



WHAT WE TESTED Our analysis found varying levels of arsenic in more than 60 rices and rice products—cereals, crackers, and more.

Arsenic in your food

Our findings show a real need for federal standards for this toxin

ORGANIC RICE baby cereal, rice breakfast cereals, brown rice, white rice—new tests by CONSUMER REPORTS have found that those and other types of rice products on grocery shelves contain arsenic, many at worrisome levels.

Arsenic not only is a potent human carcinogen but also can set up children for other health problems in later life.

Following our January investigation that found arsenic in apple and grape juices, we recently tested more than 200 samples of a host of rice products. They included iconic labels and store brands, organic products and conventional ones; some were aimed at the booming gluten-free market.

The results of our tests were even more troubling in some ways than our findings for juice. In virtually every product tested, we found measurable amounts of total arsenic in its two forms. We found significant levels of inorganic arsenic, which is a carcinogen, in almost every product category, along with organic arsenic, which is less toxic but still of concern. Moreover,

the foods we checked are popular staples, eaten by adults and children alike.

Though rice isn't the only dietary source of arsenic—some vegetables, fruits, and even water can harbor it—the Environmental Protection Agency assumes there is actually no “safe” level of exposure to inorganic arsenic.

No federal limit exists for arsenic in most foods, but the standard for drinking water is 10 parts per billion (ppb). Keep in mind: That level is twice the 5 ppb that the EPA originally proposed and that New Jersey actually established. Using the 5-ppb standard in our study, we found that a single serving of some rices could give an average adult almost one and a half times the inorganic arsenic he or she would get from a whole day's consumption of water, about 1 liter.

We also discovered that some infant rice cereals, which are often a baby's first solid food, had levels of inorganic arsenic at least five times more than has been found in alternatives such as oatmeal. Given our findings, we suggest limiting the consumption of rice products. Use our chart

and recommendations on page 25.

Our study was a snapshot of the market, with many products purchased in the New York metropolitan area and online, to gauge the extent of arsenic's presence in everyday foods. It can't be used for overall conclusions about specific brands. Still, we found important trends:

- White rice grown in Arkansas, Louisiana, Missouri, and Texas, which account for 76 percent of domestic rice, generally had higher levels of total arsenic and inorganic arsenic in our tests than rice samples from elsewhere.
- Within any single brand of rice we tested, the average total and inorganic arsenic levels were always higher for brown rice than for white.
- People who ate rice had arsenic levels that were 44 percent greater than those who had not, according to our analysis of federal health data. And certain ethnic groups were more highly affected, including Mexicans, other Hispanics, and a broad category that includes Asians.
- Reducing arsenic in food is feasible. We examined the efforts of two food compa-

nies trying to tackle the problem and learned about methods being used to try to reduce arsenic in products.

•Based on these findings, our experts are asking the Food and Drug Administration to set limits for arsenic in rice products and fruit juices as a starting point.

Rice producers argue that concerns about dietary exposure to arsenic in rice are overblown. “There is no documented evidence of actual adverse health effects from exposure to arsenic in U.S.-grown rice,” says Anne Banville, a vice president at the USA Rice Federation, a trade association representing the \$34 billion rice industry. “And we believe the health benefits of rice must be properly weighed against the risks of arsenic exposure, which we believe are minimal.”

But scientists warn of complacency. “We already know that high concentrations of arsenic in drinking water result in the highest known toxic substance disease risks from any environmental exposure,” says Allan Smith, M.D., Ph.D., a professor of epidemiology at the University of California, Berkeley. “So we should not be arguing to wait for years until we have results of epidemiologic studies at lower arsenic intake, such as from rice consumption, to take action.” His studies of arsenic in public water in Chile and Argentina helped show that it causes lung and bladder cancer and other diseases.

Such long-term studies that track health effects of exposure to arsenic in rice have only recently begun in the U.S. Researchers at the Dartmouth Children’s Environmental Health and Disease Prevention Research Center in late 2011 published a small but informative study that indicated consuming slightly more than a half-cup of cooked rice per day resulted in a significant increase in urinary arsenic levels, comparable to the effects of drinking a liter of water containing the federal maximum of 10 ppb arsenic. The authors say their results suggest “many people in the U.S. may be exposed to potentially harmful levels of arsenic through rice consumption.”

