PRINTABLE FLASHCARDS

Common Poisons

26 poisons taught in MBBS Forensic Medicine & Toxicology. Each card carries the name and local names on the front, and the scientific name, class, poisonous part, fatal dose, active principle, mechanism, signs, treatment and medicolegal aspects on the back.

How to print

- Print pages 2 to 27 double-sided on A4, flipping on the long edge. Each front page is followed by its backs.
- Use "Actual size" (100%), not "Fit to page", so the fronts and backs line up.
- Cut along the dashed line. Each sheet gives two A5 cards. Card stock of 200 to 250 gsm holds up best.

Colour key

- Corrosive (5)
- Irritant: metallic (3)
- Cardiac (4)
- Irritant: vegetable (4)
- Neurotic (7)
- Agrochemical (3)

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NAME

Abrus precatorius

COMMON NAMES

Rati, Gunchi, Gunja, Gulagunchi, Jequirity, Indian liquorice, Rosary pea, Rosary bead, Crab's eye



Photo: Wikimedia Commons, Abrus seed (2237059484).jpg

Recall on the back: scientific name · class · poisonous part · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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CUT

NAME

Dhatura

COMMON NAMES

Dhatura, Thorn apple, Safed dhatura (white), Kala dhatura (purple), Ummatta, Shivashekhara, Jimsonweed, Devil's trumpet, Mad apple



Photo: Wikimedia Commons, Datura stramonium fruit, doornappel vrucht (1).jpg

Recall on the back: scientific name · class · poisonous part · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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Abrus precatorius

SCIENTIFIC NAME

Abrus precatorius Linn., family Fabaceae (Leguminosae)

CLASS OF POISON

Irritant: organic, vegetable

PART POISONOUS

All parts are poisonous. The seeds are the part used as poison: egg-shaped, bright scarlet with a large black spot at one pole, about 8 x 6 mm, weighing about 105 mg (Reddy) or 120 mg (Vij). White, black, yellow and blue varieties also occur.

FATAL DOSE

1–2 seeds (90–120 mg) by injection

ACTIVE PRINCIPLE

Abrin, a heat-labile toxalbumin

MECHANISM OF ACTION

Abrin stops protein synthesis and clumps red cells.

MEDICOLEGAL ASPECTS

- Sui used to kill cattle for hides
- Homicide by slap with sui between fingers
- Powdered seeds produce conjunctivitis in malingering
- Abortifacient and arrow poison

SIGNS AND SYMPTOMS

- Delayed onset: hours to 2–3 days
- Haemorrhagic gastritis with bloody diarrhoea
- Injection site: swelling, ecchymosis, necrosis
- Picture mimics viperine snake bite
- Convulsions, then death from cardiac failure

TREATMENT

- Lavage, activated charcoal, purgative
- Dissect out the sui
- Anti-abrin serum
- Sodium bicarbonate keeps urine alkaline

> *Swallowed whole, rati seeds pass harmlessly; chewed or injected as a sui, abrin kills like a viper.*

CUT

Dhatura

SCIENTIFIC NAME

Datura fastuosa (syn. D. metel) with varieties D. alba (white flower) and D. niger (deep-purple flower); Datura stramonium in the Himalayas. Family Solanaceae

CLASS OF POISON

Neurotic: cerebral, deliriant

PART POISONOUS

All parts, including the nectar (honey), are poisonous.

FATAL DOSE

0.6 to 1 g seeds; 50 to 125 seeds

ACTIVE PRINCIPLE

Hyoscine, hyoscyamine, traces of atropine

MECHANISM OF ACTION

Antimuscarinic block: dries secretions, dilates pupils, causes delirium.

MEDICOLEGAL ASPECTS

- Road or railroad poison: stupefy, then rob
- BNS 123 (formerly IPC 328)
- Seeds resist putrefaction; preserve urine
- Seeds mistaken for capsicum seeds

SIGNS AND SYMPTOMS

- Dry mouth, dysphagia, hoarse voice
- Flushed face, hot dry skin, hyperpyrexia
- Dilated fixed pupils, blurred near vision
- Muttering delirium, carphologia, drunken gait
- Urinary retention; tachycardia; later coma

TREATMENT

- Lavage with tannic acid; activated charcoal
- Physostigmine 1 to 2 mg slow i.v.
- Purgation for days to clear seeds
- Avoid morphine; cool, catheterise, ventilate

> *Blind as a bat, hot as a hare, dry as a bone, red as a beet, mad as a hen.*

NAME

Croton

COMMON NAMES

Jamalgota, Jamal gota, Naepala, Nepala, Purging croton



Photo: Wikimedia Commons, Croton tiglium 02.JPG

Recall on the back: scientific name · class · poisonous part · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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CUT

NAME

Castor

COMMON NAMES

Arandi, Castor oil plant, Castor bean, Mole bean



Photo: H. Zell, CC BY-SA 3.0, via Wikimedia Commons

Recall on the back: scientific name · class · poisonous part · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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Croton

SCIENTIFIC NAME

Croton tiglium Linn., family Euphorbiaceae

CLASS OF POISON

Irritant: organic, vegetable

PART POISONOUS

Seeds and the oil pressed from them (croton oil).

FATAL DOSE

4–5 seeds or 1–2 mL oil

ACTIVE PRINCIPLE

Crotin (toxalbumin); crotonoleic acid resin in oil

MECHANISM OF ACTION

Vesicant resin inflames the gut and drives drastic purging.

MEDICOLEGAL ASPECTS

- Accidental overdose as a purgative
- Mistaken for castor oil or seeds
- Root and oil used as abortifacient
- Oil used as arrow poison

SIGNS AND SYMPTOMS

- Burning pain from mouth to stomach
- Salivation, vomiting, violent purging
- Dehydration, vertigo, collapse
- Oil blisters the skin

TREATMENT

- Stomach wash and activated charcoal
- Demulcents; no further purgative
- IV fluids and electrolytes

> *Jamalgota: striped seed, drastic purge. Castor seed is mottled; croton seed has longitudinal lines.*

CUT

Castor

SCIENTIFIC NAME

Ricinus communis Linn., family Euphorbiaceae

CLASS OF POISON

Irritant: organic, vegetable

PART POISONOUS

Entire plant is poisonous; the seeds are most toxic, as is the press cake left after the oil is extracted.

