Applications of core–shell particles in active pharmaceutical ingredients via liquid chromatography

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Abstract
High performance liquid chromatography (HPLC) and ultrahigh performance liquid chromatography (UHPLC or UPLC) have been the most widely used tools for research and routine quality control of active pharmaceutical ingredients (API). The most important challenge in these techniques is fast and efficient separation. Both techniques are preferred due to their selectivity, high accuracy and remarkable precision. On the other hand, they have some limitations: In some cases, traditional HPLC uses high amounts of organic solvents with longer analysis time, and furthermore UHPLC has high back pressure and frictional heating. To overcome these limitations, scientists have developed new type of column particles. In general, two different silica types of column packing material based on their backbone have been used for HPLC and UHPLC. Stationary phases that have fully porous silica particles comply with the essential criteria of analysis, but these show all the limitations of HPLC. However, in recent years, core–shell silica particles (a combination of solid core and porous shell) have been increasingly used for highly efficient separation with reduced run times. Thus, core–shell technology provides the same efficient separations as the sub 2 μm particles that are used in UHPLC, while eliminating the disadvantages (potentially lower backpressure). The key factors for core–shell particles are size and thickness of porous shell layer, the latter of which can be explained using the Van Deemter equation. The columns packed with core–shell particles have been employed in a wide range of applications for analysis and quality control of pharmaceutical active substances

Biography
Malik Qaisar Hussain has 15 years' experience in liquid chromatographic method development and validation, has strong scientific, analytical, statistical, managerial and training skills. Currently he is working as a Director validation for Pharma Services. Pharma Services, Pakistan provides services regarding the method development, calibration and validation of liquid chromatographic systems in Pakistan.



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Type of Presentation: Workshop