The USA Rice Federation says it is working with the FDA and the EPA as they examine and assess arsenic levels in food and has supplied rice samples to those agencies for research. It also says some of its member companies may be doing their own testing. One rice company shared with us details of how it is taking matters into its own hands. Grant Lundberg, CEO

of Lundberg Family Farms in Richvale, Calif., which sells rice and rice products, says the company is testing more than 200 samples of the many varieties of rice in its supply chain and plans to share the results with FDA scientists.

Studies show that arsenic can cause cancer in humans.

“We’re committed to providing safe food, to really listening to our consumers, and dealing with this problem very openly because doing the research needed to assess what the risks really are is the only way to go,” Lundberg says.

Tracing arsenic’s sources

The USA Rice Federation tells consumers that there is no reason to be concerned about arsenic in food. Its website states that arsenic is “a naturally occurring element in soil and water” and “all plants take up arsenic.”

But “natural” does not equal safe. Inorganic arsenic, the predominant form of arsenic in most of the 65 rice products we analyzed, is ranked by the International Agency for Research on Cancer (IARC) as one of more than 100 substances that are Group 1 carcinogens. It is known to cause bladder, lung, and skin cancer in humans,

with the liver, kidney, and prostate now considered potential targets of arsenic-induced cancers.

Though arsenic can enter soil or water due to weathering of arsenic-containing minerals in the earth, humans are more to blame than Mother Nature for arsenic contamination in the U.S. today, according to the federal Agency for Toxic Substances and Disease Registry. The U.S. is the world’s leading user of arsenic, and since 1910 about 1.6 million tons have been used for agricultural and industrial purposes, about half of it only since the mid-1960s. Residues from the decades of use of lead-arsenate insecticides linger in agricultural soil today, even though their use was banned in the 1980s. Other arsenical ingredients in animal feed to prevent disease and promote growth are still permitted. Moreover, fertilizer made from poultry waste can contaminate crops with inorganic arsenic.

Rice is not the only source of arsenic in food. A 2009-10 study from the EPA estimated that rice contributes 17 percent of dietary exposure to inorganic arsenic, which would put it in third place, behind fruits and fruit juices at 18 percent, and vegetables at 24 percent. A more complete study by the European Food Safety Authority found cereal products could account for more than half of dietary exposure to inorganic arsenic, mainly because of rice.

Rice absorbs arsenic from soil or water



FIELD TESTS Grant Lundberg, a rice producer in Richvale, Calif., has begun extensive testing for arsenic.

much more effectively than most plants. That's in part because it is one of the only major crops grown in water-flooded conditions, which allow arsenic to be more easily taken up by its roots and stored in the grains. In the U.S. as of 2010, about 15 percent of rice acreage was in California, 49 percent in Arkansas, and the remainder in Louisiana, Mississippi, Missouri, and Texas. That south-central region of the country has a long history of producing cotton, a crop that was heavily treated with arsenical pesticides for decades in part to combat the boll weevil beetle.

"Extensive surveys of south central U.S. rice, by more than one research group, have consistently shown that rice from this region is elevated in inorganic arsenic compared to other rice-producing regions," says Andrew Meharg, professor of biogeochemistry at the University of Aberdeen in Scotland and co-author of the book "Arsenic & Rice." "And it does not matter relative to risk whether that arsenic comes from pesticides or is naturally occurring." High levels of arsenic in soil can actually reduce rice yields. Meharg, a leading researcher in the field, notes the Department of Agriculture has invested in research to breed types of rice that can withstand arsenic. That may help explain the relatively high levels of arsenic found in rice from the region, though other factors such as climate or geology may also play a role.

What our tests found

We tested 223 samples of various rice products that we bought mostly in April and May, many from stores in the New York metropolitan area and online retailers. The samples covered a variety of rice-containing food categories, including infant cereals, hot cereals, ready-to-eat cereals, rice cakes, and rice crackers. We bought products often used by people on gluten-free or other special diets, including rice pasta, rice flour, and rice drinks.

We tested at least three samples of the foods and beverages for total arsenic. We measured specific levels of inorganic arsenic. And we checked for two forms of organic arsenic, called DMA and MMA.

