

Clostridioides difficile ON RETAIL MEAT SAMPLES. A POSSIBLE SOURCE OF HUMAN CLINICAL INFECTIONS?

Derek Tan^{1,2}, Michael Mulvey^{1,2}, George Zhanel¹, Denice Bay¹, Richard Reid-Smith³, George Golding^{1,2}
derek.tan@canada.ca

¹University of Manitoba, Faculty of Medical Microbiology, Winnipeg, Canada; ²National Microbiology Laboratory, Public Health Agency of Canada, Winnipeg, Canada; ³Center for Food-borne, Environmental and Zoonotic Infectious Disease, Public Health Agency of Canada, Guelph, Canada

Introduction

Clostridioides difficile is a leading nosocomial pathogen. *C. difficile* spores can be found dispersed throughout the environment and can also colonize and infect animals. Previous studies have shown that *C. difficile* spores can be isolated from commercially available beef, veal, pork, vegetables, and seafood. However, a definitive link has yet to be made between food contamination and hospitalized cases. This study aims to isolate *C. difficile* from retail meat and compare them to human clinical isolates.

Methods

Frozen retail pork, beef and veal samples obtained from the Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS) program were screened for *C. difficile*. Defrosted samples were hand massaged in PBS. Bacterial isolation was performed twice per sample. First, PBS rinse samples were plated on *C. difficile* moxalactam norfloxacin (CDMN) agar and incubated. Secondly, PBS rinse samples were incubated in CDMN broth, ethanol shock treatment, plated on CDMN agar and incubated. Growth on agar plates were inspected manually with any suspected *C. difficile* colonies confirmed by *C. difficile* multiplex PCR. Positive toxigenic isolates were molecularly characterized by ribotyping.

Results

In this study, 9 of 603 meat samples (1.5%) tested positive for toxigenic *C. difficile* (Table 1). Of the 603 samples: no isolates were obtained from 28 beef samples, 4 isolates were obtained from 116 veal samples (3.4%), and 5 isolates were isolated from 458 pork samples (1.1%). Identified ribotypes NS110 (n=3), rt106 (n=3), rt131 (n=1), NS195 (n=1) and for 1 isolate the ribotype is pending. All 9 isolates were A/B toxigenic positive with rt131 also being binary positive.

Sample Commodity	Quantity Processed	Positive Samples	Ribotype	NAP Type
Beef	28	0 (0.0%)	---	---
Veal	116	4 (3.4%)	rt131 rt106 NS110	NAP10 NAP11 Non-NAP
Pork	458	5 (1.1%)	NS195 rt106 NS110	NAP4 NAP11 Non-NAP
Total	603	9 (1.5%)		

Table 1. Sample commodity type, quantity of samples processed, positive *C. difficile* recovery rate, ribotypes of isolated colonies and NAP types of isolated colonies.

Conclusion

A low percentage of retail meat samples were contaminated by *C. difficile* spores. All ribotypes of *C. difficile* retail meat isolates have been identified in human clinical isolates obtained through the Canadian Nosocomial Infection Surveillance Program. Future work includes the use of whole genome sequencing to genetically compare retail meat isolates from human clinical isolates to further delineate if retail meat could be a reservoir of human *C. difficile* infections.