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ADULTERATION IS MOTIVATION OF ANY SUBSTANCE TO CONVERT IT FROM TENDER TO ADULT TO IMPROVE ITS GESTURE

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ABSTRACT

Adulteration is a word which complies with the contamination of debris with main ingredient. This is either chemical or biological or environmental moieties which make the main component contaminated. This substance might be toxic or nontoxic. The gesture of main substance gets mixed and represent the outcome filthy. All adulterations are poison but depends on the quantity or dose.

KEYWORDS: Poison, adulterants, curare, hemlock, aconite.

Overview: Paracelsus [1493–September 1541] Swiss physician is coined as Father of Toxicology said that Everything is poison, there is poison in everything. Only the dose makes a thing not a poison. Poison in everything, and no thing is without poison. The dosage makes it a poison or a remedy. Medicine is not only a science; it is also an art. It does not consist of compounding pills and plasters; it deals with the very processes of life, which must be understood before they may be guided. The art of healing comes from nature, not from the physician. Therefore, the physician must start from nature, with an open mind. The dose makes the poison. Dreams must be heeded and accepted. For a great many of them come true.[1]

Figure-1: Paracelsus [Father of Toxicology].

Life is like music, it must be composed by ear, feeling and instinct, not by rule. Nevertheless, one had better know the rules, for they sometimes guide in doubtful cases, though not often. Nature also forges man, now a gold man, now a silver man, now a fig man, now a bean man. Man is a microcosm, or a little world, because he is an extract from all the stars and planets of the whole firmament, from the earth and the elements; and so, he is their quintessence. For it is we who must pray for our daily bread, and if He grants it to us, it is only through our labour, our skill and preparation. For it is we who must pray for our daily bread, and if He grants it to us, it is only through our labour, our skill and preparation. What the eyes perceive in herbs or stones or trees is not yet a remedy; the eyes see only the dross. The interpretation of dreams is a great art. Man is a microcosm, or a little world, because he is an extract from all the stars and planets of the whole firmament, from the earth and the elements; and so, he is their quintessence. Dreams are not without meaning wherever they may come from-from fantasy, from the elements, or from other inspiration.[2] This process is alchemy: its founder is the smith Vulcan. Medicine rests upon four pillars - philosophy, astronomy, alchemy, and ethics. Once a disease has entered the body, all parts which are healthy must fight it: not one alone, but all. Because a disease might mean their common death. Nature knows this; and Nature attacks the disease with whatever help she can muster. We do not know it because we are

fooling away our time with outward and perishing things, and are asleep in regard to that which is real within ourself. However, anyone to whom this happens should not leave his room upon awakening, should speak to no-one, but remain alone and sober until everything comes back to him, and he recalls the dream. For one country is different from another; its earth is different, as are its stones, wines, bread, meat, and everything that grows and thrives in a specific region. The physician must give heed to the region in which the patient lives, that is to say, to its type and peculiarities. This is alchemy, and this is the office of Vulcan; he is the apothecary and chemist of the medicine. Often the remedy is deemed the highest good because it helps so many. From time immemorial artistic insights have been revealed to artists in their sleep and in dreams, so that at all times they ardently desired them. What sense would it make or what would it benefit a physician if he discovered the origin of the diseases but could not cure or alleviate them? Many have said of Alchemy, that it is for the making of gold and silver. For me such is not the aim, but to consider only what virtue and power may lie in medicines. Although Alchemy has now fallen into contempt, and is even considered a thing of the past, the physician should not be influenced by such judgements. A mortal life not through that breath that flows in and that flows out. The source of his life is another and this causes the breath to flow. When a man undertakes to create something, he establishes a new heaven, as it were, and from it the work that he desires to create flows into him. For such is the immensity of man that he is greater than heaven and earth. Although Alchemy has now fallen into contempt, and is even considered a thing of the past, the physician should not be influenced by such judgements. What sense would it make or what would it benefit a physician if he discovered the origin of the diseases but could not cure or alleviate them? When a man undertakes to create something, he establishes a new heaven, as it were, and from it the work that he desires to create flows into him. For such is the immensity of man that he is greater than heaven and earth. The dreams which reveal the supernatural are promises and messages that God sends us directly: they are nothing but His angels, His ministering spirits, who usually appear to us when we are in a great predicament. A mortal life not through that breath that flows in and that flows out. The source of his life is another and this causes the breath to flow. If we want to make a statement about a man's nature on the basis of his physiognomy, we must take everything into account; it is in his distress that a man is tested, for then his nature is revealed.[3]

Adulterations in everything of drugs of natural origin: Adulteration is the act of making something impure or altering its original form by adding materials or elements that aren't usually part of it, especially inferior ones. Adulteration is the noun form of the verb adulterate, meaning to make something impure by adding inferior materials or elements.

