

Multidrug-resistant bacteria found in 40% of supermarket meat samples

April 14 2023



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Multidrug-resistant *E. coli* were found in 40% of supermarket meat

samples tested in a Spanish study. E. coli strains capable of causing severe infections in people were also highly prevalent, this year's European Congress of Clinical Microbiology & Infectious Diseases (ECCMID 2023, Copenhagen, 15-18 April) will hear.

Antibiotic resistance is reaching dangerously high levels around the world. Drug-resistant infections kill an estimated 700,000 people a year globally and, with the figure projected to rise to 10 million by 2050 if no action is taken, the World Health Organization (WHO) classes [antibiotic resistance](#) as one of the greatest public health threats facing humanity.

Multidrug-resistant bacteria can spread from animals to humans through the [food chain](#) but, due to commercial sensitivities, data on levels of antibiotic-resistant bugs in food is not made widely available.

To find out more, Dr. Azucena Mora Gutiérrez and Dr. Vanesa García Menéndez, of the University of Santiago de Compostela-Lugo, Lugo, Spain, together with colleagues from other research centers, designed a series of experiments to assess the levels of multidrug-resistant and extraintestinal pathogenic Enterobacteriaceae (Klebsiella pneumoniae, E. coli and other bacteria that can cause multidrug-resistant infections such as sepsis or urinary tract infections) in meat on sale in Spanish supermarkets.

They analyzed 100 meat products (25 each of chicken, turkey, beef and pork) chosen at random from supermarkets in Oviedo during 2020.

The majority (73%) of the meat products contained levels of E. coli that were within food safety limits.

Despite this, almost half (49%) contained multidrug-resistant and/or potentially pathogenic E. coli. From those, 82 E. coli isolates were recovered and characterized. In addition, 12 K. pneumoniae isolates

were recovered from 10 of the 100 meat products (7 chicken, 2 turkey and 1 pork).

Forty of the 100 meat products contained multidrug-resistant *E. coli* (56 of the 82 *E. coli* characterized). These included *E. coli* that produced extended-spectrum beta-lactamases (ESBLs), enzymes that confer resistance to most [beta-lactam antibiotics](#), including penicillin, cephalosporins and the monobactam aztreonam.

The percentage of positive samples for the carriage of ESBL-producing *E. coli* per meat type was: 68% turkey, 56% chicken, 16% beef and 12% pork. This higher presence of ESBL-producing *E. coli* strains in poultry compared to other types of meat is likely due to differences in production and slaughter.

Twenty-seven percent of the meat products contained potentially pathogenic extraintestinal *E. coli* (ExPEC). ExPEC possess genes that allow them to cause disease outside the gastrointestinal tract. ExPEC causes the vast majority of [urinary tract infections](#) (UTIs), is a leading cause of adult bacteremia (sepsis) and is the second most common cause of neonatal meningitis.

Six percent of the meat products contained uropathogenic (UPEC) *E. coli*—UPEC is part of the ExPEC group; these possess specific virulence traits that allow them to cause UTIs.

One percent of the meat products contained *E. coli* harboring the *mcr-1* gene. This gene confers resistance to colistin, an antibiotic of last resort used to treat infections caused by bacteria resistant to all other antibiotics.

The study's authors, who in a previous study reported high levels of bacteria that were potentially capable of causing severe human infections

and/or multidrug resistant in chicken and turkey, say that their latest research shows that consumers may also be exposed to these bacteria through beef and pork.

They are calling for regular assessment of levels of antibiotic-resistant bacteria, including ExPEC E. coli, in [meat products](#).

Dr. Mora adds, "Farm-to-fork interventions must be a priority to protect the consumer. For example, implementation of surveillance lab methods to allow further study of high-risk bacteria (in farm animals and meat) and their evolution due to the latest EU restriction programs on antibiotic use in veterinary medicine."

"Strategies at farm level, such as vaccines, to reduce the presence of specific multidrug-resistant and pathogenic bacteria in food-producing animals, which would reduce the meat carriage and consumer risk."

"The consumer plays a key role in food safety through proper food handling. Advice to consumers includes not breaking the cold chain from the supermarket to home, cooking meat thoroughly, storing it properly in the refrigerator and disinfecting knives, chopping boards and other cooking utensils used to prepare raw meat appropriately to avoid cross-contamination. With these measures, eating meat becomes a pleasure and zero risk."

More information: Conference: www.eccmid.org/

Provided by European Society of Clinical Microbiology and Infectious Diseases

Citation: Multidrug-resistant bacteria found in 40% of supermarket meat samples (2023, April

14) retrieved 25 April 2024 from <https://medicalxpress.com/news/2023-04-multidrug-resistant-bacteria-supermarket-meat-samples.html>

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