Summer and Winter Prevalence of Shiga Toxin–Producing *Escherichia coli* (STEC) O26, O45, O103, O111, O121, O145, and O157 in Feces of Feedlot Cattle

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**Abstract**

The United States Department of Agriculture Food Safety and Inspection Service has declared seven Shiga toxin–producing *Escherichia coli* (STEC) serogroups (O26, O45, O103, O111, O121, O145, and O157) as adulterants in raw, non-intact beef products. The objective of this study was to determine the prevalence of these seven serogroups and the associated virulence genes (Shiga toxin [*stx*1, *stx*2], and intimin [*eae*]) in cattle feces during summer (June–August 2013) and winter (January–March 2014) months. Twenty-four pen floor fecal samples were collected from each of 24 cattle pens, in both summer and winter months, at a commercial feedlot in the United States. Samples were subjected to culture-based detection methods that included enrichment, serogroup-specific immunomagnetic separation and plating on selective media, followed by a multiplex polymerase chain reaction for serogroup confirmation and virulence gene detection. A sample was considered STEC positive if a recovered isolate harbored an O gene, *stx*1, and/or *stx*2, and *eae* genes. All O serogroups of interest were detected in summer months, and model-adjusted prevalence estimates are as follows: O26 (17.8%), O45 (14.6%), O103 (59.9%), O111 (0.2%), O121 (2.0%), O145 (2.7%), and O157 (41.6%); however, most non-O157 isolates did not harbor virulence genes. The cumulative model-adjusted sample-level prevalence estimates of STEC O26, O103, O145, and O157 during summer (*n*=576) were 1.0, 1.6, 0.8, and 41.4%, respectively; STEC O45, O111, and O121 were not detected during summer months. In winter, serogroups O26 (0.9%), O45 (1.5%), O103 (40.2%), and O121 (0.2%) were isolated; however, no virulence genes were detected in isolates from cattle feces collected during winter (*n*=576). Statistically significant seasonal differences in prevalence were identified for STEC O103 and O157 (*p*<0.05), but data on other STEC were sparse. The results of this study indicate that although non-O157 serogroups were present, non-O157 STEC were rarely detected in feces from the feedlot cattle populations tested in summer and winter months.


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