

Secret of safe sprout production is very clean seeds, expert says

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A University of Illinois study that uses new technology to assess and compare the safety of radish, broccoli, and alfalfa sprouts concludes that the secret to keeping sprouts free of foodborne pathogens lies in industry's intense attention to cleanliness of seeds.

"Once seeds have germinated, it's too late. [Sprouts](#) are extremely complex structures with a forest-like [root system](#) that conceals microorganisms. Just a few *E. coli* cells can grow to a substantial population during germination and sprouting, and it's very difficult to get rid of them all," said Hao Feng, a U of I associate professor of food and bioprocess engineering.

Feng's study is the cover story of the August 2011 issue of the *Journal of Food Science*. Two other papers that detail his work with sprouts will appear in upcoming issue of that journal and in the [Journal of Food Protection](#).

In his experiments, Feng used both the FDA-recommended dose of chlorine to kill microorganisms and a new sanitizer that was a combination of surfactant and organic acid. He used a laser-scanning confocal microscope to look at micro-slices of seeds, then employed computer software to get a three-dimensional view of their [surface structure](#). This allowed him to calculate each seed's [surface roughness](#).

Although *E. coli* could be eliminated on the alfalfa seeds because of their relatively smooth surface, broccoli and radish seeds have rough surfaces.

Their texture renders these rougher seeds more susceptible to the attachment of pathogens and makes these microorganisms very difficult to remove, he said.

Low doses of irradiation can be successfully used on broccoli and radish seeds, but that treatment runs the risk of losing sprouts' quality and nutritional value. And sprouts do have immense [nutritional value](#). Broccoli sprouts have been linked to [cancer prevention](#); radish sprouts have lots of vitamins A and C, he noted.

He also found that better results were achieved with broccoli sprouts when the [sanitizer](#) is used on small batches rather than large ones.

Feng assured consumers that sprouts are carefully tested for the presence of pathogens. "When there is one positive result, the entire batch is thrown out," he said.

He suggested some ways these sprouts could be more safely incorporated into your diet.

"In Asian cultures, sprouts are used in stir-fry recipes. Again, it's a trade-off. Heat kills the pathogens, but you lose some of the sprouts' nutritional punch," he said.

Asian cooks also use sprouts in dishes that use natural antimicrobials, such as vinegar, garlic, green onion, and spices, he said. "These ingredients can inhibit the growth of E. coli, even kill pathogens, but there is still some risk involved," he said.

Feng said this research demonstrates the importance of eliminating all pathogens on seeds before sprouting.

"The food industry must maintain very strict control in the sprout

production process, focusing on the cleanliness of seeds and expending money and effort on prevention. Then consumers can be assured that these nutritious food products are safe to eat," Feng said.

Scientists in the Feng lab are always working on developing new, more effective sanitizers.

Provided by University of Illinois at Urbana-Champaign

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