Evaluating the Effectiveness of Transport Media on Shiga Toxin-Producing *E. coli* Serotypes

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Introduction

One of the key issues involved in accurately testing beef and the environment for the presence of specific bacteria, particularly pathogens such as Shiga toxin-producing *Escherichia coli* (STEC), is maintaining the viability of the microorganisms when transporting samples from the field to the laboratory. This process may take up to three days when considering collection, shipping and laboratory preparation times. Allowing the target bacteria to increase or decrease in numbers during transit is undesirable, so samples must be kept chilled and the media used for transport must offer a stable but non-nutritive environment. Three commonly used non-selective transport media were evaluated for their ability to maintain original STEC levels during transport. Holding temperature may vary during shipping, so this study evaluated two separate temperatures as co-variables.

Experimental Procedures

Buffered peptone water (BPW; Becton, Dickinson and Company, Sparks, MD), Cary-Blair transport media (CB; Oxoid LTD, Basingstoke, Hampshire, England), and maximum recovery diluent (MR; Oxoid LTD) media were selected for evaluation. Sets of these media types were individually inoculated with STEC serotypes O26, O45, O103, O111, O145, and O157 before being placed in refrigerators at 30 °F or 50 °F. Samples were removed and plated from each media/strain/temperature combination at 0, 12, 24, 48, and 72 hours. Plates were placed in an incubator at 99 °F for 24 hours before enumeration and comparison.

Results and Discussion

The average log counts of each serotype on each media type at 39 °F and 50 °F are shown in Figures 1–6.

When transport medium samples were held at the desired refrigeration temperature 39 °F, all media types performed similarly; at the simulated abuse temperature of 50 °F, the Cary-Blair medium was the only one that maintained the bacteria at close to the original inoculation level.

Implications

The use of Cary-Blair transport medium in conjunction with proper chilled storage temperatures will help ensure that accurate results are obtained for field-based research studies, and for daily beef processing samples being transported to analytical laboratories for enumeration of STEC.

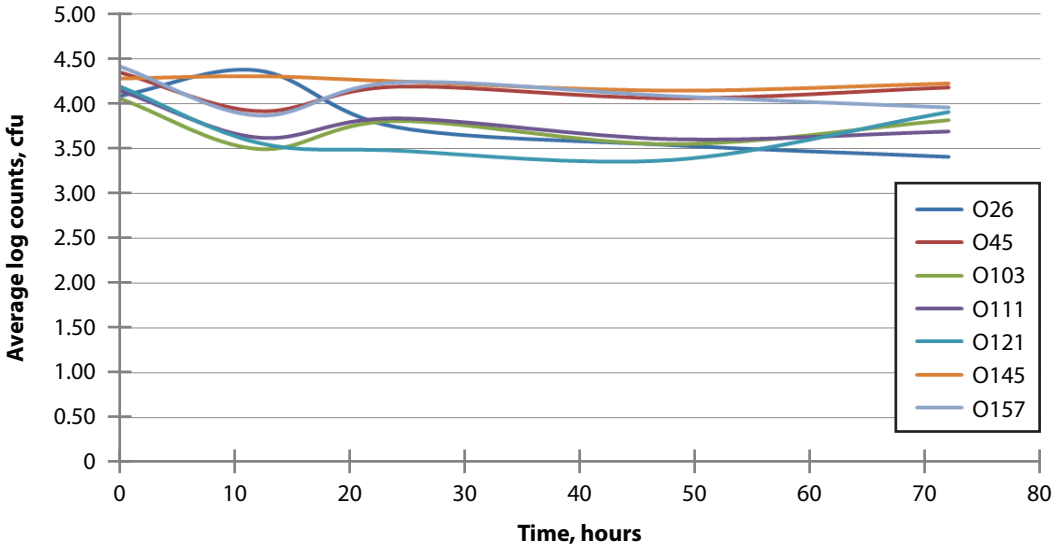

Figure 1. The average log count (cfu) of E. coli O26, O45, O103, O111, O145, and O157 on buffered peptone water and incubated at 39 °F for up to 72 hours.

