

Retention Phenomena Induced by Large Volume Injection of Solvents Non-Miscible with the Mobile Phase in Reversed-Phase Liquid Chromatography

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Abstract: Enhancement of sensitivity for spectrometric detection in liquid chromatography is obtained when increased sample volumes are loaded into the chromatographic column. A new approach of injecting large volumes of solvents non-miscible with the mobile phase is proposed. The paper focuses on the retention study of butylated hydroxyanisole (BHA) loaded into the chromatographic column dissolved in liquid alkanes (n-hexane, n-heptane, and iso-octane, respectively) at volumes up to 600 μL . A simple model based on adsorption for explaining the experimental results is proposed. A clear insight of the process was possible by studying the migration of the solvent zone within the column, at different mobile phase compositions and different loaded volumes, by means of refractive index detection. The model allowed calculation of the number of solvent molecules saturating a C_8 alkyl chain site within the stationary phase layer. Competition between the analyte and solvent molecules, together with the homogeneity of the “saturation” realized by solvent over the adsorption sites, could explain the experimental results. It was demonstrated that large volume injection of solvents non-miscible with the mobile phase is

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