

Euphoria from pyrethROIDs?

PyrethRINs are naturally occurring insecticides extracted from the flower *Chrysanthemum cinerariifolium*. They quickly undergo hydrolysis and photolysis and have a lower potency at warmer temperatures. These factors make human toxicity minimal. PyrethROIDs are synthetic derivatives that are more stable, less volatile, have a prolonged residual duration of several days, and are more likely to cause symptoms in humans. PyrethROIDs are categorized into two groups. Type II pyrethROIDs contain a cyano group, which enhances the neurotoxicity in mammals and insects, and thus they are thought to be more neurotoxic than type I. Examples of type II pyrethROIDs include cyhalothrin, cypermethrin, and deltamethrin. Pharmaceutical uses of pyrethROIDs include topical applications for lice and scabies.

The primary action of pyrethRINs and pyrethROIDs is the prolonged opening of the voltage-dependent sodium channel, resulting in hyperexcitability. Other mechanisms include the opening of various voltage-dependent chloride channels. At higher concentrations, pyrethROIDs can antagonize GABA-gated chloride channels. Both types of pyrethROIDs produce potent sympathetic activation. Animal studies showed that type I pyrethROIDs can cause fine tremor and reflex hyperexcitability, whereas type II pyrethROIDs can cause choreoathetosis, salivation, hyperexcitability, coarse tremor, and seizures (*J Toxicol Clin Toxicol*. 2000;38(2):95-101). Inhalation of large amounts may cause wheezing, hypersensitivity pneumonitis, and pulmonary edema (*Crit Care Med* 2019 Jan;47(1):538). Dermal exposure may cause paresthesia (*J Toxicol Clin Toxicol* 2000;38(2):95-101).

"Wasp dope" is a term used to describe pyrethROID misuse. A mixed-method epidemiology study was done on five rural Appalachian Kentucky counties to describe the use of wasp dope in people who use drugs (*Addiction* 2021 Jul;116(7):1901-1907). Participants were recruited and were asked about recent wasp dope use within the past six months, injection drug use, and demographics. Users were more likely to be male, experienced homelessness within the last six months, and had difficulties with transportation within the last six months. Injection drug use and use of several specific substances were both associated with recent wasp dope use, with methamphetamine being the strongest association.

Management of systemic exposure is largely supportive. Give benzodiazepines or other GABA-A agonists for seizures (*Indian J Crit Care Med* 2019 Dec;23(Suppl 4):S267-S271). Bronchodilators and corticosteroids can be used for symptomatic inhalation exposure.

Contact your local poison center at 1-800-222-1222 for patient-specific treatment recommendations for pyrethrin or pyrethROID poisoning.



Did you know?

There are several lay terms for pyrethROID misuse.

Common terms for pyrethROID misuse include "wasping", "wasp dope", and "hot shots". As described in the literature, methods of abuse include electrifying the insecticide bottle or spraying the insecticide onto a heated metal sheet, such as aluminum foil. When the contents turned into crystals, users may inhale or smoke it to get the "rush" or "high" effects. Intravenous use has also been reported (*Case Rep Psychiatry*. 2014;2014:169294 and *Psychosomatics*. Sep-Oct 2019;60(5):535-536).

Angela Lam, PharmD, BCCCP, BCPS,
BCOP

Clinical Toxicology Fellow



@MPCToxTidbits