Detection and Isolation of Shiga Toxin-Producing Escherichia coli (STEC) O104 and Other STEC Serogroups of Public Health Concern

Gian Marco Baranzoni1, Pina Fratamico2, Fernando Rubio3, Thomas Glase3, Natalie Launchi2, Lori Bagi2 and Sabrina Albottini2

1Department of Veterinary Medical Science, University of Bologna, 50 via Tolara di Sopra, Ozzano dell’Emilia (BO), Italy; 2USDA, Agricultural Research Service, Eastern Regional Research Center, 54 SteamWhistle Drive, Wooster, PA, United States

Abstract

Detection and isolation of Shiga toxin-producing Escherichia coli (STEC) O104 are important food-borne pathogens that cause outbreaks and serious cases of food-borne illness. Methods for detection and isolation of STEC, particularly the non-O157 STEC, are needed to prevent their transmission through contaminated food. The objectives of this study were to develop a method for the detection and isolation of STEC O104 and serogroups belonging to O26, O45, O103, O111, O121, O145 and O157. The development of IMS (improved magnetic isolation) and latex bead agglutination assays for STEC O104 and other serogroups was evaluated. The use of IMS and latex bead agglutination assays allowed for rapid identification and isolation of STEC O104 and other serogroups from food samples.

Results and Discussions

Monoclonal antibodies: inclusivity and exclusivity

Latex bead agglutination assays

Results: The latex bead agglutination assays for detection of E. coli serogroups O26, O45, O104, O111, O121, O145, and O157. Positive reactions were observed only on target E. coli serogroups.

Methods and Materials

Monoclonal antibodies inclusivity and exclusivity

Sandwich type ELISA formats were developed using Costar 96-well microtiter plates and various STEC strains (O26, O45, O103, O111, O121, O145 and O157) as targets. Antibodies against O26, O45, and O104 were selected to detect and isolate serogroups belonging to O26, O45, and O104, respectively. The specificity of the antibody response was assessed using various STEC strains and non-STEC strains. The specificity of the antibody response was further evaluated using various STEC strains and non-STEC strains. The specificity of the antibody response was assessed using various STEC strains and non-STEC strains. The specificity of the antibody response was assessed using various STEC strains and non-STEC strains.

Detection and isolation of STEC O104 and EAEC-STEC O104 in artificially contaminated sprouts

Number of positive samples out of number of total samples tested for every experimental group. Samples in which some negative results were observed are highlighted in red. There was agreement between screening and isolation results.

Conclusions

• Very specific monoclonal antibodies for the detection of E. coli belonging to serogroups O26, O45, O111, O121, O145, and O157 were successfully developed. Further studies are needed for production of monoclonal antibodies for O26.

References