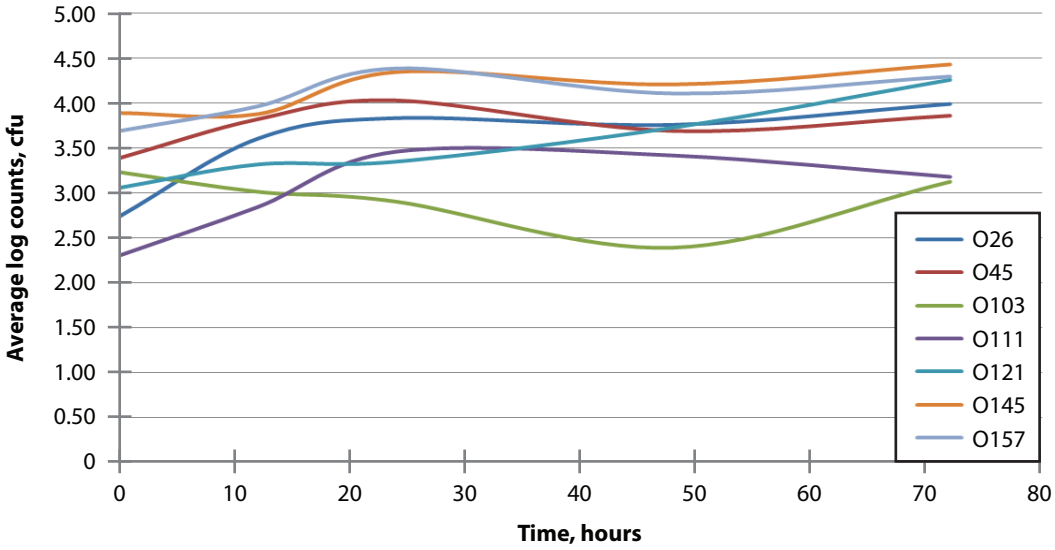

Figure 2. The average log count (cfu) of E. coli O26, O45, O103, O111, O145, and O157 on Cary-Blair transport media and incubated at 39 °F for up to 72 hours.

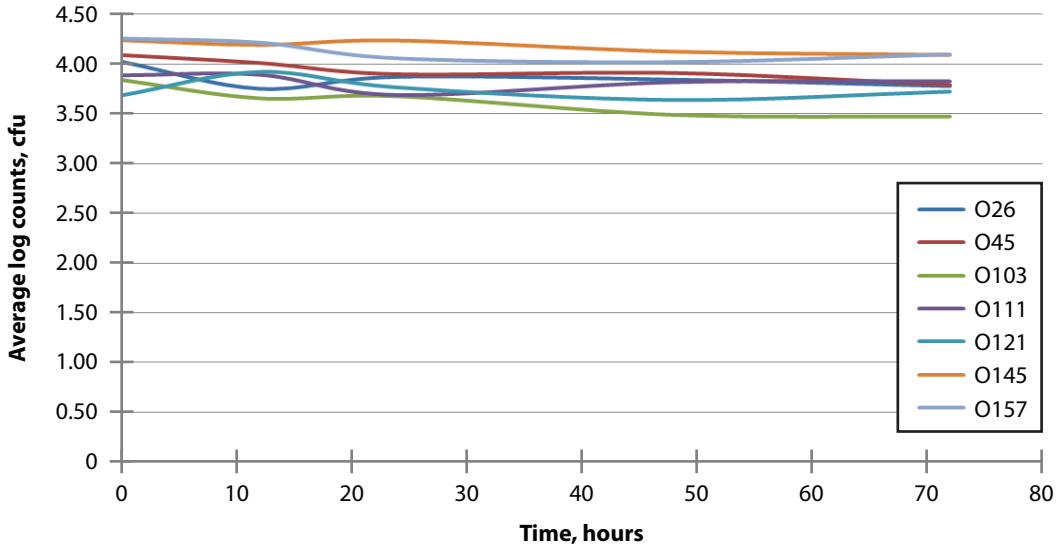

Figure 3. The average log count (cfu) of E. coli O26, O45, O103, O111, O145, and O157 on maximum recovery diluent and incubated at 39° F for up to 72 hours.

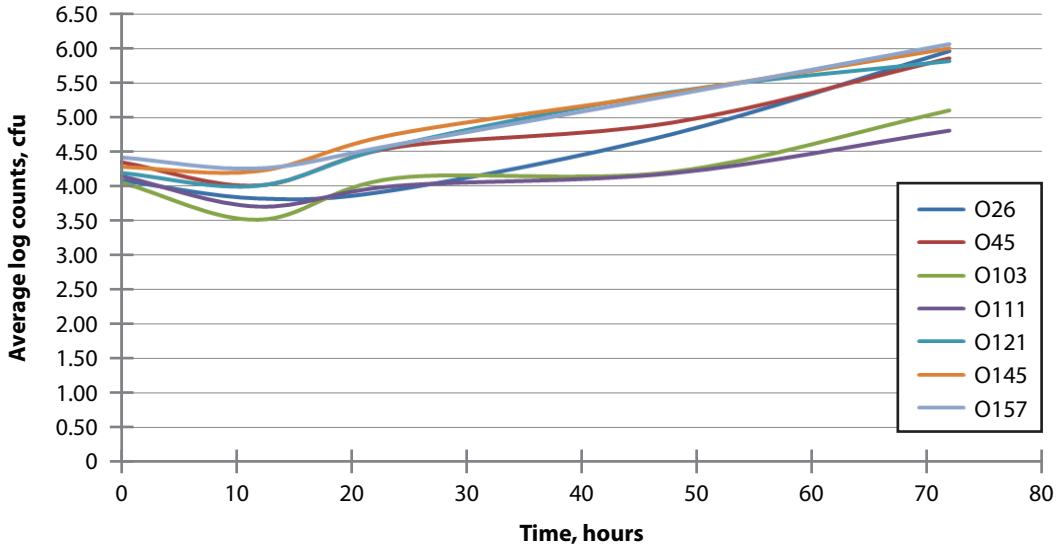

Figure 4. The average log count (cfu) of E. coli O26, O45, O103, O111, O145, and O157 on buffered peptone water and incubated at 50° F for up to 72 hours.