INTRODUCTION

Medicinal plants constitute an effective source of traditional and homeopathy medicine. Herbal medicine has been shown to have genuine utility. In India, about 80% of the rural population depends on medicinal herbs and/or indigenous systems of medicine. In fact, today, approximately 70% of synthetic medicines are derived from plants.

Herbal adulteration is one of the common malpractices in herbal raw- material trade. Adulteration is described as intentional substitution with another plant species or intentional addition of a foreign substance to increase the weight or potency of the product or to decrease its cost. In general, adulteration is considered as an intentional practice. However, unintentional adulteration also exists in herbal raw-material trade due to various reasons, and many of them are unknown even to the scientific community.

Definition: The term adulteration is defined as substituting original crude drug partially or wholly with other similar looking substances. The substance, which is mixed, is free from or inferior in chemical and therapeutic property.

Types of adulterants: 1. Intentional adulteration: Generally, the drugs are adulterated by substitution with substandard commercial varieties, inferior drugs or artificially manufactured commodities. The different types of adulterants found in market are given here.

1) Adulteration using manufactured substances: In this type of adulteration, the original substances are adulterated by material that are artificially manufactured. The materials are prepared in a way that their general form and appearance resemble with various drugs.

Eg. Cargo of ergot from Portugal was adulterated with small masses of flour dough moulded to the correct size and shape and coloured, first using red ink,and then into writing ink. Artificial invert sugar is used in place of honey. Paraffin wax coloured yellow and is been substituted for beeswax. Compressed chicory is used in place of coffee berries. Bass-wood is cut exactly the required shape of nutmeg and used to adulterate nutmeg.[4]

2) Substitution using inferior commercial varieties: In this type, the original drugs are substituted using inferior quality drugs that may be similar in morphological characters, chemical constituents or therapeutic activity.

Eg. Hog gum or hog tragacanth for tragacanth gum, Mangosteen fruits for Bael fruits, Arabian senna, obovate senna and province senna are used to adulterate senna, ginger being adulterated with cochin, African and Japanese ginger.

3) Substitution using exhausted drugs: In this type of substitution, the active medicaments of the main drugs are extracted out and are used again. this could be done for the commodities that would retain its shape and appearance even after extraction, or the appearance and taste could be made to the required state by adding

colouring or flavouring agents. This technique is frequently adopted for the drugs containing volatile oil, such as clove, Fennel, etc.
Eg. After extraction, Saffron and red rose petals are re-coloured by artificial dyes. The bitterness of exhausted gentian is restored by adding aloes.[5]
4) Substitution of superficially similar inferior natural substance: The substituents used may be morphologically similar but will not be having any relation to the genuine article in their constituents or therapeutic activity.
Eg. Ailanthus leaves are substituted for belladonna, senna leaves, Saffron admixed with saff flower.
Peach kernels and apricot kernel for almonds
5) Adulteration using the vegetative part of the same plant: The presence of vegetative parts of the same plant with the drug in excessive amount is also an adulteration.
Eg. Epiphytes, such as mosses, liverworts and lichens that grow over the barks also may occur in unusual amounts with the drugs. Excessive number of stems in drugs like lobelia, stramonium, hamamelis leaves, etc.
6) Addition of toxic materials: In this type of adulteration, the materials used for adulteration would be toxic in nature. A big mass of stone was found in the centre of a bale of liquorice root. limestone pieces with asafoetida, lead shot in opium, amber coloured glass pieces in colophony.
7) Adulteration of powders: Powdered drugs are found to be adulterated very frequently. Adulterants used are generally powdered waste products of a suitable colour and density. Powderedolive stones for powdered gentian, liquorice or pepper, brick powder for barks.
8) Addition of synthetic principles: Synthetic pharmaceutical principles are used for market and therapeutic value.
Eg. Citral is added to lemon oil, diabetes angel containing glyburide and phenformin, sleeping buddha containing estazolam.