FATAL DOSE

5–10 chewed seeds; ricin about 6 mg

ACTIVE PRINCIPLE

Ricin, a toxalbumin; oil holds none

MECHANISM OF ACTION

Ricin stops protein synthesis and destroys gut lining cells.

MEDICOLEGAL ASPECTS

- Accidental: children chewing the seeds
- Seeds must be chewed to poison
- Markov umbrella murder, London 1978
- Ricin is a bioterrorism agent

SIGNS AND SYMPTOMS

- Latent period of 2–24 hours
- Burning mouth, vomiting, bloody diarrhoea
- Dehydration, cramps, shock
- Late haemolysis, convulsions, uraemia

TREATMENT

- Lavage and activated charcoal
- Demulcents
- IV fluids and electrolytes
- Watch glucose, haemolysis, kidneys

> *Swallowed whole, castor seed passes harmless; chewed, it releases ricin. Castor oil carries no ricin.*

NAME

Marking nut

COMMON NAMES

Bhilawa, Bhilawan, Bhilwa, Bibva, Bhela, Oriental cashew, Marking nut



Photo: Wikimedia Commons, Semecarpus anacardium 01.jpg

Recall on the back: scientific name · class · poisonous part · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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CUT

NAME

Nux vomica

COMMON NAMES

Kuchila, Kuchla, Nux vomica, Strychnine tree, Poison nut



Photo: Wikimedia Commons, Strychnos nux-vomica 001.JPG

Recall on the back: scientific name · class · poisonous part · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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Marking nut

SCIENTIFIC NAME

Semecarpus anacardium Linn. f., family Anacardiaceae

CLASS OF POISON

Irritant: organic, vegetable

PART POISONOUS

The nut (fruit). Its thick cellular pericarp holds a brownish, oily, acrid juice that turns black on exposure to air. The nuts are black and heart-shaped, with a rough projection at the base. Washermen (dhobis) use the juice as marking ink on clothes.

FATAL DOSE

5–10 g

ACTIVE PRINCIPLE

Semecarpol and bhilawanol in the pericarp juice

MECHANISM OF ACTION

Acrid phenolic juice blisters skin, eyes and gut.

MEDICOLEGAL ASPECTS

- Fabricates bruise to support false charge
- Blister fluid analysis exposes the fake
- Applied to genitals as punishment
- Abortion stick; thrown like vitriol

SIGNS AND SYMPTOMS

- Painful itchy blister that looks like bruise
- Same lesions on fingertips from scratching
- Juice in eye causes ophthalmia
- Large oral dose: blisters, gastroenteritis, coma

TREATMENT

- Wash skin with lukewarm antiseptic water
- Saline irrigation for the eyes
- Gastric lavage and demulcents if swallowed

> *Dhobi's marking ink fakes a bruise: blistered, itchy, dark brown, never changes colour, fingertips also blistered.*

CUT

Nux vomica

SCIENTIFIC NAME

Strychnos nux-vomica, family Loganiaceae. Chief alkaloid strychnine, $C_{21}H_{22}N_2O_2$

CLASS OF POISON

Neurotic: spinal poison (convulsant)

PART POISONOUS

Seeds of the ripe fruit are the poisonous part, with strychnine and brucine about 1.5% each.

FATAL DOSE

Strychnine 15 to 100 mg; one crushed seed

ACTIVE PRINCIPLE

Strychnine and brucine in the seeds

MECHANISM OF ACTION

Blocks inhibitory glycine in the cord: reflex generalised convulsions.

MEDICOLEGAL ASPECTS

- Mostly accidental: tonics, quacks, children
- Rodenticide; dog, cattle and arrow poison
- Preserve brain and spinal cord
- Differentiate from tetanus: no lockjaw first

SIGNS AND SYMPTOMS

- Opisthotonos: body arched on head and heels
- Risus sardonicus: fixed grin
- Full relaxation between fits; fits on stimulus
- Consciousness retained till death

TREATMENT

- Dark, quiet room; minimal handling
- Diazepam i.v., then barbiturates
- Paralyse and ventilate if fits persist
- Lavage only after fits are controlled

> *Strychnine: mind clear, muscles fully relaxed between fits. Tetanus: lockjaw first, rigidity persists between spasms.*

NAME

Aconite

COMMON NAMES

Mitha zahar, Mitha bish, Bish, Bikh, Mitha teliya (oil-soaked root), Vatsanabha, Monk's hood, Wolf's bane, Blue rocket

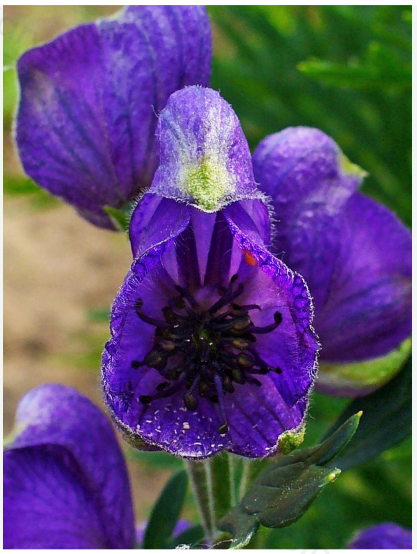


Photo: Wikimedia Commons, Aconitum napellus 010.JPG

Recall on the back: scientific name · class · poisonous part · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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CUT

NAME

Poppy husk

COMMON NAMES

Doda, Bhukki, Post, Post ka doda, Poppy straw, Poppy husk, Poppy heads



Photo: Wikimedia Commons, Poppies-seeds-dry.png

Recall on the back: scientific name · class · poisonous part · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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Aconite

SCIENTIFIC NAME

Aconitum ferox (Himalayan, most of the bazaar root) and Aconitum napellus, family Ranunculaceae. Chief alkaloid aconitine, $C_{34}H_{47}NO_{11}$

CLASS OF POISON

Cardiac poison (Reddy, Vij); neurotoxic in Rao

PART POISONOUS

All species and all parts are poisonous: least when young, more as seeds ripen, most in bloom.

