

Agriculture & Pesticides Facts

DO PESTICIDE RESIDUES BUILD UP IN THE BODIES OF ANIMALS?

A group of insecticides introduced following World War II (but no longer in use in North America) exhibited a characteristic known as bio-accumulation or bio-magnification. These products - DDT is the best known example - are very resistant to being broken down either in the environment or in the bodies of organisms that consume them. As a result, they can persist in the environment for several years following application.



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In humans and animals, chemicals are normally dealt with by the body's "waste disposal" systems. Compounds that are soluble in water are removed from the bloodstream by the kidneys and excreted in the urine. Fat-soluble chemicals are broken down by the liver and the breakdown products are excreted in the urine or bile. Because DDT and its relatives are fat-soluble, they are not excreted in the urine. They are also resistant to being broken down in the liver, causing breakdown to occur very slowly. As a result, any that enters the body of an animal tends to remain there, stored in its body fat. An animal is likely to retain and accumulate all of the DDT that is in any plant or animal that it eats.

The concentration of persistent pesticides tends to increase as one progresses up the food chain - the longer the food chain, the greater the accumulation. In aquatic systems, for example, DDT might first be absorbed by algae or some other microscopic plant, which would be eaten by minute aquatic animals (commonly referred to as plankton). These in turn serve as food for minnows which are eaten by larger fish and so on. At each step along the food chain, each animal accumulates all of the DDT present in all of the organisms that it has eaten and all of it is passed along to the animal that eats it.

When DDT was in widespread usage (for control of malaria-carrying mosquitoes and numerous other insect pests), the concentrations in some predatory birds and large fish species built up to very high levels. At the same time, the populations of some species were declining and some exhibited birth defects or other reproductive problems. Because of these concerns, use of DDT and related products was either banned or greatly restricted in many areas by the mid-1970s. (More recently, evidence has emerged to suggest that DDT was not the cause of the problems.)

PESTICIDE RESIDUES AND LIVESTOCK PRODUCTS

Some people caution against eating meat and other products from cattle, pigs or poultry because of the potential risk of consuming elevated pesticide residues. In fact, there is little risk of being exposed to pesticide residues in animal products. Modern pesticides are much less persistent than DDT and are not prone to bio-accumulation. The pesticide registration process in Canada and in most other nations stringently scrutinizes for, and rejects, pesticide products that exhibit such characteristics. Pesticides in use today are much more readily broken down and detoxified, both in the environment and in animal bodies. (See AGCare Factsheet: What Happens to Pesticides that are Applied to Crops?)

The length of the food chain is also a significant factor in bio-accumulation. The more links there are in the chain, the greater the problem. The aquatic systems, in which the symptoms appeared in the 1960s, have many links in the food chain before the top is reached. In agricultural systems, the chain is rarely more than 2 links long (i.e., crops are fed to livestock which are consumed by people). Thus, even if the pesticides now in use were prone to accumulate - which they are not - the potential for accumulation of harmful residues is greatly diminished in comparison to some foodchains in nature.