2. Unintentional adulteration: Unintentional adulteration may be due to the following reasons:
1) Confusion in vernacular names between indigenous systems of medicine and local dialects
2) Lack of knowledge about the authentic plant
3) Non availability of the authentic plant
4) Similarity in morphology and or aroma
5) Careless collection
6) Other unknown reasons

Name confusion: In Ayurveda, 'Parpatta' refer to *Fumaria parviflora*. In siddha, 'Parpadagam' refer to *Mollugo pentaphylla*. Owing to the similarity in the names in traditional system of medicine, these two herbs are often interchanged or adulterated or substituted. Because of the popularity of siddha medicine in some parts of south India, traders in these regions supply *M.Pentaphylla* as Parpatta/Parpadagam and the north Indian suppliers supply *F.Parviflora*. These two can be easily identified by the presence of pale yellow to mild brown coloured, thin wiry stems and small simple leaves of *M.Pentaphylla* and black to dark brown -coloured, digitate leaves with narrow segments of *F.Parviflora*.

Lack of knowledge about authentic source: Nagakesar is one of the important drugs in Ayurveda. The authentic source is *Mesua ferrea*. However, market sample are adulterated with flowers of *Calophyllum inophyllum*. Though the authentic plant is available in plenty throughout the western ghats and parts of the Himalayas, suppliers are unaware of it. There may also be some restrictions in forest collection. Due to these reasons, *C. inophyllum* is sold as Nagkesar. Authentic flowers can be easily identified by the presence of two- celled ovary, whereas in case of spurious flowers they are single celled.[6]

Similarity in morphology: *Mucuna pruriens* is the best example for unknown authentic plant and similarity in morphology. It is adulterated with similar papilionaceae seeds. *M.utilis* (sold as white variety) and *M.deeringiana* (sold as bigger variety) are popular adulterants. Apart from this, *M.cochin chinensis*, *Canavalia variso* and *C.ensiformis* are also sold in Indian markets. Authentic seeds are upto 1cm in length with shining mosaicpattern of black and brown colour on their surface. *M.deeringiana* and *M.utilis* are bigger (1.5-2cm) in size. *M.deeringgiana* is dull black, whereas *M.utilis* is white orbuff coloured.

Lack of authentic plant: *Hypericum perforatum*is cultivated and sold in European markets. In India, availability of this species in very limited. However, the abundant Indo-Nepal species *H.patulum*is sold in the name of *H.perforatum*. Market sample is a whole plant with flowers, and it is easy to identify them taxonomically. Anatomically, stem transverse section of *H.perforatum* has compressed thin phloem, hollow pith and absence of calcium oxalate crystals. On the other hand, *H.patulum* has broader phloem, partially hollow pith and presence of calcium oxalate crystals.

Similarity in colour: It is well known that in course of time, drug materials get changed to or substituted with other plant species.

Eg. Ratanjot – On discussion with supplier and non-timer forest product (NTFP) contractors, it came to be known that in the past, roots of *Ventilago madraspatana* were collected from western Ghats, as the only source of Ratanjot. However, that is not the practice now. It is clearly known that *Arnebia euchroma var euchroma* is the present source. Similarity in yielding a red dye, *A. euchroma* substitutes *V. madraspatana.* The description to identify these two is unnecessary because of the absence of *V. madraspatana*in market. Whatever is available in the market, in the name of Ratanjot, was originated from *A.euchroma.*

Careless collections: Some of the herbal adulterations are due to the carelessness of herbal collectors and suppliers. *Parmelia perlata* is used in ayurveda, unani, and siddha. It is also used as grocery. Market samples showed it to be admixed with other species (*P.perforata* and *P.cirrhata*). Sometimes, *Usnea* sp. is also mixed with them. Authentic plants can be identified by their thallus nature.[7]

Unknown reasons: Vidari is another example of unknown authentic plant. It is an important ayurvedic plant used extensively. Its authentic source is *Pueraria tuberosa*, and its substitute is *Ipomoea digitata*. However, market samples are not derived from these two. It is interesting to know that an endangered gymnosperm *Cycas circinalis* is sold in plenty as vidari. The adulterated materials originated from Kerala, India. Although both the authentic plant and its substitute are available in plenty throughout India, how *C.circinalis* became a major source for this drug is unknown. *P.tuberosa* can be easily identified by the presence of papery flake-like tubers, I.*digitata* by the presence of its concentric rings of vascular bundles and their adulterant *C.circinalis* by its leaf scars and absence of vessel elements.

