

School Pesticide Monitor

A Bi-monthly Bulletin on Pesticides and Alternatives



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Beyond Pesticides / National Coalition Against the Misuse of Pesticides
701 E Street, SE, Suite 200 • Washington, DC 20003 • 202-543-5450
info@beyondpesticides.org • www.beyondpesticides.org

Latest Studies Confirm the Risks of Antibacterial Products

The common antibacterial chemical triclosan is widely used in personal care products—including soaps, deodorants, cosmetics, detergents, cleansing lotions, wipes and toothpastes—as well as plastics and fabrics. Despite their increased use, Rolf Halden, Ph.D., an environmental scientist at the Johns Hopkins University and Arizona State University, points out that household antibacterial soaps are ineffective against bacteria and do not kill cold, flu, or intestinal viruses.

Recently published research builds on the existing body of evidence showing that antibacterial products containing triclosan are ineffective and threaten public health and the environment. Triclosan has already been linked to skin irritations, allergy susceptibility, depression of the central nervous system, bacterial and compounded antibiotic resistance, and dioxin contamination, as well as the destruction of fragile aquatic ecosystems. With thousands of antimicrobial products on the market, scientists are saying that the most effective way to fight germs is with plain soap and water.

Body Burden. A new Swedish study, published in *Science of the Total Environment*, finds triclosan in the plasma and breast milk of nursing mothers. The study finds that triclosan may exert adverse effects on biological systems by interfering with the biotransformation of compounds that are inside and outside the body.

A study published in *Environmental Health Perspectives* found urinary concentrations of triclosan in three out of four individuals tested, with concentrations highest during the third decade of a person's life and among those with higher household incomes. The study illustrates the ubiquitous nature of triclosan.

Thyroid Disruption. At environmentally relevant levels, triclosan has been shown to interfere with the thyroid hormone in frogs, affecting the timing of metamorphosis in tadpoles. Results of a study, published in *Aquatic Toxicology*, indicate that low levels of triclosan can potentially affect the human thyroid gland. The thyroid plays a role in development, body temperature and metabolism. "Frogs serve as a very sensitive sentinel species for chemicals that can actually disrupt thyroid hormone action," said University of Victoria molecular biologist Caren Helbing, Ph.D., one of the authors of study, *The bactericidal agent triclosan modulates thyroid hormone-associated gene expression and disrupts postembryonic anuran development.* "Triclosan at levels measured

in our waterways can actually affect how thyroid hormones work in frogs."

Antibiotic Resistance. Antibacterial soaps may render some common antibiotics less effective, says University of Michigan public health professor Allison Aiello, Ph.D. According to her study published in *Clinical Infectious Diseases*, triclosan works by targeting a biochemical pathway in the bacteria that allows the bacteria to keep its cell wall intact. Because of the way triclosan kills the bacteria, mutations can happen at the targeted site. Dr. Aiello says a mutation could mean that triclosan can no longer get to the target site to kill the bacteria because the bacteria and the pathway have changed form. Thus, it may cause some bacteria
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Staying Clean and Healthy Without Triclosan

When used outside of health care settings, triclosan is unnecessary, and constant exposure to triclosan becomes a health and environmental hazard. The best solution to preventing infections is plain soap and water.

- Wash hands frequently and thoroughly. Regular soaps lower the surface tension of water, washing away unwanted bacteria.
- Lather hands for at least 10 to 15 seconds and then rinse off in warm water. It is important to wash hands often, especially when handling food, before eating, after going to the bathroom, and when someone in your house is sick.
- Dry hands with a clean towel to help brush off any germs that did not get washed down the drain.
- Take time to teach children the correct way to wash their hands.
- Wash surfaces that come in contact with food with a detergent and water.
- Wash children's hands and toys regularly to prevent infection.
- Because triclosan has become so ubiquitous in soaps and toiletries, make sure to carefully read all ingredients when buying these products. Triclosan is also known as Irgasan and Microban.
- Check with your school to see if it uses triclosan-containing products in its classrooms and bathrooms.
- If you feel like you need antibacterial protection, Australian tea tree oil and grapefruit seed extract, included in some natural soaps, have antimicrobial properties.
- Alcohol-based antibacterial sanitizers, such as Purell, do not carry the same risks of antibiotic resistance and dioxin contamination as triclosan-containing products.

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(202) 543-5450

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Triclosan Provides No Added Protection from Bacteria

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to become resistant to commonly used antibiotics such as amoxicillin.

With the rise of antibiotic-resistant bacteria responsible for an increasing number of hospitalizations, deaths and school closures, public health advocates are concerned over the rampant overuse of antibacterial products and antibiotics.

Environmental Effects. Over 95% of triclosan uses are in consumer products that are disposed of down sink drains. Triclosan cannot be completely removed from wastewater by conventional treatment processes. It has been found in both wastewater effluent and sewage sludge where it is then carried to streams and rivers, destroying aquatic ecosystems, and/or is spread on agricultural fields. Dr. Halden points out that triclosan is found in fish and waterways and may kill beneficial organisms in soil and water. Most recently, a study published in *Environmental Science and Technology*, finds triclosan in earthworms living in sewage sludge, indicating that such chemicals are entering the food chain.

The findings in water are of serious concern in light of a previous study by Virginia Tech researchers, who found that triclosan reacts with chlorine in tap water to form significant quantities of chloroform. Chloroform is classified by the Environmental Protection Agency as a probable human carcinogen. The research also suggests that the reaction of triclosan with chlorine could produce highly chlo-

minated, and thus dangerous, dioxins in the presence of sunlight.

Soap and Water Beat Antibacterials. In the first known comprehensive analysis of whether antibacterial soaps containing triclosan work better than plain soaps, Dr. Aiello finds that washing hands with an antibacterial soap is no more effective in preventing an infectious illness than plain soap. Moreover, antibacterial ingredients in soaps sold to the public do not remove any more bacteria from the hands during washing than plain soaps.

Dr. Aiello's study finds that e-coli bacteria in lab experiments shows resistance when exposed to as little as 0.1 percent weight/volume triclosan soap. "[T]hese e-coli could survive in the concentrations that we use in our (consumer formulated) antibacterial soaps," Dr. Aiello said. Researchers reviewed 27 studies, from 1980 to 2006, and found that soaps containing triclosan within the range of concentra-

tions commonly used in the community setting (0.1 to 0.45 percent wt/vol) are no more effective than plain soaps.

Some researchers say that the public needs to realize that some bacteria are beneficial to human health. Kimberly Thompson, Sc.D., a professor of risk analysis and decision science at Harvard University says, "The flood of antimicrobial products is driven by monetary profits, and not by scientific evidence."

Water Utilities Take on Triclosan. Some water utilities are phasing out the use of triclosan because of its impact on health and the environment. The East Bay Municipal Utility District in Oakland, CA wrote in its newsletter, "Because the American Medical Association says that regular soap and water are just as effective," the utility is phasing out its use of antibacterial soaps.

Consult *Beyond Pesticides'* Triclosan Fact-sheet for more information.

Celebrate National Healthy Schools Day Monday April 28, 2008

National Healthy Schools Day is a day to promote healthy school environments for students and school personnel. Healthy Schools Network, a nonprofit environmental health organization, is coordinating nationwide events that educate the community, parents, teachers, and school decision makers about the importance of a healthy school environment. There are many ways to get involved from demonstrating integrated pest management (IPM) practices and products to writing a letter to your school asking them to use green cleaning products or an IPM program. See www.nationalhealthyschoolsday.org or call 518-462-0632.