

Arsenic in your rice: What to do?

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Arsenic, a naturally occurring element and industrial byproduct, poses a significant health risk to millions of people worldwide when it leaches into drinking water. It's highly poisonous at high doses, but chronic exposure to lower levels increases the risk of bladder, lung, and skin cancer, as well as infertility and possibly diabetes, heart disease, and other conditions. Though this is often thought of as a major problem only in developing countries, such as Bangladesh, the U.S. has arsenic problems of its own. In fact, it's estimated that over two million Americans drink water from private wells that have high arsenic concentrations. This past year, arsenic made headlines on several occasions for its presence in rice and other foods, too.

Against the grain

In September, *Consumer Reports* released results of its analysis of 223 rice samples, which included white and brown, organic and conventionally grown, domestic and imported, and brand-name and store-brand rices. It also tested rice-based products, such as rice [cereals](#), beverages, pasta, flour, and crackers. Virtually all were found to contain both [inorganic arsenic](#) (a known human carcinogen) and organic arsenic (considered less harmful but still of concern)—many at "worrisome levels." In this context, the term "organic" refers to the element's chemistry, not whether the food was grown organically.

There were wide variations in the findings—after all, there are many different kinds of rice grown all over the world and under different conditions. But some trends emerged: White rice from Arkansas, Louisiana, Missouri, and Texas (where most U.S. rice comes from) had more total and inorganic arsenic than rice grown elsewhere (including California, India, and Thailand). And within the same brands, brown rice had more arsenic than white rice (some arsenic is removed when the grain's outer layer is stripped

during processing to make [white rice](#)). Preliminary results from an FDA analysis of 200 rice products, also released in September, were consistent with those of Consumer Reports; results from about a thousand more samples are due out shortly.

Organic brown rice syrup has also been in the news in recent months. A study last May from Dartmouth College, in *Environmental Health Perspectives*, found that cereal bars, toddler formulas, and other products made with this sweetener had elevated arsenic levels. It did not compare organic brown rice syrup to non-organic brown rice syrup, but there's no reason to think the type of agricultural method used was a factor, according to Brian Jackson, Ph.D., lead author of the study.

Why is rice such an arsenic magnet? It turns out that rice is particularly efficient in taking up arsenic, partly because it's grown in water-flooded conditions, which reduces the binding of arsenic by soil, thus making the substance more available to the grain. Moreover, arsenic-based pesticides were used for decades on cotton crops in parts of the U.S. where rice is now grown, and their residues remain in the soil. When you factor in industrial sources of arsenic that contaminate soil (such as from coal-burning plants, mining, and copper smelters) and arsenic still used in some pesticides, animal feeds, and fertilizers, it's easy to see how arsenic can end up in rice.

Other foods have trace amounts of arsenic, too, including some fruits, vegetables, juices, wine, mushrooms, poultry, and seaweed (particularly hijiki). Fish that consume seaweed concentrate arsenic at higher levels, but most is changed by the fish to the less harmful organic form. According to a 2010 EPA study, 17 percent of our dietary exposure to inorganic arsenic comes from rice, while fruits and fruit juices contribute 18 percent, and vegetables 24 percent.

Of course, if you eat a lot of rice, a higher percentage of your total arsenic exposure would be from that. Arsenic has also been found in some mineral waters as well as homeopathic products and herbs used in Ayurvedic (traditional Indian) medicine.

What's the rice risk?

Are the amounts of arsenic in rice high enough to be of concern? It's hard to say. There are no federal limits for arsenic in food as there are for drinking water (ironically, China, which has a poor food safety record, is the only country that regulates arsenic in food). In 2001, the EPA set the limit for arsenic in water at 10 parts per billion (ppb), a big decrease from the previous 50 ppb limit set in 1975—but still too high, some experts say. The EPA had earlier proposed a stricter limit of 5 ppb arsenic in water (which only New Jersey follows).

In the *Consumer Reports* testing, many rice products exceeded the amount of arsenic you would get from drinking a liter of water with a level of 5 ppb. On the other hand, it's unknown if arsenic in rice poses the same risk as arsenic in water, because our bodies may absorb and process it differently. Plus, the health risk also depends on the concentrations of the different forms of arsenic that are present.

