USDA-CSREES 2006 National Water Quality Conference

Assessing the Impacts of Arsenic on Midwestern Dairy Operations

The USEPA's decision to lower the standard for arsenic in drinking water from 50 to 10 ppb has elevated public concern about potential health risks from naturally-occurring arsenic in ground water. In west central Minnesota, over 50% of wells sampled in an earlier study had arsenic concentrations greater than 10 ppb; about 8% were over 50 ppb. Dairy farmers in the region were concerned about possible health effects on their cows and the potential for arsenic to pass into milk. We found no research that addressed whether arsenic passes into dairy products, and found that potential impacts on livestock had not been well documented.

With funding from the CSREES Great Lakes Regional Water Program, we enlisted three dairy farms in Minnesota and one in Wisconsin with arsenic concentrations >60 ppb in their water supply, and used the University of Minnesota dairy herd as a control. We sampled well water; bulk milk; feed and forage; and hair, hooves, blood, and urine from five cows on each of the four farms. Arsenic was not detected in bulk milk samples (detection limit 5 ppb). Arsenic in blood, hair, and hooves did not correlate with drinking water arsenic, but urine appears to be a good biomarker for arsenic exposure in cattle.

Through new grant funding from the University of Minnesota, we'll sample 100 cattle at 20 farms with arsenic ranging from 0 to >100ppb during the next four months. Milk will be processed into cheese to investigate whether arsenic is concentrated during processing. Meat products and bull-calves fed milk-replacer for three months will be tested for arsenic. Innovative water treatment will be installed at a farm with arsenic >100 ppb and we will assess if/how rapidly arsenic levels in the cows decline. Study results will be available at the conference.

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