FATAL DOSE

Root 1 g; aconitine 2 to 5 mg

ACTIVE PRINCIPLE

Aconitine and allied alkaloids, most in the root

MECHANISM OF ACTION

Holds sodium channels open: tingling, numbness, and fatal arrhythmia.

MEDICOLEGAL ASPECTS

- Mitha zahar: sweet poison, masked in paan
- Arrow poison and cattle poison
- Abortifacient; root mistaken for horseradish
- Destroyed by putrefaction: keep vomit

SIGNS AND SYMPTOMS

- Tingling, then numbness of mouth and body
- Salivation, vomiting, diarrhoea
- Hippus; later dilated pupils
- Bradycardia, AV block, ventricular arrhythmias
- Mind clear until death

TREATMENT

- Lavage with iodine in KI or tannic acid
- Multiple-dose activated charcoal
- Atropine 0.5 to 1 mg for bradycardia
- ECG monitoring; treat arrhythmias; ventilate

> *Mitha zahar: sweet taste, then tingling and numbness. Cut root turns pink; horseradish stays white.*

CUT

Poppy husk

SCIENTIFIC NAME

Papaver somniferum Linn., family Papaveraceae (opium poppy, white poppy)

CLASS OF POISON

Neurotic: cerebral, somniferous (narcotic)

PART POISONOUS

Ripe, dried capsule shells left after harvest, whole or crushed into husk.

FATAL DOSE

Not fixed; morphine 200 mg fatal in non-addict

ACTIVE PRINCIPLE

Trace morphine, codeine, noscapine, papaverine

MECHANISM OF ACTION

Low-dose opioid agonist; daily use breeds dependence.

MEDICOLEGAL ASPECTS

- NDPS: poppy straw is a narcotic drug
- Poppy straw excludes seeds by definition
- Doda-post addiction common in Punjab, Rajasthan

SIGNS AND SYMPTOMS

- Decoction drunk or husk chewed daily
- Drowsiness, itching, constipation, pinpoint pupils
- Overdose: coma, miosis, respiratory depression
- Withdrawal: yawning, lacrimation, piloerection, diarrhoea

TREATMENT

- Airway, oxygen, naloxone IV for overdose
- Gradual withdrawal under supervision
- Methadone 30 to 40 mg daily, tapered
- Clonidine, propranolol, psychiatric counselling

> *Poppy straw under NDPS means every part of the harvested poppy except the seeds.*

NAME

Poppy capsule

COMMON NAMES

Green poppy capsule, Doda, Post, Poppy head



Photo: Wikimedia Commons, Opium pod cut to demonstrate fluid extraction1.jpg

Recall on the back: scientific name · class · poisonous part · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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CUT

NAME

Poppy seeds

COMMON NAMES

Khus khus, Khaskhas, Posto, Poppy seed



Photo: Wikimedia Commons, Poppy seeds.jpg

Recall on the back: scientific name · class · poisonous part · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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Poppy capsule

SCIENTIFIC NAME

Papaver somniferum Linn., family Papaveraceae (opium poppy, white poppy)

CLASS OF POISON

Neurotic: cerebral, somniferous (narcotic)

PART POISONOUS

Unripe green capsule. Its milky latex, exuding on incision, is the source of opium and the most toxic part. Ripe dry capsules hold only a trace; seeds are harmless.

FATAL DOSE

As opium: about 2 g; morphine 200 mg

ACTIVE PRINCIPLE

Latex: morphine, codeine, thebaine, noscapine, papaverine

MECHANISM OF ACTION

Latex morphine stimulates mu receptors and depresses breathing.

MEDICOLEGAL ASPECTS

- Incising unripe capsule yields opium latex
- NDPS: harvested capsules are poppy straw
- Capsule infusion habit in Punjab, Rajasthan

SIGNS AND SYMPTOMS

- Euphoria, then stupor, then deep coma
- Pinpoint pupils, fixed to light
- Slow breathing, cyanosis, cold sweat
- Halwa or decoction of green capsules

TREATMENT

- Airway, oxygen, ventilation first
- Naloxone 0.4 mg IV, titrate, repeat
- Activated charcoal; permanganate lavage obsolete
- No atropine

> *Unripe capsule gives the latex (opium); ripe dry capsule holds only a trace.*

CUT

Poppy seeds

SCIENTIFIC NAME

Papaver somniferum Linn., family Papaveraceae (opium poppy, white poppy)

CLASS OF POISON

Non-poisonous food item from the opium poppy (Neurotic: somniferous plant)

PART POISONOUS

Seeds are not poisonous. They contain no opium (Vij) and are harmless and nutritive (Reddy). The latex of the unripe capsule is the toxic part of the plant.

FATAL DOSE

Not poisonous in ordinary use

ACTIVE PRINCIPLE

No opium; yields bland edible oil

MECHANISM OF ACTION

No latex, so no morphine and no narcotic action.

MEDICOLEGAL ASPECTS

- NDPS poppy straw excludes the seeds
- Freely sold as food condiment
- 'Only khus khus' cannot explain narcosis

SIGNS AND SYMPTOMS

- No toxic effect after normal eating
- Opioid signs mean opium, husk or capsule
- White or creamy seeds sprinkled on sweets

TREATMENT

- No specific treatment needed
- Look for another opium source
- If triad present, treat as opium

> *Khus khus is harmless food: the one poppy part outside NDPS 'poppy straw'.*

NAME

Crude opium

COMMON NAMES

Afeem, Afim, Opium, Kasoomba (decoction), Madak, Chandu (smoking preparations)



Photo: Wikimedia Commons, Black tar (raw) opium seized in Afghanistan.jpg

Recall on the back: scientific name · class · poisonous part · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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CUT

NAME

Tobacco

COMMON NAMES

Tobacco, Tambaku, Khaini, Bidi, Snuff



Photo: Wikimedia Commons, P1000485 Nicotiana tabacum (tobacco) (Solanaceae) Plant.JPG

Recall on the back: scientific name · class · poisonous part · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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Crude opium

SCIENTIFIC NAME

Papaver somniferum Linn., family Papaveraceae (opium poppy, white poppy). Crude opium is the air-dried latex of the unripe capsule.

