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Water bodies pollutants screening by nanostructured optical biosensors

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This work presents a generic integrated biosensing platform for real-time optical monitoring of heavy metal pollutants in water bodies by enzymatic activity inhibition. Optical studies exhibit high specificity and sensitivity towards three metal ions (Ag^+ , Pb^{2+} , Cu^{2+}), with a detection limit of 56 ppb. Additionally, we demonstrate detection and quantification of metal pollutants in real water samples (e.g. surface and ground water) with results comparable with gold standard analytical techniques, such as inductively coupled plasma atomic emission spectroscopy (ICP-AES). The main advantage of the presented biosensing concept is the ability to detect heavy metal ions, at environmentally relevant concentrations, using a simple and portable experimental setup, while the specific biosensor design can be tailored by varying the enzyme type.

Biography

Giorgi Shtenberg completed his PhD in 2014 in Biotechnology and Food Engineering at Technion–Israel Institute of Technology. He has expertise in Nanomaterials, Semiconductors, Microfluidics, Photonics and Biological Interfaces for biomedical and environmental monitoring applications. He is currently a Scientist and Head of Bio-Nano-Laboratory at Institute of Agriculture Engineering, ARO-The Volcani Center. He is focusing on the development of novel biosensors/bioassays that will transform from a laboratory-based research into real on-site “lab-on-chip” platforms for addressing problems in fields of agriculture, animal diagnostics, food safety and environmental monitoring and detection.

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