The effect of different amines added to eluents as silanol masking agents on the chromatographic behavior of some diuretics in reversed-phase high-performance liquid chromatography using C18 packings.

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Abstract— A preliminary gradient separation in reversed-phase liquid chromatography of a mixture of 25 solutes (diuretics, probenecide, and atenolol) is carried out using several C18 columns and an aqueous phosphoric acid solution (pH 3.2)-acetonitrile mobile phase as a control. Using this separation, the chromatographic behavior of these solutes is studied using 11 water-soluble primary, secondary, and tertiary amine modifiers in the range of 0.7-7.5 mM and a Spherisorb C18 column. This study reveals the presence in the complex sample of two groups of solutes with positive (five typical solutes showed improvements in peak symmetry and retention) or negative responses using these amines as mobile phase modifiers. After experimentation in the presence of amines, these differences are related to solute structure. Hexylamine is found to be an effective masking agent of silanols because of its structure and small required concentration. On these bases, the silanophilic and hydrophobic character of typical solutes and several C18 packings are evaluated under isocratic elution and a relative effectiveness index for amines, and a method for their assessment is proposed. The role of the amine structure on solute retention and the importance of selecting amines of suitable hydrophobic character, molecular geometry, and concentration is discussed. A model of the formation and stabilization of the silanol-amine complex based on hydrophobic and ionic interactions is also proposed.

Index Terms—

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