CLASS OF POISON

Neurotic: cerebral, somniferous (narcotic)

PART POISONOUS

Dried latex (opium) collected from vertical incisions on the unripe capsule.

FATAL DOSE

Opium 2 g; morphine 200 mg

ACTIVE PRINCIPLE

Morphine 10%, codeine, thebaine; noscapine, papaverine

MECHANISM OF ACTION

Mu-receptor agonist that depresses the respiratory centre.

MEDICOLEGAL ASPECTS

- Painless suicide; homicide rare (bitter, smelly)
- Infanticide: opium smeared on mother's nipple
- NDPS Act 1985 controls opium

SIGNS AND SYMPTOMS

- Excitement, then stupor, then deep coma
- Pinpoint pupils, dilating terminally
- Breathing 2 to 4 per minute
- Cyanosis, cold sweat, smell of opium

TREATMENT

- Airway, oxygen, ventilation
- Naloxone 0.4 mg IV, titrate, repeat
- Activated charcoal, useful even after injection
- No atropine

> *Coma, pinpoint pupils and respiratory depression: the triad of opium poisoning.*

CUT

Tobacco

SCIENTIFIC NAME

Nicotiana tabacum, family Solanaceae. Chief alkaloid nicotine, $C_{10}H_{14}N_2$

CLASS OF POISON

Cardiac poison (Reddy, Vij)

PART POISONOUS

All parts are poisonous except the ripe seeds.

FATAL DOSE

Nicotine 40 to 100 mg; tobacco 15 to 30 g

ACTIVE PRINCIPLE

Nicotine and anabasine in dried leaves

MECHANISM OF ACTION

Nicotinic receptors stimulated, then blocked: excitement gives way to paralysis.

MEDICOLEGAL ASPECTS

- Mostly accidental: children, enema, poultice
- Green tobacco sickness in harvesters
- Malingering: soaked leaves in the axilla
- Oldest insecticide; Insecticides Act 1968

SIGNS AND SYMPTOMS

- Burning mouth, salivation, vomiting
- Early miosis, sweating, tachycardia, hypertension
- Late bradycardia, hypotension, convulsions
- Respiratory muscle paralysis; death in minutes

TREATMENT

- Wash skin; fast lavage with water and charcoal
- Activated charcoal; airway and oxygen
- Atropine 1 to 2 mg i.m.
- Mecamylamine is the specific oral antagonist

> *Nicotine rivals cyanide in speed: death in 5 to 15 minutes. Survive 16 hours and recovery is likely.*

NAME

Cannabis

COMMON NAMES

Indian hemp, Bhang, Siddhi, Sabji, Patti, Ganja, Charas, Hashish, Majoon (Majun), Marijuana, Pot, Grass, Weed



Photo: Wikimedia Commons, Marijuana.jpg

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CUT

NAME

Cerbera thevetia

COMMON NAMES

Yellow oleander, Pila kaner, Peela kaner, Exile, Bastard oleander, Lucky nut, Manjal arali



Photo: Wikimedia Commons, Thevetia peruviana - Fruits.jpg

Recall on the back: scientific name · class · poisonous part · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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Cannabis

SCIENTIFIC NAME

Cannabis sativa (var. indica), family Cannabaceae. Main psychoactive principle delta-9-tetrahydrocannabinol (THC), $C_{21}H_{30}O_2$

CLASS OF POISON

Neurotic: cerebral, deliriant (Reddy, Rao); hallucinogen (Vij)

PART POISONOUS

Active resin occurs in all parts except stem, root and seeds (Reddy); the female flowering tops are richest.

FATAL DOSE

Charas 2 g, ganja 8 g, bhang 10 g/kg

ACTIVE PRINCIPLE

Delta-9-tetrahydrocannabinol (THC) in the resin

MECHANISM OF ACTION

THC stimulates CB1 receptors; brainstem spared, so death is rare.

MEDICOLEGAL ASPECTS

- Run amok: homicidal frenzy in hemp insanity
- Majoon, charas used by road poisoners
- NDPS Act 1985: ganja, charas; Section 20
- Voluntary intoxication no defence: BNS 24

SIGNS AND SYMPTOMS

- Euphoria, laughter, talkativeness
- Distorted time, space; hallucinations
- Red eyes, tachycardia, increased appetite
- Narcosis and deep sleep; rarely fatal

TREATMENT

- Reassurance in a quiet room
- Diazepam 5 to 10 mg for aggression
- Haloperidol for psychosis or flashbacks
- Charcoal if recently swallowed

> *Bhang from leaves, ganja from female flowering tops, charas from resin; potency rises in that order.*

CUT

Cerbera thevetia

SCIENTIFIC NAME

Cerbera thevetia, also called Thevetia peruviana (current name Cascabela thevetia); family Apocynaceae

CLASS OF POISON

Cardiac poison (vegetable cardiac glycoside)

PART POISONOUS

All parts are poisonous, and a milky juice exudes from every part.

FATAL DOSE

8 to 10 seeds; 15 to 20 g root

ACTIVE PRINCIPLE

Thevetin, thevetoxin, nerifolin, peruvoside, cerberin: cardiac glycosides

MECHANISM OF ACTION

Blocks Na+/K+-ATPase, causing digitalis-like bradycardia and heart block.

