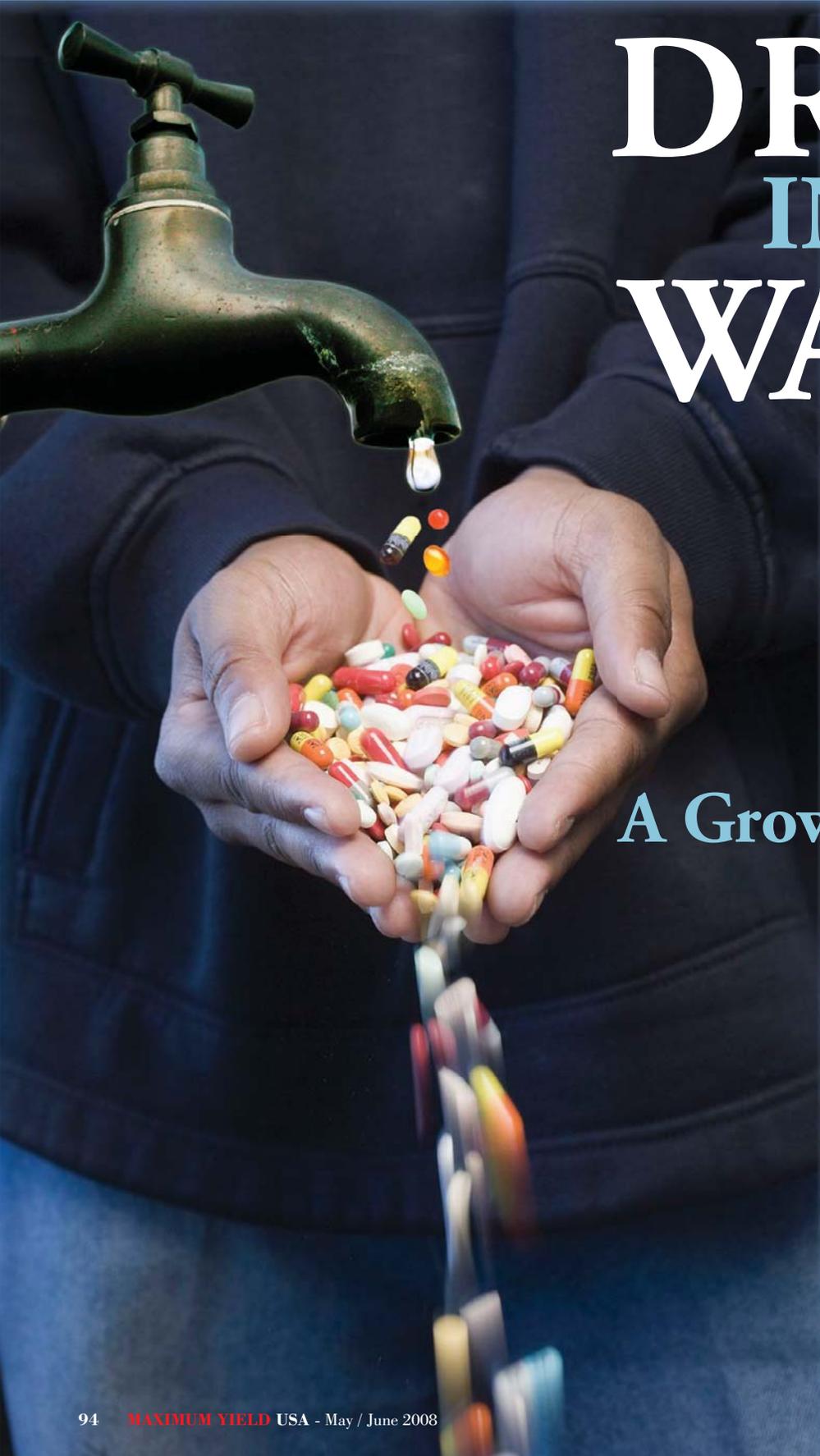


by Richard Gellert

A photograph showing a person's hands cupped together, holding a large quantity of various pills and capsules. Above the hands, a single pill is falling from a faucet, suggesting that drugs are being poured into the water supply. The background is a solid blue color.

DRUGS IN OUR WATER

A Growing Concern

A recent five-month investigation of our nation's drinking water ended with the discovery of an alarming plethora of drugs lurking in the water. That's right folks — your tap water is chock full of pharmaceutical goodies. A virtual medicine cabinet full of antibiotics, sex hormones, anti-depressants, and street drugs are hiding in the water you and your plants drink. No need to panic just yet, because this is nothing new. These nasty ingredients have been in your water a long time without the public knowing about it. Thankfully, with the proper knowledge you can protect your families and gardens against these potentially harmful substances.



pharmaceuticals on the EPA list.

