

## 6. Abstract

Endocrine disrupting compounds disturb the natural hormonal balance of water organisms and can cause many adverse changes in the reproductive, nervous or immune system. EDCs include natural and synthetic hormones, pesticides, as well as many compounds used in consumer products and industrial applications. Numerous studies demonstrated that constant exposure even to low concentrations of hormones may lead to serious and irreversible changes in the proper functioning of the endocrine system. The presence of these pollutants in the aquatic environment is extremely dangerous for the health and life of people and animals. Hormones are found in low concentrations in the environment and real samples are often characterized by complex and variable matrices. Therefore, before carrying out the final analysis with the appropriately selected and optimized chromatographic method, a process of purification and enrichment of hormones should be carried out.

The aim of the first part of this study was to determine the impact of natural and synthetic hormones on the growth of cyanobacteria and green algae. From among the tested hormones individually, the strongest toxic effect was observed for 17- $\alpha$ -ethinylestradiol and progesterone. Weaker effect was shown by  $\beta$ -estradiol, 5-pregnen-3b-ol-20-on, as well as testosterone. In contrast, estrone, estriol and levonorgestrel did not significantly affect the growth of the tested species compared to the control sample. The strongest effect is shown by mixed compounds and leads to a synergistic effect.

Another aim of this study was to use innovative and selective molecularly imprinted polymers to develop a procedure for the simultaneous extraction of six hormones. During the molecularly imprinted solid-phase extraction (MISPE), satisfactory recoveries and good precision were obtained. In addition, the developed MISPE/HPLC-DAD method was characterized by good linearity, satisfactory limits of detection and limits of quantification and demonstrated practical applicability for the determination of hormones in environmental samples.