Script

Poisonous seeds

Introduction :

Very recently we have heard about some children died due to consumption of poisonous fruits, Some healthy cows died after eating plants in the field ect. When we were young my parents never agree to teach datura, castor oil seeds and some wild plants. It is true many plants commonly used as food possess toxic parts Very few plants causes serious threat to certain animals (such as cats, dogs, or livestock) or certain types of people (such as infants, the elderly persons, ect.). Chemicals concentrated in the cells of roots, leaves, bark and seeds serve as the plant's defense against insect and animal attack. Some of these compounds can be toxic, especially if ingested or touched by humans and can, result in adverse reactions.

Fresh fruit and vegetables are an important part of a healthy diet, however several fruits and vegetables , especially seeds are contain small amounts of natural toxins. These natural toxins help protect the plants and create resistance to diseases and certain types of insects. The public should be aware of the presence of natural toxins in these fruits and vegetables.

This episode deals with different types of Poisonous seeds special reference to **deadly poisonous seeds,Toxic chemical and toxicity, cet,** The following topics are highlighted:

1:Toxic chemical / compounds in the seeds.

2: Notable examples include:

3: Castor oil Seeds: ***Ricinus communis***

4: ***Datura*** as **angel's trumpets**

5: Conclusion

1:Toxic chemical / compounds in the seeds.

1. Aamygdalin, a cyanogenic glycoside
2. Abrin.
3. Aconitine,
4. Brucine, another dangerous chemical.
5. Cerberin, .
6. Containricin
7. Cyanogenic glycoside
8. Cytisine.
9. Digoxin.
10. Glycoalkaloid solanine
11. Linamarin, a Cyanogenic glycoside
12. Lupin
13. Lupinine ,
14. Myristicin,
15. Nicotine tropane alkaloids
16. Ouabain
17. Photosensitivity.
18. Phytohaemagglutinin, a lectin
19. Psoralen
20. Ricin
21. Scopolamine and atropine.
22. Sparteine
23. Strychnine,
24. β-N-Oxalyl-L-α,β-diaminopropionic acid or ODAP, a neurotoxic amino acid cyanogenic glycoside

2: Notable examples include:

- **Castor oil plant *Ricinus communis*** (commonly known as , **castor bean**
- **Nutmeg** (***Myristica fragrans*****).**
- **Crab's eye *Abrus precatorius*** (known commonly as **jequirity**, , **rosary pea**
- ***Datura*** **genus** (several species commonly known as **jimson weed**,
- Genus *Gossypium*).

- **Apple** (*Malus domestica*). Seeds are poisonous, containing a small amount of amygdalin, a cyanogenic glycoside. It is possible to ingest enough seeds to provide a fatal dose.

Ackee, akee or achee - *Blinghia sapida* - is a food staple in many Western Africa, Jamaican and Carribean diets. However, unripe fruit contains natural toxins called **hypoglycin** that can cause serious health effects. The only part of this fruit that is edible, is the properly harvested and prepared ripe golden flesh around the shiny black seeds. The fruit is poisonous unless ripe and after being opened naturally on the tree.

3: Castor oil Seeds: ***Ricinus communis*** (commonly known as **castor oil plant**, **castor bean** and **Palma Christi**). The seeds contain ricin, an extremely toxic and water-soluble ribosome-inactivating protein;. Also present are ricinine, an alkaloid, and an irritant oil.. Naturally occurring lectin (a carbohydrate-binding protein. The toxin is present in the entire plant but is concentrated in its seeds. . Castor beans are processed throughout the world to make castor oil. Ricin is part of the waste "mash" produced when castor oil is made. Ricin irreversibly blocks protein synthesis. Ricin has some potential medical uses, such as bone marrow transplants and cancer treatment (to kill cancer cells.) The United States investigated ricin for its military potential during World War I.

Because ricin can quickly and repeatedly inactivate hundreds of ribosomes in multiple cells, These include a burning sensation in the mouth and throat, abdominal pain, purging and bloody diarrhea. Within several days there is severe dehydration, a drop in blood pressure and a decrease in urine. Unless treated, death can be expected to occur within 3–5 days;Toxicity varies among animal species: 4 seeds will kill a rabbit, 5 a sheep, 6 an ox or horse, 7 a pig, and 11 a dog. Castor oil, long used as a laxative, muscle rub, and in cosmetics, is made from the seeds, but the ricin protein is denatured during processing. Because ricin can quickly and repeatedly inactivate hundreds of ribosome's in multiple cells, the LD_{50} in adults is only about 22 µg/kg

when injected or inhaled; ingested ricin is much less toxic due to the digestive activity of peptidases, although a dose of 20 to 30 mg/kg, or about 4 to 8 seeds, can still cause death via this route. Reports of actual poisoning are relatively rare.[If ingested, symptoms may be delayed by up to 36 hours but commonly begin within 2–4 hours. These include a burning sensation in the mouth and throat, abdominal pain, purging and bloody diarrhea. Within several days there is severe dehydration, a drop in blood pressure and a decrease in urine.

