School Pesticide Monitor

A Bi-Monthly Bulletin on Pesticides and Alternatives
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Children at Risk from Cumulative Pesticide Exposure

Researchers at UC Davis and UCLA conducted an analysis of the toxic compounds in food that children and adults are exposed to through a normal diet. The study, entitled "Cancer and non-cancer health effects from food contaminant exposures for children and adults in California: a risk assessment" is published in the journal *Environmental Health* (available online at bit.ly/XERC50).

"We focused on children because early exposure can have long-term effects on disease outcomes," said Rainbow Vogt, Ph.D., lead author of the study. "Currently, the U.S. Environmental Protection Agency (EPA) only measures risk based on exposures of individual contaminants. We wanted to understand the cumulative risk from dietary contaminants. The results of this study demonstrate a need to prevent exposure to multiple toxins in young children to lower their cancer risk."

Researchers performed their risk assessment by estimating exposure to food contaminants based on self-reported food frequency data for eleven toxic compounds-acrylamide, arsenic, lead, mercury, chlorpyrifos, permethrin, endosulfan, dieldrin, chlordane, DDE, and dioxin. Data was drawn from the 2007 "Study of the Use of Products and Exposure-Related Behavior," (available online at 1.usa.gov/RE7Xu5) which examines behaviors that influence exposure to toxicants in the home environment. Normal consumption patterns were then measured against established benchmarks for cancer risks and other non-cancer health risks.

Results of the study are of particular concern for parents with young children. Every child in the study exceeded the cancer benchmarks for arsenic, dieldrin, DDE and dioxin. Moreover, children exceeded the non-cancer and cancer benchmarks by a greater margin than adults for all compounds. In fact, preschool-age children (years 2-4) were significantly more likely to have higher

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Pesticide Exposure Linked to Rising Food Allergies

According to the Centers for Disease Control and Prevention (CDC), allergies in children rose 18 percent between 1997 and 2007 to 4-6 percent of children who are affected by food allergies. Given these statistics, there's a good chance that one of your students or your child's classmates has a food allergy. A new study may shed some light on why these allergies so rampant and on the rise in the U.S., and suggests that exposure to certain chemicals in tap water may be partially to blame.

The study, published in the December issue of *Annals of Allergy, Asthma and Immunology* (see bit.ly/Ud5ndD) finds that exposure to dichlorophenols may be associated food allergies. Dichlorophenols are used as an intermediary in the manufacturing of some of the most commonly used pesticides, such as 2,4-D, and are also used to chlorinate drinking water.

Lead researcher Elina Jerschow, M.D. and her associates analyzed the urine of Americans who were participants in the U.S. National Health and Nutrition Examination Survey (NHANES) of 2005-2006. Participants with higher levels of dichlorophenols are more likely to have allergies then those with low levels present in their urine.

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Cumulative Risk

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dietary intakes relative to their body weight for acrylamide, lead, chlordane, dieldrin, DDE, and dioxins compared to older children (years 5-7). As co-author of the study, Irva Hertz-Picciotto, Ph.D. notes, "We need to be especially careful about children, because they tend to be more vulnerable to many of these chemicals and their effects on the developing brain."

The authors note that data on cumulative exposure to individual pesticides does not provide a holistic view of the chemicals children are exposed to throughout their young lives. The study explains, "Since exposures may operate synergistically, additively, or even antagonistically, a more comprehensive approach to establishing safe contaminant levels in food would consider the hundreds of chemicals humans are exposed to on a daily basis through a number of different routes and from different sources."

Of particular note for environmental regulators is the significant presence of DDE, a breakdown product of the legacy chemical DDT. Co-author of the study Deborah Bennett, Ph.D. notes, "Given the significant exposure to legacy pollutants, society should be concerned about the persistence of compounds we are currently introducing into the environment. If we later discover a chemical has significant health risks, it will be decades before it's completely removed from the ecosystem."

The study does review alternative strategies to reduce risk. Researchers put forward the idea of eating a varied diet and consuming many different types of foods because, for instance, certain chemicals may be found in lettuce and broccoli, while others in peaches in apples. The goal in this approach would be to minimize excessive exposure to a certain chemical. However, as the authors noted early in the study, attempting to minimize risk by eating a varied diet could lead to unknown consequences. Different chemicals can operate synergistically, possibly increasing the potency of other chemicals.

In light of the gaps in EPA's regulatory process, Beyond Pesticides advocates for an alternatives assessment in environmental rulemaking. An alternatives assessment would reject the use of exposures that are considered acceptable under the current risk assessment calculations because the availability of safer alternatives deems them unnecessary.

A plausible strategy to avoid chemical exposure, the authors note, is to choose organic food. Organic certification is the only system of food labeling that is subject to independent public review and oversight, assuring consumers that toxic, synthetic pesticides used in conventional agriculture are replaced by management practices focused on soil biology, biodiversity, and plant health. This eliminates commonly used toxic chemicals in the production and processing of food that is not labeled organic, therefore reducing overall pesticide exposure.

Allergies

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Researchers in this study argue that by consuming high levels of dichlorophenols individuals are altering the composition of bacteria in their stomachs. By over consuming dichlorophenols individuals are exposed to too few healthy bacteria, which makes them more sensitive to food allergies.

"Previous studies have shown that both food allergies and environmental pollution are increasing in the United States," said Dr. Jerschow. "The results of our study suggest these two trends might be linked, and that increased use of pesticides and other chemicals is associated with a higher prevalence of food allergies."

Dichlorophenol chemicals are used to manufacture pesticides and may appear in the environment as these pesticides break down. 2,4-Dichlorophenol is a breakdown product of 2,4-D, which has been found to be a cancer promoter and an endocrine disruptor. The controversial antibacterial triclosan also breaks down into 2,4-Dichlorophenol when it interacts with chlorinated water. The chemical 2,5-Dichlorophenol has also been linked to childhood obesity.

Even though dichloprophenols have been discovered in drinking water, opting for bottled water may not reduce the risk for developing allergies. According to Dr. Jerschow, "Other dichlorophenol sources, such as pesticide-treated fruits and vegetables, may play a greater role in causing food allergy." The only way to avoid pesticide-treated fruits and vegetables is to purchase produce that is USDA certified organic.

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