Script

Title: Poisonous plants and fruits

Introduction:

Many plants commonly used as food, possess toxic parts, are toxic unless processed, or are toxic at certain stages of their lives. Some only pose a serious threat to certain animals (such as cats, dogs, or livestock) or certain types of people (such as infants, the elderly, or individuals with pathological vulnerabilities). Most of these food plants are safe for the average adult to eat in modest quantities.

Dear Students, in to-day's lecture, we will discuss about "**Poisonous plants and fruits"** special reference Notable poisonous plants, history, major toxic compounds and their mode of action,cet.

. The fallowing points are high lighted,

1: **Notable examples**

2: Mode of action

3: Cassava (*Manihot esculenta*

4: *Cerbera odollam* (commonly known as the suicide tree)

5:Coclusion

Notable examples include.

- Philodendron family (Araceae)
- Cactus family (Cactaceae)
- Tomato family (Solanaceae)

- Spurge family (Euphorbiaceae).
- Oleander (*Nerium oleander*)

The whole oleander plant is poisonous right down to the nectar. It is said that even the smoke from burning the plant is toxic and there are reports of serious poisoning resulting from using the twigs as cooking skewers. Toxic compounds causes Bloody diarrhea, vomiting, drooling and irregular heart beat may all occur. Toxins such as cardiac glycosides, nerioside and oldendrin all contribute to oleander's lethal armory.

- **White snakeroot (*Ageratina altissima*)**

The name snakeroot comes from the fact it can be used as a treatment when applied to snakebites

The toxicity is a type of alcohol, tremetol, which gets its name from the tremors it causes in those poisoned. Along with this there would be violent vomiting, delirium, severe thirst and ultimately death.

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***Manchineel* (Hippomane mancinella)**

Found in coastal regions of Florida, South and Central America the manchineel is possibly the world's most poisonous tree.
The fruit is said to be potentially lethal if eaten .Every part is stuffed full of powerful toxins, most notably the sap which contains toxin called phorbol, a strong skin irritant. This is a particular hazard during rain when anyone taking shelter under the tree's leaves runs the risk of getting splashed with sap-laden raindrops. Even a tiny amount can cause the skin to blister and also It is also reported that the smoke from burning the wood can cause blindness.

The Carib natives were said to use the sap on their arrow heads, poison the wells of their enemies with the leaves and even tie some unfortunate victims to the trunk of the tree.

***Cerbera odollam*, Suicide Tree**
In the Indian state of Kerala alone it is thought to be responsible for around 50 deaths a year. Despite being called the suicide tree the toxins work equally well for murder and the flavour is easily hidden under the spicy food.

It is estimated that around 3,000 people a year died in these trials, many willingly submitting themselves to the process believing it infallible.

Trial by poison was finally abolished in 1861 by King Radama. It contains the powerful alkaloid, cerberin, which is similar to digoxin in foxgloves. These both work by disrupting the heart's rhythm often with fatal results.

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. It is often used in homicide and suicide in India; Kerala's suicide rate is about three times the Indian average.

Deadly nightshade **(Atropa belladonna*)***

The main toxins in deadly nightshade are atropine, scopolamine and hyoscyamine all of which effect the nervous system by blocking certain neurotransmitters. Whilst all parts of the plant are toxic, the root is generally most poisonous. A dose of around two to five berries is usually sufficient to kill an adult.

The classic symptoms of poisoning include dilated pupils, blurred vision, dry mouth, hallucinations, loud heart beats (audible several feet away), aggressive behaviour, convulsions, coma and possibly death.

Lily of the Valley **(Convallaria majalis*)***

Despite its pretty appearance it is deadly poisonous containing no less than 38 different cardiac glycosides. Chief amongst these is convallatoxin which has a similar effect to digitalis in foxgloves. All parts of the plants are toxic including the orangey-red berries. The symptoms of lily of the valley poisoning include severe headache, nausea, vomiting, slow heart beat and excessive urination.