Ricin toxin is found in the beans of **the castor plant**, *Ricinus communis.* It is one of the most lethal and easily produced plant toxins. Ricin can be in the form of a powder, mist, or pellet, or dissolved in water or weak acid. It is a very stable substance and is not affected by extremes in temperature

- Inhalation
  - Cough, weakness, fever, nausea, muscle aches, chest pain and cyanosis
  - Pulmonary edema, 18-24 hours after inhalation
  - Severe respiratory distress
  - Death from hypoxemia, 36-72 hours

They may cause an acute and potentially fatal gastroenteritis. Delayed visceral damage is another serious complication; however, the latter is quite rare. The toxicity is dose related and depends on the amount of castor beans ingested. There is no specific treatment and supportive. Death usually occurs within two to six hours in fatal poisoning.

In severe poisonings pronounced motor weakness occurs and cutaneous sensations of tingling and numbness spread to the limbs. Cardiovascular features. 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. The only post-mortem signs are those of asphyxia.

Indian pea (*Lathyrus sativus*). A legume grown in Asia and East Africa.
The seeds contain variable amounts of β -N-Oxalyl-L-a, β-diaminopropionic acid or ODAP, a neurotoxic amino acid. ODAP causes wasting and paralysis if eaten over a long period, and is considered the cause of the disease neurolathyrism, disease that causes paralysis of the lower body and emaciation of gluteal muscle (buttocks).

Kidney bean or common bean or common bean **(***Phaseolus vulgaris*). The toxic compound phytohaemagglutinin, a lectin, is present in many varieties of common bean but is especially concentrated in red kidney beans. The lectin has a number of effects on cell metabolism; it induces cell division, and affects the cell membrane in regard to transport and permeability to proteins. It agglutinatinates most mammalian red blood cells types.
Symptoms, which include nausea, vomiting, and diarrhea. Onset is from 1 to 3 hours after consumption of improperly prepared beans, and symptoms typically resolve within a few hours.

Lima bean or **butter bean** (*Phaseolus lunatus*). Raw beans contain dangerous amounts of linamarin, a cyanogenic glcoside.

Nutmug (***Myristica fragrans*).** Contains myristicin, Raw nutmeg produces anticholinergic-like symptoms, attributed to myristicin and elemicin. The intoxicating effects of myristicin can lead to a physical state somewhere between waking and dreaming; euphoria is reported and nausea is often experienced. Users also report bloodshot eyes and memory disturbances. Myristicin is also known to induce hallucinogenic effects, such as visual distortions. Nutmeg intoxication has an extremely long delay before peak is reached, sometimes taking up to seven hours, and effects can be felt for 24 hours, with lingering effects lasting up to 72 hours.

Lemon, as well as lime,orange and other citrus fruits are known to contain aromatic oils and compounds of Psoralen which is toxic to dogs, cats, and some animals. The

acid is found all over the entire plant. Symptoms include vomiting, diarrhea, depression and photosensitivity.

Areca catechu (commonly known as **betel nut palm** and **pinyang**). The nut contains an alkaloid related to nicotine which is addictive. It produces, some stimulation, and lots of red saliva, which cannot be swallowed as it causes nausea. Withdrawal causes headache and sweats. Use is correlated with mouth cancer, and to a lesser extent asthma and heart disease.

Genus Brugmansia, (commonly known as **angel's trumpet**). All parts of all plants in this genus contain the tropane alkaloids scopolamine and atropine; often fatal. These plants are closely related to and were once grouped with members of the Datura genus, which contain the same deadly alkaloids.

Digitalis purpurea (commonly known as **foxglove**). The leaves, seeds, and flowers are poisonous, containing cardic or other steroid glycosides. These cause irregular heartbeat, general digestive upset, and confusion; can be fatal.

Family: Malvaceae
Tribe:Gosypieae
Genus *Gossypium*

Gossypol is a natural phenol derived from the cotton plant (genus *Gossypium*). Gossypol is a phenolic aldehyde that permeates cells and acts as an inhibitor for several dehydrogenase enzymes. It is a yellow coloured pigment..

