

3rd Euro-Global Conference on Infectious Diseases

September 05-06, 2016 Frankfurt, Germany

Detection and molecular characterization of enteropathogenic bacteria isolated from children with acute diarrhea, slaughtered animals and raw meat samples in Tehran, Iran

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Infectious diarrhea is a leading cause of morbidity and mortality globally. Worldwide, enteropathogenic bacteria are responsible for one of the most important infectious diseases linked to the food industry and they affect animal welfare with the potential to give rise to public health problems. As in many countries, in Iran Shiga toxin producing *Escherichia coli* (STEC) strains have been frequently isolated from cattle, raw meat and young humans. In this study, we have explored the epidemiology of diarrheagenic *Escherichia coli* (DEC), *Shigella* spp., *Salmonella* spp. and *Campylobacter* spp. from differing sources in Tehran Province of Iran. Total 445 samples, which include 235 domestic cow feces, collected from three semi-urban community farms, 134 ground beef samples from slaughtered bovine/sheep sources (specifically a Tehran abattoir) and 76 stool samples acquired from human children (1 to 60 months of age) with acute diarrhea were sequentially examined for stx1, stx2, eae, lt, st, Pcvd435, O157:H7, α -hly and *Shigella* spp., *Salmonella* spp. and *Campylobacter* spp. genes via Polymerase Chain Reaction (PCR) approach. Shiga-toxin producing *Escherichia coli* strains were isolated from 41% of meat, 64% of cattle feces and 24% of children's fecal samples. PCR analysis indicated that 16 samples in total were positive for O157:H7. Also, 14% of human children and 0.85% of cattle species were *Shigella* spp. positive. The most commonly isolated STEC bacteria were from the O146, O112a and O44 serogroups for all 3 sources. Remarkably, none of the STEC strains proved to be from the O145, O111 and O26 serogroups. In conclusions, high levels of Shiga toxin producing *E. coli* in cattle and raw beef samples were observed at high rates and STEC colonization is widespread amongst healthy cattle in Iran. These observations provide strong evidence that STEC is one of the major causes of diarrhea in developing countries, mainly in children. The panel of assays employed offer simple strategies for the widespread detection and characterization of diarrheagenic *E. coli* isolates from a range of sources. DEC detection in this manner facilitates our understanding of their prevalence, clinical characteristics and epidemiology and will serve to support the future development of further food safety control strategies which target all STEC serotypes.

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Plant derived pharmaceuticals

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Plant made biologics have elicited much attention over recent years for their potential in assisting those in developing countries who have poor access to modern medicine. Additional applications such as the stockpiling of vaccines against pandemic infectious diseases or potential biological warfare agents are also under investigation. Plant virus expression vectors represent a technology that enables high levels of pharmaceutical proteins to be produced in a very short period of time. Recent advances in research and development have brought about the generation of superior virus expression systems which can be readily delivered to the host plant in a manner that is both efficient and cost effective. The following presentation describes recent innovations in plant virus expression systems and their uses for producing biologics from plants.

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