MECHANISM OF RELEASE OF PESTICIDES

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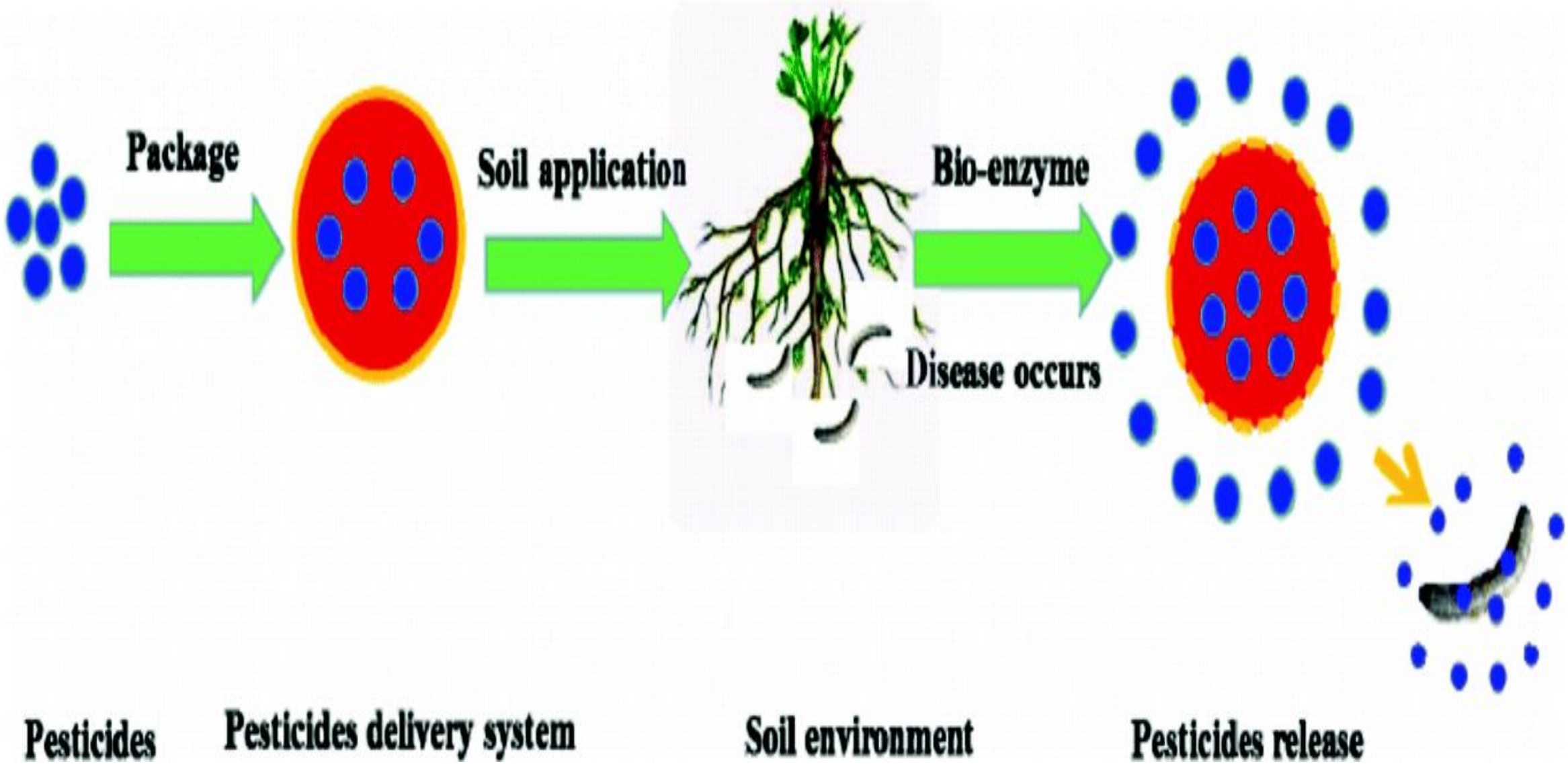
Three different mechanisms may be involved in controlling the release of biologically active compounds:

- ❖Release through a membrane by diffusion
- ❖Removal of a protective wall by an enzyme, Microorganisms
- ❖Chemical attack
- ❖Release from chemical or physical bonds by temperature or moisture

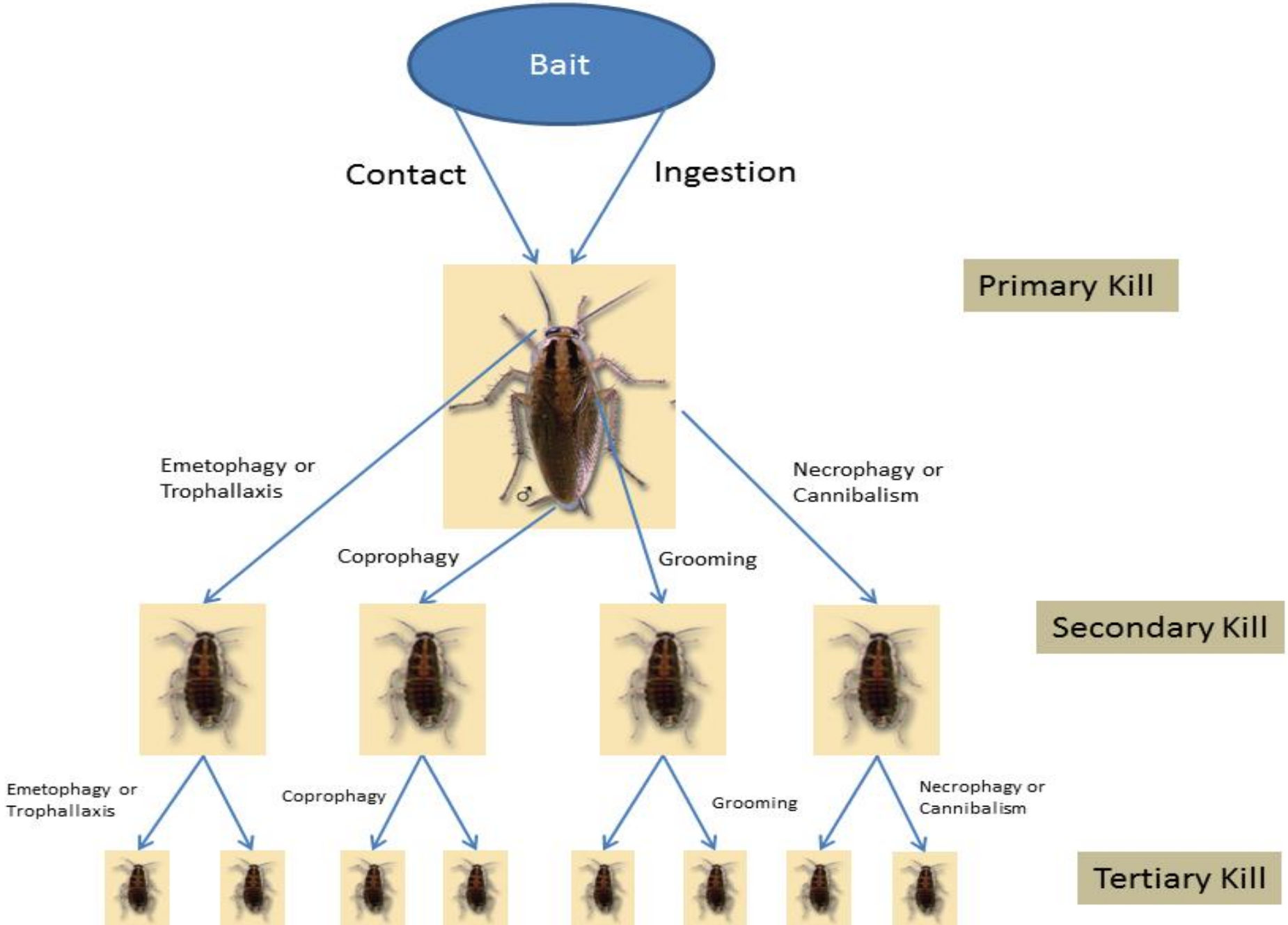

Package
Soil application
Bio-enzyme
Disease occurs
Pesticides
Pesticides delivery system
Soil environment
Pesticides release

BAITS

- Baits can be very useful for achieving selective toxicity of insecticides against some species of insects.