The plants are modified by RNA interference, shutting down the genes for gossypol production in the seed, while leaving them unaffected in the rest of the plant. The resulting gossypol-free cottonseed is then suitable as a high-quality protein source suitable for consumption not only by cattle, but also by humans. Protein makes up 23% of the cottonseed. General signs of acute toxicity are similar among animal species and include respiratory distress, impaired body weight gain, anorexia,

weakness, apathy, and death after several days. Heart failure was reported in calves, lambs, and dogs

Family:Fabaceae

Genus: Abrus

Species : ***A praceatorius***

Abrus precatorius, known commonly as jequirity, Crab's eye, rosary pea, precatory pea or bean. The plant is best known for its seeds, which are used as beads and in percussion instruments, and which are toxic due to the presence of Abrine. The toxic abrine is a dimer consisting of two protein subunits, termed A and B. The B chain facilitates abrin's entry into a cell by bonding to certaintransport proteins on cell membranes, which then transport the toxin into the cell. One molecule of abrin will inactivate up to 1,500 ribosome per second.

Symptoms are identical to those ofricin, except abrin is more toxic by almost two orders of magnitude; the fatal dose of abrin is approximately 1/75th that of the fatal dose of ricin. Abrin has an LD_{50} of only 0.56 µg/kg in mice, and Kingsbury lists a toxic dose in humans at 0.00015% body weight, or approximately 0.1 mg for a 150 lb human. ngesting intact seeds may result in no clinical findings, as they can pass undigested through the gastrointestinal tract due to their hard shell.

Abrus precatorius*, called *kudri mani in Tamil and *Guruvinda ginja* in Telugu, has been used in Siddha medicine for centuries. The Tamil Siddhars knew about the toxic effects in plants and suggested various methods which is called "suththi seythal" or purification. This is done by boiling the seeds in milk and then drying them. The protein is denatured when subjected to high temperatures which removes its toxicity.

This plant is also poisonous to horses. Symptoms of poisoning include nausea, vomiting, convulsions, liver failure, and death, usually after several days. The seeds have been used as beads in jewelry, which is dangerous; inhaled dust is toxic and pinpricks can be fatal. The seeds *are* unfortunately attractive to children.

Family: Apocynaceae

Genus: *Cerbera*

Species : ***C. odollam***

C. odollam contain cerberin, a digoxin-type cardenolide and cardic glycoside toxin that blocks the calcium ion channelsinheart muscle, causing disruption of the heart beat, most often fatally. The difficulty in detecting cerberin in autopsies and its the ability of strong spices to mask its taste makes it an agent of homicide and suicide in India. In 2004, a team led by scientist by name Yvan Gaillard documented more than 500 cases of fatal *Cerbera* poisoning between 1989 and 1999 in the southwest Indian state of Kerala alone

Aconitum genus ,several species, commonly ,called **aconite**, **wolfsbane** and **monkshood**). All parts are poisonous. The poison is an alkaloid called aconitine, which disables nerves, lowers blood pressure, and can stop the heart. Even casual skin contact should be avoided; symptoms include numbness, tingling, and cardiac irregularity. It has been used as poison for bullets (by German forces during World War II), as a bait and arrow poison (ancient Greece), and to poison water supplies (reports from ancient Asia). If ingested, it usually causes burning, tingling, and numbness in the mouth, followed by vomiting and nervous excitement. It is usually a quick-acting poison, and has been used in the past for killing wolves (hence one of the common names).

Family: Solanaceae

Sub family Solanoideae

Tribe: Datureae

Genus*: Datura.*

Datura : It belonging to the family Solanaceae. They are known as angel's trumpets and commonly known as daturas. All species of *Datura* are poisonous, especially their seeds and flowers.

4:*Datura* geneus (several species commonly known as weed, thorn apple, stinkweed, Jamestown weed, angel's trumpets, moonflower, and sacred datura). Containing the tropane alkaloids ,scopolamine, hyoscyamine,

and atropine, all parts of these plants are poisonous, especially the seeds and flowers. Ingestion causes abnormal thirst, hyperthermia, severe delirium and incoherence, visual distortions, bizarre and possibly violent behavior, memory loss, coma, and often death; it is a significant poison to grazing . For this same reason, *Datura* has also been a popular poison for suicide and murder, particularly in parts of Europe and India.

