Prediction of Asymmetric Peak Profile using Mathematical Method with Competitive Langmuir Isotherm

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The characteristics of adsorption isotherm of single and binary component were investigated using preparative chromatography with water/methanol solution (75%:25%, v/v) as the mobile phase. The parameters of the Langmuir adsorption isotherm were obtained from the data points by frontal analysis (FA). The experimental data and calculated values of two components, phenol and caffeine, were compared using a simple and expanded Langmuir isotherm model. The six adsorption isotherm model, as three models for single component and three for binary component were used. For phenol, the Bi-Langmuir model had better agreements with the experimental data, while for caffeine, the Langmuir model was enough to have good agreement. For binary components, the competitive adsorption isotherm was utilized with the parameters of adsorption isotherm from single component.