Though inorganic arsenic is considered the most toxic, concerns have been raised about potential health risks posed by those two organic forms, which the International Agency for Research on Cancer has labeled "possibly carcinogenic to humans." We found DMA in the 32 rices we tested,

A CEO reworks his toddler formulas

Jay Highman, the CEO and president of Nature's One, an Ohio company that made the nation's first organic baby formula, says he was concerned when a study published in February implicated his formula as containing arsenic. The problem: organic brown rice syrup, one of the ingredients.

"We had always been known for having the highest standards for the cleanest, purest ingredients, and overnight we became a poster child for arsenic in rice," Highman says. He resolved that he would find a way to eliminate arsenic contamination in the rice syrup.

Highman searched for the purest source for rice and found that he had to go outside of the U.S. to find rice with the lowest possible arsenic content. He declined to disclose his source for fear larger companies "will start devouring our supply chain." He worked with his syrup supplier to develop a filtration process that would eliminate detectable levels of arsenic.

By July, he said the combination of more pristine rice and the new filtration process produced brown rice syrup that met his goal. We included samples of two Nature's One dairy

formulas and one soy formula in our tests.

The original powdered samples we tested of dairy- and soy-based formulas had inorganic arsenic that averaged 40.6 ppb for dairy and 77.7 ppb for soy.

When we tested the new versions of the two dairy formulas, the levels were either undetectable or nearly so. The company says its new formulation has use-by dates of January 2014 (Dairy with DHA & ARA), July 2015 (Dairy), or later.

Highman says he has been reworking the soy formula and hopes to produce a product that has lower levels of arsenic. If he can't get it lower, Highman says he will create a non-dairy formula without soy. Meanwhile, an interim soy version we tested did have somewhat lower levels of arsenic, but it had higher levels of cadmium, another toxin.



ARSENIC SLEUTH
Jay Highman's company makes dairy- and soy-based formulas.

which include choices from the south central states and elsewhere, including California, India, and Thailand.

In brands for which we tested both a white and a brown rice, the average total and inorganic arsenic levels were higher in the brown rice than in the white rice of the same brand in all cases. Among all tested rice, the highest levels of inorganic arsenic per serving were found in some

Within brands, brown rice had higher arsenic than white.

samples of Martin Long Grain Brown rice, followed by Della Basmati Brown, Carolina Whole Grain Brown, Jazzmen Louisiana Aromatic Brown, and Whole Foods' 365 Everyday Value Long Grain Brown. But we also found samples of brown rice from Martin and others with inorganic arsenic levels lower than that in some white rice.

Though brown rice has nutritional advantages over white rice, it is not surprising that it might have higher levels of arsenic, which concentrates in the outer layers of a grain. The process of polishing

rice to produce white rice removes those surface layers, slightly reducing the total arsenic and inorganic arsenic in the grain.

In brown rice, only the hull is removed. Arsenic concentrations found in the bran that is removed during the milling process to produce white rice can be 10 to 20 times higher than levels found in bulk rice grain.

We also tested for lead and cadmium, other metals that can taint food. The levels we found were generally low overall. Based on our recommended limits for rice products, even the few samples with elevated lead and cadmium should not contribute significantly to dietary exposure.

Cereals cause concern

Worrisome arsenic levels were detected in infant cereals, typically consumed between 4 and 12 months of age.

Among the four infant cereals tested, we found varying levels of arsenic, even in the same brand. Gerber SmartNourish Organic Brown Rice cereal had one sample with the highest level of total arsenic in the category at 329 ppb, and another sample had the lowest total level in this category at 97.7 ppb. It had 0.8 to 1.3 micrograms of inorganic arsenic per serving.

Earth's Best Organic Whole Grain Rice cereal had total arsenic levels ranging from 149 ppb to 274 ppb, but higher levels



minimize that risk. For our recommendations, we used the latest available science to choose a moderate level of protection that balances safety and feasibility, similar to the EPA's approach for water. Our scientists made these calculations using standard estimates of weight, typical daily consumption of individual rice products over a lifetime, and the range of levels of inorganic arsenic we found. For our recommendations for children, we paid particular attention to their levels of consumption during this critical phase of their development.

