

## CHEMISTRY IN AGRICULTURE

### Pesticides

Pesticides are substances that are meant to control pests, including weeds.

In general, a pesticide is a chemical or biological agent (such as a virus, bacterium, or fungus) that kills or otherwise discourages pests.

The term pesticide includes all of the following: herbicides, insecticides, fungicides.

Most pesticides are intended to serve as plant protection products (also known as crop protection products), which in general, protect plants from weeds, fungi, or insects`

Along with these benefits, pesticides also have drawbacks, such as potential toxicity to humans and other species.

Examples of specific synthetic chemical pesticides are glyphosate, Acephate, Deet, Propoxur, Metaldehyde, Boric Acid, Diazinon, Dursban, DDT, Malathion, etc.

### Herbicides

Herbicides also commonly known as weedkillers, are substances used to control unwanted plants.

Selective herbicides control specific weed species, while leaving the desired crop relatively unharmed, while non-selective herbicides (sometimes called total weedkillers in commercial products) can be used to clear waste ground, industrial and construction sites, railways and railway embankments as they kill all plant material with which they come into contact.

Examples of contact herbicides are diclofop, dinoseb, diquat, and paraquat.

Certain contact herbicides, like diquat and paraquat, are deactivated by soil particles. They must be mixed with clear water and applied directly to the vegetation.

### Insecticides

Insecticides are substances used to kill insects.

They include ovicides and larvicides used against insect eggs and larvae, respectively.

Insecticides are used in agriculture, medicine, industry and by consumers.

Insecticides are claimed to be a major factor behind the increase in the 20th-century's agricultural productivity.

Nearly all insecticides have the potential to significantly alter ecosystems; many are toxic to humans and/or animals.

### **Fungicides**

Fungicides are biological organisms used to kill parasitic fungi or their spores.

A fungistatic inhibits their growth.

Fungi can cause serious damage in agriculture, resulting in critical losses of yield, quality, and profit.

Fungicides are used both in agriculture and to fight fungal infections in animals.

Examples of broad-spectrum fungicides include captan, sulfur, and mancozeb.

### **Bio-fertilizer**

A biofertilizer is a substance which contains living microorganisms which, when applied to seeds, plant surfaces, or soil, colonize the rhizosphere or the interior of the plant and promotes growth by increasing the supply or availability of primary nutrients to the host plant.

Biofertilizers can be expected to reduce the use of synthetic fertilizers and pesticides.

The microorganisms in biofertilizers restore the soil's natural nutrient cycle and build soil organic matter.

Through the use of biofertilizers, healthy plants can be grown, while enhancing the sustainability and the health of the soil.

They are extremely advantageous in enriching soil fertility and fulfilling plant nutrient requirements by supplying the organic nutrients through microorganism and their byproducts. Hence, biofertilizers do not contain any chemicals which are harmful to the living soil.

Biofertilizers such as Rhizobium, Azotobacter, Azospirillum and blue green algae (BGA) have been in use a long time.