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Abstract

This ebook aims to describe the subject of Bioanalytical Chemistry mainly to undergraduate students of Chemistry but also to serve as introduction to other interested scientists. Bioanalytical chemistry represents a rapidly growing field that lays at the heart of the life sciences and natural sciences. Bioanalysis uses analytical techniques (chromatography, mass spectroscopy and other) with the aim of solving biological problems and gaining new knowledge on biochemical pathways and the mechanisms of life. The first part describes the two main lines of development and application: Systems Biology, Omics techniques (genomics, proteomics, metabolomics) and Bio-pharmaceutical Analysis. The biological substrates, their problems and peculiarities in chemical analysis are described in

a separate chapter. The role of metals in the human body is analyzed separately. In the second part the main analytical techniques used in bioanalytical Chemistry are presented: Biological Sample Processing Techniques, Electroanalysis and Biosensors, Immunochemical Techniques, Capillary Electrophoresis, Chromatographic Techniques, Mass Spectrometry, Bioanalytical Applications of ICP-MS and LC-MS toward Elemental analysis, Atomic Spectrometry in the Analysis of Biological Materials. Finally, Validation of Bioanalytical Methods is presented. Method validation is a challenging task in the analysis of real samples especially when analysis aims at endogenous substances. The last chapter offers an introduction to guidelines and instructions of control mechanisms (e.g. EMA and FDA).