According to federal data, some infants eat up to two to three servings of rice cereal a day. Eating rice cereal at that rate, with the highest level of inorganic arsenic we found in our tests, could result in a risk of cancer twice our acceptable level.

For children and pregnant women, risks are heightened. Keeve Nachman, Ph.D., a risk scientist at the Center for a Livable Future in the Johns Hopkins Bloomberg School of Public Health, says, "The more we learn about arsenic's additional effects on the developing brain, the more concerned I am by these levels of arsenic being found in infant and toddler rice cereal."

Ready-to-eat cereals, which are popular with adults as well as children, also gave us cause for concern. For instance, Barbara's Brown Rice Crisps had inorganic arsenic levels that ranged from 5.9 to 6.7 micrograms per serving. Kellogg's Rice Krispies, at 2.3 to 2.7 micrograms, had the lowest levels for the category in our tests.

Rice drinks in our tests showed inorganic arsenic levels of up to 4.5 micrograms per serving. Based on those results, our scientists advise that children under the age of 5 should not have rice drinks as

part of a daily diet. In the United Kingdom, children younger than 4½ years are advised against having rice milk because of arsenic concerns.

"This is a time when cells are differentiating into organs and many other important developmental things are going on, so getting exposed to a toxicant like arsenic in utero or during early childhood can cause damage that may not appear until decades later," says Michael Waalkes, laboratory chief at the Division of the National Toxicology Program. He is one of the authors of a June 2012 report funded in part by the National Institutes of Health that concluded early life exposure to arsenic produces a wide range of cancers and other diseases.

Diet changes arsenic risk

If rice truly is an important source of arsenic exposure, then people who eat rice should have greater arsenic levels in their body, on average, than people who do not. To find out, we analyzed data collected annually by the National Center for Health Statistics for the National Health and Nutrition Examination Survey (NHANES). The survey contains information on the health and nutrition of a nationally representative sample of the U.S. population, based on interviews and physical exams, which may include blood and urine tests.

Our data analysis was led by Richard Stahlhut, M.D., M.P.H., an environmental health researcher at the University of Rochester, who is experienced in NHANES analysis, and Ana Navas-Acien, M.D., Ph.D., a physician-epidemiologist with expertise in arsenic research at Johns Hopkins University's Bloomberg School of Public Health. Working with CONSUMER

of inorganic arsenic per serving, from 1.7 to 2.7 micrograms.

So what's a parent to do? To reduce arsenic risks, we recommend that babies eat no more than 1 serving of infant rice cereal per day on average. And their diets should include cereals made of wheat, oatmeal, or corn grits, which contain significantly lower levels of arsenic, according to federal information.

The EPA sets limits for a carcinogen based on how many extra cases of cancer would be caused by exposure to the toxin at a certain level. The limit is designed to

Limit your exposure

To reduce arsenic exposure, consider limiting rice in your family's diet to the quantities noted here. Our scientists based these recommendations on a person eating just one product per day or

per week over a lifetime. If you eat more than one type, your risk would increase. Vary your diet to include non-rice products. If you exceed these limits one week, you can cut back the next.

Rice product	Infant cereal	Hot cereal	Ready-to-eat cereal	Rice drink	Rice	Rice pasta	Rice crackers	Rice cakes
Approximate serving size uncooked	¼ cup	¼ cup	1 cup	1 cup	¼ cup	2 oz.	16-18 crackers	1-3 cakes
Children	1 serving/day	1¼ servings/week	1½ servings/week	—	1¼ servings/week	1½ servings/week	½ serving/day	1 serving/week
Adult	NA	2½ servings/week	3 servings/week	½ serving/day	2 servings/week	3 servings/week	1 serving/day	2⅓ servings/week

TOP: BILLY DELES

REPORTS statisticians, they reviewed NHANES data from 2003 through 2010 from participants age 6 or older whose urine was tested for arsenic and who had reported what they'd had to eat or drink from midnight to midnight the day before their examination. A urine test is the best measure of recent arsenic exposure because most of it is excreted in urine within a few days after ingestion.

Because seafood contains a form of organic arsenic called arsenobetaine, generally considered nontoxic to humans, we then excluded from our analysis anyone who reported eating seafood during the 24-hour period and those with detectable levels of arsenobetaine in their urine. The remaining participants therefore were more likely to have had exposure to inorganic arsenic, which poses the greatest potential health risks.

