

Sample Preparation going green(er) in food analysis- The paradigm of antibiotics residues

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Beyond any doubt, sample analysis is a multistep endeavor, in which measurement is the final step of a long journey that begins with sample preparation. The choice of the right approach in the sample pretreatment stages, is the key to success for accurate, precise, sensitive, and selective results.

Till now, numerous techniques, methods, procedures and approaches are published in the literature, offering a wide range of analytical tools to the lab practitioner. Analytical scientists all over the world have developed protocols for a plethora of analytes in various sample matrices.

Food samples are among the most complicated matrices in which the analytical chemist has to determine several classes of analytes, in low concentrations, in the presence of various endogenous compounds, taking into consideration all demands of legislation. In the past decades, advances in sample pretreatment have followed the trends for green chemistry and green analytical chemistry, focusing on miniaturization and automation, using the least possible amount of organic solvents.

Antibiotics are chemical compounds, which are totally or partly synthesized by living microorganisms that: either inhibit the growth or kill other microorganisms. Several classes of antibiotics are used in human and/or veterinary medicine, such as: β -lactams (Cephalosporins and Penicillins), Quinolones, Tetracyclines, Aminoglycosides, Macrolides, Sulfonamides, amphenicols, rifamycins etc.

Producers find it easy to use them for growth promotion, because they are readily obtainable and cheap, and they provide cost-effective insurance against possible loss from illness. However, failure to observe prescribed withdrawal periods may lead to the presence of residues in food, causing immediate effects such as allergies, or delayed effects, such as the development of drug resistant bacteria, therapy failure or impact on immune response.

In order to ensure human safety and health regulatory agencies have enacted Permitted Limits (PL) or Maximum Residue Levels (MRLs) for the presence of antibiotics in animal products.

The advances in method development for the extraction of several antibiotic classes from various food samples of animal origin will be presented with special focus in compliance with green analytical chemistry demands.



Dr Victoria Samanidou is Full Professor and Director of the Laboratory of Analytical Chemistry in the Department of Chemistry of Aristotle University of Thessaloniki, Greece.

Her research interests focus on the development of sample preparation methods using sorptive extraction prior to chromatographic analysis. She has co-authored 190 original research articles in peer reviewed journals and 57 reviews, 60 editorials/in view and 50 chapters in scientific books (h-index 40, Scopus Author ID 7003896015, 5268 citations, Web of Science Researcher ID AAE-4121-2020). She is editorial board member of more than 29 scientific journals and guest editor in more than 25 special issues. She has peer reviewed more than 655 manuscripts for 141 scientific journals.

In 2016, she was included in top 50 power list of women in Analytical Science, as proposed by Texere Publishers. <https://theanalyticalscientist.com/power-list/the-power-list-2016>

In 2020 she was included in the 2% top world scientists in the field of Analytical Chemistry (career - 2019, as well as single year 2019) published in PLOS Biology based on citations from SCOPUS. <https://dx.doi.org/10.17632/btchxktzyw>. <https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3000918>

She is Leader of Working Group 1 Science and Fundamentals of EuChemS-DAC Sample Preparation Study Group and Network (2021) <https://www.sampleprep.tuc.gr/en/working-groups/wg1-science-and-fundamentals>

Since 2016 she has been elected as President of the Steering Committee of the Association of Greek Chemists-Regional Division of Central & Western Macedonia.

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