Hemlock/ ***Conium maculatum*** *(family Apiaceae)*

In ancient Greece it was used as a form of execution, most notably on the philosopher Socrates in around 400 BC.

Poison hemlock contains the potent toxin coniine. It is estimated that a dose of around 0.15 grams is sufficient to kill an adult. The mode of action of this poison is 'killing from the outside in'. A numbness of the extremities slowly spreads inwards, culminating in paralysis of the lungs and death. Cases of hemlock poisoning still occur, usually with people mistaking the plant for something edible such as a salad ingredient. Hemlock is a member of the same family as the carrot and fennel so the highly toxic root may also be consumed in error

Water hemlock is related but the toxins here, cicutoxin and cicunol, have a very different effect. These are neurotoxins and cause violent, painful convulsions, cramps and tremors very different to the calm sweeping paralysis of coniine.

Aconite **(Aconitum napellus)**

Also known as "the queen of poisons" this is possibly the most poisonous plant in Europe.

The pretty purple flowers are a fairly common sight on the foothills of mountains throughout northern Europe and Asia. All parts of the plant containing deadly aconitine. Just touching the plant can cause severe symptoms whilst ingesting often proved fatal. The effects are immediate and begin with a burning in the mouth. This is followed by drooling, vomiting and diarrhea. As the poison progresses victims may experience numbness, tingling, irregular heartbeat and ultimately death from respiratory failure.

Wolfsbane's deadly history is long. It features in literature both ancient and modern from Shakespeare right up to Harry Potter.The sap has long been used to tip spears and arrows. It was even used by some Eskimos to tip their harpoons for hunting whales. A more recent use was by the Nazis in World War II when the toxin was extracted to tip bullets.

2: Mode of action

- Poisons Acting on the Brain – includes narcotics, deliriants, and inebriants. Poppy, jimson weed and black nightshade fall into this category.
- Poisons acting on the spinal cord – convulsives.
- Poisons acting on the heart – depressants and asthenics. Poison hemlock, foxglove and oleander fall into this category.
- Vegetable irritants – purgatives, abortives, irritants with nervous symptoms and simple irritants. Castor bean plant as well as many, many others fall into this category.
- The symptoms include nausea, vomiting, gastric pain, bloody diarrhea, thirst, hot skin, frequent pulse, sweats, headache, dullness of vision and jaundice. If sufficient quantity is taken it leads to death in convulsions or from exhaustion.
- Heat treatment to the seeds will usually rid the seeds of the ricin toxin. One of the three most toxic plants
- All livestock, pets and humans
- 6 seeds can kill a horse/1-2 seeds can kill a child

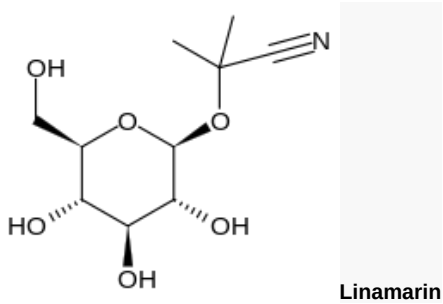
3:Cassava (*Manihot esculenta*).

Cassava is the third largest source of food carbohydrates in the tropics, after rice and maize. Cassava is a major staple food in the developing world, providing a basic diet for over half a billion people. It is one of the most drought-tolerant crops, capable of growing on marginal soils. Nigeria is the world's largest producer of cassava, and Thailand is the largest exporter of dried cassava. Excess cyanide residue from improper preparation is known to cause acute cyanide intoxication, and goiters, and has been linked to ataxia (a neurological disorder affecting the ability to walk.) It has also been linked to tropical calcific pancreatitis in humans, leading to chronic pancreatitis.Roots and leaves also contain two cyanogenic glycosides,linamarin and lotaustralin..The cyanide is carried away in the

processing water and the amounts produced in domestic consumption are too small to have environmental impact.

