

ABSTRACT

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Title of Thesis: Study of chemiluminescence properties of metformin using sequential injection analysis

Chemiluminescent properties of metformin were studied using a sequential injection analysis in the three systems with different composition of the reagents. The first system used potassium permanganate and sulfuric acid, the second cerium sulfate tetrahydrate and (tris (2,2'-bipyridyl) dichloro-ruthenium hexahydrate. The third system used the N-bromosuccinimide and fluorescein. The flow rate, concentration and volumes of reagents, scheme of the measuring cycle and used solvents have been optimized into the first two systems. The concentration of N-bromosuccinimide (NBS) and fluorescein in the third system were based on data found in literature [Zhouping Wang, Anal. Lett. 2003]. The volume and speed were detected automatically using the program FaFSIAOptim, created the Department of Analytical Chemistry. Scheme of the measuring cycle was optimized in the same way as in the previous two systems. During the optimization, and subsequent measurements revealed that the only suitable system is the third system with NBS and fluorescein. Therefore, further extending only to him. Process matched the resulting diagram summarizing the optimal measuring conditions: 66 μl 0.01 M solution of NBS, 36 μl 0.05 mM solution of fluorescein, 58 μl 2.5 mM solution of cetyltrimethylammonium bromide, 100 μl solution of metformin, the speed of the transport the zone of the product to the detector 88 $\mu\text{l/s}$, photomultiplier voltage 400 V. Standard curve (range 10^{-7} - 10^{-2} M) on this system have polynomial shape. Linear dependence of the chemiluminescent signal on the concentration of metformin was found in the 1×10^{-3} - 5×10^{-5} M concentrations of metformin. The value of detection limit was 5×10^{-8} M (8.28 ng / ml), limit of quantification has the value 2×10^{-7} M (33.12 ng / ml). Repeatability was measured in solutions of metformin concentration 10^{-4} M and

10^{-3} M. With the metformin solution of concentration 10^{-3} M was obtained RSD value of 1.59%, with concentration of 10^{-4} M it was 2.11%.