

SELENIUM *VS* BIRD FLU

SELENIUM IN CHICKEN FEED COULD SLOW BIRD FLU MUTATIONS.

Desperately poor villages in Asia are unable to afford commercial feeds and must make do with whatever food sources are available for their animals.

Two Texas Tech professors say adding selenium to poultry feed in certain parts of the world could be the first line of defense against a bird flu pandemic emerging from Southeast Asia.

Julian Spallholz, professor of nutrition and biochemistry, and Mallory Boylan, associate professor of nutrition, say supplementing chickens' diets with selenium may help slow the mutation of bird influenza viruses. Work initially done by Melinda Beck of the University of North Carolina and Orville Levander of the USDA showed that selenium-deficient mice infected with a Cocksackie virus produced a mutated, more virulent form of the virus.

Spallholz and Boylan have been working with animal scientists and public health officials of Thailand on the benefits of dietary selenium. The Tech scientists say it probably will reduce the mutation rate of avian influenza virus H5N1, known as bird flu. Avian influenza viruses occur naturally in wild birds, carriers of the virus now spreading around the world. H5N1 is very contagious among commercial chickens on farms and can sicken or kill other domesticated birds. Bird flu doesn't usually infect humans, but there have been several cases in which they have become infected and died from it. In 2004, avian influenza viruses that made the transition from birds to humans killed about half of the people infected.

While the risk from bird flu is generally low, it's possible for humans to catch it through contact with infected birds. It becomes more dangerous if mutations result in a viral disease more likely to be spread among humans, or one that is more resistant to medications. Spallholz says mutations can and do happen in Southeast Asia and Central Africa. There soils are deficient in selenium, resulting in feeds that lack enough of the trace element. Unlike the United States, where commercial animal feeds are fortified with selenium, bird feed in Asian countries may not have any selenium added to it.

Selenium, an essential trace element for animals, is normally supplied through the food chain to animals by plant foods. The content of the trace element in plant foods varies according to the content of selenium in the soil where the plants are grown.

Research suggests that viral mutations in bird flu may be reduced by providing enough selenium in the feed given to chickens, ducks, swine and other livestock, as is done in the United States.

"In various parts of the world, soils are low in selenium, where it's not available to plants,"

Spallholz says. "If animals that eat plants in the wild have a low intake of selenium, there is some predisposition for viruses to mutate. A lot of viral mutations that end up in the human population come from areas that probably have selenium-deficient soils, thanks to the monsoons and heavy rainy seasons we see in much of Asia. Raising the levels of selenium may reduce the frequency of these viral mutations."

"These viruses are very susceptible to mutations, and that's dangerous," Spallholz continues. "The 1918 Spanish flu epidemic killed millions of people worldwide. The possibility of a pandemic is what has a lot of people concerned."

Boylan says desperately poor villages in Asia are unable to afford commercial feeds and must make do with whatever food sources are available for their animals.

"All the animals in these small villages are not going to be fed commercial animal rations," Boylan says. "They're fed whatever's local—grains, plants, and scraps—all of it selenium-deficient."

Tech has signed an agreement with Emergent Technologies Inc. of Austin to license technology that involves the attachment of selenium to molecules. Spallholz and Boylan say the technology could be used to fortify chicken feed or to add selenium to existing drugs, making them more lethal to the bird flu virus.

"I suggested to Emergent Technologies that they take existing anti-viral drugs and attach selenium to them, making a very potent anti-viral drug," says Spallholz. "Emergent is trying to commercialize this technology, which was developed here at Texas Tech. We hope that it will become an important tool in the fight against bird flu."



Julian Spallholz and Mallory Boylan with a flock of flu-free chickens

— SCOTT SLEMMONS