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Project Title: Prevalence of Resistant and Susceptible *Campylobacter* in Retail Ground Beef

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Objective: The objective of this study was to determine the prevalence of resistant and susceptible *Campylobacter* spp. in retail ground beef during the spring in retail markets in Lubbock, Texas.

Experimental Design & Analysis:

During the spring of 2013, a total of 178 ground beef samples were collected from seven stores in Lubbock, Texas. Samples were processed and subjected to detection of *Campylobacter* using a PCR-based system and presumptive positives were determined based on the number of positives as determined by the BAX protocols for the detection of *Campylobacter* (Dupont Qualicon). Positive samples were confirmed by plating samples onto Modified Charcoal Cefoperazone Deoxycholate Agar and R&F® *Campylobacter* chromogenic plating media. A total of 175 isolates were selected, frozen, and grown on blood agar for recovery. Of these, 88 isolates were successfully recovered and subjected to National Antimicrobial Resistance Monitoring System (NARMS) testing methods to determine resistance patterns. Results were determined using the SWIN software system. A multiple sample proportions test was performed in R to determine prevalence of resistant *Campylobacter* isolates to the four antibiotics.

Key Results:

According to the results determined using the SWIN software, there were four out of the nine antibiotics (erythromycin, gentamicin, ciprofloxacin, and tetracycline) with determined results for susceptibility or resistance. *Campylobacter* isolates expressed resistance to specific antibiotics as follows: 4.54% (n=4) for ciprofloxacin, 91.9% (n=68) for erythromycin, 15.3% (n=13) for gentamicin, and 4.60% (n=4) tetracycline. There was a significant difference ($p < 0.05$) in the prevalence of resistant *Campylobacter* observed among the four antibiotics. Every isolate recovered was resistant to at least one antibiotic. Only 3.41% (n=3) of the isolates were multidrug resistant as defined by the isolate exhibiting resistance to three or more classes of antibiotics.

Industry Application:

Antibiotic resistance is a controversial issue, and can occur for multiple reasons. In this study the majority of the isolates were resistant to erythromycin, a macrolide. Macrolides are commonly used to treat clinical cases of *Campylobacteriosis* in humans meaning that this could be a public health issue. The antibiotic tylosin is also a macrolide used in the cattle industry. Retail is one of the last segments in the food processing chain. It is important to consider resistant pathogen contamination at the retail level in order to better understand the need for pathogen interventions from farm to fork to protect public health. *Campylobacter*, a pathogen estimated to cause 1.3 million illnesses every year in the United States alone, was found to be commonly detected in ground beef products. This research is a point in time observation of the presence of resistant *Campylobacter* at the retail level in Lubbock, Texas. Further research is needed to determine a national prevalence.

Figure 1 – Percentage of antibiotic resistance, susceptibility, and multidrug resistance of *Campylobacter* isolates from raw, retail ground beef samples collected during the spring of 2013 in Lubbock, TX.

