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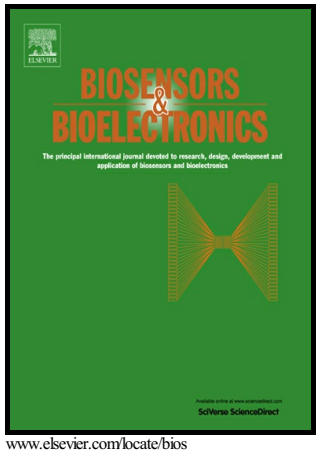

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Biosensor for detection of dissolved chromium in potable water: A review

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Abstract:

The unprecedented deterioration rate of the environmental quality due to rapid urbanization and industrialization causes a severe global health concern to both ecosystem and humanity. Heavy metals are ubiquitous in nature and being used extensively in industrial processes, the exposure to excessive levels could alter the biochemical cycles of living systems. Hence the environmental monitoring through rapid and specific detection of heavy metal contamination in potable water is of paramount importance. Various standard analytical techniques and sensors are used for the detection of heavy metals include spectroscopy and chromatographic methods along with electrochemical, optical waveguide and polymer based sensors. However, the mentioned techniques lack the point of care application as it demands huge capital cost as well as the attention of expert personnel for sample preparation and operation. Recent advancements in the synergetic interaction among biotechnology and microelectronics have advocated the biosensor technology for a wide array of applications due to its characteristic features of sensitivity and selectivity. This review paper has outlined the overview of chromium toxicity, conventional analytical techniques along with a particular emphasis on electrochemical based biosensors for chromium detection in potable water. This article emphasized porous silicon as a host material for enzyme immobilization and elaborated the working principle, mechanism, kinetics of an enzyme-based biosensor for chromium detection. The significant characteristics such as pore size, thickness, and porosity