Poison: It is a substance [solid/liquid/gas] which if introduced in the living body, or brought into contact with any part thereof, will produce ill health or death, by its constitutional or local effects or both. Any substance that can harm the body by altering cell structure or functions. It is a toxic matter.

History: Socrates was forced to drink Hemlock [*Conium maculatum*] for corrupting the youth of Athens. Cleopatra committed suicide through the bite of an asp: a poisonous snake. In 15th century in Italy, Julius Caesar and Lucrezia Borgia assassinated many of their political rivals by poisoning with arsenic, copper & phosphorus. Lead caused poisoning in hundreds of thousands from the time of Roman era till 17th & 18th century as it was used in pottery, cosmetics and in automobile fuels.[8]

Figure-2: Socrates, Hemlock, Cleopatra, Asp, Julius Caesar & Lucrezia Borgia.

General Considerations: Forensic toxicology is the study of the chemical and physical properties of toxic substances and their physiological effect on living organisms. Forensic toxicology deals with the medico-legal aspects of the harmful effects of chemicals on human beings. Clinical toxicology delas with diagnosis and treatment of human poisoning.[9]

Types of Poisons

Ingested [swallowed through mouth]
Inhaled [breathed through lungs]
Absorbed [taken inside through topical route by skin]
Injected [taken inside through parenteral route by needle device]

Nature of Poisoning

1. Homicidal: Killing of a human being by another human being by administering poisonous substance deliberately.
2. Suicidal: When a person administer poison himself to end his/her life.
3. Accidental: When the incident occurs unknowingly. Eg. Household poison: Nail polish remover, acetone, barium sulfide as depilatory.
4. Occupational: When the poisoning occurs by professionals. Eg insecticides, obnoxious fumes [Union Carbide gas leakage case of MIC, December 1984].[10]

Classification of Poisons

1. Corrosives: Systemic
Strong Acids: Sulfuric acid [oil of vitriol], nitric acid [aqua fortis], hydrochloric acid [muriatic acid]
Strong Alkalis: Hydrates & Carbonates of sodium, potassium, ammonia [caustic soda, caustic potash]
Metallic Salts: Zinc chloride, Ferric chloride, Potassium cyanide, Silver nitrate, Copper sulfate

2. Irritants:
a) Inorganic:
Nonmetallic: Phosphorus, Iodine, Chlorine
Metallic: Arsenic. Antimony, Lead
Mechanical: Glass powder, Hair
b) Organic:
Vegetables: *Arbus precatorius* [jequirity bean], *Ricinus communis* [castor], *Codiaeum variegatum* [croton], *Calotropis gigantea* [Calotropis]
Animal: Snake & insect venom, Cantharides
Types and Causes:
Bacterial:
Toxin type:
Staphylococcus aureus, Streptococcus pneumonia, Clostridium tetani, Clostridium botulinum
Infection type: *Salmonella typhi*
Non-bacterial:
Virus: Enterovirus
Parasite: *Giardia duodenalis, Entamoeba histolytica*
Protozoa: Nematode, Flatworm, Tapeworm
Chemical: Arsenic: $_{33}As^{74}$, Mercury: $_{80}Hg^{201}$, Cadmium: $_{48}Cd^{110}$, Copper: $_{29}Cu^{63.5}$
3. Systemic:
a) Cerebral:
CNS depressants: Alcohol, Opioids. Hyprnotics, General anesthetics
CNS stimulants: Amphetamines, Caffeine
Deliriant: *Datura stramonium*, *Cannabis sativa*, *Erythroxylum coca*
b) Spinal: *Nux vomica*
c) Peripheral: *Conium maculatum* [conium], *Strychnos toxifera* [curare].
d) Cardiovascular: *Aconitum variegatum* [aconite], *Cinchona officinalis* [quinine], HCN
e) Asphyxiants: Carbon monoxide, Carbon dioxide, Hydrogen sulfide

Figure-3: Datura, Cannabis, Cocoa, Nux vomica, Conium, Curare, Aconitr, Cinchona.

