

Lecture 19 PESTICIDES GROUPS

Groups of pesticides : The pesticides are generally classified into various groups based on pest organism against which the compounds are used, their chemical nature, mode of entry and mode of action.

1. Based on organisms

- a) Insecticides : Chemicals used to kill or control insects (eg.) endosulfan, malathion
- b) Rodenticides : Chemicals exclusively used to control rats (eg.) Zinc phosphide
- c) Acaricides : Chemicals used to control mites on crops / animals (eg.) Dicofol
- d) Avicides : Chemicals used to repel the birds (eg.) Anthraquinone
- e) Molluscicides : Chemicals used to kill the snails and slugs (eg.) Metaldehyde
- f) Nematicides : Chemicals used to control nematodes (eg.) Ethylene dibromide
- g) Fungicides : Chemicals used to control plant diseases caused by fungi (eg.) Copper oxy chloride
- h) Bactericide : Chemicals used to control the plant diseases caused by bacteria (eg.) Streptomycin sulphate
- i) Herbicide : Chemicals used to control weeds (eg.) 2,4, - D

2. Based on mode of entry

- a) Stomach poison : The insecticide applied in the leaves and other parts of the plant when ingested, act in the digestive system of the insect and bring about kill (eg.) Malathion.
- b) Contact Poison : The toxicant which brings about death of the pest species by means of contact (eg.) Fenvalerate.
- c) Fumigant : Toxicant enter in vapour form into the tracheal system (respiratory poison) through spiracles (eg.) Aluminium phosphide
- d) Systemic poison : Chemicals when applied to plant or soil are absorbed by foliage (or) roots and translocated through vascular system and cause death of insect feeding on plant. (eg.) Dimethoate.

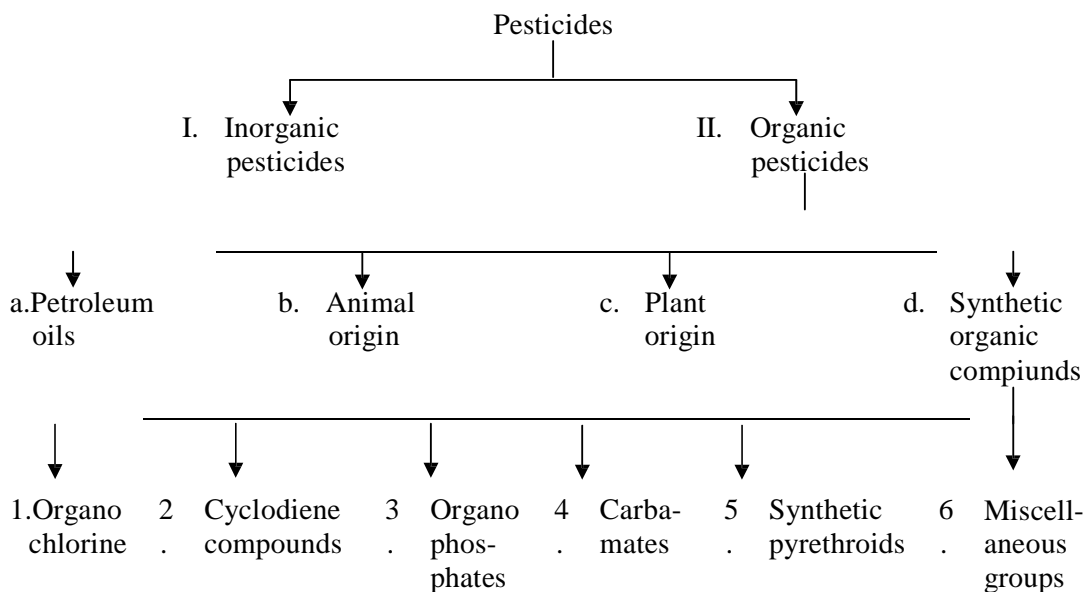
3. Based on mode of action

- a) Physical poison : Toxicant which brings about kill of one insect by exerting a physical effect (eg.) Activated clay.

- b) Protoplasmic poison : Toxicant responsible for precipitation of protein (eg.) Arsenicals.
- c) Respiratory poison : Chemicals which inactivate respiratory enzymes (eg.) hydrogen cyanide.
- d) Nerve poison : Chemicals inhibit impulse conduction (eg.) Malathion.
- e) Chitin inhibition : Chemicals inhibit chitin synthesis (eg.) Diflubenzuron.

4. Based on chemical nature

Classification based on chemical nature of insecticides



I. Inorganic pesticides

Inorganic chemicals used as insecticides

Eg. Arsenic, Fluorine, Sulphur, lime sulphur (Insecticides) zinc phosphide (Rodenticide)

II. Organic pesticides

Organic compounds (constituted by C, H, O and N mainly)

Hydrocarbon oil (or) Petroleum oil – eg. Coal tar oil, kerosine etc.,

Animal origin insecticides – eg. Nereistoxin extracted from marine annelids – commercially available as cartap, padan.

Plant origin insecticides : Nicotine from tobacco plants, pyrethrum from *Chrysanthemum* flowers, Rotenoids from roots of *Derris* and *Lonchocarpus*
Neem – *azadirachtin*, *Pongamia glabra*, Garlic etc.,

Synthetic organic compounds : These organic chemicals are synthetically produced in laboratory.

- i. Chlorinated hydrocarbon (or) organochlorines
Eg. DDT, HCH, Endosulfan, Lindane, Dicofol (DDT, HCH banned)
- ii. Cyclodienes
Eg. Chlordane, Heptachlor (Banned chemicals)
- iii. Organophosphates : (Esters of phosphoric acid)

- Eg. Dichlorvos, Monocrotophos, Phosphamidon, Methyl parathion, Fenthion, Dimethoate, Malathion, Acephate, Chlorpyrifos
- iv. Carbamates: (Derivatives of carbamic acid)
Eg. Carbaryl, Carbofuran, Carbosulfan
- v. Synthetic pyrethroids ; (Synthetic analogues of pyrethrum)
Eg. Allethrin, Cypermethrin, Fenvalerate
- vi. Miscellaneous compounds
Neonicotinoids (Analogues of nicotine) eg. Imidacloprid Spinosyns (Isolated from actinomycetes) eg. Spinosad Avermectins (Isolated from bacteria) eg. Avermectin, Vertimec Fumigants : Eg. Aluminium phosphide, Hydrogen cyanide, EDCT