Our resulting analysis of 3,633 study participants found that on average, people who reported eating one rice food item had total urinary arsenic levels 44 percent greater than those who had not, and people who reported consuming two or more rice products had levels 70 percent higher than those who had no rice.

"Despite our taking into account other common sources of arsenic, and no matter which way we sliced the data, we see a very strong association between rice consumption and arsenic exposure," says Stahlhut, who along with Navas-Acien led a similar analysis of NHANES data for our January 2012 article on arsenic in juice. That analysis found that study participants who reported drinking apple or grape juice had total urinary arsenic levels

that were on average nearly 20 percent higher than those who didn't. Consumers Union, the advocacy arm of Consumer Reports, urged the FDA to set a 3 ppb limit for total arsenic in apple and grape juice.

"These findings show that rice is an important source of arsenic exposure for the U.S. population," says Navas-Acien. The associations were even stronger for rice compared with juice and are consistent with the relatively high levels of arsenic, including inorganic arsenic, measured in rice samples, she says. She says the results underscore the need for monitoring arsenic in food and establishing

Our study shows people who eat rice have higher arsenic levels.

safety standards. A new study of NHANES data from Dartmouth researchers also shows that rice consumption can contribute to increased urinary arsenic levels in children.

What should be done

Consumers Union believes a standard for arsenic should be set for rice, and industry should accelerate efforts to reduce arsenic levels in rice. They should also develop types of rice that take up less arsenic, and use rice with the lowest possible arsenic in products for young children, such as infant rice cereal.

Our scientists are also asking regulators

to prohibit agricultural practices that may lead to increases in arsenic in rice:

- The EPA should phase out use of pesticides containing arsenic.
- The USDA and the EPA should end the use of arsenic-laden manure as fertilizer.
- The FDA should ban the feeding of arsenic-containing drugs and animal byproducts to animals.

To find out more about what Consumers Union is doing on the subject and to get involved, go to ConsumersUnion.org/arsenic. On the international stage, a group advising the World Health Organization is meeting in 2014 to consider proposed arsenic standards for rice. Limits of 200 ppb (inorganic) for white rice and 300 ppb (total or inorganic) for brown rice are under discussion.

After the concerns raised by our juice story, the FDA says it is confident in the overall safety of apple juice. "FDA has made significant progress in developing a proposed action level for arsenic in apple juice and is nearing completion of this work," the agency says in a statement.

The FDA also says it is studying arsenic in rice and rice products to determine the level and types of arsenic typically found and to identify ways to reduce it.

"The need for a standard for arsenic in food is long overdue," says Trudy Bialic, director of public affairs for PCC Natural Markets, a Seattle-area chain that is America's largest food co-op. "Certainly there are excellent and committed people in FDA's ranks, but it's shameful the agency has not addressed this problem more systematically, leaving us to figure it out on our own to protect ourselves."

How to cut your arsenic risk

Test your water

If your home is not on a public water system, have your water tested for arsenic and lead. To find a certified lab, contact your local health department or call the federal Safe Drinking Water Hotline at 800-426-4791.

Change the way you cook rice

You may be able to cut your exposure to inorganic arsenic in rice by rinsing raw rice thoroughly before cooking, using a ratio of 6 cups water to 1 cup rice for cooking and draining the excess water afterward. That is a traditional method of cooking rice in Asia. The modern technique of cooking rice in water that is entirely absorbed by the grains has been promoted because it allows rice to

retain more of its vitamins and other nutrients. But even though you may sacrifice some of rice's nutritional value, research has shown that rinsing and using more water removes about 30 percent of the rice's inorganic arsenic content.

Eat a varied diet

Some vegetables can accumulate arsenic when grown in contaminated soil. To help, clean vegetables thoroughly, especially potato skins. Some fruit juices such as apple and grape juice are high in arsenic, as our previous tests showed. To prevent obesity and tooth decay, pediatricians advise that infants younger than 6 months shouldn't drink juice; children up to age 6 should have

no more than 4 to 6 ounces a day and older children no more than 8 to 12 ounces. Like grape juice, wine also can be a source of exposure, according to data collected in the FDA's Total Diet Study, which provides more complete information about arsenic content in a variety of foods. Go to fda.gov and search for "total diet study analytical results."

