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POLYSACCHARIDE MATRICES FOR THE SORPTION-FLUORIMETRIC ANALYSIS OF ECOTOXICANTS

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Cellulose diacetate (CDA) and chitosan (CTS) were used in the design of sorption matrices for the sorption-fluorimetric analysis of polycyclic aromatic compounds (PAH) and heterocyclic compounds. The conditions of making film matrices from CDA with high sorption capacity for organic fluorophores, in particular pyrene were optimized. Various types of film matrices were made from CTS of the salt and basic forms. The morphological surface-energy, physicochemical and physicomechanical characteristics of our CDA and CTS matrices in comparison with commercial CDA membranes, cellulose and chitosan containing sorption materials were examined. The possibility of using CDA and CTS film matrices for solid-phase extraction and solid-surface fluorescence (SSF) of PAH, eosin Y and trypaflavine was investigated. The set of properties of our CDA film matrix was found to cause high sorption and fluorescence of pyrene in the solid phase of the sorbent. Suitable conditions for PAH sorption on the surface of CDA matrices were determined and a sorption-fluorimetric method to analyze PAH in aqueous media was developed. The linear dependence of the SSF signal on the pyrene concentration in the sorbate in the range 2×10-6 – 2×10-8 g/l of the substance was built. The possibility to determine other PAH including the most toxic of them, benzo[a]pyrene, was proved. So, the SSF technique with the CDA matrix allows analyzing PAH traces in environmental objects and may be used in environmental monitoring. CTS matrices with adsorbed fluorescent dyes are shown as promising platforms for chemosensors. The developed polysaccharide matrices are characterized by relatively low cost, the ability of raw material reproduction and waste biodegradation, which is important for their use in test systems and rapid analytic methods.

BIOGRAPHY

Svetlana Rogacheva has completed postgraduate course in Saratov State University, Russia, and received candidate of Biological Sciences Degree (PhD). She got the Doctor of Biological Sciences Degree in the specialty "Biophysics" in 2009. She is the Head of the Department of Nature and Technosphere Safety in Yuri Gagarin Saratov State Technical University, Russia. She has over 200 publications and 9 patents in Russian that have been cited over 150 times. 35 publications are presented in Web of Science and Scopus, where her publication H-index is 3. She is an expert of the scientific and technical sphere, accredited by the Ministry of Education and Science, Russia.

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