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Brief Report on Liquid Chromatography Mass Spectrometry (LC-MS)

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Brief Report

The insightful science strategy fluid chromatography–mass spectrometry (LC–MS) joins the actual detachment abilities of fluid chromatography (or HPLC) with the mass examination capacities of Mass Spectrometry (MS). Because the specific capabilities of each approach are improved synergistically, coupled chromatography - MS systems are useful in chemical analysis. While liquid chromatography may separate mixtures with numerous components, mass spectrometry can identify the individual components' structural identity with high molecular specificity and detection sensitivity. The biochemical, organic and inorganic substances typically found in complex samples of environmental and biological origin may be analysed with this tandem method Subsequently, LC-MS might be utilized in an assortment of enterprises, including biotechnology, natural observing, food handling, drug, agrochemical and beauty care products.

With the introduction of Electrospray Ionisation (ESI), a simple and robust interface, Liquid Chromatography-Mass Spectrometry (LC-MS) has become a common method. It may be used to analyse a wide range of biological compounds and the use of tandem MS with stable isotope internal standards allows for the development of extremely sensitive and accurate assays, however some technique optimization is needed to reduce ion suppression effects. Fast scanning rates provide for a high degree of multiplexing, allowing for the measurement of many substances in a single analytical run. With the development of more inexpensive and reliable equipment, LC-MS is beginning to compete with traditional liquid chromatography and other methods such as immunoassay in various areas of clinical biochemistry.

Liquid chromatography with tandem mass spectrometry (LC-MS-MS) is a strong analytical method that combines liquid chromatography's separating capacity with triple quadrupole mass spectrometry's very sensitive and selective mass analysis capabilities. LC-MS is an analytical method that involves physically separating target chemicals (or analytes) and then detecting them using mass. Despite its youth, its sensitivity, selectivity and accuracy have made it a popular method for detecting microgram or even nanogram amounts of a wide range of analytes, including drug metabolites, pesticides and food adulterants, as well as natural product extracts.

The effluent is sent to the mass spectrometer after elution from the LC column. The LC column effluent is nebulized, de-solvated and ionised in the mass spectrometer for an LC/MS/MS system, resulting in charged particles. By applying electromagnetic fields to these charged particles, they migrate through a succession of mass analysers (quadrupole) in high vacuum. The first quadrupole is aimed at a certain mass/charge precursor ion (or parent ion), excluding all other mass/charge ratio particles. The selected mass/charge ions are subsequently broken into product ions (or daughter ions) in the collision cell by colliding with an inert gas. Targeting specific product ion fragments is done using the third quadrupole. An electron multiplier is then used to quantify the separated product ions. The transition of ions from the precursor to the product ion is extremely specific to the structure of the chemical of interest, resulting in excellent selectivity.

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