A cyanide is any chemical compound that contains monovalent combining group CN. This group, known as the cyano group, consists of a carbon atom triple-bonded to a nitrogen atom

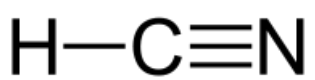
Linamarin is a cyanogenic glucoside found in the leaves and roots of plants such as cassava, lima beans, and flax.



Linamarin

Ingestion of food prepared from insufficiently processed cassava roots with high linamarin levels has been associated with dietary toxicity, particularly with the upper motor neuron disease.

Hydrogen cyanide gas in air is explosive at concentrations over 5.6%. This is far above its toxicity level.



Hydrogen cyanide

A hydrogen cyanide concentration of 300 mg/m^3 in air will kill a human within 10–60 minutes. A hydrogen cyanide concentration of 3500 ppm (about 3200 mg/m^3) will kill a human in about 1 minute. The toxicity is caused by the cyanide ion, which halts cellular respiration by acting as a non –competitive inhibitor for an enzyme in mitochondria called cytocrome coxidase. Specifically CN^- binds to Fe in theheme subunit in cytochromes, interrupting electron transfer.

<u>Mango tree:</u>

Mango peel and sap contain urushiol, the allergen in poison ivy and poison sumac that can cause urushiol –induced contact dermatitis in susceptible people. Many times cross-reactions between mango contact allergens and urushiol have been observed. Urushiol is also present in mango leaves and stems.

Potato (*Solanum tuberosum*).

Family: Solanaceae
Genus: Solanum
Species: ***S. tuberosum***

Potatoes contain toxic compounds known as glycoalkaloids, of which the most prevalent are solanine and chaconine. Solanine is also found in other plants in the family Solanaceae, which includes such plants as the deadly nightshade, henbane , tobacco as well as eggplant and tomato.

. Glycoalkaloids may cause headaches,diarrhea, cramps and in severe cases coma and death.Poisoning from cultivated potatoes occurs very rarely, however some varieties of potato contain greater glycoalkaloid concentrations than others.Tubers that are exposed to light turn green from chlorophyll synthesis, thus giving a visual clue as to areas of the tuber that may have become more toxic.

Rhubarb (*Rheum rhaponticum*).

The leaf stalks are edible, but the leaves themselves contain notable quantities of oxalic acid, which is nephrotoxic and corrosive acid present in many plants. Symptoms of poisoning include kidney disorders, convulsions and coma, though it is rarely fatal. The $LD5_0$

Tomato (*Solanum lycopersicum*).

Like many other members of the night shade family Solanaceae, tomato leaves and stems contain solanine , causing digestive upset and nervous excitement. Leaves, stems, and green unripe fruit of the tomato plant also contain small amounts of the

poisonous alkaloid tomatine. Ripe tomatoes do not contain any detectable tomatine. Tomato plants can be toxic to dogs if they eat large amounts of the fruit, or chew plant material.

Agertina altissima (commonly known as **white snakeroot**).

All parts are poisonous, causing nausea and vomiting and often fatal. Milk from cattle that have eaten white snakeroot can sicken, or kill, humans .

Asparagus* genus** (several species including ***Asparagus officinalis). Though asparagus plants cultivated for food are typically harvested before they reach reproductive maturity, the berries of the mature plant are poisonous, containing furostanol and spirostanol saponins. Rapid ingestion of more than five to seven ripe berries can induce abdominal pain and vomiting.

Atropa belladomma (commonly known as **deadly nightshade**, **belladonna**, **devil's cherry** . ***Atropa belladonna*** in the tomato family Solanaceae. It has a long history of use as a medicine, cosmetic, and poison.

All parts of the plant contain tropane alkaloids. The berries pose the greatest danger to children because they look attractive and have a somewhat sweet taste. The consumption of two to five berries by a human adult is probably lethal. The root of the plant is generally the most toxic part, though this can vary from one specimen to another. Ingestion of a single leaf of the plant can be fatal to an adult.

