New findings emerge on prevention, detection in cattle.

Only 8 years ago, a killer foodborne bacterial disease was relatively unknown in the United States. In fact, when USDA’s Economic Research Service published a report on the economic impact of major U.S. foodborne diseases in 1987, *Escherichia coli* 0157:H7 was not even included.

Then, in January 1993, four children died and dozens of children and adults became ill from eating undercooked hamburgers contaminated with *E. coli* 0157:H7 bacteria at a fast-food restaurant in Seattle, Washington. This wasn’t the first time food scientists recognized 0157:H7 infections, but the incident focused research attention on the problem.

In March of 1993, a team of ARS scientists at the National Animal Disease Center (NADC) in Ames, Iowa, began studying the relationship between *E. coli* 0157:H7 and other microbes that normally live in a cow’s first stomach, or rumen. Their findings will provide the basis for future studies on the impact of pre-slaughter livestock feeding schedules on the presence of pathogenic microbes such as *E. coli* 0157:H7.

The members of this ARS team—microbiologist Mark A. Rasmussen, veterinary medical officer Brad T. Bosworth, and microbiologists William C. Cray, Jr., and Thomas Casey—have translated their research findings into recommendations for livestock producers and marketers.

“We used data collected by Australian scientists who have studied the effect of rumen fermentation on *Salmonella* bacteria and applied this information to the 0157:H7 problem,” says Rasmussen. “Poorly managed cattle that are subjected to dietary stress during transport and marketing represent a high-risk group and may carry an unusually high number of 0157:H7.”

Livestock and Meat Board’s blue-ribbon task force on *E. coli* 0157:H7 in Atlanta in November 1993.

Rasmussen recommends that producers and marketers minimize pre-slaughter fasting stress by feeding animals regularly. This practice could do a lot to maintain the normal balance of rumen microbes and suppress bacteria like *E. coli* 0157:H7.

In other NADC studies, ARS microbiologist William C. Cray, Jr., has developed an experimental model to study *E. coli* 0157:H7 in healthy cattle. In the last 2 years, he has established the pattern and duration of fecal shedding of 0157:H7 from cattle.

Cray’s research has shown that 0157:H7 doesn’t make cattle sick and that calves can shed more bacteria for longer periods of time than mature cows.

“The potential for calves to serve as reservoirs of *E. coli* 0157:H7 needs to be studied more thoroughly,” says Cray.

Meanwhile, to quickly identify 0157:H7, Bosworth and Casey are using molecular biology to develop a PCR (polymerase chain reaction) method.

PCR has already been proved a useful tool in identifying several viruses, viroids, and mycoplasma-like organisms directly from nucleic acid extracts. The method could be useful in checking several samples simultaneously and in differentiating 0157:H7 from other *E. coli* strains.—By Linda Cooke, ARS.

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