MEDICOLEGAL ASPECTS

- Common suicidal poison: South India, Sri Lanka
- Homicide uncommon: bitter taste, large dose
- Abortifacient; cattle poison with corn/bread
- Resists putrefaction: found on exhumation

SIGNS AND SYMPTOMS

- Burning, numb mouth; vomiting, diarrhoea
- Sinus bradycardia and AV block
- Hyperkalaemia, hypotension
- Dilated pupils, weakness, collapse

TREATMENT

- Gastric lavage; multi-dose activated charcoal
- Atropine i.v. for bradycardia
- Anti-digoxin Fab fragments
- Temporary pacing for complete heart block

> *Seed inside a triangular grooved nut. Thevetin is one-eighth as potent as ouabain.*

NAME

Nerium oleander

COMMON NAMES

White oleander, Pink oleander, True oleander, Kaner, Safed kaner, Lal kaner, Karabi, Karavira, Arali



Photo: Wikimedia Commons, Nerium oleander flowers leaves.jpg

Recall on the back: scientific name · class · poisonous part · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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CUT

NAME

Hydrochloric acid (HCl)

COMMON NAMES

Muriatic acid, Spirit of salt, Spirit of salts, Namak ka tezab

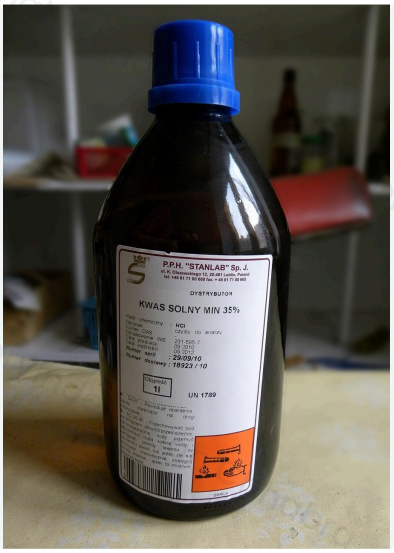


Photo: Wikimedia Commons, Hydrochloric acid 02.jpg

Recall on the back: scientific name · class · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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Nerium oleander

SCIENTIFIC NAME

Nerium oleander, synonyms Nerium odorum and Nerium indicum; family Apocynaceae

CLASS OF POISON

Cardiac poison (vegetable cardiac glycoside)

PART POISONOUS

Vij and Rao call all parts poisonous, including the nectar, which yields poisonous honey.

FATAL DOSE

15 to 20 g root; 5 to 15 leaves

ACTIVE PRINCIPLE

Oleandrin, nerin, folinerin; neriodorin, neriodorein, karabin (Vij)

MECHANISM OF ACTION

Digitalis-like Na+/K+-ATPase block, plus strychnine-like spinal spasms.

MEDICOLEGAL ASPECTS

- Root used as abortion stick
- Suicide by root decoction
- Cattle poison: root juice rag per anum
- Heat resistant: detectable in burnt body

SIGNS AND SYMPTOMS

- Dysphagia, frothy salivation, vomiting
- Slow pulse, then fast and weak
- AV block, fibrillation
- Twitching, tetanic spasms, lockjaw

TREATMENT

- Gastric lavage; multi-dose activated charcoal
- Atropine for bradycardia
- Anti-digoxin Fab; temporary pacing
- Correct hyperkalaemia; avoid calcium

> *Nerium and arsenic resist heat: both detectable in the ashes of a burnt body.*

CUT

Hydrochloric acid (HCl)

SCIENTIFIC NAME

Hydrogen chloride in water; HCl

CLASS OF POISON

Corrosive: mineral (inorganic) acid

FATAL DOSE

15–20 mL concentrated acid

ACTIVE PRINCIPLE

Hydrochloric acid; normally present dilute in gastric juice

MECHANISM OF ACTION

Coagulative necrosis plus irritant fumes; no remote action.

MEDICOLEGAL ASPECTS

- Mostly suicidal; toilet cleaner accidents
- Acid attack: BNS 124 (IPC 326A/326B)
- Free treatment: BNSS 397 (CrPC 357C)
- Analyst must prove free acid above normal

SIGNS AND SYMPTOMS

- Grey or greyish-white mucosa, later brown
- Skin usually spared, teeth unchanged
- Strongly acid vomit with altered blood
- Cough and dyspnoea from inhaled fumes

TREATMENT

- No emetics, no gastric lavage
- Dilute with water or milk early
- No bicarbonate: carbon dioxide may rupture stomach
- Demulcents, airway, endoscopy at 12–24 hours

> *Muriatic acid: grey mucosa, spared skin, fumes in the lungs, and free HCl must exceed normal gastric HCl.*

NAME

Nitric acid (HNO_3)

COMMON NAMES

Aqua fortis, Red spirit of nitre, Spirit of nitre, Shora ka tezab



Photo: Wikimedia Commons, Nitric acid fuming.jpg

Recall on the back: scientific name · class · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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CUT

NAME

Sulphuric acid (H_2SO_4)

COMMON NAMES

Oil of vitriol, Vitriol, Battery acid, Gandhak ka tezab



Photo: Wikimedia Commons, Sulphuric acid on a piece of towel.JPG

Recall on the back: scientific name · class · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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Nitric acid (HNO_3)

SCIENTIFIC NAME

Nitric acid; HNO_3

CLASS OF POISON

Corrosive: mineral (inorganic) acid

FATAL DOSE

10–15 mL concentrated acid

ACTIVE PRINCIPLE

Nitric acid (aqua fortis); fuming, choking odour

MECHANISM OF ACTION

Coagulative necrosis; nitrated protein (xanthoprotein) stains tissue yellow.

MEDICOLEGAL ASPECTS

- Accident or suicide; homicide rare
- Yellow staining confirms nitric acid
- Used in acid attacks: BNS 124
- Industrial fume deaths

SIGNS AND SYMPTOMS

- Yellow stains on lips, fingers, clothes
- Yellowish coating on teeth
- More belching and abdominal distension
- Lacrimation, cough, dyspnoea from fumes

TREATMENT

- No emetics, no gastric lavage
- Dilute early with water or milk
- No bicarbonate: carbon dioxide worsens distension
- Demulcents, airway, endoscopy, later dilatation

> *Aqua fortis turns tissue yellow: xanthoproteic reaction. Brown ring test confirms nitrates.*

CUT

Sulphuric acid (H_2SO_4)

SCIENTIFIC NAME

Sulphuric acid; H_2SO_4

CLASS OF POISON

Corrosive: mineral (inorganic) acid

FATAL DOSE

5–10 mL concentrated acid

ACTIVE PRINCIPLE

Sulphuric acid (oil of vitriol); oily, non-fuming, chars tissue

MECHANISM OF ACTION

Coagulative necrosis with heat and charring; tissue turns black.

