Comparison of the performance of amines and ionic liquids as additives in RPLC for the analysis of basic compounds

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The residual silanols, present in silica-based stationary phases used in reversed-phase liquid chromatography, are responsible for additional ion-exchange interactions with positively charged solutes that result in undesirable broad and tailed peaks. In order to enhance the chromatographic performance of these compounds, amines of different nature have been traditionally added to the mobile phase. These cationic reagents decrease the silanol activity by covering or blocking the silanol sites, which yields symmetrical peaks. The number of available amines as potential additives is high, but recently, the possibilities have even expanded with the introduction of ionic liquids (ILs) as a powerful alternative. In consequence, the offer is now so wide that the selection of the most suitable blocking silanol agent is not easy, being possible that among different solutions the best is not always chosen. ILs seems to be the fashionable option, which has somehow relegated the use of classical amines, or extended wrong ideas about the supposed ineffective results of amines as silanol suppressors. Several reasons for these assumptions can be addressed: The reduced number of amines that are compared with ILs, insufficient understanding of the mechanisms of retention, and an incorrect interpretation of the silanol suppressing potency, which is exclusively evaluated based on the retention behavior. In this work, a comprehensive study of the silanol suppression effect given by two amines and a group of ILs for the analysis of a set of basic β-blockers is carried out. The results are analyzed considering retention and peak shape, which allows elucidating the protection mechanism of both types of additives.

Biography

María José Ruiz-Ángel obtained her PhD from the University of Valencia (Spain) in 2003. In 2004-2006, she was granted with a Post-doctorate fellowship in the Laboratoire des Sciences Analytiques at the University Claude Bernard in Lyon (France). In 2007, she was awarded with a Ramón y Cajal research position in the Department of Analytical Chemistry at the University of Valencia, where she is Professor since March 2012. She has written over 50 research articles, most focusing on secondary equilibria using surfactants and ionic liquids, fundamental studies in HPLC and development of analytical methods for pharmaceutical and clinical samples.

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