

Common Pesticide Poisons Homes Insecticides Said to Degrade Rapidly Show persistence

By Aviva Glaser

A study published in the *International Journal of Hygiene and Environmental Health* (208: 193-199) finds that synthetic pyrethroids persist in house dust and air in significant concentrations for months after they are applied, disproving the popular myth that they are not long lasting. This class of chemicals is found in such common insecticides as Talstar®, Demon®, Raid® Roach Fogger, Ambush®, and Dagnet®.

Synthetic pyrethroids are chemically formulated versions of the natural-based pesticide pyrethrum, made from extracts from plants in the chrysanthemum family. A widely used class of insecticides, synthetic pyrethroids are designed to be more toxic and longer lasting than pyrethrum, and therefore are more potent to insects and pose more risks to humans.

The study, "Pyrethroids Used Indoor – Ambient monitoring of pyrethroids following a pest control operation," by researchers in various institutes in Germany, specifically looks at the pyrethroids cyfluthrin, cypermethrin, deltamethrin, and permethrin. The researchers collected dust and airborne particles in 19 houses and buildings one day before treatments by pest control operators. They compared these baseline levels of synthetic pyrethroids to levels one day after the treatment, 4-6 months after, and 10-12 months after.

One day after application, all of the pyrethroids were detected in significantly increased concentrations in the houses. Over the course of the following months, the concentrations all decreased. However, after 4-6 months, all four chemicals could still be detected. Shockingly, as long as one year after treatment, both permethrin and cyfluthrin levels remained elevated in house dust, in what the authors called "general background level[s]," indicating that these two pyrethroids especially have very slow degradation times.

Earlier this summer, the Centers for Disease Control (CDC) released its *Third National Report on Human Exposure to Environmental Chemicals*. The CDC, which tracks the human "body burden" of chemicals, included synthetic pyrethroids in the study for the first time ever. The study finds that exposure to synthetic pyrethroids is widespread; specifically, permethrin, cypermethrin, deltamethrin, and/or their metabolites were all found in greater than 50% of the subjects tested.

These two new studies are particularly worrisome in light of the many health problems associated with synthetic pyrethroids. Exposure to synthetic pyrethroids has been reported

to lead to headaches, dizziness, nausea, irritation, and paresthesia (skin sensations). There are also serious chronic health concerns related to synthetic pyrethroids. EPA classifies both permethrin and cypermethrin as possible human carcinogens, based on evidence of lung tumors in lab animals exposed to these chemicals.¹ Many synthetic pyrethroids have been linked to disruption of the endocrine system, which can adversely affect reproduction and sexual development, interfere with the immune system, and increase chances of breast cancer. EPA lists both permethrin and cypermethrin as suspected endocrine disruptors.²

Synthetic pyrethroids have also been linked to respiratory problems such as hypersensitization, and may be triggers for asthma attacks.³ Material Safety Data Sheets, issued by the Occupational Safety and Health Administration (OSHA), for pyrethroid products often warn, "Persons with history of asthma, emphysema, and other respiratory tract disorders may experience symptoms at low exposures." In view of the fact that asthma is the most common long-term childhood illness today, persistent residues of pyrethroids in house dust and air need to be taken very seriously.

Children are especially sensitive to the effects of permethrin and other synthetic pyrethroids. A study found that permethrin is almost five times more toxic to eight-day-old rats than to adult rats due to incomplete development of the enzymes that break down pyrethroids in the liver.⁴ Additionally, studies on newborn mice have shown that permethrin may inhibit neonatal brain development.⁵

Although synthetic pyrethroids are often seen as safe alternatives to organophosphate insecticides, this study clearly demonstrates that when these chemicals are applied in houses, they do not disappear. Moreover, they are making their way into human bodies at alarming rates. At the same time, there are clear established methods for managing buildings that prevent infestation of unwanted insects without the use of synthetic chemicals,⁶ including exclusion techniques, sanitation and maintenance practices, as well as mechanical and least toxic controls (which include boric acid and diatomaceous earth). Based on the host of health effects linked to this chemical class, synthetic pyrethroid use in the home is hazardous and unnecessary, and the effects of long-term low dose exposure need to be more thoroughly studied.

Endnotes

¹ US EPA. 2002. List of Chemicals Evaluated for Carcinogenic Potential. Office of Pesticide Programs. Washington, DC; Cox, C. 1998. Permethrin. *Journal of Pesticide Reform* 18(2): 14-20.

² Illinois Environmental Protection Agency. 1997. *Endocrine Disruptors Strategy*. Springfield, IL: EPA.

³ Beyond Pesticides, 2005. *Asthma, Children, and Pesticides: What You Should Know To Protect Your Family*. Washington, DC: 15 pages.

⁴ Cantalamessa, F. 1993. Acute toxicity of two pyrethroids, permethrin and cypermethrin, in neo-natal and adult rats. *Archives of Toxicology* 67: 510-513.

⁵ Imamura L, H. Hasegawa, K. Kurashina, T. Matsuno, and M. Tsuda. 2002. Neonatal exposure of newborn mice to pyrethroid (permethrin) represses activity-dependent c-fos mRNA expression in cerebellum. *Archives of Toxicology* 76(7): 392-397.

⁶ Brenner, BL, S Markowitz, M Rivera, et al. 2003. Integrated pest management in an urban community: a successful partnership for prevention. *Environmental Health Perspectives*. 111(13):1649-53.