

New Research into Antimicrobial Resistance Opens Doors to Detection and Control

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Antibiotic-resistant pathogens are a potential threat to human and animal health and food safety. The Alberta Meat and Livestock Agency (ALMA) actively funds research into antimicrobial resistance, as it is vital to quantify risks and identify potential methods of detection and control.

Dr. Mueen Aslam, a Research Scientist at Agriculture and Agri-Food Canada's Lacombe Research Centre, conducted one such study entitled "Prevalence of genetic determinants of antimicrobial resistance in *E. coli*, enterococci and *Salmonella* isolated from retail meats." The study aimed to isolate bacteria from meat and poultry sold at Alberta grocery stores and test the bacteria's resistance to antibiotics used to treat infections in humans and animals.

Dr. Aslam and his team collected over 500 samples of chicken, ground beef, pork and turkey from retail locations in Alberta. Potentially harmful bacteria were then isolated from the samples and cultured in the presence of various antibiotics to see if they were sensitive or resistant. The physical sensitivity or resistance of the bacteria to the antibiotics is called a phenotype. In addition, the DNA of the bacteria was tested to see if they possessed genes which would allow them to be resistant to specific antibiotics. The genetic fingerprint of the bacteria is called a genotype. The concern is that the genetic code that expresses resistance to certain antibiotics used in human medicine could potentially be shared with pathogens known to affect human health, thereby putting food safety at risk.

Dr. Aslam found a greater prevalence of resistant bacteria on poultry when compared to beef and pork. While the exact cause for the higher prevalence is unknown, ALMA is funding further research into identifying sources and potential

causes of resistant bacteria for all poultry and livestock species. Dr. Aslam's findings provide an important baseline data set for the national program, the Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS).

ALMA is collaborating with provincial and federal organizations on initiatives aimed at quantifying and mitigating the risks of antimicrobial resistance. Moreover, several ongoing research projects are evaluating methods for controlling antimicrobial resistance by introducing new technologies such as high pressure processing, which uses high pressure and moderate temperatures to destroy bacteria on food products, or use of alternatives to antibiotics in livestock production.

Antimicrobial resistance is a potential risk to animal health, human health and ecosystem health. ALMA is encouraging ongoing research into reducing these risks. The "One Health Roadmap: A New View" outlines ALMA's commitment to strategic projects where human, animal and environment health systems intersect.