

Nanomaterial Based Electrochemical Sensors for Endocrine Disrupting Compounds

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Abstract : Main sources of endocrine disrupting compounds in the ecosystem are hormones, pesticides, phthalates, flame retardants, dioxins, personal-care products, coplanar polychlorinated biphenyls (PCBs), bisphenol A, and parabens. These endocrine disrupting compounds are responsible for learning disabilities, brain development problems, deformations of the body, cancer, reproductive abnormalities in females and decreased sperm count in human males. Although discharge of these chemical compounds into the environment cannot be stopped, yet their amount can be retarded through proper evaluation and detection techniques. The available techniques for determination of these endocrine disrupting compounds mainly include high performance liquid chromatography (HPLC), mass spectroscopy (MS) and gas chromatography-mass spectrometry (GC–MS). These techniques are accurate and reliable but have certain limitations like need of skilled personnel, time consuming, interference and requirement of pretreatment steps. Moreover, these techniques are laboratory bound and sample is required in large amount for analysis. In view of above facts, new methods for detection of endocrine disrupting compounds should be devised that promise high specificity, ultra sensitivity, cost effective, efficient and easy-to-operate procedure. Nowadays, electrochemical sensors/biosensors modified with nanomaterials are gaining high attention among researchers. Bioelement present in this system makes the developed sensors selective towards analyte of interest. Nanomaterials provide large surface area, high electron communication feature, enhanced catalytic activity and possibilities of chemical modifications. In most of the cases, nanomaterials also serve as an electron mediator or electrocatalyst for some analytes.

Keywords : electrochemical, endocrine disruptors, microscopy, nanoparticles, sensors

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