

## Pesticides

**Organophosphate Pesticides** affect the nervous system by disrupting the enzyme that regulates acetylcholine, a neurotransmitter. Most organophosphates are insecticides. They were developed during the early 19th century, but their effects on insects, which are similar to their effects on humans, were discovered in 1932. Some are very poisonous (they were used in World War II as nerve agents). However, they usually are not persistent in the environment.



**Carbamate Pesticides** are widely used against insects, fungi, and weeds. They also affect the nervous system by disrupting the enzyme regulating acetylcholine. The enzyme effects are usually reversible. There are several subgroups within the carbamates.

**Organochlorine Insecticides** were commonly used in the past, but many have been removed for the market due to their health and environmental effects and their persistence (e.g. DDT and chlordane).

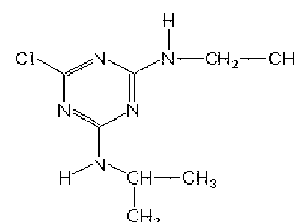
**Pyrethroid Pesticides** were developed as a synthetic version of the naturally occurring pesticide pyrethrin, which is found in chrysanthemums. They have been modified to increase their stability in the environment. Some synthetic pyrethroids are toxic to the nervous system.

With **enzyme-linked immunosorbent assay (ELISA)** method the amount of pesticides in water, soil, and other matrices can be determined.

Ideal instruments for ELISA formats are the BERTHOLD TECHNOLOGIES' absorbance readers Apollo-1 (1 channel) and Apollo-8 (8 channel) or the multimode reader Mithras LB 940.

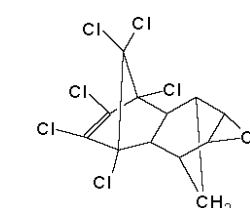
## Atrazine

Atrazine is a selective triazine herbicide used to control broadleaf and grassy weeds in corn, sorghum, sugarcane, pineapple, christmas trees, and other crops, and in conifer reforestation plantings. It is also used as a nonselective herbicide on non-cropped industrial lands and on fallow lands. It is available as dry flowable, flowable liquid, liquid, water dispersible granular and wettable powder formulations.



Atrazine is absorbed by plants mainly through the roots, but also through the foliage. Once absorbed, it is translocated upward and accumulates in the growing tips and the new leaves of the plant. In susceptible plant species, atrazine inhibits photosynthesis. In tolerant plants, it is metabolized. Most crops can be planted 1 year after application of atrazine. Atrazine increases the uptake of arsenic by treated plants.

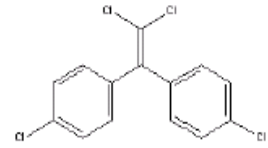
## Cyclodienes



Cyclodienes are chlorinated insecticides that have been used widely for controlling soil insects. Aldrin, which readily breaks down to dieldrin in living system, is used to control soil pests (termites) on corn and potato crops. Dieldrin is used on fruit, soil, seeds and has been used to control vectors of tropical diseases. Aldrin and dieldrin have been banned in most industrialized countries but it's still used in some. Cyclodienes are environmentally stable and are not metabolized very rapidly by animals; they're deposited and stored in fatty tissue. Therefore the potential for biomagnification in food chains is high.

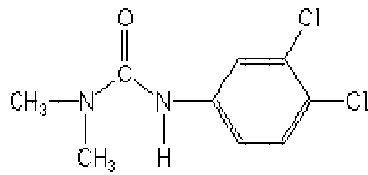
## DDE/DDT

DDT is an organochlorine insecticide used mainly to control mosquito-borne malaria; use on crops has generally been replaced by less persistent insecticides. It was extensively used during the Second World War among Allied troops and certain civilian populations to control insect typhus and malaria vectors, and was then extensively used as an agricultural insecticide after 1945. DDT was banned for use in Sweden in 1970 and in the United States in 1972, although it's still used in other parts of the world. Many insect pests may have developed resistance to DDT.



DDT and its main metabolite DDE, have been found to be toxic to animals, cause birth defects and it's known to be an endocrine disruptor (EDC). DDT is environmentally stable and is not metabolized very rapidly by animals, it's deposited and stored in fatty tissue. Therefore the potential for biomagnification in food chains is high.

## Diuron



Diuron is a substituted urea herbicide used to control a wide variety of annual and perennial broadleaf and grassy weeds. It is used to control weeds and mosses on non-crop areas and among many agricultural crops such as fruit, cotton, sugar cane and legumes. Diuron works by inhibiting photosynthesis.

Diuron has a low acute toxicity to mammals even though the compound can cause eye and throat irritation. Some signs of central nervous system depression have been noted at high levels of diuron exposure. For humans, the only reported case of acute, oral exposure to the herbicide produced no significant symptoms or toxicity.

## Selection of Pesticides detection kits:

### Absorbance technology:

#### Kits:

- Diuron ELISA Kit (Abraxis Kits)
- DDE/DDT ELISA Kit (Abraxis Kits)
- Cyclodienes ELISA Kit (Abraxis Kits)
- Atrazine ELISA Kit (Abraxis Kits)

#### BERTHOLD instruments:

- Apollo Absorbance Readers LB 911/LB 912
- Mithras Multimode Reader LB 940