Experiment with other grains

Vary your grains, especially if you eat more than two or three servings of rice per week. Though not arsenic-free, wheat and oats tend to have lower levels than rice. And quinoa, millet, and amaranth are among other options for those on a gluten-free diet, though they have not been studied as much.



Arsenic in food

How to read the table There is no federal limit for arsenic in most foods, but there is a federal limit of 10 parts per billion for arsenic in drinking water. The most protective standard in the country is New Jersey's at 5 ppb. At that limit, drinking a liter of water would expose you to 5 micrograms of inorganic arsenic. That provides a yardstick by which you can compare the

ranges of inorganic arsenic per serving detected in the samples we tested of the products below. Overall, inorganic arsenic ranged in our samples from 11 percent to 87 percent of the total arsenic we found. The overall average was 55 percent.

Our tests don't offer general conclusions about overall arsenic levels in any brand or rice product category. We tested at least three

samples of products (many bought in the New York metro area and online in April and May). Serving sizes generally used are specified by the government for each category. For more details, go to ConsumerReports.org/cro/arsenicinfood.

■ At least one sample exceeded New Jersey drinking water limit (5 micrograms of inorganic arsenic per liter).

Listed in alphabetical order within category.

Product	Origin	Total arsenic (ppb) ^①	Inorganic arsenic (micrograms/serving) ^②
RICE (45 g, about ¼ cup uncooked)			
365 Everyday Value Long Grain Brown (Whole Foods)	③	210 to 282	7.4 to 8.4
365 Everyday Value Organic Indian Basmati White (Whole Foods)	India	82.2 to 99.9	2.9 to 3.5
365 Everyday Value Organic Thai Jasmine White (Whole Foods)	Thailand	104 to 150	2.7 to 3.0
Archer Farms Organic Basmati (Target)	India	54.7 to 81.7	1.3 to 2.2
Archer Farms Organic Jasmine (Target)	Thailand	112 to 121	2.7 to 3.9
Cajun Country Enriched Long Grain	LA	328 to 348	4.8 to 5.2
Cajun Country Popcorn Long Grain	LA	350 to 436	3.9 to 5.3
Canilla Extra Long Grain Enriched	U.S.	198 to 431	3.2 to 7.2
Carolina Enriched Extra Long Grain	AR,LA,TX	144 to 236	3.4 to 4.8
Carolina Jasmine Enriched Thai Fragrant Long Grain	Thailand	119 to 159	3.0 to 3.2
Carolina Whole Grain Brown	AR,LA,TX	277 to 318	6.4 to 8.7
Della Basmati Brown	AR	308 to 568	5.9 to 9.4
Della Basmati White	AR	191 to 227	3.5 to 4.5
Doguet's Brown	U.S.	283 to 342	5.6 to 6.4
Doguet's Enriched Long Grain	U.S.	124 to 219	3.3 to 4.4
Goya Enriched Medium Grain	③	196 to 297	3.8 to 5.1
Great Value Brown (Walmart)	U.S.	212 to 344	5.2 to 6.8
Great Value Parboiled (Walmart)	U.S.	138 to 239	4.1 to 4.4
Jazzmen Louisiana Aromatic Brown	LA	237 to 295	4.7 to 8.6
Jazzmen Louisiana Aromatic White	LA	168 to 209	3.2 to 4.1
Lundberg California White Basmati	CA	64.3 to 75.5	1.3 to 1.6
Lundberg Short Grain Brown	CA	169 to 204	3.8 to 5.4
Mahatma Extra Long Grain Enriched	U.S.	129 to 284	3.4 to 4.9
Market Pantry Enriched Long Grain White (Target)	AR,LA,TX	184 to 254	4.0 to 4.6
Martin Long Grain Brown	MO	113 to 455	3.7 to 9.6
Martin Long Grain Enriched	MO	133 to 193	2.3 to 3.4
Rice-Select Organic Textmati White	TX	330 to 917	3.8 to 4.8
Texas Best Organics Long Grain Brown	TX	252 to 287	4.2 to 7.6
Texas Best Organics Long Grain White	TX	138 to 226	3.2 to 4.3
Trader Joe's White Basmati From India	India	75.9 to 86.0	2.5 to 2.9
Uncle Ben's Original Enriched Parboiled Long Grain	U.S.	220 to 246	5.9 to 6.3
Uncle Ben's Whole Grain Brown	U.S.	209 to 285	5.7 to 6.7

