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ANALYSIS OF MONITORING STUDIES ON CEPHALOSPORIN RESIDUES IN POULTRY FEED, DROPPINGS, AND MEAT IN UKRAINE (2022)

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Introduction. The misuse of antibiotics in agriculture is an urgent public health threat. In Ukraine, there is a lack of information on the use and overuse of antibiotics in agriculture. According to the data of Ukrainian scientists (2013–2018), residues of tetracyclines and fluoroquinolones, including enrofloxacin and norfloxacin, were most often detected in chicken droppings. However, monitoring studies of feed and poultry meat indicate the absence of antibacterial drug residues. The presence of antibacterials in poultry droppings causes contamination of soils, surface and underground waters, food products, and feed. This can lead to the emergence of antibiotic-resistant strains of microorganisms, which poses an immediate threat to public health.
This study aimed to assess the presence of antibiotic residues in poultry feed, poultry droppings, and meat from Ukrainian farms.
Methods. From 2022, 112 samples of feed for fattening poultry from domestic enterprises from 20 Oblasts of Ukraine were tested for the presence of cephalosporins. Samples for the studies were collected by regional veterinary inspectors in accordance with Methodological recommendations regarding sampling procedures for the implementation of the State Monitoring Plan for residues of veterinary drugs and pollutants in live animals and unprocessed food products of animal origin in Ukraine (taking into account the requirements of Council Directive 96/23/EC). Liquid chromatographs with a double mass spectrometric detector Alliance XE and Xevo (Waters Corporation company, USA) were used to study the residual content of antibacterials in droppings, chicken tissues, and feed. The chromatograph was equipped with a SunFire™ C18, 5 µm, 4.6×50 mm analytical column for the Aliance XE and an ACQUITY UPLC® BEH C18, 1.7 µm, 2.1×100 mm for the Xevo, a dual quadrupole tandem mass spectrometry detector, positive ionization electrospray, and MassLynx 4.1 calculation software.
Results. Residues of these substances were found in 7 samples, which is 6.3% of the total amount of the studied material. The quantitative content of cefquinome was identified, which ranged from 472.6 to 1045.2 ?g/kg. As a result of the obtained data, 21 samples of poultry droppings were tested as investigative measure, of which 8 (33%) samples revealed significant concentrations of this antibiotic (330.6 to 799.7 ?g/kg). Subsequently, 478 poultry meat samples were tested for cephalosporins (?-lactams, group B1.8). However, no positive meat samples were found. In Ukraine, norms for cefquinome in poultry feed are not regulated by legislation. However, EU Regulation No. 37/2010 stipulates the maximum permissible level in poultry meat, which is 50 ?g/kg, respectively.
Conclusion. Our results suggest that in Ukraine, there is sporadic unauthorized use of cephalosporins in the poultry industry. The release of antibiotics into the environment poses risks to human health. Quality monitoring of the content of antibiotic residues is necessary not only in poultry products, but also in droppings of fattening poultry, as well as the development of regulatory documentation regulating antibiotic residues in animal manure and poultry droppings.