

M.Sc. IV Semester

MBT- 4003B (Optional)

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Bioinsecticides

What are Bioinsecticides?

An insecticide is a type of pesticide that specifically targets insects that harm animals or agricultural crops.

biological insecticides, also known as biopesticides, which are pesticides made from natural materials that are meant to kill or control insects. These natural source materials may include animals, plants, bacteria, or minerals. Simply put, biopesticides are composed of living things, are made by living things, or are found in nature.

Types of Biological Insecticides

There are three main categories of bioisecticides (biopesticides).

- 1. Biochemical pestcicides**
- 2. Microbial pesticides**
- 3. Plant – incorporated protection**

Biochemical pesticides

Biochemical pesticides are **naturally occurring (herbal) substances that control pests by non-toxic mechanisms.**

Examples of biochemical pesticides include **hydrogen peroxide (H_2O_2), plant oils like eucalyptus oil, lemongrass oil and rosemary oil.**

Microbial pesticides

This type uses microorganisms as the active ingredient.

These microorganisms are usually bacteria or fungi but can also be viruses, protozoa, or oomycetes

Plant-Incorporated Protectants (PIPs)

This type uses substances that are produced by plants after genetic material, such as genes or proteins, has been added to the plant by humans. Plants are modified in this way so that they are naturally resistant to insect pests, and different types of genes and proteins can enhance a plant's resistance to different types of pests

Advantages of Biopesticides

- **Biopesticides are usually less toxic than conventional pesticides.**
- **Biopesticides generally affect only the target pest and closely related organisms, in contrast to broad spectrum, conventional pesticides that may affect organisms as different as birds, insects and mammals.**
- **Biopesticides often are effective in very small quantities and often decompose quickly, resulting in lower exposures and largely avoiding the pollution problems caused by conventional pesticides.**
- **When used as a component of Integrated Pest Management (IPM) programs, biopesticides can greatly reduce the use of conventional pesticides, while crop yields remain high.**

Control Agent	Mode of Action	Examples	Control Agent
Bacteria	Produce toxins that are detrimental to certain insect pests when ingested	<i>Bacillus thuringiensis</i>	Lepidopterans
		<i>Bacillus popilliae</i>	Japanese beetle
		<i>Agrobacterium radio bacter</i>	Crown gall disease
Viruses	Kills insects when ingested. Insect's feeding behavior is disrupted thus it starves and dies.	Baculoviruse: Nuclear polyhedrosis virus (NPV)	Lepidopteran and Hymenopteran
		Baculoviruses: Granulosis virus (GV)	Lepidopteran
		Baculoviruse: Group C	Arthropods
		Entomopox	
Fungi	Controls insects by growing on them secreting enzymes that weaken the insect's outer coat, and then getting inside the insect and continuing to grow, eventually killing the infected pest	<i>Entomophaga praxib ulli</i>	Grasshoppers
		<i>Zoophthora radicans</i>	Aphids
		<i>Neozygites floridana</i>	Cassava green mite

Control Agent	Mode of Action	Examples	Control Agent
Protozoa	Kills insects when ingested. Insect's feeding behavior is disrupted thus it starves and dies.	<i>Nosema</i>	Grasshoppers
		<i>Vairimorpha</i>	Lepidoptera
		<i>Malamoeba</i>	Locusts
Nematode	They kill their target organisms by entering natural body openings or by penetrating the insect cuticle directly.	<i>Heterorhabditis bact eriophora</i>	Black vine weevil, Japanese beetles
		<i>Phasmarhabditis her maphrodita</i>	Various slugs and snails
		<i>Steinernema carpoc apsae</i>	Black vine weevil, strawberry root weevil, cranberry girdler

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