Datura poisoning: All Datura plants contain tropane alkaloids such as scopolamine and atropine, primarily in their seeds and flowers, as well as the roots of certain species such as *D. wrightii*. Because of the presence of these substances, Datura has been used for centuries in some cultures as a poison. A given plant's toxicity depends on its age, where it is growing, and the local weather conditions.[11] These variations make Datura exceptionally hazardous as a drug. Since datura directly causes the effects of anticholinergic syndrome, the symptoms of its toxicity are often cited by the traditional mnemonic: "Blind as a bat, mad as a hatter, red as a beet, hot as a hare, dry as a bone, the bowel and bladder lose their tone, and the heart runs alone". Datura, as well as

long-term psychoactive/toxic usage of other anticholinergic drugs, also appear to significantly increase the risk of developing dementia. In traditional cultures, a great deal of experience with and detailed knowledge of Datura was critical to minimize harm. Many tragic incidents result from modern users ingesting or smoking Datura. For example, in the 1990s and 2000s, the United States media reported stories of adolescents and young adults dying or becoming seriously ill from intentionally ingesting Datura. Deliberate or inadvertent poisoning resulting from smoking jimsonweed and other related species has been reported as well.[12]

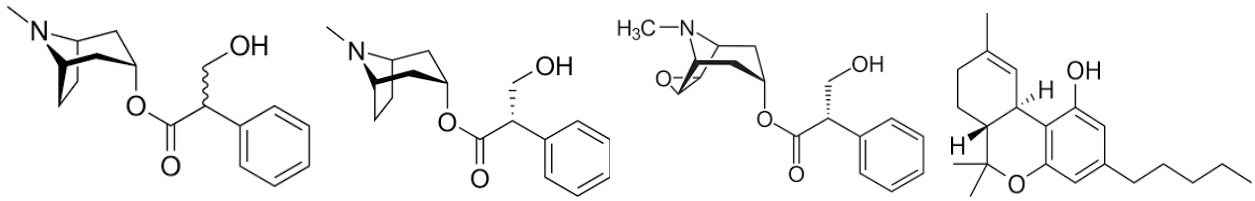

Figure-4: Atropine, Hyoscyamine, Scopolamine, THC.

Although most poisonings occur with more common species of Datura such as *D. stramonium*, several reports in the medical literature indicate deaths from *D. ferox* intoxication. Children are especially vulnerable to atropine poisoning. *D. inoxia* with ripe, split-open fruit. In some parts of Europe and India, Datura has been a popular poison for suicide and murder. From 1950 to 1965, the State Chemical Laboratories in Agra, India, investigated 2,778 deaths caused by ingesting Datura. A group called Thugs (practicers of thuggee) were reportedly devotees of an Indian religious cult made up of robbers and assassins who strangled and/or poisoned their victims in rituals devoted to the Hindu goddess Kali. They were alleged to employ Datura in many such poisonings, using it also to induce drowsiness or stupefaction, making strangulation easier. Datura toxins may be ingested accidentally by consumption of honey produced by several wasp species, including Brachygastra lecheguana, during the Datura blooming season. These semi-domesticated honey wasps apparently collect Datura nectar for honey production, which can lead to poisoning. The U.S. Centers for Disease Control and Prevention reported accidental poisoning resulting in hospitalization for a family of six who inadvertently ingested Datura used as an ingredient in stew. In some places, buying, selling, or cultivating Datura plants is prohibited. Solanaceous tribes with a similar chemistry (i.e. a similar tropane alkaloid content), include the Hyoscyameae, containing such well-known toxic species as *Hyoscyamus niger* and *Atropa belladonna*, the Solandreae containing the genus Solandra ("chalice vines") and the Mandragoreae, named for the famous Mandragora officinarum, most of which are considered traditional witches' herbs and poisons.[13]

