Frequently Asked Questions

Risk Assessment Study of PPCPs in Recycled Water to Support Public Acceptance

These frequently asked questions are intended for utility managers, public information officers and/or community affairs staff responsible for fielding questions or providing information to communities considering the use of recycled water as a part of their water supply portfolio.

What are the most common uses for recycled water?

In California, agriculture accounts for approximately 50 percent of recycled water use while landscape irrigation accounts for about 20 percent. Recycled water has safely been used to irrigate public facilities such as school grounds, athletic fields, golf courses, parks, common areas of residential neighborhoods, and lawns of single-family residences for many years. There have not been any reported cases of illness or allergies as a result of its use for landscape irrigation or agricultural uses. Other uses include industrial applications and groundwater recharge.

Is recycled water safe?

Yes it is. Tertiary-treated recycled water meets standards that allow it to be used for most non-drinking purposes. In California, the Regional Water Quality Control Board and California Department of Public Health have strict permitting and monitoring procedures to ensure the reliability of treatment processes and controlled use of recycled water. Disinfected tertiary-treated recycled water is virtually free from all pathogens, including viruses. Several long-term microbiological studies involving thousands of samples have confirmed that pathogens are reduced to non-detectable or insignificant levels in tertiary-treated recycled water.

What are Pharmaceuticals and Personal Care Products (PPCPs)?

Pharmaceuticals and Personal Care Products are products used by individuals for personal health or cosmetic reasons. PPCPs comprise a diverse collection of thousands of chemical substances, including prescription and over-the-counter therapeutic drugs, fragrances, lotions, and cosmetics.

How do PPCPs end up in recycled water?

The treatment process for wastewater is not designed to remove all the chemicals that become part of the waste stream through human consumption and excretion. Numerous studies have shown that residual amounts of PPCPs remain in treated wastewater effluent at trace concentrations. PPCPs are believed to enter municipal wastewater through bathing, cleaning, laundry, and the disposal of unused pharmaceuticals and human waste.

Is there a treatment process that will remove pharmaceuticals?

The wastewater industry is investing millions of dollars into research to analyze the benefits of different treatment processes. Last year, one industry group undertook a study that compared the effectiveness of various treatment/removal processes for a variety of of pharmaceuticals. The industry is currently conducting research to determine which processes are most effective in removing various chemical compounds, including pharmaceuticals.

How high are the concentrations of PPCPs in recycled water?

This depends on the level of treatment and the methods used by the wastewater treatment plant that produces your recycled water. Typically, trace levels of PPCPs in recycled water are found in the low microgram (parts per billion) per liter range to the low nanogram (parts per trillion) per liter range. For this study, we used the 90th percentile of measured occurrence data for secondary and tertiary-treated recycled water presented in: *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water. Recommendations of a Science Advisory Panel. Final Draft. California State Water Resources Control Board. June 25, 2010.*

Do these concentrations pose a risk to children on playgrounds and in parks?
The risk assessment showed that measured concentrations of PPCPs in recycled water do not pose unacceptable risks to children on playgrounds and parks. To help us understand that the health risks from recycled water are minimal, we can compare the exposure of a child on a playground irrigated with recycled water containing trace amounts of a specific PPCP, such as a common antibiotic, against a more familiar exposure, such as an adult dose of that same antibiotic that one might get from the doctor's office. In this example, a child would have to play on a playground for an hour per week, six months per year, with constant contact with recycled water, for 1,900,000 years before being exposed to the equivalent of one dose of that antibiotic.

Is there a risk for landscape or agricultural workers who come in contact with recycled water?
The relative risks due to exposure for these workers is greater than for a child on a playground, but the risks are still well within an acceptable range. For instance, assuming a landscape worker is exposed to recycled water for an entire 8-hour work day, it would take 69,000 years for that worker to receive the equivalent of one dose of a common antibiotic.

How do these risks compare with risks from other chemicals occurring in food or air?
Risks from PPCPs in recycled water are very low compared to risks from other types of chemicals that we eat and breathe every day. Chemicals have been detected in our food and air at concentrations higher than what the government has deemed to be acceptable. For example, benzene, a constituent of gasoline known to cause cancer, has been detected in outdoor air at levels nine times greater than acceptable levels. PCBs, an industrial chemical banned in the U.S. over 30 years ago because of its harmful effects, has recently been measured in grocery store-bought fish at concentrations five times greater than acceptable levels. All of the PPCPs studied in this risk assessment were measured in recycled water at concentrations many times *lower* than acceptable levels for non-potable uses, indicating that risks from PPCPs in non-potable recycled water exposure are much less than risks from other chemicals we are exposed to in our daily lives.

What is risk assessment?
Risk assessment is a process that examines the toxicity of a chemical and the estimated exposure to that chemical to determine the risk to human health. So, risk is a combination of toxicity and exposure (Risk= Toxicity x Exposure). This study used the U.S. EPA risk assessment methodology, which includes assessing exposure, toxicity and characterization of risk.

An exposure assessment identifies the situations in which a person might be exposed to a chemical, and estimates the level of exposure based on the length and type of exposure. Toxicity assessment evaluates 1) whether the exposure could cause harmful health effects, and 2) the relationship between the level of chemical exposure and the degree of the harmful health effects. Some chemicals may be harmful at small doses, and some chemicals may require a large dose before any harmful effects occur. By combining exposure and toxicity assessments, risks can be quantified and compared with acceptable levels of risk.

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