MEDICOLEGAL ASPECTS

- Classic vitriolage agent: BNS 124
- Grievous hurt: BNS 116 (IPC 320)
- Laxmi 2013 regulated acid sale
- Haigh acid bath body disposal

SIGNS AND SYMPTOMS

- Black streaks from mouth angles to chin
- Chalky-white teeth, black sodden tongue
- Black vomit with charred mucosal shreds
- Mind clear till death

TREATMENT

- No emetics, no gastric lavage
- Dilute with water or milk within 30 minutes
- No bicarbonate: carbon dioxide may rupture stomach
- Airway, demulcents, endoscopy, later dilatation

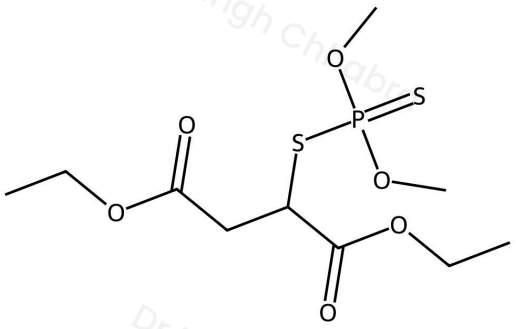
> *Oil of vitriol: black char, chalky teeth, stomach a black spongy mass; perforation commonest of the three acids.*

NAME

Malathion

COMMON NAMES

Kill bug, Bugsoline, Bugsolin-20, Cimexol, Jyothi oil (household insecticide brands)



Structural formula drawn for these notes

Recall on the back: scientific name · class · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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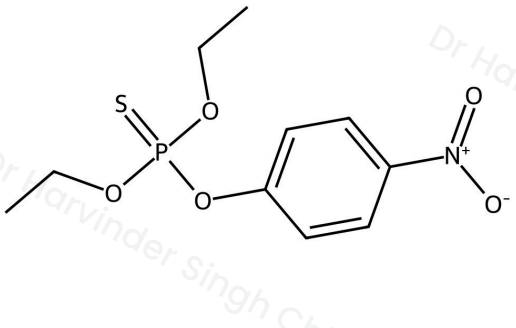
CUT

NAME

Parathion

COMMON NAMES

Folidol (Follidol), E-605, Kill phos, Ekato, Nitrostigmine



Structural formula drawn for these notes

Recall on the back: scientific name · class · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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Malathion

SCIENTIFIC NAME

S-1,2-bis(ethoxycarbonyl)ethyl O,O-dimethyl phosphorodithioate, $C_{10}H_{19}O_6PS_2$. An alkyl organophosphate.

CLASS OF POISON

Agrochemical: organophosphorus insecticide (alkyl phosphate)

FATAL DOSE

About 1 g orally

ACTIVE PRINCIPLE

Malathion; activated to malaoxon in the liver

MECHANISM OF ACTION

Irreversibly phosphorylates acetylcholinesterase, so acetylcholine accumulates.

MEDICOLEGAL ASPECTS

- Commonest suicidal poison in rural India
- Accidental in sprayers and children
- Homicide rare: smell betrays it
- Viscera in saturated saline, not spirit

SIGNS AND SYMPTOMS

- SLUDGE with bronchorrhoea and pinpoint pupils
- Fasciculations, then weakness and areflexia
- Kerosene-like smell of breath and vomit
- Intermediate syndrome at 1–4 days

TREATMENT

- Decontaminate skin; lavage, activated charcoal
- Atropine 2–4 mg IV, doubled till atropinisation
- Pralidoxime 30 mg/kg, then 8 mg/kg/hour
- Diazepam for convulsions

> *Malathion is least toxic: human carboxylesterases detoxify it, insects cannot. Atropinise to a dry chest, not wide pupils.*

CUT

Parathion

SCIENTIFIC NAME

O,O-diethyl O-(4-nitrophenyl) phosphorothioate (diethyl nitrophenyl thiophosphate), $C_{10}H_{14}NO_5PS$. An aryl organophosphate.

CLASS OF POISON

Agrochemical: organophosphorus insecticide (aryl phosphate)

FATAL DOSE

175 mg oral (Reddy); 100 mg (Vij)

ACTIVE PRINCIPLE

Parathion; liver converts it to paraoxon

MECHANISM OF ACTION

Paraoxon irreversibly phosphorylates acetylcholinesterase; acetylcholine accumulates.

MEDICOLEGAL ASPECTS

- Folidol / E-605: highly toxic, rating 6
- Suicide common; homicide rare
- p-Nitrophenol in urine confirms parathion
- Banned in India (check current list)

SIGNS AND SYMPTOMS

- SLUDGE, bronchorrhoea, pinpoint pupils
- Fasciculations, then respiratory muscle paralysis
- Convulsions and coma
- Kerosene-like smell from the solvent

TREATMENT

- Wash skin at once; lavage, charcoal
- Atropine doubling doses till chest is dry
- Pralidoxime early, before ageing
- Diazepam; avoid morphine and succinylcholine

> *Parathion is a prodrug: liver makes paraoxon. Urine p-nitrophenol turns yellow with NaOH.*

NAME

DDT

COMMON NAMES

DDT, Chlorophenothane



Photo: CDC Public Health Image Library (US government), Public domain, via Wikimedia Commons

Recall on the back: scientific name · class · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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CUT

NAME

Lead tetroxide

COMMON NAMES

Red lead, Minium, Sindoor, Sindhur, Mitia sindhur, Vermilion (loosely), Lal sindoor



Photo: Wikimedia Commons, Red lead.jpg

Recall on the back: scientific name · class · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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DDT

SCIENTIFIC NAME

1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane, $C_{14}H_9Cl_5$. A chlorinated hydrocarbon (organochlorine).

