

ABSTRACT

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Title of Diploma Thesis: Evaluation of separation potential of stationary phases based on porous graphitic carbon.

Stationary phases based on porous graphitic carbon (PGC) exhibit many interesting features. For example high mechanical resistance, stability across the entire pH range and excellent high temperature resistance. Moreover, they are significant due to their unique mechanism of retention. Despite all of these positive features and long existence on the market, their broader use in pharmaceutical analysis is still lacking.

In our paper we have analyzed 11 groups of drugs, including active pharmaceutical ingredient and its potential impurities. Overall, 67 substances have been analyzed. Each separation on PGC has been optimized in order to achieve the best results. Changes in conditions of separation included testing of several mobile phases, gradient and isocratic elution and testing the effect of higher temperature. The use of gradient elution, with mobile phase consisting of acetonitrile and isopropanol in proportion 1:1 as organic modifier and 0,1% trifluoroacetic acid as aqueous part has appeared as the most versatile conditions. Furthermore, the same substances were analyzed on a reference column BEH C18 and results have been compared with results obtained by analysis on PGC. Reference column achieved good results without necessity of complicated optimizations. Most substances have been eluted and column has proven good selectivity and resolution. In contrast, more complex approach and complicated process of optimization were necessary for the PGC analysis. Nevertheless, its use in pharmacy is possible and can represent a solution for difficult separation of highly polar substances.

Keywords: porous graphitic carbon; impurities; optimization; comparison