the sick well and the well sick. Technically, therefore, one cannot differentiate a medicinal plant or a drug plant from a poisonous plant; it all depends on the purpose of the user and the consequences. It is probably fair to say that all medicines are poisonous except that they serve certain specific physiological or antibiotic functions in curbing the further development of animal or human maladies at certain dosage levels. The dosage level in this definition is very important, since overdose can become poisonous.

However, in this matter, overindulgence in anything is harmful and this includes spices, seasonings such as salt and sugar, vitamins, or even meals. Thus, it is plain that edible, medicinal and poisonous plants cannot be considered as entirely separate and distinct classifications, but are merely arbitrary designations made for practical purposes.

When we speak of poisonous plants, we usually have in mind the kinds of reactions resulting from contact or ingestion. Common reactions, immediate or delayed, are nausea, vomiting, stomach pain, itching blistering, diarrhea, cerebral depression, convulsion, and, in extreme cases, coma and death. These different reactions, from mild to severe, may vary according to the amount of intake. Also, there is a difference in individual sensitivity to the poisonous principle. For instance, a small percentage of the population is completely immune to poison ivy which causes contact dermatitis to a majority of us. Furthermore, with the same amount of intake of a given plant in proportion to body weight, some people have less violent reactions than others. Usually a child is more apt to be seriously harmed by poisonous plant intake because of smaller body weight. Dosages innocuous to an adult can cause serious reactions in a child.

MORE RECENT scientific investigation of the internal biological clock and rhythm of animals and plants indicates that the daily and seasonal in-born physiological fluctuation affects the lethal dosage level of medicines or poisons. Clinical trials have shown that certain drugs can be more effective if given at certain times of the day. Drs. Franz Halberg and Erhard Haus of the University of Minnesota have found that lethal doses vary considerably in rats according to the time of day a drug is given. Thus the reaction of particular poisonous plants may vary from individual to individual and from hour to hour. Further complications can be involved when an allergic response is included. Some people are specifically allergic to peaches, strawberries, and other fruits; they would certainly consider these plants to be poisonous to them.

Many food plants contain powerful poisons. For instance, solanine is a compound poisonous to humans (it also has

some medicinal value) and is present in small or large amounts in most of the plants in the family Solanaceae, depending on species and different parts of the plant and seasonal variation. Potato and tomato plants contain it, and also the Jimson weed (*Datura stramonium*).

Then, should we call both potato and tomato poisonous plants? Probably we should, because if one eats potato leaves or tomato leaves, there could be ill or poisonous effects, which is probably why there are many people who still consider tomatoes, the fruit, to be poisonous. Even the potato tuber can be poisonous if it is exposed to sunlight for a period of time. Sunlight induces the formation of chlorophyll from protochlorophyll which is present in the skin of the tuber and thus capable of carrying on the process of photosynthesis as in the case of leaves. Solanine formation is one of the byproducts of photosynthesis. The green potato tubers are reported to be poisonous if taken up to specific amounts according to the individual.

Knowledge, or awareness, of poisonous plants goes back to antiquity. A first century Greek physician, Dioscorides, wrote a work on plants called *The Greek Herbal of Dioscorides*, which contained information that remained standard for centuries and which accurately identified many plants we now know have toxic parts. The very word "toxic," used to describe the poisonous principle in a plant, comes from an ancient word meaning "bow poison," and refers, of course, to the poisons derived from plants that prehistoric as well as later tribes put on the tips of their arrows for hunting and fighting.

In the United States, knowledge of poisonous plants has developed mainly out of concern for the health of livestock, and this development took place only as the vast cattle ranges of the West were opened up. It is only in relatively recent times that the threat of poisonous plants to humans has been under investigation.

Poisoning of any kind, whether it be from plants or animals, can produce some terrible reactions. Among plants, perhaps the worst in this respect is the water hemlock. Eaten in sufficient quantity, it has been reported to cause the most violent convulsions and swellings of the body invariably resulting in death. It is all the more dangerous because adults as well as children can easily mistake its roots, said to be pleasant tasting, with those of wild parsnip or other edible roots. The famous poison hemlock with which Socrates was put to death produced relatively mild reactions. According to records, Socrates was able to tell his friends of the effects of the poison as it made its way from his feet to his heart in a progressive paralysis of the central nervous system.

The question has been asked: is taste a good index of the edibility of a plant? Unfortunately it is not. Plants that taste good are not necessarily safe, just as those that are bitter and unpleasant are not necessarily poisonous or dangerous. Further, there is no accounting for taste anyway, as illustrated by the familiar phrase, "one man's meat is another man's poison." The only reliable index is scientific evidence. In any case, compared to other causes of mortality to man, the incidental death due to poisonous plants is very low — an average of 150 annually in the United States, which is much less than death due to food poisoning. Losses of livestock due to plant poisoning, however, are estimated to cost several million dollars every year.

