



Lincoln University

College of Agriculture, Environmental and Human Sciences



The U.S. is the third largest rice-exporting country in the world. A recent study found that rice grains grown in the South Central U.S. had high arsenic (As) concentrations due to historical application of arsenic-containing pesticides for cotton production. This problem threatens public health, food safety and the rice-based regional economy.

Reducing Arsenic Content in Rice

Research Methodology, Results and Impacts

Scientists at Lincoln University of Missouri, in collaboration with researchers at two other Missouri universities and a federal rice research institute conducted laboratory, greenhouse and field studies to address the critical environmental issue of Arsenic (As) in rice. They researched the bioavailability (the amount of a substance that affects plants) of As in soil. The team found solutions to reduce rice As uptake and grain As content through soil amendments (additives), rice cultivar (plant variety) selection and water management. The results showed that both As content in rice grains and rice yield depend on the rice cultivar. The As content was also influenced by the soil-As level and water management practices. Arsenic-resistant cultivars yielded more and contained less As in the grain than did at-



Arsenic (As) buildup on rice must be examined.



risk cultivars. The As buildup in the grain could be greatly reduced by wet-dry water management and by adding nano-iron (iron particle size that is smaller than 10^{-6} meter, about 1/100 the width of a human hair) material to rice fields.

Future Research

Studies are needed on As behavior and its interactions with key soil minerals under various water management conditions. The impacts of As buildup on rice grain nutritional quality and the influences of nanomaterials and soil amendments on As bioavailability and uptake by rice plants must also be examined.

This study is funded by the United States Department of Agriculture (USDA) - National Institute of Food and Agriculture (NIFA) from 2010-2014 to Lincoln University of Missouri. The project addresses the NIFA priority area of "Food Security and Safety."

**For more information,
contact Project Director,
Dr. John Yang,
Principal Investigator,
YangJ@LincolnU.edu or
(573) 681-5109.**