

P5. THE ANALYTICAL INSTRUMENTATION METHODS NEEDED FOR MODERN FORENSIC TOXICOLOGY LABORATORY

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The use of advanced analytical techniques for a modern forensic toxicology laboratory is indispensable. The current presentation aims to present the methodological theory and current technology for the determination of chemicals in biological tissues, fluids and environment. The goal of analytical measurements is to attain coherent, confidential, sensitive and right data. For achieving this goal, method is required to be validated. This procedure should be done separately for each matrix and laboratory. The most modern instrumentations used in forensic toxicology laboratory are Gas Chromatograph–Quadrupole Mass Spectrometer (GC–QMS), GC–Ion Trap MS (GC–ITMS and GC–MS/MS), Liquid Chromatograph–Mass Spectrometers (LC–ITMS and LC–MS–MS), Magnetic Sector MS and GC–Combustion Isotope MS, Time-of-Flight Mass Spectrometers (TOF–MS), Fourier Transform Ion Cyclotron Resonance Mass Spectrometers (FTMS) and Orbitrap™, Cyclic Voltammetry and Pulsed Electrochemical Detectors (PED) and Capillary Electrophoresis. The QMS, ITMS, and LC–MS allow identifying and quantifying a number of toxicants such as small molecular weight chemicals and steroids in environment and biological tissues. Innovations like lower column diameter size, high ignition rate furnaces, high compression carrying gas control and choice of more effective capillary columns have diminished the time needed for determination. Facilitating of software design for LC–MS and LC–MS/MS allow easier and faster analysis. Hybrid tools are important for the growing needs of forensic laboratories in criminal investigations. FTMS have disadvantages such as expensive and need of ultra-low vacuum. However, Orbitrap is a new technology, and can be use instead of FTMS.

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