THE GREATEST threat of poisonous plants is to children. The plant hobbyist who likes to keep ornamental plants inside the house should be aware of the possible poisonous effect of these inedible plants to their children, especially babies. It should be clear that house plants, as well as many other things that can be put in the mouth, should be kept out of reach of infants. Children at understanding ages are not

likely to eat indiscriminately. Since most of these plants are bitter and unpleasant in taste, this fact alone will discourage their eating enough to harm them. More precaution should be employed with respect to plants with colorful and tempting berries, fruits, or seeds that can be easily taken. Castor bean seeds, for example, are highly poisonous; 1 to 3 seeds, thoroughly chewed and swallowed by a child, likely will cause death. However, if seeds are swallowed without chewing, it is unlikely to produce harmful effects.

Most ornamental plants are inedible. Since we do not know much about their chemistry we should also consider them possibly poisonous. We should teach our children what to eat and what not to eat. If poisoning is suspected, the following procedure is recommended.* A physician or a hospital emergency room should be contacted immediately. If this cannot be done, and the victim is not unconscious or convulsive, vomiting should be induced by first giving him a cup of lukewarm salt water (a heaping *teaspoon* of table salt dissolved in the cup of water), and then tickling the back of the throat with a blunt object, such as a spoon handle. This will serve to both dilute the poison, and empty the stomach. Even if the person vomits or if vomiting does not take place within 2 minutes, if Syrup of Ipecac is available, one tablespoon should then be given. A physician should be contacted even if the person vomits.

The following list of known poisonous plants is prepared by Dr. Leonid Enari, biologist on the research staff of the Los Angeles County Department of Arboreta and Botanic Gardens. These plants contain high levels of poisonous principles in one or more of their parts. A more detailed description of these plants together with seventy-four drawings will soon be issued by the Department in a brochure titled, *Poisonous Plants of Southern California*.

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COMMON NAME	SCIENTIFIC NAME	PLANT TYPE	TOXIC PART
Rosary pea, jequirity pea, precatory bean, prayer bean or love bean	<i>Abrus precatorius</i>	WV	Seeds
Bushmans poison	<i>Acokanthera oppositifolia</i> (A. <i>venenata</i>)	S	Entire plant
Monkshoods	<i>Aconitum napellus</i> and other species	P	Entire plant
Baneberry	<i>Actaea rubra</i>	P	Entire plant
Horsechestnuts	<i>Aesculus californica</i> and other species	T	Seeds, flowers, leaves
Naked Lady	<i>Amaryllis belladonna</i>	B	Bulbs
Belladonna	<i>Atropa belladonna</i>	P	Entire plant
Boxwoods	<i>Buxus sempervirens</i> and other species	S	Leaves
Caladiums	<i>Caladium bicolor</i> and other species	P	Entire plant
Hemp, marijuana, hashish or pot	<i>Cannabis sativa</i>	A	Entire plant, but particularly the flowering tips of female plants
Nightblooming jasmine	<i>Cestrum nocturnum</i>	S	Berries, leaves
Water hemlock	<i>Cicuta douglasii</i>	P	Entire plant
Autumn crocus	<i>Colchicum autumnale</i>	B	Entire plant
Elephants-Ear	<i>Colocasia esculenta</i>	P	Entire plant
Poison hemlock	<i>Conium maculatum</i>	A	Entire plant
Lily-of-the-valley	<i>Convallaria majalis</i>	P	Entire plant
Daphnes	<i>Daphne odora</i> and other species	S	Berries, flowers, leaves, bark
Jimson weed, Jamestown weed, thornapple, apple of Peru or tolquacha	<i>Datura stramonium</i>	A	Entire plant
Angel's trumpet	<i>Datura suaveolens</i>	S	Entire plant
Rattlebox	<i>Daubentonia punicea</i>	S	Seeds
Larkspur	<i>Delphinium ajacis</i> and other species	A	Entire plant
Delphiniums	<i>Delphiniums elatum</i> and other species	P	Entire plant
Bleeding hearts	<i>Dicentra formosa</i> and other species	P	Entire plant
Dumb canes	<i>Dieffenbachia picta</i> and other species	P	Entire plant
Foxglove	<i>Digitalis purpurea</i>	A, P	Entire plant
Skyflowers	<i>Duranta erecta</i> and other species	S, T	Berries

