

Study shows integrated organic crop and livestock production systems can conform to food safety standards

18 December 2019, by Fred Love



A new study found that rotating organic crop and livestock production on the same land didn't pose significant food safety risks. For instance, no traces of common strains of *E. coli* or salmonella were found on the meat produced in the experiments. Credit: Kathleen Delate

Experiments involving the integration of cattle into crop rotations in organic food production showed such systems performed well in keeping pathogens out of meat, according to a recently published study.

The study involved three experimental organic farming systems on which crops were rotated with [cattle](#). Researchers found no traces of common strains of *E. coli* or salmonella on the meat produced in the experiments, and pathogens detected in feed, fecal and hide samples remained below thresholds commonly detected in conventional production systems.

Kathleen Delate, a professor of horticulture and

agronomy at Iowa State University and one of the authors of the study, said the results show promise for the potential of farmers to integrate animal and crop production. Experiments have shown such arrangements can help farmers realize a number of benefits, including better soil health, but Delate said no previous studies of such systems in the Midwest focused on food safety.

"Our feeling is that this kind of integration could be a practice more and more farmers could adopt for a variety of reasons," Delate said. "Farmers are interested and are looking to universities and researchers for advice on how to get it done."

The study, published in the journal [Renewable Agriculture and Food Systems](#), included findings from three experimental farms in Iowa, Minnesota and Pennsylvania. A small number of cattle grazed on small grain (wheat and rye) pastures on the farms, and then corn and soybeans were planted on the same acres the following year before the land was returned to grazing pasture. This differs from common agricultural practices in which animal and crop production are kept separate.

The research team monitored the [integrated systems](#) for a range of results, including whether such an arrangement could pose food safety risks via cross-contamination. They found adhering to standard [food](#) safety practices produced meat and grain that, when compared to conventional farming practices, was as safe or safer for consumption. None of the meat samples tested positively for *E. coli* O157:H7, a bacterial strain that can cause severe illness in humans; or for salmonella. Testing of cattle hide, feed and fecal samples returned some positive results for pathogens, but the results were in line with studies from conventional operations.

"The integrated crop-livestock system in this study demonstrated a high probability of meeting [food safety](#) goals for limiting E. coli O157:H7 and Salmonella spp. contamination in the forage, feed, feces, hide and meat of grass-based organic cattle," the study concluded.

Delate said the study also found evidence integrated management yields benefits for soil health, but she said those results most likely will appear in a separate publication.

Delate said she helped take care of the four cattle raised at the on-farm site in Greenfield, Iowa, which required her to learn some new skills. The experimental site in Minnesota had 11 cattle, and the Pennsylvania farm had 12.

"I had never worked with animals myself as part of an experiment," she said. "Learning animal husbandry was something new. I learned, first-hand, how raising cattle in a grass-based, rotationally grazed system is both challenging and rewarding."

More information: Joshua Nazareth et al. Food safety considerations in integrated organic crop–livestock systems: prevalence of Salmonella spp. and E. coli O157:H7 in organically raised cattle and organic feed, *Renewable Agriculture and Food Systems* (2019). [DOI: 10.1017/S1742170519000292](#)

Provided by Iowa State University

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