. The root of the plant is generally the most toxic part, though this can vary from one specimen to another. Ingestion of a single leaf of the plant can be fatal to an adult. Casual contact with the leaves can cause skin pustules.

The berries pose the greatest danger to children because they look attractive and have a somewhat sweet taste. The consumption of two to five berries by children and ten to twenty berries by adults can be lethal. In 2009, a case of *A. belladonna* being mistaken for blueberries, with six berries ingested by an adult woman, was documented to result in severe anticholinergic syndrome.

The plant's deadly symptoms are caused by atropine's disruption of the parasympathetic nervous system's ability to regulate involuntary activities such as sweating, breathing, and heart rate.. *A. belladonna* is also toxic to many domestic animals, causing narcosis and paralysis. In humans its anticholinergic properties will cause the disruption of cognitive capacities like memory and learning.

Hyacinthus orientalis (commonly known as **hyacinth**):

The bulbs are poisonous, causing nausea, vomiting, gasping, convulsions, and possibly death. Even handling the bulbs can cause skin irritation.

Jacobaea vulgaris (commonly known as **ragwort**).

Contains many different alkaloids, including jacobine, jaconine, jacozine, otosenine, retrorsine, seneciphylline,senecinine and senkirkine. Poisonous to livestock and hence of concern to people who keep horses and cattle. Horses do not normally eat fresh ragwort due to its bitter taste, however it loses this taste when dried, and becomes dangerous in hay. Signs that a horse has been poisoned include yellow mucus membranes, depression, and lack of coordination.. *Jacobaea vulgaris* is also theoretically poisonous to humans.

Nerium oleander (commonly known as **oleander**):

All parts are toxic, the leaves and woody stems in particular. Contains nerioside, oleandroside, saponins and cardiac glycosides. Causes severe digestive upset, heart trouble and contact dermatitis. The smoke of burning oleander can cause reactions in the lungs, and can be fatal.

Nerioside:The toxic agent is lycorine, whichcauses salivation,vomiting anddiarrhea. Called alsonerine. **nerioside** a cardiac glycoside found inNerium oleander and one ..

***Phytolacca* genus** (commonly known as **pokeweed**):

Leaves, berries and roots contain phytolaccatoxin and phytolaccigenin. The toxicity of young leaves can be reduced with repeated boiling and draining. Ingestion of poisonous parts of the plant may cause severe stomach cramping, persistent diarrhea, nausea, vomiting (sometimes bloody), slow and difficult breathing, weakness, spasms, hypertension, severe convulsions, and death.

***Rhus* genus** :

Formerly grouped with poison ivy and the rest of the Toxicodendron genus, all parts of this tree contain low levels of a highly irritating oil with urushiol. Skin reactions can include blisters and rashes. The oil spreads readily to clothes and back again, and has a very long life. Infections can follow scratching. As urushiol is not a poison but an allergen, it will not affect certain people. The smoke of burning *Rhus lancia* can cause reactions in the lungs, and can be fatal.

Solanum delcamara (commonly known as **bittersweet nightshade**):

All partsof the plants are poisonous, containing solanine and causing fatigue, paralysis, convulsions, and diarrhea. Rarely fatal.

Solanum nigrum (commonly known as **black nightshade**):

. All parts of the plant except the *ripe* fruit contain the toxic glycoalkaloid solanine. Solanine poisoning is primarily displayed by gastrointestinal and neurological disorders. Symptoms include nausea, diarrhea, vomiting, stomach cramps, burning of the throat, cardic dysrhythmia, headache and dizziness. In large quantities, solanine poisoning can be fatal.