CLASS OF POISON

Agrochemical: organochlorine (chlorinated hydrocarbon) insecticide

FATAL DOSE

15–30 g

ACTIVE PRINCIPLE

DDT, a chlorinated hydrocarbon

MECHANISM OF ACTION

Keeps axonal sodium channels open, so neurones fire repeatedly.

MEDICOLEGAL ASPECTS

- Persistent pollutant, stored in fat
- Mostly accidental; homicide very rare
- Banned in farming; vector control allowed
- Insecticides Act 1968

SIGNS AND SYMPTOMS

- Vomiting and abdominal pain within an hour
- Tremors and myoclonic jerks
- Sudden convulsions, then respiratory failure
- Liver and kidney damage

TREATMENT

- Protect airway; wash skin; activated charcoal
- Diazepam for convulsions
- Cholestyramine 16 g/day
- Avoid adrenaline, milk and oily cathartics

> *DDT: sodium channel opener causing tremor and fits. No adrenaline, no milk or oils.*

CUT

Lead tetroxide

SCIENTIFIC NAME

Lead tetroxide (triplumbic tetroxide), Pb_3O_4

CLASS OF POISON

Irritant: inorganic, metallic

FATAL DOSE

Lead salts 10-40 g; red lead: no separate figure

ACTIVE PRINCIPLE

Lead; scarlet insoluble Pb_3O_4 powder (sindoor)

MECHANISM OF ACTION

Blocks ALA dehydratase and ferrochelatase, so haem synthesis fails.

MEDICOLEGAL ASPECTS

- Sindoor in hair parting: chronic poisoning
- Abortion stick paste: BNS 88 (IPC 312)
- Cattle poison, alone or with arsenic
- Homicide and suicide rare

SIGNS AND SYMPTOMS

- Facial pallor, earliest chronic sign
- Burtonian blue gum line
- Colic with constipation, wrist drop
- Anaemia with basophilic stippling

TREATMENT

- Remove exposure; lavage with magnesium sulphate
- $CaNa_2EDTA$, with BAL given 4 h first
- Oral succimer (DMSA) or penicillamine
- Calcium gluconate IV for colic

> *Red lead is the sindoor and the abortion-stick paste; its stain can be mistaken for blood.*

NAME

Lead sulphide

COMMON NAMES

Galena, Surma, Kohl, Kajal (when lead-based), Collyrium



Photo: Rob Lavinsky, iRocks.com, CC BY-SA 3.0, via Wikimedia Commons

Recall on the back: scientific name · class · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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CUT

NAME

Oxalic acid

COMMON NAMES

Acid of sugar, Salt of sorrel, Essential salt of lemons (potassium binoxalate and quadroxalate), Ink-stain remover



Photo: Wikimedia Commons, Oxalic acid dihydrate.jpg

Recall on the back: scientific name · class · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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Lead sulphide

SCIENTIFIC NAME

Lead(II) sulphide, PbS

CLASS OF POISON

Irritant: inorganic, metallic

FATAL DOSE

Least toxic lead salt; chronic intake 1-2 mg/day

ACTIVE PRINCIPLE

Lead; galena (PbS) sold as surma

MECHANISM OF ACTION

Cumulative lead blocks haem synthesis and swells the child's brain.

MEDICOLEGAL ASPECTS

- Accidental: surma, kajal on infants
- Lead sulphide sold as antimony surma
- Drugs and Cosmetics Act 1940 applies
- Homicide and suicide not expected

SIGNS AND SYMPTOMS

- Pica, pallor, anaemia with stippling
- Encephalopathy: ataxia, fits, coma
- Lead lines at long-bone metaphyses
- Colic and constipation

TREATMENT

- Stop the surma; screen the family
- BAL then $CaNa_2EDTA$ for encephalopathy
- Oral succimer (DMSA) for milder cases
- Repeat blood lead for rebound

> *Real surma is antimony sulphide; lead sulphide (galena) passes as it and poisons children.*

CUT

Oxalic acid

SCIENTIFIC NAME

Ethanedioic acid; $C_2H_2O_4$ (hydrated form $C_2H_2O_4.2H2O$)

CLASS OF POISON

Corrosive: organic acid, with remote (systemic) action

FATAL DOSE

15–20 g

ACTIVE PRINCIPLE

Oxalic acid; crystals resemble Epsom salt

MECHANISM OF ACTION

Corrodes mucosa, then binds calcium causing hypocalcaemia and renal crystals.

MEDICOLEGAL ASPECTS

- Mistaken for Epsom salt purgative
- Bleaches ink: used in forgery
- Homicide rare: sour taste
- Black streaks in stomach diagnostic

SIGNS AND SYMPTOMS

- Coffee-ground vomit, burning throat
- Tetany, tingling, convulsions from low calcium
- Oliguria with envelope-shaped oxalate crystals
- Collapse, ventricular fibrillation

TREATMENT

- Careful lavage with calcium lactate
- Lime water or chalk in milk
- Calcium gluconate 10%, 10 mL slow IV
- Dialysis for renal failure

> *Acid of sugar: looks like Epsom salt, steals calcium. Antidote is calcium: lime water, chalk, gluconate.*

NAME

Carbolic acid

COMMON NAMES

Phenol, Phenic acid, Phenyl (household disinfectant, loosely), Hospital smell



Photo: Wikimedia Commons, Phenol (carbolic acid)04.jpg

Recall on the back: scientific name · class · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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CUT

NAME

Calomel

COMMON NAMES

Calomel, Mercurous chloride, Subchloride of mercury, Raskapoor



Photo: Rob Lavinsky, iRocks.com, CC BY-SA 3.0, via Wikimedia Commons

Recall on the back: scientific name · class · fatal dose · active principle · mechanism · signs · treatment · medicolegal aspects

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Carbolic acid

SCIENTIFIC NAME

Hydroxybenzene; C_6H_5OH

CLASS OF POISON

Corrosive: organic (aromatic) acid, with local and remote action (CNS depressant)

FATAL DOSE

10–15 g

ACTIVE PRINCIPLE

Phenol (hydroxybenzene); carbolic hospital smell

MECHANISM OF ACTION

Protein-precipitating corrosive and local anaesthetic; absorbed, depresses respiratory centre.

