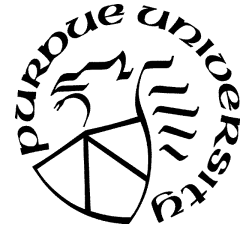


ANIMAL ISSUES



Briefing

Roughage and *E. coli* in Beef

John Patterson
Department of
Animal Sciences

Purdue Extension
Knowledge to Go

1-888-EXT-INFO

The Situation

- Over 30 million cases of food-borne illnesses are reported each year, and many more go unreported.
- Some of these illnesses are related to consumption of meat products. Some are related to consumption of uncooked plant products contamination by food handlers and by improper food handling at home.
- Factors associated with a rising incidence of food poisoning in the US may be due to changes in human susceptibility as the population ages and increased numbers of immunocompromized individuals.
- People today are more interested in convenience and saving time, sometimes at the cost of proper food handling and preparation. People are eating out more, and they are relying more on other people to prepare foods.

What We Know:

- Many of the microorganisms that cause food poisoning are normal inhabitants of human and animal intestinal tracts. Types of bacteria that we hear a lot about include *E. coli*, *Salmonella* and *Campylobacter*. There are many others.
- Only certain strains of each type of bacteria actually cause disease in humans, and these strains rarely cause clinical problems in the host animal. Thus, it is hard to detect animals carrying human pathogens.
- *E. coli* 0157:H7 is the causative agent for several food poisoning outbreaks. It is unusual in that a very low dose of *E. coli* 0157:H7 may cause infection in some individuals.
- Most people have symptoms (diarrhea and then bloody stools) around 4 days after exposure and recover on their own in 2-9 days. Antibiotics don't seem to help.
- A small percentage of people develop a more severe complication, hemolytic uremic syndrome (HUS), which affects the kidneys and blood clotting system. HUS is more common in the young and elderly. It may cause severe health problems or death.
- The physiology of the intestinal tract and the predominant (good) microflora of the intestinal tract tend to inhibit growth of these pathogens. The pathogens multiply when the intestinal physiology/microbial populations are disrupted.

- We know that *E. coli* 0157:H7 is shed sporadically by very few animals, even on farms that have been implicated in food poisoning. We also know that stress, such as shipping to processing plants, tends to increase shedding of some pathogens.
- Increasing “good” bacteria (*lactobacilli* and *fidobacteria*) in the intestine tends to reduce growth of pathogens and incidence of disease. Use of a defined mixture of intestinal bacteria to protect day-old chicks from infection with *salmonella* has just been approved. In addition to probiotics, there are a group of carbohydrate compounds (oligosaccharides) that tend to selectively increase the natural populations of good bacterial in the intestinal tract, with a subsequent decrease in pathogens.

What We Don’t Know

- We don’t know the relative importance of animal (immune system, gut microflora), dietary (feed ingredients, level of feed intake) and environmental (weather, co-mingling, crowding) factors that allow the animal to become infected.
- We don’t know the factors that cause animals to move between the carrier (infected, but not shedding) and shedding (more likely to infect other animals or meat products) condition.

- We don’t know how to reduce pathogen levels in animals at the processing plant prior to slaughter. A recent article in *Science* magazine (*Science*, 11 September, Volume 281, p. 1666-1668, 1998) suggests that feeding feedlot cattle hay for the last 5 days before market could reduce the level of acid resistant *E. coli* and presumably *E. coli* 0157:H7. Whether this approach is feasible or not is not nearly as important as the suggestion that there may be ways of improving human food safety by treating the animal prior to shipping to market.

What We’re Doing About It

- We are studying the effect of different management systems on prevalence of *salmonella* in swine.
- We are attempting to determine what factors increase or decrease the ability of pigs to fight off *salmonella* infection.
- We are evaluating nutritional methods that would reduce *salmonella* shedding on farm and at the processing plant.