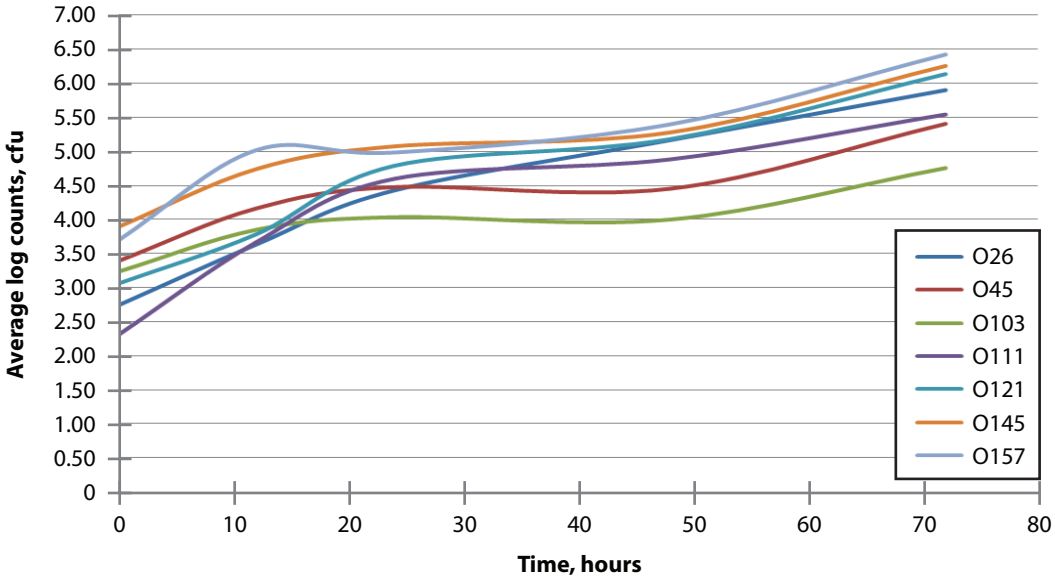

Figure 5. The average log count (cfu) of E. coli O26, O45, O103, O111, O145, and O157 on Cary-Blair transport media and incubated at 50 °F for up to 72 hours.

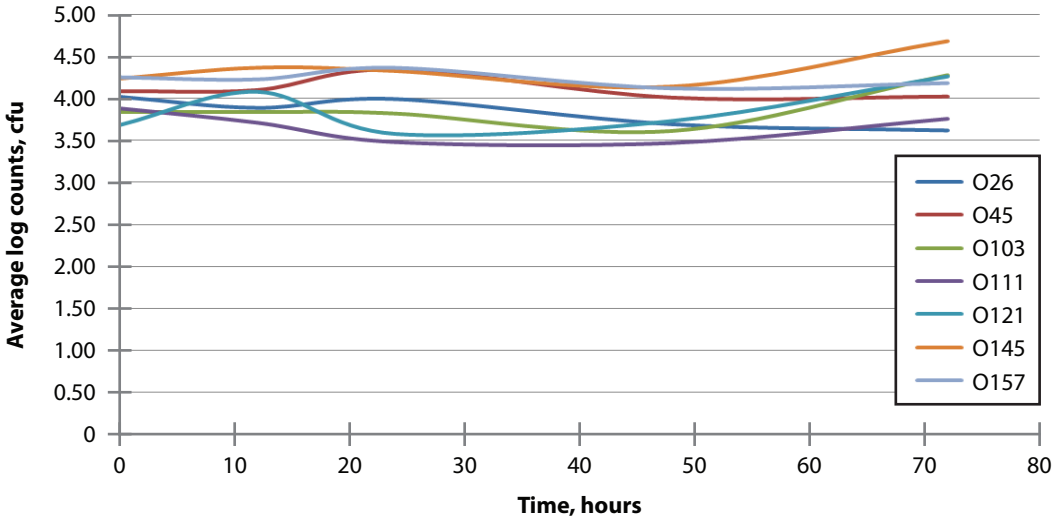

Figure 6. The average log count (cfu) of E. coli O26, O45, O103, O111, O145, and O157 on maximum recovery diluent and incubated at 50 °F for up to 72 hours.