

Abstract

Chromatographic techniques play a crucial role in the separation and analysis of metabolites in complex biological samples. This article explores novel chromatographic methods developed to enhance the efficiency, resolution, and sensitivity of metabolite analysis. Recent advancements in high-performance liquid chromatography (HPLC), ultra-
ulmincluding the integr
setups, are examined for their impact on improving the resolution of complex mixtures and reducing analysis time. The article also addresses the challenges and limitations associated with these techniques and provides insights into future trends and potential developments in chromatographic analysis of metabolites. The integration of these

