Adsorption equilibrium of benzene and its derivatives in reversed-phase liquid chromatography

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The adsorption behavior of a solute is one of the most important factors to consider when designing a batch and a continuous liquid chromatographic separation process. In this work, adsorption isotherms were obtained by a frontal analysis for three low-molecular compounds (benzene, toluene, and chlorobenzene) on a commercial C18 bonded silica column. The absorption based on the Lamgmuir, Freundlich, and Lamgmuir-Freundlich models were investigated according to changes of the composition of methanol highly-enriched eluent. The calculations and analysis of the coefficients obtained for three models confirm that the adsorption data for solutes are best modeled with the Langmuir-Freundlich isotherm. Langmuir and Freundlich isotherm models couldn't satisfactorily describe mechanism and provide the objective information on the physical nature of the absorption in spite of the acceptable accuracy.