

Detection and fate of biological active pollutants in environmental matrices

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In connection with the increase in human population and the greater demands for agricultural and industrial activities, the production of chemical substances increased. The production and use of these chemicals leads to their release into the all components of environment at very high concentrations. These compounds, owing to their biological activity primary or secondary affects the natural functions of ecosystems, their stability and adversely affects the diversity of plant and animal species living in these communities. In order to prevent and protect the environment, reliable procedures and sensitive analytical tools that are very effective for studying the behavior of these chemicals in the environment and for detection and prediction their impact on the ecosystem components must be used.

The results of presented work are focused on detection and fate of biologically active substances steroidal estrogens, which are naturally produced by human and animals or deliberately manufactured and released into the aquatic ecosystem from disparate sources.

Four different extraction techniques: modified soxhlet extraction, accelerated solvent extraction, microwave-assisted extraction and method QuEChERS were tested for isolation of steroid estrogens from sediment at low environmentally relevant concentrations. The best of them proved QuEChERS technique using sorbent modified with primary-secondary amines for extract purification. This technique was subsequently used and tested for the study of the sorption behavior of 17β - estradiol (β E2) and 17α - ethinylestradiol (EE2) in water-sediment system.

Method QuEChERS proved to be very effective method for the extraction of estrogenic compounds from environmental matrices such as water and sediment as well as very promising for the study of the sorption behavior of these pollutants in the environment.