Product	Origin	Total arsenic (ppb) ^①	Inorganic arsenic (micrograms/serving) ^②
INFANT CEREAL (15 g, about ¼ cup uncooked)			
Beech-Nut Homestyle Rice	–	110 to 130	0.8 to 1.0
Earth's Best Organic Whole Grain Rice	–	149 to 274	1.7 to 2.7
Gerber Rice	–	232 to 264	1.6
Gerber SmartNourish Organic Brown Rice	–	97.7 to 329	0.8 to 1.3

Product	Origin	Total arsenic (ppb) ^①	Inorganic arsenic (micrograms/serving) ^②
HOT CEREAL (40 g, about ¼ cup uncooked)			
Bob's Red Mill Brown Rice Farina Creamy Rice	–	100 to 215	2.3 to 6.8
Bob's Red Mill Organic Brown Rice Farina Creamy Rice	–	131 to 165	3.0 to 4.3
Cream of Rice	–	80.4 to 97.5	1.8 to 2.0
READY-TO-EAT CEREAL (30 g, about 1 cup)			
Arrowhead Mills Organic Sweetened Rice Flakes	–	398 to 963	3.6 to 3.9
Barbara's Brown Rice Crisps	–	326 to 376	5.9 to 6.7
General Mills Rice Chex Gluten Free	–	246 to 344	3.8 to 4.0
Kellogg's Rice Krispies	–	168 to 196	2.3 to 2.6
Kellogg's Rice Krispies Gluten Free	–	123 to 126	2.5 to 2.7
Trader Joe's Crisp Rice Cereal	–	212 to 243	2.9 to 3.0
RICE CAKES & CRACKERS (30 g, about 1-3 rice cakes, 16-18 crackers)			
Asian Gourmet Plain Rice Cracker	–	113 to 208	1.2
Edward & Sons Organic Brown Rice Snaps Unsalted Plain Rice Cracker	–	102 to 199	1.8 to 3.2
Lundberg Brown Rice Organic Rice Cake	–	161 to 195	2.2 to 3.1
Quaker Lightly Salted Rice Cake	–	205 to 239	2.7 to 3.4
Suzie's Whole Grain Thin Cakes	–	249 to 397	4.1 to 8.4
RICE PASTA (55 g, about 2 oz. dry)			
Annie Chun's Maifun Rice Noodles	–	82.8 to 98.4	2.6 to 3.1
DeBoles Rice Spirals	–	271 to 300	6.9 to 7.5
Tinkyada Brown Rice Pasta Shells	–	190 to 249	4.2 to 5.7
Trader Joe's Organic Brown Rice Pasta Fusilli	–	347 to 384	5.9 to 6.9
RICE FLOUR (30 g, about ¼ cup)			
Arrowhead Mills Organic Brown	–	361 to 565	4.3 to 5.5
Arrowhead Mills Organic White	–	180 to 424	1.8 to 3.0
Goya Enriched	–	161 to 254	2.1 to 2.9
RICE DRINKS (240 ml, 1 cup)			
Pacific Rice Low Fat Plain Beverage	–	17.1 to 18.0	3.1 to 3.9
Rice Dream Classic Original Rice Drink	–	20.9 to 68.2	2.9 to 4.5
RICE SYRUP (30 ml, 2 tablespoons)			
Lundberg Sweet Dreams Eco-Farmed Brown	–	176 to 193	5.4 to 5.9
Lundberg Sweet Dreams Organic Brown	–	167 to 180	4.6 to 5.8
RICE VINEGAR (15 ml, 1 tablespoon)			
Asian Gourmet Plain	–	4.6 to 7.3	0.1

① Includes organic and inorganic arsenic. ② The sum of the arsenic species, arsenite, and arsenate. ③ Information on rice origin was not provided to us by the manufacturer.

For calculations of inorganic arsenic, all values reported as less than the reporting limits were applied as 100% of the reporting limits.