Ask the pharmaceutical industry whether the contamination of water supplies is a problem, and officials will tell you no. "Based on what we now know, I would say we find there's little or no risk from pharmaceuticals in the environment to human health," said microbiologist Thomas White, a consultant for the Pharmaceutical Research and Manufacturers of America.

One of the most alarming quotes from the report is the following from the Philadelphia Water Department: "It would be irresponsible to communicate to the public about this issue, as doing so would only generate questions that scientific research has not yet answered." Well, I guess no one really knows if we are being harmed, so might as well keep it under the rug.

How Do the Drugs Get Into the Water?

According to the investigation, the drugs get into the drinking water supply a number of ways: some people flush unneeded medication down toilets; other medicine gets into the water supply after people take medication, absorb some, and pass the rest out in urine or feces. In fact, some studies suggest that almost 90 percent of the active compounds in medicines can pass through the human body. Most pharmaceuticals remain even after wastewater treatments and cleansing by water treatment plants.

Human waste isn't the only source of contamination. Cattle, for example, are given ear implants that provide a slow release of trenbolone, an anabolic steroid used by some bodybuilders, which causes cattle to bulk up. But not all the trenbolone circulating in a steer is metabolized. A German study showed 10 percent of the steroid passed right through the animals. Water sampled downstream of a Nebraska feedlot had steroid levels four times as high as the water taken upstream.



Why Didn't They Tell Us?

Utilities and government agencies insist the water is safe. I don't know about you, but I find it increasingly more difficult to trust the word of our government or large corporations. Of course they are going to tell us it's safe. Otherwise mass hysteria would break out, right? But how safe is it? What long-term effects do these drugs have on our bodies? Do plants take up, store, and even concentrate these trace amounts in the fruits and flowers that we enjoy?

Water providers rarely disclose results of pharmaceutical screenings, unless pressed, the study learned. For example, the head of a group representing major California suppliers said the public "doesn't know how to interpret the information" and might be unduly alarmed. When researchers make the same discoveries, they usually don't identify the cities involved. There are plenty of reasons offered for the secrecy: concerns about national security, fears of panic, a feeling that the public will not understand, even confidentiality agreements.

"That's a really sensitive subject," said Elaine Archibald, executive director of California Urban Water Agencies, an 11-member organization comprising the largest water providers in California. She said many customers "don't know how to interpret the information. They hear something has been detected in source water and drinking water, and that's cause for alarm, just because it's there." Water providers are not required to tell people if they find a contaminant that is not on a U.S. Environmental Protection Agency list. To date, there are no

Only in City Water?

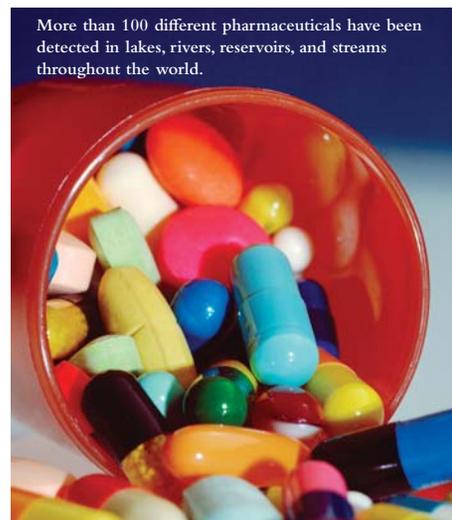
While it seems like the majority of the problems would be linked to major metropolitan areas, the study found mounds of evidence to the contrary. Rural consumers who draw water from their own wells aren't in the clear either. Nor are those that have natural springs or a surface source.

The investigation also indicates that watersheds, the natural sources of most of the nation's water supply, also are contaminated. Pharmaceuticals can also permeate aquifers deep underground, the source of 40 percent of the nation's water supply. Federal scientists who drew water in 24 states from aquifers near contaminant sources such as landfills and animal feed lots found trace levels of hormones, antibiotics, and other drugs.

Contamination is not confined to the United States. More than 100 different pharmaceuticals have been detected in lakes, rivers, reservoirs, and streams throughout the world. Studies have detected pharmaceuticals in waters throughout Asia, Australia, Canada, and Europe, even in Swiss lakes and the North Sea.

Health Affects To Humans and Plants

While researchers do not yet understand the exact risks from decades of persistent exposure to random combinations of low levels of pharmaceuticals, recent studies (which have gone virtually unnoticed by the general public) have found alarming effects on human cells and wildlife. Recent laboratory research has found that small amounts of medication have affected human embryonic kidney cells, human blood cells, and human breast cancer cells.



