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***E. COLI O157:H7***

The recent outbreak of *E. coli* O157:H7 infections caused by contaminated (unpasteurized) apple juice, has highlighted this bacterial disease and the issues of food safety. Many questions come up during these outbreaks and we will attempt to answer some of these.

**Why is *E. coli* O157:H7 important?** This bacteria (and perhaps several other related bacteria) can cause serious illness in humans. There are three common syndromes that are known to be caused by *E. coli* O157:H7, one is hemorrhagic colitis, in which the patients suffer painful (cramps), bloody diarrhea. The second is hemolytic uremic syndrome (HUS), in which there is red blood cell destruction, kidney failure, and neurologic complications such as strokes or seizures. The third syndrome in humans is called thrombotic thrombocytopenic purpura (TTP) which is similar to HUS and also causes bleeding disorders. The young and very old are at greatest risk to disease due to *E. coli* O157:H7. Illness typically occurs 3 to 4 days following ingestion of contaminated material. Bloody diarrhea usually is seen on the second or third day of illness and usually resolves in about a week. Antibiotics have not been shown to help and antidiarrheal drugs can make the illness worse. Approximately 10% of the people with bloody diarrhea may develop HUS or TTP and about 10-20% of these patients may die. Some people become infected and do not develop any illness or symptoms of disease. These asymptomatic infected people and those with illness (diarrhea) can transmit the *E. coli* O157:H7 to other humans. Another important facet of this disease is the low number of organisms needed to cause infection, estimated at less than 50 organisms. This is contrasted to the several thousand to one million bacteria needed to transmit *Salmonella* infections.

**Does *E. coli* O157:H7 cause disease in animals?** No concrete evidence has been published demonstrating disease in animals caused by this bacteria. Considerable work has been done in cattle and there is no evidence to date that *E. coli* O157:H7 causes disease in cattle. There is some suggestion that *E. coli* O157:H7 may cause disease in dogs consuming contaminated raw meat products.

**How do humans become infected?** Outbreaks of *E. coli* O157:H7 infections are usually associated with contaminated foods, while the source of infection in the sporadic cases (individual cases) is rarely identified. Person to person spread also occurs and is particularly important in day care centers or schools where young children congregate. Some of the common foods thought to be involved with outbreaks include: uncooked (undercooked) beef products, lettuce, apple cider or apple juice, mayonnaise, cantaloupe, raw milk, and potatoes. Additionally, drinking water and swimming associated outbreaks have been reported. The total number of cases in the U. S. is estimated to be about 20,000 per year with about 250 deaths per year nationwide. The outbreaks caused by this bacteria are usually food associated; however, approximately one half of the cases are sporadic and a source is usually not determined.

**What role do cattle play in this disease?** Cattle have been studied extensively in regard to this condition, partly because of the large outbreaks involving undercooked hamburgers in the Northwestern U. S. The number of healthy cattle with *E. coli* O157:H7 in their feces ranges from 0.33 % to 1.8% in the surveys that have been reported. For ill cattle or cattle on premises implicated in outbreaks, the rate has ranged from 0% to 9.5% of the animals with *E. coli* O157:H7 in their feces. Cattle that shed the *E. coli* O157:H7 organism in their feces generally do so for only a short period of time, perhaps only one day. This is in contrast to infected children which can shed the organism for an average of 13-17 days after illness. Cattle feces that contain *E. coli* O157:H7 could possibly contaminate food and this food could be a source of infection. This could occur in processing facilities such as happened in one instance of contaminated hamburger involved in a multi-state outbreak. This organism survives cold temperatures and is able to remain viable in an acid environment, such as apple cider and mayonnaise, and thus foods can remain infected for long periods of time. Because cattle have been shown to shed these organisms, even though at low rates, they have become incriminated as part of the problem. From the outbreaks involving lettuce, cantaloupes, apple juice, and other foods, it is obvious that cattle are not the sole source of the problem. The true role of cattle has yet to be determined.

**What are some preventive measures?** The *E. coli* O157:H7 organism is easily killed by heat. Cooking at 155°F for 0.13 minutes will kill the number of organisms usually present in contaminated food products. This is easy to accomplish for meat products such as hamburger or sausage. However, for products consumed without cooking such as apple cider or lettuce it presents much more of a problem. Foods such as milk, apple cider, and apple juice should obviously be pasteurized-this is not only important for preventing infection by *E. coli* O157:H7, but also for *Salmonella*, *Campylobacter*, and other pathogens. Also, the issue of cleanliness by food handlers and food preparers is central to prevention of any food safety concern. Another area of concern is with ground beef products. Modern day beef processors grind huge amounts of beef at one time, so if contamination of the equipment or contamination of the beef occurs it creates a large and widespread problem.

**What is the future of this issue?** There is obviously much to learn about this organism and where it normally reside in nature, how it makes its way into the various food products, and how we can prevent the *E. coli* O157:H7 diseases in humans. As producers of quality food, we have an obligation to continue to be on the leading edge of this battle for food safety of beef and other foods.

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