MEDICOLEGAL ASPECTS

- Suicide and accidental disinfectant ingestion
- Homicide rare: odour betrays it
- Abortifacient by intrauterine injection
- Preserve viscera in saline, not alcohol

SIGNS AND SYMPTOMS

- White hard mucosa, burning then numbness
- Phenolic odour on breath
- Coma, miosis, hypothermia, stertorous breathing
- Carboluria: urine turns smoky green on standing

TREATMENT

- Gastric lavage allowed: stomach hardens
- Lavage with olive oil or Epsom salt
- Leave 30 g magnesium sulphate in stomach
- Methylene blue for methaemoglobinaemia

> *Gastric lavage is allowed: phenol tans the stomach leathery. Green urine is carboluria.*

CUT

Calomel

SCIENTIFIC NAME

Mercury(I) chloride, Hg_2Cl_2

CLASS OF POISON

Irritant: inorganic, metallic

FATAL DOSE

1.5-2 g (Vij)

ACTIVE PRINCIPLE

Mercurous chloride; white, tasteless, insoluble powder

MECHANISM OF ACTION

Mercury binds -SH enzymes; the kidney is the main target.

MEDICOLEGAL ASPECTS

- Teething powder: acrodynia in infants
- Laxative abuse: chronic mercurialism
- Drastic purgative used for abortion
- Suicide, homicide rare

SIGNS AND SYMPTOMS

- Acrodynia: pink, painful, peeling hands and feet
- Gingivitis and salivation
- Hatter's shakes, erethism
- Mercuria lentis on slit lamp

TREATMENT

- Stop exposure
- BAL, DMSA or penicillamine
- No $CaNa_2EDTA$: nephrotoxic with mercury
- Never BAL and penicillamine together

> *Calomel teething powder caused pink disease. Mercurous salts are insoluble, so far less toxic than mercuric.*

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11. **Poppy capsule**: Unripe Papaver somniferum capsule, lanced. Photo: Wikimedia Commons, Opium pod cut to demonstrate fluid extraction1.jpg https://commons.wikimedia.org/wiki/File:Opium_pod_cut_to_demonstrate_fluid_extraction1.jpg
12. **Poppy seeds**: Poppy seeds (khus khus). Photo: Wikimedia Commons, Poppy seeds.jpg https://commons.wikimedia.org/wiki/File:Poppy_seeds.jpg
13. **Crude opium**: Crude opium (afeem). Photo: Wikimedia Commons, Black tar (raw) opium seized in Afghanistan.jpg https://commons.wikimedia.org/wiki/File:Black_tar_(raw)_opium_seized_in_Afghanistan.jpg
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15. **Cannabis**: Cannabis sativa leaf. Photo: Wikimedia Commons, Marijuana.jpg https://commons.wikimedia.org/wiki/File:Marijuana.jpg
16. **Cannabis**: Charas (hashish). Photo: Wikimedia Commons, Pure Manali hashish (1 tolla = 10 g) (4142310413).jpg https://commons.wikimedia.org/wiki/File:Pure_Manali_hashish_(1_tolla_=_10_g)_(4142310413).jpg
17. **Cerbera thevetia**: Yellow oleander (Thevetia peruviana, pila kaner) fruit and seed. Photo: Wikimedia Commons, Thevetia peruviana - Fruits.jpg https://commons.wikimedia.org/wiki/File:Thevetia_peruviana_-_Fruits.jpg
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21. **Nitric acid (HNO_3)**: Fuming nitric acid (aqua fortis). Photo: Wikimedia Commons, Nitric acid fuming.jpg https://commons.wikimedia.org/wiki/File:Nitric_acid_fuming.jpg
22. **Nitric acid (HNO_3)**: Fuming nitric acid. Photo: Wikimedia Commons, Fuming nitric acid 40ml.jpg https://commons.wikimedia.org/wiki/File:Fuming_nitric_acid_40ml.jpg
23. **Sulphuric acid (H_2SO_4)**: Sulphuric acid (oil of vitriol) charring cloth. Photo: Wikimedia Commons, Sulphuric acid on a piece of towel.JPG https://commons.wikimedia.org/wiki/File:Sulphuric_acid_on_a_piece_of_towel.JPG
24. **Sulphuric acid (H_2SO_4)**: Dehydration of sugar by concentrated sulphuric acid. Photo: Wikimedia Commons, Dehydration of sugar by sulfuric acid.png https://commons.wikimedia.org/wiki/File:Dehydration_of_sugar_by_sulfuric_acid.png
25. **Malathion**: Malathion. Structural formula drawn for these notes
26. **Parathion**: Parathion. Structural formula drawn for these notes
27. **DDT**: DDT (dichlorodiphenyltrichloroethane). Photo: CDC Public Health Image Library (US government), Public domain, via Wikimedia Commons https://commons.wikimedia.org/wiki/File:DDT_WWII_soldier.jpg
28. **DDT**: DDT sprayed over swamp water for mosquito (malaria) control, 1958. Photo: CDC Public Health Image Library (US government), Public domain, via Wikimedia Commons https://commons.wikimedia.org/wiki/File:DDT_spray_1958.jpg
29. **Lead tetroxide**: Lead tetroxide (Pb_3O_4, red lead, sindoor adulterant, minium pigment). Photo: Wikimedia Commons, Red lead.jpg https://commons.wikimedia.org/wiki/File:Red_lead.jpg
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31. **Oxalic acid**: Oxalic acid (acid of sugar) crystals. Photo: Wikimedia Commons, Oxalic acid dihydrate.jpg https://commons.wikimedia.org/wiki/File:Oxalic_acid_dihydrate.jpg
32. **Carbolic acid**: Phenol (carbolic acid) crystals. Photo: Wikimedia Commons, Phenol (carbolic acid)04.jpg https://commons.wikimedia.org/wiki/File:Phenol_(carbolic_acid)04.jpg
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