Though some rice manufacturers are taking the news seriously, the USA Rice Federation, which represents thousands of rice farmers, maintains that rice is safe and nutritious and that "there is not sufficient data about arsenic levels in rice or potential risk to human health on which to base any recommendations to lower consumption or stop eating rice." But Consumer Reports and various health authorities, along with some politicians, have called on the FDA to set limits for arsenic in rice, particularly in baby

foods. After it analyzes all its data, the FDA will make a decision—but that could be years away. In the meantime, the agency says there is no need to avoid rice, but does advise eating a variety of grains.

Putting it into perspective

We are exposed to trace amounts of arsenic all the time—in our food, water, and air. For centuries, arsenic was even used as medicine and in cosmetics, and it may actually play a role in physiological processes in some animals. Even if rice is a significant source of inorganic arsenic, keep in mind that many foods carry some risk and that a good recourse is to eat a varied diet, since this will limit your exposure to any toxic substances that may be present in a particular food.

In the long term, the solution to the arsenic problem rests largely with industry to produce rice products with lower residues (by growing rice in less water, developing varieties that take up less arsenic, and removing arsenic from soil, for example) and with the government to establish arsenic limits in food and beverages.

Based on its findings, Consumer Reports recommends that adults should consume no more than 2 to 3 servings of rice products a week. Children, who are more vulnerable to arsenic's toxicity due to their smaller body size, should eat only about 1 to 1½ servings a week and should not drink rice milk as part of their daily diet before age 5; infants should consume no more than 1 serving of infant rice cereal a day. We don't think adults need to adhere to such strict limits, but if you eat a lot of rice, you may want to take the following steps to reduce your exposure to arsenic.

- **Cook rice the way you cook pasta—in a lot of water. Use 6 cups of boiling water for 1 cup of dry rice. When the rice is done, drain off the remaining water. You may lose some nutrients in the cooking water but you also reduce arsenic residues—by as much as 45 percent, according to a 2009 study in the *Journal of Environmental Monitoring*. Rinsing rice before cooking helps, too, though it also removes some B vitamins.**
- **Look for rice grown in California and imported basmati and jasmine rices, which may have lower arsenic levels. A 2007 study in *Environmental Health Perspectives*, for example, found less arsenic in rice grown in California than in the south-central U.S. Another paper found that basmati rice from India and Pakistan, as well as jasmine rice from Thailand, had the least arsenic. But other research has had contradictory results.**
- **Avoid [brown rice](#) syrup and foods made with it, many of which are "junk food" anyway, even if they are "organic" or come from a health-food store. Also, limit foods with multiple rice ingredients.**
- **Consider other grains, such as oatmeal and barley, especially for infants, as well as corn grits, bulgur wheat, and quinoa. Alternatives to [rice](#) drinks include soy, hemp, and almond beverages.**

Your anti-arsenic arsenal: 4 more tips

- **Limit juice. Another investigation by Consumer Reports, in early 2012, found that nearly 10 percent of 88 apple and grape juices sampled had levels of arsenic—mostly inorganic arsenic—above federal standards for water. (Arsenic-based pesticides were once used in orchards and vineyards.) Whole fruit is a better source of**

nutrients and fiber anyway; juices are high in sugar and calories. Most people should drink no more than one cup of juice a day; young children even less. You can also dilute juice with water to reduce calories and exposure to any contaminants.

- If you have a private well, have your water tested and, if necessary, treated. Ask your local health department to recommend a certified lab, or call the EPA's Safe Drinking Water Hotline at 800-426-4791. If you need a water treatment system, [NSF](#) is a good resource. Arsenic in groundwater varies across the country. A [U.S. Geological Survey](#) map shows where levels exceed federal limits. You needn't worry if you get your water from a public supply.
- Wash produce well. In particular, scrub potatoes and other vegetables that are grown in soil, in case the soil was contaminated with arsenic; this helps reduce any clinging particles.
- [Support the call by Consumers Union](#) (the advocacy arm of Consumer Reports) to set arsenic levels in foods and ban [arsenic](#) in pesticides, fertilizers, and animal feed. tinyurl.com/CUarsenic

Provided by University of California - Berkeley

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