Taxux baccata (commonly known as **English yew', common yew** and **graveyard tree**):

. Nearly all parts contain toxic taxanes . The seeds themselves are particularly toxic if chewed. Several people have committed suicide by ingesting leaves and seeds, including Catuvolcus, king of a tribe now Belgium. It is afflicts more than 70% of the

human population, with as many as 350,000 cases reported annually in the United States alone.

Avocado :Avocado leaves contain a toxic fatty acid derivative,persin, which in sufficient quantity can cause colic in hourse and, without veterinary treatment, death .The symptoms include gastrointestinal irritation, vomiting, diarrhea, respiratory distress, congestion, fluid accumulation around the tissues of the heart, and even death.. **Poisonous Mushrooms:**

Some mushrooms are poisonous, the death cap mushroom is a deadly, poisonous introduced fungus that is responsible for 90% of all deaths related to mushroom consumption. It is commonly found in South Eastern Australia near established oak trees and possibly some other trees.

One Mushroom contains enough poison to kill an adult. Onset of symptoms occurs 6-24 hours or more after ingestion of mushrooms. Symptoms include ,stomach pains, nausea, vomiting and diarrhoea.. However, by this stage the toxin will have already caused serious liver damage. Death from liver failure can occur many days after ingestion.

However, by far the majority of mushroom poisonings are not fatal, but the majority of fatal poisonings are attributable to the Amanita phalloides mushroom. Amanitas can be mistaken for other species, as well, in particular when immature.

Amanita muscaria (fly agaric) – Contains the psychoactive muscimol and the neurotoxin ibotenic acid.

Gyromitrin: Stomach acids convert gyromitrin to monomethylhdrazine (MMH), a compound employed in rocket fuel. It affects multiple body systems. It blocks the important neurotransmitter GABA, leading to , muscle cramps, loss of coordination, tremors . It causes severe gastrointestinal irritation, leading to vomiting and diarrhea. It can also cause to jaundice, kidney failure, and finally anemia.

Mushroom poisoning Great reference;

1: Roman Emperor Cladius is said to have been murdered by being fed the death cap mushroom.

2:Pope Clement VII is also rumored to have been murdered this way. However, it is similarly debated whether he died from any kind of poisoning at all.

3:Holy Roman Emperor Charles VI believed to have died from eating the death cap mushrooms.

5: Conculsion:

Every now and then, there have been reports of food poisoning cases suspected to have been caused by consumption of raw vegetables and fruits containing natural toxins.Natural toxins are poisonous substances present naturally in fruits and vegetables. They are produced by plants to defend themselves against fungi, insects and offer a protective mechanism for the plant.

Bamboo is a largest members of the grass family. The toxicological compounds of bamboo shoots is similar to that of cassavas. The natural toxin, cyanogenic glycoside, in fresh bamboo shoots may lead to food poisoning when consumed. To render them safe for consumption, fresh bamboo shoots should be sliced into smaller pieces wash it 2 days remove water and cooked thoroughly. Symptoms of poisoning are same as those by cassavas.

To avoid toxin :

1. Do not eat vegetables and fruits raw or undercooked if they are usually consumed cooked.
2. Do not buy green potatoes or potatoes which are sprouting
3. When eating fresh fruits, avoid eating seeds of fruits, such as apples, apricots, pears, etc., whereas the flesh of these fruits is nutritious and safe to eat.
4. Cyanogenic glycoside toxin is also found in the cassava root and fresh bamboo shoots, making it necessary for them to be cooked before canning or eating.

5. However, the bitter cassava contains more toxins and should be prepared and cooked properly prior to consumption. Grating the root and prolonged soaking of the gratings in water will leach out the cyanide, reducing the levels of toxin. In addition to soaking, cooking will further detoxify the roots before consumption.
6. Cyanogenic glycoside found in fresh bamboo decomposes quickly when placed in boiling water, rendering the bamboo shoots safe for consumption. It has been found that boiling in higher temperatures and longer intervals remove up to 96 percent. The highest concentrations are detoxified by cooking for two hours.