

# Review of Advanced Chromatographic Techniques for Quantifying Life-Saving Drugs in Complex Matrices

**Ashwini Kumar Singh<sup>1</sup> and Dr. Shirish Premchand Jain<sup>2</sup>**

<sup>1</sup>Research Scholar, Department of Pharmacy

<sup>2</sup>Research Guide, Department of Pharmacy

Sunrise University Alwar (Raj.) India

**Abstract:** Quantifying life-saving drugs in complex biological and environmental matrices is critical for therapeutic monitoring, pharmacokinetic studies, and toxicology. Traditional analytical methods often lack the sensitivity, selectivity, or speed required for modern applications. Recent advances in chromatographic techniques including High-Performance Liquid Chromatography, Ultra-High Performance Liquid Chromatography, Gas Chromatography, and hyphenated techniques such as LC-MS/MS and GC-MS/MS have significantly enhanced analytical performance. This review summarizes these advances, discusses methodological challenges, and provides a comparative framework for selecting the most appropriate techniques.

**Keywords:** Advanced chromatography, bioanalytical methods, life-saving drugs