



URGENT SOLUTIONS TO URGENT PROBLEMS

# PESTICIDES AND TOXICITY

**Pesticides is the name given to a range of materials that kill or destroy unwanted forms of life. The pesticide is named according to what form of life is destroyed. For example, if unwanted plants, also called weeds, are destroyed the pesticide is called a weedicide or a herbicide. Hence the pesticide types are called miticides, insecticides, fungicides etc. A pesticide belonging to one group may also be effective in killing other unwanted pests, and so belong to two or more groups.**

For centuries there has been a range of pesticides available, with a number of these still used today, including arsenic which is effective against a wide range of unwanted plants, insects, termites and bacteria; and copper sulphate used particularly to stop mildew on grape vines. These centuries old pesticides are mostly compounds of naturally occurring metallic elements such as arsenic, lead, mercury, copper, thallium. We learnt from the alchemists of old and their attempts to transmute base metal into gold that elements cannot be transmuted. Hence once applied they continue to exist where they were applied unless they are leached away by solution into water or oil if present, or physically transported away by being adsorbed to soil particles which are then physically washed away downslope or into a watercourse. They present a problem when, because of over application, their concentration becomes too high, for example excess copper in groundwater is a current problem.

The twentieth century saw the introduction of a range of synthetic pesticides, the bulk of which were introduced into Australia after the second world war. The most notable was DDT, an organochlorine compound used as an insecticide.



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When first introduced DDT was hailed as the great saviour. It prevented the death by malaria of millions of people each year by killing mosquitos, and it killed the insects that ate food crops, allowing the world to feed many more people. The world population grew enormously in the 50 years following its introduction, for example India tripled its population during the period.

Organochlorines are not highly toxic to humans but the difficulty is that they do not degrade quickly and they accumulate in fat so that predatory animals at the top of the food chain can end up with high concentrations in their bodies and these can have effects such as thinning egg shells. Because of this organochlorines were phased out and the more toxic organophosphates were introduced. These have the advantage of not lasting long in the environment. While they present an occupational toxicity problem for people applying them, their long term environmental effects are much reduced.

Herbicides cover a wide range of materials, depending on the type of herbage to be killed and whether some persistence when applied is desired or not. Some are quite toxic to people. One of Getex's staff remembers being approached for help with an analysis method many years ago by people doing a post mortem on two people who had put a red wine coloured paraquat herbicide in a wine bottle for storage, then after a few drinks, had drunk the herbicide. This illustrates the importance of not storing anything other than food in a food container. Staff have also had more recent experience with again a paraquat herbicide applied in a significant quantity of water to the ground and running into the next property where racehorses were kept. One horse died with the herbicide being strongly implicated in the horse's death.

It is interesting to note that the toxicity of a material to various animals depends on a number of factors. In the case of horses, the inability to regurgitate renders them more susceptible to toxins than bovines. As a general rule herbivores are more tolerant to toxins than carnivores as herbivores' livers contain more enzymes to digest toxins which are usually of plant origin. Carnivores lack these enzymes, a good example being cats, which are difficult to treat with drugs or to sedate.

## **Contact GETEX for assistance with PESTICIDES**

***GETEX operates 24 hours/day, 7 days per week  
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