- Spot application permits the use of insecticides in a safe manner with no environmental disruption.

- A bait containing hexaflumuron or novi flumuron as toxicant is used in the Sentricon Termite Elimination System and difluben zuron as toxicant in the Exterra Termite Bait System.


Bait
Contact
Ingestion
Primary Kill
Emetophagy or Trophallaxis
Coprophagy
Grooming
Necrophagy or Cannibalism
Secondary Kill
Emetophagy or Trophallaxis
Coprophagy
Grooming
Necrophagy or Cannibalism
Tertiary Kill

- A bait formulation consists of a carrier, toxicant, and feeding stimulants.

- A malathion 4% bait formulated from crude cottonseed oil (5%) and sucrose (10%) on a laying-mash carrier was very effective in controlling mole crickets in the field.

- A microencapsulated bait called Slam which consists of cucurbitacins and 8% carbaryl, is also available for controlling corn rootworm adults.

- Bait gels are common for household insect control.

DILUENTS

- Diluents are known as inerts or carriers.

- It plays an important role in the behavior of the formulated product. Diluents have been prepared from agricultural wastes such as walnut shells, pecan shells, tobacco stems, and corncobs; from minerals such as kaolinite, attapulgite, and talc; and from fossilized deposits such as diatom beds.

- The exact diluent used in a given preparation depends on cost, properties, and availability.

- Dusts require low sportive inerts to minimize the toxicant-diluent interaction.

- For WPs, inerts must be high in sportive power because they carry a large amount of toxicant especially when the toxicant is a liquid.

- It is required that an inert diluent contains hot spots or alkalinity to inactivate part of the toxicant.

- urea can be used as a deactivator to counteract the undesirable effects in some dust and wettable formulations.

SOLVENTS

- Solvents are important ingredients of emulsifiable concentrates and of solution formulations.
- When the formulation is to be used on crops, it is critical that the solvent be nonphytotoxic.
- The solvent must have a high level of solvent power if an EC is being formulated.
- Solvent must also be water insoluble.

- If the specific gravity of the solvent is near that of water, the setting tendency of the emulsion is decreased.

- The terms top creaming and bottom creaming are used to describe emulsions in which the insecticide containing solvent has risen to the top or settled to the bottom of the emulsion

SURFACTANTS

- Surfactants, also known as surface-active agents, are chemicals that will orient at an interface.

- They serve as coupling agents, joining two phases, liquid-liquid, liquid-solid, or liquid air.

- When the phases being coupled are liquid-air, the surfactant may cause foaming and will be called a foaming agent.

- If the interfaces are liquid-solid, the surfactant may result in the wetting of the solid and will be called a wetting agent.

- In liquid-liquid interfaces, such as oils and water, the surfactant would be an emulsifier because it allows oils and water to mix as an emulsion.

- There are more than 3000 commercial surfactants

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- They are grouped according to type of action as follows: wetting agents, stabilizing agents, spreaders, penetrants, co-solvents (coupling agents), hygroscopic agents, or stickers.

- Surfactants are divided into three main groups, based on their ionization in water; these are anionic surfactants, cationic surfactants, and nonionic surfactants.

- when a positive ion is formed, it is called a cationic surfactant.

- If on ionization, one end of the molecule becomes a negative ion, the surfactant is known as an anionic surfactant

Pesticide Application Equipment

Many types of equipment are available for applying pesticides which include:

- Hand-operated sprayers
- Motorized sprayers
- Boomless sprayers
- Boom sprayers
- Airblast sprayers
- Granular applicators
- Aerial applicators

Good results can be obtained when suitable equipment is selected for application.