



PESTICIDE DETECTIVES

SYNTHETIC PYRETHROIDS

Bifenthrin and Permethrin



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What are bifenthrin and permethrin?

Pyrethrins are a natural form of pesticide found in some chrysanthemum flowers. Bifenthrin and permethrin are a class of synthetic pyrethroids that are structurally similar to pyrethrins and act in a similar manner to pyrethrins. Bifenthrin was first registered for use in 1985 by the United States Environmental Protection Agency (U.S EPA). Permethrin was registered for use in 1979 by the US EPA.



Uses of bifenthrin and permethrin



Synthetic pyrethroids (SPs) are now found as an active ingredient in many household insecticides. They are used on pets, on wool carpets, on clothing, for mosquito control and in agriculture. These pesticides are also used in new housing estates for termite control. The occurrence of these pesticides has increased in urban environments.

How do synthetic pyrethroids work?

SPs are effective by contact or ingestion. They affect the central and peripheral nervous system of mammals and invertebrates.



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What happens to bifenthrin and permethrin when they enter the environment?

SPs tend to bind to soil because of their low water solubility. SPs can enter aquatic systems via direct application, drift and runoff. The likelihood for pyrethroids accumulating in sediments of non-flowing aquatic systems such as wetlands and ponds is increasing due to their increased use in urban environments. SPs are highly toxic to fish and aquatic invertebrates. Bifenthrin is also highly toxic to bees.



Sediment quality guideline values for bifenthrin

Sediment quality guideline values do not exist for bifenthrin and permethrin. For bifenthrin, the median lethal effect concentration (LC50) to laboratory-based amphipods exposed to wetland sediment was 1.09 $\mu\text{g/gOC}$. For amphipoda survival, the LC50 was 1.91 $\mu\text{g/gOC}$ bifenthrin (Jeppe et al., 2017).

References

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