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Core shell technology: New trends in ultra fast HPLC

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Core shell technology is gaining importance in HPLC analyses due to economic, fast and reproducible nature. Core shell columns are called as new generation columns. Various brand names are available with Sunshell, Halo, Ascentis Express, Poroshell 120, Kinetex, Accucore and Nucleoshell trade names. These columns provide ultra fast HPLC separations for a variety of phramaceuticals with moderate sample loading, capacity and low back pressure. Chemistries of these columns are C8, C18, RP Amide, Hilic, PFP, Phenyl, and RP-aqua as well WP C 18. Silica particles are of 2.6 and 1.6 µm as total and inner solid core diameters with 0.5 µm thickness of outer porous layer; having 90 Å pore sizes and 150 m2/g surface areas. The proposed lecture will high light the importance of new generation columns with special emphasis on their textures and chemistries, separations, optimization and comparison (inter and intra stationary phases) and economy. Besides, future perspectives will also be discussed.

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Unexpected peaks in tandem mass spectra due to reaction of product ions with residual water in mass spectrometer collision cells

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Rationale: Certain product ions in electrospray ionization tandem mass spectrometry are found to react with residual water in the collision cell. This reaction often leads to the formation of ions that cannot be formed directly from the precursor ions, and this complicates the mass spectra and may distort MRM (multiple reaction monitoring) results.

Methods: Various drugs, pesticides, metabolites, and other compounds were dissolved in acetonitrile/water/formic acid and studied by electrospray ionization mass spectrometry to record their MS2 and MSn spectra in several mass spectrometers (QqQ, QTOF, IT, and Orbitrap HCD). Certain product ions were found to react with residual water in collision cells. The reaction was confirmed by MSn studies and the rate of reaction was determined in the IT instrument using zero collision energy and variable activation times.

Results: Examples of product ions reacting with water include phenyl and certain substituted phenyl cations, benzoyl-type cations formed from protonated folic acid and similar compounds by loss of the glutamate moiety, product ions formed from protonated cyclic siloxanes by loss of methane, product ions formed from organic phosphates, and certain negative ions. The reactions of product ions with residual water varied greatly in their rate constant and in the extent of reaction (due to isomerization).

Conclusions: Various types of product ions react with residual water in mass spectrometer collision cells. As a result, tandem mass spectra may contain unexplained peaks and MRM results may be distorted by the occurrence of such reactions. These often unavoidable reactions must be taken into account when annotating peaks in tandem mass spectra and when interpreting MRM results.

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