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Sarah Janssen, from the Natural Resources Defense Council, has the following to say about human health affects: "We don't know. It's true that the levels of the medications found in drinking water are very low. But especially when it comes to pharmaceuticals that are synthetic

hormones, there is concern, because hormones work at very low concentrations in the human body." Again, it's not known, Janssen says. "We know that kids, including babies and toddlers, as well as fetuses, are more susceptible to environmental exposures because their bodies are still developing and their exposure on a pound-per-pound basis is higher. And they lack the detoxification system adults have. So it is not unreasonable to expect they would be at higher risk."

Although much more research needs to be done on how humans and animals are affected, one can only wonder how the plants we ingest store the contaminants from the water they are given. The toxic compounds are so small in size on the molecular level that they easily penetrate the cell walls of plant roots and leaves. We are merely guessing if these substances end up accumulating in plant tissue and fruits only to be ingested by humans at much higher concentrations.

Not even certified organic produce is immune to the possible accumulation of these toxins from their water source. Think you are giving your prized fruits and vegetable an all-organic diet? You better think again when the water they receive contains pharmaceuticals. This also goes for natural- and organic-raised livestock and poultry. In fact, they are more likely to have high concentrations of these substances because, after all, they drink water too.

What's Being Done?

As a result of the recent investigation, Senate hearings have been scheduled by Barbara Boxer and others. There have been calls for Federal solutions such as the EPA expanding their contaminant list to include pharmaceuticals. The pharmaceutical industry said they would launch a new initiative with the U.S. Fish and Wildlife Service focused on telling Americans how to safely dispose of unused medicines. Officials in many cities say they aren't going to wait for guidance from Washington to begin testing.

The subject of pharmaceuticals in drinking water was discussed when 7000 scientists and regulators from 45 countries gathered in Seattle for the annual meeting of the Society of Toxicology. "The public has a right to know the answers to these questions," said Dr. George Corcoran, the organization's president. Hmm...you think?

What Can You Do?

When disposing of expired or unneeded medications, don't flush them down the toilet. Put them in a sealed plastic bag and throw them in the trash or, better yet, bring them to a hazardous waste disposal facility.

Contact your local public utilities and ask them what pollutants they test for in drinking water. This is one way to raise awareness of the problem. Contacting your senator or congressman is another. Joining an environmental advocacy group and bringing the subject to the forefront will also help the public be more aware of and concerned about the situation.

Boiling your drinking water will not solve the problem. Forget about bottled water as a way to escape the low levels of drugs found in some public water supplies. Twenty-five percent of the world's bottled water comes from the tap. In the U.S. that percentage is considerably higher with companies like Coca-Cola and Pepsi, leading sales with filtered tap water brands of bottled water such as Dasani and Aquafina.

Will Water Filters Help?

One technology, reverse osmosis, removes virtually all pharmaceutical contaminants but is very expensive for large-scale use. Much of the bottled water that originated from tap water is run through an RO machine, but it is difficult to remove 100 percent of the contaminants with these industrial-sized systems. Analysis of bottled water that has been filtered from tap water reveals levels of 30+ ppm in many cases. Point of use, or home reverse osmosis machines, can effectively remove 99+ percent of everything, including pharmaceuticals. Analyzing the product water from high-quality home RO machines reveals levels from zero to 5 ppm in most cases.

Because removing pharmaceutical traces from water is logistically challenging, reverse osmosis is widely agreed upon as the best available treatment method. With these systems, water undergoes the reverse osmosis procedure, effectively filtering out the heavier molecular particles common in many pharmaceutical drugs. The RO system also removes contaminants such as arsenic, lead, copper, sodium, nitrate/nitrite, fluoride, cysts, dissolved solids, and chlorine taste and odor. Tests from the Colorado School of Mines revealed that high-pressure and low-pressure reverse osmosis as well as nano-filtration may provide an effective treatment barrier for trace organic compounds, including disinfection by-products, pesticides, solvents, endocrine-disrupting compounds, and pharmaceutically active compounds.

Although many under-sink filters contain activated carbon, water does not remain in contact with the carbon filter long enough to sufficiently remove pharmaceutical remnants. Since reverse osmosis is exceedingly expensive to execute on large-scale supplies, drinking-water treatment plants frequently employ chlorine. There's scientific evidence that adding chlorine makes some pharmaceuticals even more toxic to humans.

Water-filter pitchers, instant filtration cartridges, and as we've learned, bottled water, are no longer a viable match against today's complex drinking water contaminants. Reverse osmosis systems offer water that is both clean and delicious. We should never have to wonder what, exactly, our families, animals, and plants are drinking.

Anybody thirsty?

