

Dietary components decrease cadmium bioavailability in rice

March 27 2020, by Zhang Nannan



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A recent research paper published in *Journal of Agricultural and Food Chemistry* describes an alternative strategy to reduce cadmium (Cd) exposure.

Under the guidance of associate professor Zhuang Ping, SUN Shuo, a

doctoral student from South China Botanical Garden of the Chinese Academy of Sciences conducted *in vitro* and *in vivo* bioassays to test Cd bioavailability.

The influence of 39 dietary components on Cd bioaccessibility in water or rice were determined using an *in vitro* gastrointestinal model, following which an *in vivo* bioassay was used to determine the most effective components on Cd bioavailability in rice.

Heavy metal pollution is one of the oldest environmental problems, which is still a serious health problem, especially in some developing countries. Cadmium is a common toxic heavy metal in the environment. Oral intake is the primary way for people to expose [cadmium](#).

Reducing the exposure of cadmium in diet is an effective and feasible [strategy](#) to reduce the risk. One of the ways to reduce the exposure risk is to eat agricultural products with low cadmium content; on the other hand, reducing the bioavailability of Cd in the systemic circulation is another strategy to reduce Cd exposure, and [dietary supplements](#) play an important role in modulating or preventing cadmium poisoning.

The results of the study showed that several components significantly reduced the solubility of Cd (10-98%) in intestinal phase. Tannic acid, TiO₂, zinc gluconate, CaCl₂ and proanthocyanidins were the most effective in decreasing Cd bioaccessibility in rice, with reductions of 93–97%, 54–61%, 32–49%, 24–32% and 11–14%, respectively.

Upon adding the dietary components, the reduction rates of the Cd-relative bioavailability (Cd-RBA) were 20–58% and 10–31% in the kidney and liver, respectively. The results may have important implications for reducing health risks associated with Cd exposure via consumption of rice.

This is the first report on reducing health risk of Cd exposure from rice by dietary components in China. Since dietary components significantly influenced rice Cd bioavailability, dietary strategies can be used to modulate Cd exposure from rice consumption. For populations susceptible for Cd exposure via rice or other food consumption, [dietary components](#) with a high mineral content or antioxidant would be a good strategy to alleviate the adverse impact of [rice](#) Cd.

More information: Shuo Sun et al. Use of dietary components to reduce bioaccessibility and bioavailability of cadmium in rice, *Journal of Agricultural and Food Chemistry* (2020). [DOI: 10.1021/acs.jafc.0c01582](#)

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