

Arsenic in your food? Scared? Shouldn't be, but if so there's a GMO fix

A lawsuit filed last month in Los Angeles County claimed that some California wines tested for higher-than-allowable levels of inorganic arsenic. Among the defendants: Trader Joe's, which sells some of the wines, and about two dozen California wineries, including Beringer, Fetzer and Sutter Home. The suit [maintained](#) that the wine contained "health risks" and that the wineries and the stores that sold the wines were "secretly poisoning wine consumers in direct violation of California law."

Is there any basis for those fears? After all, celebrity "experts" like Dr. Oz have run [alarmist shows](#) about it.

Arsenic is prevalent in the natural environment in air, soil and water, and in food, and is generally not considered a health risk despite the claims by Dr. Oz and other professional fear mongers. Predictably it shows up in dairy products, grains, meat and fish. Arsenic exists in two forms: organic and inorganic. In the former, the arsenic is part of a carbon-containing compound, which renders it almost harmless.

It is the inorganic form that is slightly toxic—but at very high levels of consumption, and otherwise perfectly harmless despite what you might read on the Internet. At chronic levels of exposure—unrealistic doses hundreds or thousands of times higher than normal human exposure—animals exposed to inorganic arsenic at levels far higher than humans would ever be exposed to were linked to lung and bladder cancers, skin lesions, cardiovascular disease and diabetes.

The biggest hue and cry has focused on arsenic levels in grains. Rice in particular absorbs it better than many other plants. There are a few—very few—regions where rice absorbs enough inorganic arsenic soaked in groundwater that humans face similar documented health symptoms.

In 2012, the Food and Drug Administration released data confirming that rice and rice products can have elevated levels of arsenic. "All of the data suggest levels that are not high enough to give us cause for concern for immediate or near-term effects," FDA commissioner Margaret Hamburg [said](#) when it issued its original report. FDA maintains a website separating the dangerous Oz-perpetrated myths from the facts.

But the overwhelming evidence that humans are not in harms way did not stop *Consumer Reports* from hyping those findings then—and again recently. CR issued its own report in 2012, challenging the FDA and greatly exaggerating the health risks. After sampling 60 different rice products, including cold breakfast cereals, infant rice cereal, rice milk, and brown rice, CR found that most contained some amount of inorganic arsenic—which would be expected as rice absorbs arsenic so well. CR recommended limited intake of rice products: no more than one serving of infant rice cereal per day, and adults should stop at two servings of rice per week.

The group also called on regulators to ban pesticides and arsenic-containing drugs used in livestock and crop production, which they say contributes to the elevated levels of the element found in foods. Currently, the federal limit for arsenic in drinking water is set at 10 parts per billion (ppb), equivalent to one

microgram (one millionth of a gram) dissolved in one liter of water.

Consumer Reports has not backed away from its chemophobic-based campaign. Last fall it [released its own guidelines](#), contending that rice “can have much more inorganic arsenic ... than our 2012 data showed,” suggesting that it is only safe for adults to have 4½ servings of rice per week, and for children to have 2¾ servings. This does not apply to our apple juice, or rice milk, which contain much less. So, at best, this is a minimal or even theoretical risk, yet it is again all over the news.

The very limited dangers that might exist from arsenic in staples like rice are addressable—by limiting consumption. But that’s not always possible in countries heavily dependent on a rice diet. Now there’s another possible solution: genetic engineering—if opponents do not scuttle the research.

[Scientists in Japan and Korea](#) have identified a protein in some varieties of rice that helps the plant sequester arsenic away from the grain – the part we eat. They are hoping to genetically engineer the mutation responsible for this protein into all cultivated rice plants to reduce our intake of arsenic.

States in the southeast United States – like Arkansas, Louisiana, and Texas – have higher levels of arsenic in their rice than that grown elsewhere. This is a byproduct of the cotton and tobacco industries: when these crops were grown in these areas, they were treated with an insecticide that contained arsenic. The insecticide has not been in use since the 1980s, but it lingers in the groundwater.

And it’s not only white rice: ironically, [brown rice, touted by foodies, is 80 percent higher in arsenic than white rice](#). Ironical because brown rice is generally healthier than white because it retains the nutrient rich outer husk and bran that is shed in the making of white rice, but it is in these outer layers that arsenic builds up. Organic rice also contains arsenic and often at higher levels than their conventional counterparts, because it are often sweetened with brown rice syrup which is erroneously perceived as healthier than sugar. This was found to be the case for [baby formula](#).

According to the FDA, the levels of arsenic currently present in rice only pose a very limited potential risk to populations that rely heavily on rice as a food source—Asians, Southeast Asians, Hispanics, and people on a [gluten free diet](#) (most gluten-free items are made primarily from rice flour)—and only in the few areas where inorganic concentrations are high. In other words, arsenic in food is not a serious health hazard, as CR claims, and no restrictions are warranted except in very extreme cases.

The researchers intend to follow up on their initial findings in three ways: they will look for rice strains that naturally produce high levels of this protein, so they can breed it with more mainstream varieties; they will use genetic modification to increase the levels of this protein in rice to see if they can get arsenic levels in the grains even lower; and they will look for similar proteins that can possibly combined with this one to get arsenic levels lower still.

“Because the rice grain is the major source of arsenic intake, reducing the transfer of arsenic from soil to the grain is a pressing public health issue,” write the researchers in their new paper. “Our work suggests a strategy for limiting arsenic accumulation in rice grains and thereby reducing human arsenic exposure.”

Their work also suggests the potential of genetic engineering and genetically informed breeding practices

to correct for the agricultural oversights of the past.

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Additional Resources:

- [Genetically engineered rice: Protection from arsenic?](#), Medical Xpress
- [Toxin Found in Most U.S. Rice Causes Genetic Damage](#), Discover
- [U.S. Researchers Search for More Nutritious Rice](#), USDA