Cannabis poisoning: Cannabis intoxication can lead to acute psychosis in many individuals and can produce short-term exacerbations of pre-existing psychotic diseases such as schizophrenia. Psychiatric symptoms observed in some studies include depersonalization, fear of dying, irrational panic, and paranoid ideas.[14]

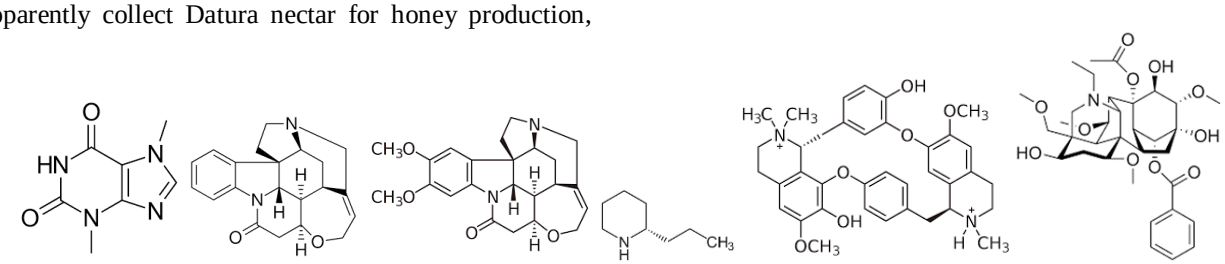

Figure-5: Cocoa, Sctrychnine, Brucine, Tubocurarine, Aconitine.

Cocoa poisoning: Acute toxicity, manifested by hyperthermia, tremors, diaphoresis, tachycardia, cardiac dysrhythmias, myocardial infarctions, vasoconstriction, and hypertension, is probably the result of cocaine's effect on norepinephrine reuptake. Behavioral effects are most likely caused by its actions on the dopaminergic system.

It is a major source of the highly poisonous, intensely bitter alkaloids strychnine and brucine derived from the seeds inside the tree's round, green to orange fruit. The seeds contain approximately 1.5% strychnine, and the dried blossoms contain 1.0%. However, the tree's bark also contains brucine and other poisonous compounds.

Nux vomica poisoning: From acute toxicity experiments done on zebrafish (correlates with mammalian models of organ meridians), it has demonstrated that low concentrations of strychnine changes the phenotype of the heart whilst high concentrations effectively halts heart functionality. Furthermore, organ toxicity is reversible in certain organs and delayed in other organs in zebrafish. Specimens were exposed to the toxins and if left exposed for a day. The heart and central nervous system recovered after 48 hours, whilst the liver and kidney experienced cell death.[15]

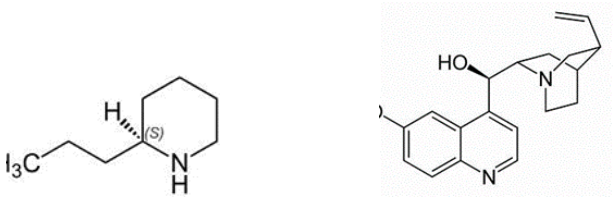

Figure-6: Conine & Quinine.

Hemlock poisoning: Poison hemlock (*Conium maculatum*) is a plant that is poisonous for humans and animals. Accidental ingestion of the plant may result in central nervous system depression, respiratory failure, acute rhabdomyolysis, acute renal failure and even death. The main treatment of hemlock poisoning is supportive care.

Curare poisoning: Curare is the name given to various highly toxic substances used by certain indigenous tribes in South America to poison their hunting arrows. Curare is also the name given to the plants that produce the toxic substances. Curare paste was applied to arrowheads and used to kill prey when hunting.[16]

Aconite poisoning: Aconitine and related alkaloids found in the Aconitum species are highly toxic cardiotoxins and neurotoxins. The wild plant (especially the roots and root tubers) is extremely toxic. In traditional Chinese medicine, aconite roots are used only after processing to reduce the toxic alkaloid content.[17]

