Consumption of Street-Vended Beverage a Potential Exposure Risk for Non-O157 Enterohemorrhagic Escherichia coli Infection: The Importance of Testing for Virulence Loci

To the Editor—We read with great interest the article by Hadler et al [1] that established international travel as the main exposure risk for non-O157 Shiga toxin–producing Escherichia coli (STEC) infection compared with patients with O157 STEC infection (15.3% vs 2.5%, respectively; P < .01). Up to 60% of US visitors to Mexico develop travelers’ diarrhea [2], which has been associated with non-O157 STEC infections [3].

In Mexico, non-O157 STEC strains have been isolated from persons with diarrheal episodes [4] and from food items [5], but the frequency of non-O157 STEC and other diarrheagenic E. coli pathotypes (DEPs) among beverages is unknown. We recently analyzed 56 samples of street-vended beverages for enteropathogens, by standard methods [6], and for DEPs, by polymerase chain reaction identification of virulence loci [7, 8]; STEC strains were further characterized by the OXoid agglutination test for the O157 serotype. Samples were collected during September–December 2010 at La Villa, a major tourist attraction north of Mexico City that has a high concentration of street-food vendors and an estimated average of 20 million national and international visitors per year. We found that 26 (46.4%) of the 56 samples were contaminated with E. coli.

The most frequently contaminated beverages were horchata (a rice-based traditional Mexican beverage), with 13 of 21 positive samples (62%), and fresh strawberry drink, with 6 of 10 positive samples (60%). In 3 of the 26 E. coli–positive samples (11.5%), we isolated non-O157 STEC strains in sufficient numbers to cause disease (≥2.8 × 10³ colony-forming units per liter of sample; Table 1); no other DEP was identified from these beverages. Another 3 of 21 (14%) Horchata samples harbored other enteropathogens (1 sample had Citrobacter freundii, 1 had Aeromonas hydrophila, and 1 had group B Salmonella and A. hydrophila). Of note, as shown in Table 1, all of the non-O157 STEC strains isolated had stx1 and/or stx2 genes and were positive for the gene encoding intimin (ie, eaeA). Together, the presence of Shiga toxin and intimin genes defines enterohemorrhagic E. coli (EHEC), a subset of pathogenic STEC strains that can cause hemorrhagic colitis and hemolytic uremic syndrome [9].

Our study shows that consumption of street-vended beverages is a potential source of non-O157 EHEC for both the local population and for individuals from industrialized countries who visit Mexico. A recent report associated beverages containing ice cubes with a higher risk for travelers’ diarrhea [10]. Furthermore, our study highlights the importance of characterizing virulence loci for STEC/EHEC identification, as has been shown by other studies [3–5]. Strategies to improve the safety of street-vended beverages and food, such as educational interventions for food handlers and consumers, as well as continuous surveillance for both the main pathogens and sources of contamination, will reduce the risk posed by these items.

Table 1. Characteristics of Beverages Testing Positive for Enterohemorrhagic Escherichia coli, Including Genes Identified

<table>
<thead>
<tr>
<th>Beverage</th>
<th>pH</th>
<th>Gene Profile</th>
<th>EHEC, CFU/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horchata</td>
<td>7</td>
<td>eaeA-stx1</td>
<td>8.3 × 10²</td>
</tr>
<tr>
<td>Fresh strawberry</td>
<td>6</td>
<td>eaeA-stx1</td>
<td>3.6 × 10³</td>
</tr>
<tr>
<td>Horchata</td>
<td>7</td>
<td>eaeA-stx2</td>
<td>2.8 × 10³</td>
</tr>
</tbody>
</table>

Abbreviations: CFU, colony-forming units; EHEC, enterohemorrhagic Escherichia coli.

* Beverages are sold by the liter.

Note

Potential conflicts of interest. All authors: No reported conflicts.

All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

5. Lopez-Saucedo C, Cerna JF, Estrada-Garcia T. Non-O157 Shiga toxin–producing Escherichia coli is the most prevalent diarrheagenic E. coli pathotype in street-vended taco

References

5. Lopez-Saucedo C, Cerna JF, Estrada-Garcia T. Non-O157 Shiga toxin–producing Escherichia coli is the most prevalent diarrheagenic E. coli pathotype in street-vended taco


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