

EMERGENT PATHOGENS IN MEAT AND POULTRY: BRAZIL AND THE WORLD

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In the last ten years food industry, and specially meat and poultry industries have been challenged by a marked change in the foodborne disease scenario, driving food producers, public health agents and food scientists to review and bring up to date their procedures to follow these transformations. These last two decades have been characterized by the occurrence of a different form of foodborne outbreaks: some microorganisms known as non-critical foodborne pathogens in the old scenario, have emerged, as infectious agents associated with severe foodborne illness.

Emerging infections mean diseases whose incidence have increased within the last two decades or threaten to increase in the near future (WILSON, 1999). The emergence of new foodborne pathogens as well the reemergence of old ones present a crucial challenge to be faced. Most countries continue their efforts to improve, both the national surveillance, and reporting system to harmonize their presentation of data, as far as possible, according international surveillance programs for control of foodborne diseases. Foodborne surveillance systems are limited and foodborne diseases are not known with accuracy.

Emergent foodborne pathogens, normally, have an animal reservoir from which they spread to humans. Examples of emergents are *Salmonella* serotype Enteritidis, causing ovarian infection in chicken, *Campylobacter jejuni* causing intestinal infection in chicken, and beef cattle carrying *Escherichia coli* O157:H7, *Yersinia enterocolitica* globally disseminated among pig cattle, *S. Typhimurium* (DT) 104 occurring simultaneously in North America and Europe, and *Listeria monocytogenes*, an environmental pathogen that continue to be an unsolved problem for regulatory agencies and food industries (TAUXE, 1997).

Meat and meat products are important vehicles of foodborne illness in the United States (USDA, 1996, MMWR, 2000) as well as in European countries (WHO, 1995). In Latin America, poultry and meat account for 2 and 5% of the outbreaks, respectively (INPAZ - SIRVE-ETA, 1988).

Salmonella

Comparisons based on available literature clearly indicate that *Salmonella* continues to be the major microorganism involved in foodborne illness. *Salmonella* had accounted for 19% of the foodborne outbreaks in Latin America (INPAZ - SIRVE-ETA, 1988). From 1994 to 1998, 776 foodborne disease outbreaks were reported in São Paulo state, Brazil, 33,5 % involving the presence of *Salmonella* Enteritidis mostly in poultry meat, and eggs (GELLI et alii, 1999). In the city of São Paulo the incidence of *Salmonella* has increased from 1% in 1993 to 53% in 1996 and *S. Enteritidis* had accounted for 81.4% of all *Salmonella* present in raw poultry (LIRIO et alii, 1998).

During 1999, in the United States 4,533 laboratory-confirmed cases of salmonellosis were reported (MMWR, 2000).

In Europe, between 1990 and 1992 salmonellosis was the most important foodborne disease (*S. Enteritidis*, mainly phage 4 was the most often isolated serotype) and meat and meat products was the vehicle of 1991 outbreaks, 23.4% of the total (WHO, 1995).

Escherichia coli O157:H7

Enterohemorrhagic *E. coli* is an emergent foodborne pathogen being identified as human pathogen since 1982. There is no report on occurrence of foodborne outbreaks due to Shiga-toxin producing *E. coli* in Brazil (SAAD & MELO-FRANCO, 1999). Shiga-toxin producing *E. coli* was demonstrated in 0,4% of Brazilian children diarrheic stool samples, but none was *E. coli* O157:H7 (GOMES et alii, 1994).

Some reports have addressed on infections caused by Shiga-toxin producing *E. coli* and its presence in food in Argentina (LÓPEZ et alii, 1989) and Chile (CORDOVÉZ, 1992).

During 1999, in the USA, 530 laboratory-confirmed cases of *Escherichia coli* O157 infections were reported (MMWR, 2000).

Extremely rare a decade ago, Vero cytotoxin-producing *E. coli* O157 infection is emerging as an important public health problem in some European countries (CHALMERS et alii, 1999 and WOLFORD & NOAH, 1999).

In Japan, many cases of enterohaemorrhagic *E. coli* (EHEC) infection has been reported, although most of the cases are believed to be foodborne, the contaminated food has not been identified with certainty, except in a few isolated cases (WHO, 2000).

Campylobacter

No foodborne outbreak caused by *Campylobacter* has been reported in Brazil. The occurrence of *Campylobacter jejuni/coli* has been demonstrated in pigs with and without diarrhea in São Paulo. Since raw and undercooked animal products may be contaminated with microorganisms derived from intestinal contents, the prevalence of these bacteria may present a potential health hazard (MODULO et alii, 1999).

During 1999, were reported in the United States 3,794 laboratory-confirmed cases of campylobacteriosis (MMWR, 2000).

Review of 128 outbreaks of foodborne disease, affecting almost 6000 people, with six deaths between 1980 and 1995, in Australia, showed that *Campylobacter* spp., and non-typhoid *Salmonella* spp. were the most commonly reported pathogens (CRERAR, 1996).

Listeria monocytogenes

Listeria monocytogenes foodborne outbreak has not been reported in Brazil, although the bacterium has been found in several type of foods, as well as in meat and poultry products (LAGE, et alii, 1996; BORGES et alii, 1999).

Last year, in the United States, it was confirmed 113 cases of listeriosis including the hot dog outbreak caused by *L. monocytogenes* in 1999 that made 101 cases in 22 states and 15 deaths (MMWR, 2000; BUTTLER, 2000).

Outbreak of listeriosis was reported in France in December 1999, with 26 cases including 7 deaths. Jellied pork tongue was the main cause of the outbreak (WHO, 2000).

The bacterium has also been recovered from meat and poultry products in some Asian countries (BAEK et alii, 2000).

Yersinia enterocolitica

Yersinia spp. were isolated from meat and meat products in São Paulo, Brazil (TASSINARI, MELO-FRANCO & LANDGRAF, 1994), however no food related disease has been reported in the country. *Y. enterocolitica* has been recovered from pork in Argentina (VELASQUEZ, ESCUDERO & GUZMAN, 1993), and Chile (BORIE et alii, 1997), and from meat products in Mexico city (RAMÍREZ et alii, 2000).

Yersinia infection was reported in Europe (FREDERIKSSON-AHOMAA, 2000), Japan (ICHINOHE et alii, 1991), United States (MMWR, 2000; REED & KAPLAN, 1999), and Canada (TOORA, 1995).

Occurrence in meat has been described in several European countries (GORECKA, FROCHOWSKA & SCIEZYNDKA, 1997; LOGUE et alii, 1997; PANEBIANCO et alii, 1993), Africa (KARIB, BOUSSATTA & SEEGER, 1995; NORTJE et alii, 1999) and Asia (SOON-YOUNG et alii, 2000).

The reported outbreaks of foodborne illness represent only the "tip of the iceberg". It is estimated that only a small fraction of foodborne disease cases are reported. It is recommended an expanded food safety information database to provide more complete information on the incidence of foodborne diseases by pathogen and by food. New pathogens always are underreported because testing procedures are nonstandardized or have not been developed, or because doctors tend to request tests for familiar pathogens (CAST, 1994). All these uncertainty result difficult to develop a good understanding on the occurrence of emergent foodborne pathogens.