

Pop those 'BPA-free' drinking bottles into the dishwasher before using them

April 29 2021, by Cedric Ricks



Credit: University of Cincinnati

As part of a laboratory experiment, Rebecca Holmes examined water bottles that had been acquired from abroad expecting to find bisphenol A (BPA), a human-made component commonly found in polycarbonate plastics used to make consumer products.

What she found, however, was those [water](#) bottles were just fine, yet some control bottles purchased in the United States and supposedly BPA-free actually contained traces of the chemical now thought to negatively impact heart health.

Holmes, a researcher formerly in the laboratory of Hong-Sheng Wang, Ph.D., professor in the UC Department of Pharmacology and Systems Physiology, was working on her master's degree in molecular, cellular and biochemical pharmacology in the College of Medicine at the time.

"We believed that it likely was BPA contaminant on the surface of the [bottle](#)," says Holmes, who is now clinical research coordinator at Ohio State University's Wexner Medical Center. "I thought there is something here. I was thinking people are buying those bottles off the shelves, and they are taking them home and probably not washing them. They are using them so they are consuming BPA."

Holmes, Wang and Jianyong Ma, Ph.D., a research scientist at UC, decided to test an array of drinking bottles made of Tritan to see if transient BPA was present. Tritan is a BPA-free plastic. They acquired 10 different Tritan bottles and detected BPA release from two kinds of Tritan bottles. The team then tested whether rinsing, handwashing or dishwashing removed the BPA from the Tritan bottles. The results of their study is available in the scholarly journal *Chemosphere*. It showed that multiple cycles through the dishwasher was the most effective at removing BPA.

"The release of BPA from these bottles could pose a health threat to the consumer," says Ma.

Jianyong Ma, Ph.D., Hong-Sheng Wang, Ph.D., and Rebecca Holmes shown in a UC College of Medicine lab. Photo by Colleen Kelley/UC Creative + Brand.

Wang says researchers decided to consider cleaning options for Tritan bottles after Holmes did an informal survey of 114 UC students about ways they commonly cleaned brand-name water bottles after purchase. Some used the bottle right away without washing, others rinsed them

with water, while others either washed the bottle with water and soap or placed them in the dishwasher for cleaning.

"Water bottles are ubiquitous on college campuses," says Wang. "While most of the bottles we tested were indeed BPA-free our study showed that there is a possibility that some may have BPA contamination. If you are concerned about the possibility that the BPA-free bottles are contaminated, washing the bottles after purchase is a good idea. Dishwashing is an effective way of removing the contamination in the specific kind of bottle we tested."

Wang says it is also a good idea to follow a manufacturer's wash instructions on [water bottles](#) or other containers.

Researchers washed the Tritan bottles that showed release of BPA up to six times, and at that point there was no longer any detectable release of BPA. A past study by a different group of researchers shows rinsing was effective in removing BPA release from the Tritan bottles they tested, so effectiveness of washing methods likely depends on the specific bottle.

The bioactivity of the leached BPA from the bottles in the UC study was confirmed by examining the cardiovascular systems of transparent blackworms and the heart tissue of mice exposed to water in these containers over a seven-day period.

"BPA is an endocrine disruptor, and it acts like estrogen and it can affect the cardiovascular system along with other systems," says Holmes. "It can contribute to irregular heart rhythms."

Wang explains that as part of the team's project Holmes visited a plastics manufacturing factory to get a better understanding of how BPA might have gotten onto BPA-free containers.

"I wanted to go to a plant to see how plastic products are made," says Holmes. "I was able to tour the facility and none of the products in this facility were for consumer purposes. It was to see how the process works. What I found is that similar products with different types of plastic were being made closely together."

More information: Rebecca Holmes et al. Effect of common consumer washing methods on bisphenol A release in tritan drinking bottles, *Chemosphere* (2021). [DOI: 10.1016/j.chemosphere.2021.130355](https://doi.org/10.1016/j.chemosphere.2021.130355)

Provided by University of Cincinnati

Citation: Pop those 'BPA-free' drinking bottles into the dishwasher before using them (2021, April 29) retrieved 10 April 2024 from <https://phys.org/news/2021-04-bpa-free-bottles-dishwasher.html>

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