COMMON NAME	SCIENTIFIC NAME	PLANT TYPE	TOXIC PART
Crown-of-thorns	<i>Euphorbia millii</i>	S	Entire plant
Poinsettia	<i>Euphorbia pulcherrima</i>	S	Entire plant
Milk bush	<i>Euphorbia tirucalli</i>	S	Entire plant
Carolina jasmine	<i>Gelsemium sempervirens</i>	WV	Entire plant
Glory lily	<i>Gloriosa superba</i>	PV	Entire plant
Ivies	<i>Hedera helix</i> and other species	WV	Berries, leaves
Hyacinths	<i>Hyacinthus orientalis</i> and other species	B	Bulbs
Hydrangea	<i>Hydrangea macrophylla</i>	S	Shoots, leaves
Hollies	<i>Ilex aquifolium</i> and other species	S, T	Berries
Coral plant	<i>Jatropha multifida</i>	S	Entire plant, but particularly seed
Lantanas	<i>Lantana camara</i> and other species	S	Berries
Sweet pea	<i>Lathyrus odoratus</i>	AV	Seeds
Privets	<i>Ligustrum japonicum</i> and other species	S, T	Berries, leaves
Peyote	<i>Lophophora williamsii</i>	P	Entire plant
Apples	<i>Malus domestica</i> and other species	T	Seeds
Chinaberry tree	<i>Melia azedarach</i>	T	Berries, flowers
Four-o'clock	<i>Mirabilis jalapa</i>	A	Seeds
Daffodils	<i>Narcissus pseudo-narcissus</i> and other species	B	Bulbs
Oleander	<i>Nerium oleander</i>	S	Entire plant
Tobaccos	<i>Nicotiana glauca</i> and other species	S, A	Entire plant
Opium poppy	<i>Papaver somniferum</i>	A	Unripe fruits (seed-capsules)
Virginia creeper	<i>Parthenocissus quinquefolia</i>	WV	Berries (1)
Philodendrons	<i>Philodendron selloum</i> and other species	P	Entire plant
Mistletoes	<i>Phoradendron flavescens</i> and other species	S	Berries
Pokeweed, pokeberry, inkberry, or pigeonberry	<i>Phytolacca americana</i>	P	Entire plant(2)
Bird-of-paradise-bush	<i>Poinciana gilliesii</i>	S	Seeds
Apricots	<i>Prunus armeniaca</i> and other species	T	Pits (seeds)
Plums	<i>Prunus domestica</i> and other species	T	Pits (seeds)
English laurel	<i>Prunus laurocerasus</i>	S, T	Seeds, leaves
Peaches	<i>Prunus persica</i> and other species	T	Pits (seeds)

COMMON NAME	SCIENTIFIC NAME	PLANT TYPE	TOXIC PART
Cherries	Prunus cerasus and other species	T	Pits (seeds), leaves
Oaks	Quercus agrifolia and other species	T	Acorns
Rhubarb	Rheum rhaponticum	P	Leaf-blades
Azaleas	Rhododendron indicum and other species	S	Entire plant
Rhododendrons	Rhododendron macrophyllum and other species	S	Entire plant
Castor bean	Ricinus communis	A, P, S, T	Entire plant, but particularly seeds
Black locust	Robinia pseudo acacia	T	Seeds, young leaves, inner bark
Elderberries	Sambucus caerulea and other species	S, T	Unripe berries, leaves, wood(3)
Jerusalem cherry	Solanum pseudo Capsicum	S	Berries (4)
Potato	Solanum tuberosum	P	Shoot, fruits (berries), and sun-green tubers
Mescal bean	Sophora secundiflora	S, T	Seeds
Bird-of-paradise-flower	Strelitzia reginae	P	Seeds
Yews	Taxus baccata and other species	S, T	Leaves, twigs, seeds
Yellow oleander	Thevetia peruviana	S	Entire plant
False hellebores	Veratrum californicum and other species	P	Entire plant
Fava bean, horse bean, English bean or Windsor bean	Vicia faba	A	Seeds (5)
Wisterias	Wisteria floribunda and other species	WV	Seeds
Death camasses	Zigadenus venenosus and other species	B	Entire plant

NOTES: 1—The berries are suspected of causing poisoning and death of children.

2—Young tender shoots are frequently eaten as cooked greens. If thoroughly cooked in two waters, they are quite safe to eat.

3—The ripe berries are edible without harm and are frequently used for wine, pie and jelly.

4—The berries are believed to be poisonous.

5—The seeds can cause fatal anemia ("favism"), but only to few individuals of Italian, Greek or Negro descent. This inherited trait has been known for centuries and is characterized by a deficiency of glucose-6-phosphate dehydrogenase (G-6-PD), an enzyme. The beans can be eaten without danger by those not carrying this inherited trait.

Key: Plant Type

A — Annual herbaceous plant
P — Perennial herbaceous plant
B — Bulbous plant
S — Shrub

T — Tree
AV — Annual herbaceous vine
PV — Perennial herbaceous vine
WV — Woody vine



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