

Thin-layer chromatography of some benzene derivatives in aqueous and modified by cyclodextrins mobile phases

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Abstract

By means of the method of thin-layer chromatography, chromatographic behavior of some benzene derivatives in aqueous, organo-aqueous and modified by cyclodextrins mobile phases has been studied. The main regularities and peculiarities of the sorbents behavior have been revealed. It has been shown that in the mobile phases modified by cyclodextrins, efficiency and selectivity of chromatographic process is higher. Possibilities and restrictions of the studied phases have been elucidated. Techniques of quantitative determination of some quinolines in medicines have been developed, using the cyclodextrin mobile phases.

References

- [1] A.A. Shteynman. Cyclodextrins. *JRChS*. **1985**. Vol.30. No.5. P.514-518. (russian)
- [2] E.V. Chernykh, S.B. Brichkin. Supramolecular complexes based on cyclodextrins. *High Energy Chemistry*. **2010**. Vol.44. No.2. P.115-133. (russian)
- [3] E.V. Kompanceva, M.V. Gavrilina, L.S. Ushakova. β -Cyclodextrin Derivatives and Perspectives of Their Application in Pharmacy *J. Chem. farm.* **1996**. No.4. P.43-46. (russian)
- [4] S.N. Stykov. Organized environments – the strategy based on the principles of biosimilarity in analytical chemistry. *Vestnik HNU*. **2000**. No.495. *Chemistry*. No.6(29). P.9-14. (russian)
- [5] Cyclobond Handbook. Advanced Separation Technologies Inc., USA, **1992**.
- [6] E.G. Sumina. Organized Mnosystems in thin - layer chromatography. *Sorbtionnye Khromatograf. Protsessy*. **2010**. Vol.10. No.1. P.150-160. (russian)
- [7] S.N. Shtykov. Chemical analysis in nanoreactors: Main concepts and applications. *Journal of Analytical Chemistry*. **2002**. Vol.57. No.10. P.859-868. (russian)
- [8] W.L. Hinze, D.W. Armstrong. Thin-layer chromatography separation of ortho, meta and para substituted benzoic acid and phenols with aqueous solutions of α -cyclodextrin. *Anal. Lett.* **1980**. Vol.13. P.1093-1100.
- [9] L. Zhao, L. Zhu, H.K. Lee. Analysis of aromatic amines in water samples by liquid-liquid-liquid microextraction with hollow fibers and high-performance liquid chromatography. *J. Chromatogr. A*. **2002**. Vol.963. P.239-248.
- [10] V.I. Verschinin, B.G. Derendyaev, K.S. Lebedev. Computer identification of organic compounds. M.: *Science*. **2002**. 182p.
- [11] L.A. Onuchak, R.A. Minahmetov, V.A. Kurkin. Physicochemical Regularities of the Phenolic Compounds Retention in Reverse-Phase High Performance Chromatography. *Russian Journal of Physical Chemistry A*. **2002**. Vol.76. No.9. P.1691-1696. (russian)
- [12] V.D. Shatz, O.V. Sakhartova. High-efficiency liquid chromatography. *Riga*. **1988**. 160p.

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- [13] E.G. Sumina, S.N. Shtykov, V.Z. Uglanova, O.N. Sorokina. Liquid chromatography of some steroid hormones in aqueous-organic, micellar, and cyclodextrin mobile phases. *Journal of Analytical Chemistry*. **2014**. Vol.69. No.10. P.1005-1113. (russian)
- [14] O.N. Sorokina, E.G. Sumina, A.V. Petrakova, V.Z. Uglanova. Application of Cyclodextrins in Thin-Layer Chromatography for Some Antioxidants of Polyphenolic Nature. *Izvestiya of Saratov University. New Series. Series: Chemistry. Biology. Ecology*. **2013**. Vol.13. No.2. P.23-29. (russian)
- [15] E.G. Sumina, S.N. Shtykov, V.Z. Atayan. Cyclodextrins As Modifiers of the Mobile and Stationary Phases in Liquid Chromatography *Sorbtionnye Khromatograf. Protsessy*. **2005**. Vol.5. No.5. P.719-735. (russian)
- [16] V.Z. Atayan, E.G. Sumina, S.N. Shtykov. Thin Layer Chromatography of Azo Compounds in the Mobile Phases Modified by Cyclodextrins. *Sorbtionnye Khromatograf. Protsessy*. **2003**. Vol.3. No.4. P.392-398. (russian)
- [17] E.G. Sumina, V.Z. Uglanova, O.N. Sorokina, D.O. Afonina. Definition of Degree of Cleanliness of Preparations of Corticosteroid Hormones by Method of Thin-Layer Chromatography in Mobile Phases on the Basis of Cyclodextrins and Surfactants. *Izvestiya of Saratov University. New Series. Series: Chemistry. Biology. Ecology*. **2011**. Vol.11. No.2. P.48-53. (russian)
- [18] O.N. Sorokina, E.G. Sumina, S.N. Shtykov, V.Z. Atayan, S.V. Barysheva. TLC separation of D-, L -of amino acids in the 2-hydroxypropyl- β -cyclodextrin aqueous mobile phase. *Sorbtionnye Khromatograf. Protsessy*. **2010**. Vol.10. No.1. P.135-141. (russian)
- [19] W.L. Hinze, D.Y. Pharr, Z.S. Fu, W.G. Burkert. Thin-layer chromatography with urea-solubilized β -cyclodextrin mobile phase. *Anal. Chem.* **1989**. Vol.61. P.422-428.
- [20] D.W. Armstrong, F. Nome. Partitioning Behavior of Solutes Eluted with Micellar Mobile Phases in Liquid Chromatography. *Anal. Chem.* **1981**. Vol.53. No.14. P.1662-1666.