Genetically engineered rice: Protection from arsenic?

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(Medical Xpress)—In an article this week, *Consumer Reports* is calling on the Food and Drug Administration to set standards for how much arsenic can be allowed in rice after finding the potential toxin in almost every rice product it tested. At FIU, researchers are working on a new process that could reduce the amount of the contaminant in rice grains.

"Arsenic in rice is a serious health problem," said Barry P. Rosen, associate dean for basic research and graduate studies at FIU's Herbert Wertheim College of Medicine.

There are two types of arsenic – inorganic which is harmful, and organic, which is thought to be safe. Arsenic is absorbed into rice from the wet ground where rice is grown. FDA officials say they have found no evidence that suggests rice is unsafe to eat. However, arsenic not only is a potent human carcinogen but also can set up children for other health problems later in life.

Researchers at FIU are working in the lab to construct genetically engineered rice that will naturally vaporize arsenic. Rosen and his team of researchers have cloned a number of related genes from bacteria and algae such as the one-celled alga called Cyanidioschyzon, which has learned to adapt and process arsenic safely into gas.

Rosen led an international research team that discovered a gene from the alga in the Norris Geyser Basin at Yellowstone National Park, which has one of the highest arsenic levels in the world. The product of this gene

converts arsenic into a gas. They introduced one of these genes into the rice plant and recently showed that the transgenic rice converts arsenic to gas. The team's findings has the promise of reducing the amount of arsenic in the rice grain, increasing the safety of our food supply.

"What we learn from this alga can be used to develop new strategies for cleaning up the environment, growing hardier and safer food crops and developing new drugs," said Rosen.

Read more about Rosen's research in an article published on *FIU News* in 2009.

Consumer Reports 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.

Researchers also tested the urine of more than 3,633 study participants and 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. Certain ethnic groups were more highly affected, including Mexicans, other Hispanics, and a broad category that includes Asians.

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

Richard Stahlhut, an environmental health researcher at the University of Rochester who analyzed Consumer Reports' data says, "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.

The FDA is in the middle of conducting a study of 1,200 samples of grocery-store rice products—short and long-grain rice, cereals, drinks and even rice cakes—to measure arsenic levels.

More information: Read the full report on ConsumerReports.org.

Provided by Florida International University