

Volume 94 Issue 16 | p. 9 | News of The Week

Issue Date: April 18, 2016 | Web Date: April 14, 2016

Vegetables grown with treated wastewater boost human exposure to pharmaceutical contaminants

Consuming produce watered with reclaimed wastewater increased detectable levels of the drug carbamazepine in people's urine

By *Alla Katsnelson, special to C&EN*

With freshwater resources dwindling worldwide, the practice of using treated wastewater to irrigate crops is growing. But that practice might have a downside: In a new study, people who ate vegetables grown using such reclaimed water had increased urine levels of carbamazepine, an antiepileptic drug commonly detected in wastewater (*Environ. Sci. Technol.* 2016, DOI:

10.1021/acs.est.5b06256

<<http://pubs.acs.org/doi/abs/10.1021/acs.est.5b06256>>).

The randomized, controlled study is the first to directly address human exposure to such pharmaceutical contaminants via produce, says **Ora Paltiel**

<<http://www.environmental-health.huji.ac.il/staff-ora.html>> of the Hadassah-Hebrew University of Jerusalem.

Paltiel and her colleagues gave 34 healthy volunteers batches of produce to eat for a week—either vegetables grown with reclaimed water or organic vegetables grown with only freshwater.

Before the study began, some volunteers had quantifiable concentrations of carbamazepine in their urine while others didn't. This remained true for participants after a week of eating the organic produce. But after a week of eating produce grown with



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reclaimed water, every subject excreted detectable levels of the drug.

“This fits what we’ve all suspected but have not shown experimentally,” says **Alistair Boxall** <<https://www.york.ac.uk/environment/our-staff/alistair-boxall/>> of the University of York. Although the urine levels were very low—four orders of magnitude lower than those from patients actually taking the drug—people who eat a lot of produce will be exposed to such contaminants throughout their lifetimes, he adds.

Chemical & Engineering News

ISSN 0009-2347

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