CONTROL OF RESIDUES: EXAMPLE OF ANTIMICROBIALS IN FOOD

L. El Bahri
Department of Pharmacy-Toxicology, National Veterinary School, Sidi-Thabet, 2020, Tunisia

Antibacterial drugs are used extensively in animal husbandry for two main purposes: therapy and prophylaxis. Foodstuffs obtained from animals treated with antimicrobials must not contain residues of the parent compound(s) and/or their metabolites which might constitute a health hazard to the consumer. Moreover, countries intending to export foods of animal origin must ensure that their products do not contain residue of banned drugs (MRL = 0), or concentrations of legally applied drugs that exceed the Maximum Residue Limits (MRLs) set by the European Union.

Analysis of antimicrobial residues is difficult: more than 60 substances, 6 matrix, 5 animal species, very low levels (parts per billion), and fastidious methodology of validation. Analytical methods available for determining antibiotic residues are microbial inhibition methods, bioassays or enzyme immunoassays tests, physicochemical tests (e.g., thin layer chromatography), and instrumental methods such as capillary electrophoresis, biosensor systems, gas chromatography with various detectors, liquid chromatography with UV-Vis, diode array, fluorescence, mass spectrometry detectors. Microbial tests are used for the screening but in some cases they are not enough sensitive (e.g., sulfonamides, quinolones) and not really specific (false positive results). Instrumental methods more specific, more sensitive, are used to confirm the results of suspected samples.

The method should be fully validated. Validation should be needed for each matrix such as muscle, liver, kidney, fat, eggs, milk and honey and for each species such as chickens, beef, sheep, pig, and fish (no extrapolation). The method should have substantiated extraction efficiency (> 80%). Analytical methods validation involves the following parameters: specificity, linearity, accuracy, reliability, limit of detection (signal-to-noise ratio 2), limit of quantification (< MRL concentrations/2), stability of analyte ruggedness, minimum required proficiency limits, decision limit and detection capability. Efficient control of antimicrobial residues in animal products is essential for the protection of the human health.