Because of the presence of these substances, *Datura* has been used for centuries in some cultures as a poison. Many tragic incidents result from modern users ingesting *Datura*. For example, in the 1990s and 2000s, the United States media contained stories of adolescents and young adults dying or becoming seriously ill from intentionally ingesting *Datura*. *Datura* toxins may be ingested accidentally by consumption of honey produced by several wasp species, during the *Datura* blooming season. It appears that these semi-domesticated honey wasps collect *Datura* nectar for honey production which can lead to poisoning.. From 1950 to 1965, the State Chemical Laboratories in Agara, India, investigated 2,778 deaths caused by ingesting *Datura*

Strychnos nux-vomica (commonly known as the **strychnine tree**). The seeds usually contain about 1.5% strychnine, an extremely bitter and deadly alkaloid. This substance throws a human into intense muscle convulsions and usually kills within three hours. The bark of the tree may also contain brucine, another dangerous chemical.

Cerbera odollam (commonly known as the **suicide tree**).

The seeds contain cerberin, a potent toxin related to digoxin. The poison blocks the calcium ion channels in heart muscle, causing disruption of the heart beat. This is typically fatal and can result from ingesting a single seed. Cerberin is difficult to detect in autopsies and its taste can be masked with strong spices, such as a curry. It is often used in homicide and suicide in India; Kerala's suicide rate is about three times the Indian average. In 2004,. Best of our knowledge, no plant in the world is responsible for as many deaths by suicide as the *odollam* tree.

Hippomane mancinella (commonly known as **manchineel**). All parts of this tree, including the fruit, contain toxic phorbol esters typical of the Euphorbiaceae plant family. Specifically the tree contains 12-deoxy-5-hydroxyphorbol-6gamma, 7alpha-oxide, hippomanins, mancinellin, sapogenin, phloracetophenone-2, 4-dimethylether is present in the leaves, while the fruits possess physostigmine. Contact with the milky white latex produces strong allergic dermatitis. Standing beneath the tree during rain will cause blistering of the skin from even slight contact with this liquid (even a small drop of rain with the milky substance in it will cause the skin to blister). Burning tree parts may cause blindness if the smoke reaches the eyes.

Cherry (*Prunus cerasus*),
Prunus species such as,peach (*Prunus persica*),
P (*Prunus domestica*),
Almond (*Prunus dulcis*),
Apricot (*Prunus armeniaca*). Leaves and seeds contain Cyanogenic glycoside .

Strophanthus gratus. The ripe seeds of this African plant contain ouabain, a potent cardiac glycoside that, when sufficiently concentrated, can induce cardiac arrest by binding to and inhibiting the action of the sodium –potassium pump and thereby drastically slowing the contraction of cardic muscle cells Extracts from *Strophanthus gratus* and the bark of Acokanthera species have long been used by Somali tribesmen to poison hunting arrows; if the concentration is high enough, an arrow poisoned with ouabain can kill an adult hippopotamus

Ligustrum **genus** ,Berries and leaves are poisonous. Berries contain syringin, which causes digestive disturbances and nervous symptoms; can be fatal. Privet is one of several plants which are poisonous to horses. Privet pollen is known to cause asthma and eczema in sufferers. Privets are highly allergenic and have an OPALS allergy scale rating of 9 out of 10. In places where privets grow abundantly, the odor produced from the flowers may cause respiratory irritation.

Doll's eyes **.It belongs to the family:Ranunculaceae** .The whole plant has been declared toxic for human consumption, the most poisonous part is the concentrated toxins in the fruit, which have sadly claimed a number of children's lives, as they also have a sweet taste. The berries contain a carcinogenic toxin, which has an almost immediate, sedative effect on human cardiac muscles and can easily cause a quick death.

5: Conclusion: Poison was discovered in ancient times and was used by ancient tribes and civilizations as a hunting tool to quicken and ensure the death of their prey or enemies. This use of poison grew more advanced, and many of these ancient peoples began forging weapons designed specifically for poison enhancement. Poisoned weapons were used in ancient India. More than 700 plants have been identified as producing physiologically active or toxic substances in sufficient amounts to cause harmful effects in animals. Poisonous plants produce a variety of toxic substances and cause reactions ranging from mild nausea to death. Poisonous plants annually cause significantly large losses of money through injury to man and livestock. Do not allow children to suck nectar from flowers or make tea from leaves. Avoid smoke from burning plants. Teach children at an early age not to play with plants or eat berries or other plant parts without permission from a knowing adult.

References:

Irish times,Tue, Sep 1, 2015,,Dublin, More than 100 horses have died after eating toxic Sycamore seeds