Dendritic Polymers as a Modifier of Chromatographic and Electrophoretic Systems in the Determination of Vitamin and Amino Acids

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Dendrimers and hyperbranched (hb) polymers possess a number of properties, which make them promising candidates for various chromatographic applications. The purpose of our study was to identify the possibility of using new polymers such as "core-shell“, which consist of functionalized dendritic core (polyethyleneimine) surrounded by oligosaccharide (OS) shell and rhodamine B, like a components of chromatographic systems by examples of separation of hydrophilic and hydrophobic analytes (water-soluble vitamins and amino acids) . The choice of high-performance thin-layer chromatography (HPTLC) method was caused by its advantages: easy replacement of the eluent, rapidity, high efficiency, analysis of both substances at once, etc. To determine the dependences for “polymer-analyte” interactions we modified mobile (water) and stationary (silica gel) phases by different polymers, such as PEI-OS 5 and 25 kDa (A, B,C), PEI-Mal Rh 5 and 25 kDa (A, B,C). Also we investigated the influence of pH on the parameters of retention and separation efficiency. Dendrimers influence to separation of vitamin and amino acid, dependence from pH of medium, structure of polymers and method of modification were established. The most important results: 1.the increasing of retention parameters and efficiency of B12 (alkaline medium) 2.the increasing of Rf and efficiency of B2 3.the increasing of retention parameters for lysine By method of capillary zone electrophoresis (CZE) we found out the fact of quartz capillary walls modification by hb polymers, that result in decrease of electroosmotic flow. Thus, we established, that polymer has significant influence on chromatographic and electrophoretic characteristics for water-soluble vitamins and amino acids.

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