Cinchona poisoning: Cinchonism is a pathological condition caused by an overdose of quinine or its natural source, cinchona bark. Quinine and its derivatives are used medically to treat malaria and lupus erythematosus. In much smaller amounts, quinine is an ingredient of tonic drinks, acting as a bittering agent. Cinchonism can occur from therapeutic doses of quinine, either from one or several large doses.[18] Quinidine (a Class 1A anti-arrhythmic) can also cause cinchonism symptoms to develop with as little as a single dose. Signs and symptoms of mild cinchonism (which may occur from standard therapeutic doses of quinine) include flushed and sweaty skin, ringing of the ears (tinnitus), blurred vision, impaired hearing, confusion, reversible high-frequency hearing loss, headache, abdominal pain, rashes, drug-induced lichenoid reaction (lichenoid photosensitivity), vertigo, dizziness, nausea, vomiting and diarrhea. Large doses of quinine may lead to severe (but reversible) symptoms of cinchonism: skin rashes, deafness, somnolence, diminished visual acuity or blindness, anaphylactic shock, and disturbances in heart rhythm or conduction, and death from cardiotoxicity (damage to the heart). Quinine may also trigger a rare form of hypersensitivity reaction in malaria patients, termed blackwater fever, that results in massive hemolysis, hemoglobinemia, hemoglobinuria, and kidney failure. Most symptoms of cinchonism (except in severe cases) are reversible and disappear once quinine is withdrawn. Attempted suicide by intake of a large dose of quinine has caused irreversible tunnel vision and very severe visual impairment. Patients treated with quinine may also suffer from low blood sugar, especially if it is administered intravenously, and hypotension (low blood pressure). Quinine, like chloroquine, inactivates enzymes in the lysosomes of cells and has an anti-inflammatory effect, hence its use in the treatment of rheumatoid arthritis. However, inactivation of these enzymes can also cause abnormal accumulation of glycogen and phospholipids in lysosomes, causing toxic myopathy. It is possible this action is the root cause of cinchonism.[19]

4. Miscllaneous: Food poisoning, Botulism [a rare but very serious illness that transmits through food, contact with contaminated soil, or through an open wound. Without early treatment, botulism can lead to paralysis, breathing difficulties, and death.][20]

Symptoms of various types of poisoning.

Types	Symptoms
Caustic Poison (lye)	Characteristic burns around the lips and mouth of the victim
Carbon monoxide	Red or pink patches on the chest and thighs. Usually, brighter red lividity
Sulfuric acid	Black vomit
Hydrochloric acid	Greenish-brown vomit
Nitric acid	Yellow vomit
Phosphorus	Coffee brown vomit. Onion or garlic odour
Cyanide	Burnt almond odour
Arsenic, Mercury	Pronounced diarrhea
Methyl alcohol (wood) or Isopropyl alcohol	Unconsciousness, possible blindness

Acute Poisoning
Pharmaceuticals: Sedatives, Analgesics, Contraceptives, Cardiovascular Drugs
Household Products: Bleaches, Detergents, Solvents, Kerosene
Cosmetics: Perfumes, Shampoo, Nail products
Substance of Abuse: Alcohol, Tobacco, Illicit Drugs
Pesticides: Insecticides, Rodenticides, Herbicides

Plants and Mushrooms: Berries, Seeds, Leaves
Seafood Poisoning: Paralytic shellfish poisoning, Fish poisoning
Venomous bites and stings: Snake, scorpions, bees, jellyfish, spiders
Chronic Poisoning
Metals: Lead, Mercury
Pesticides in food od fields:
Organophosphates
Carbamates
Warfarins
Organochlorines: Persistent organic pollutants (POPs), has potential developmental meurobehavioural and endocrine effects. Eg. DDT.

CONCLUSION

Adulteration is the act of making something impure or altering its original form by adding materials or elements that aren't usually part of it, especially inferior ones. Adulteration is the noun form of the verb adulterate, meaning to make something impure by adding inferior materials or elements. Poison is a substance that through its chemical action usually kills, injures, or impairs an organism, that is something destructive or harmful which is an object of aversion or abhorrence. It is a substance that inhibits the activity of another substance or the course of a reaction or process a catalyst poison. Poison, in biochemistry, a substance, natural or synthetic, that causes damage to living tissues and has an injurious or fatal effect on the body, whether it is ingested, inhaled, or absorbed or injected through the skin blue-ringed octopus.

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