

Development of electrochemical sensor for detection of mercury by exploiting His-Phe-His-Ala-His-Phe-Ala-Phe modified

ABSTRACT

A sensitive voltammetric method for detection of mercury ions is described which is made by modifying a gold electrode with 3-mercaptopropionic acid followed by covalent attachment of the octapeptide His-Phe-His-Ala-His-Phe-Ala-Phe to the self-assembled monolayer using carbodiimide coupling. A linear working range for concentration of mercury between 0.25 to 0.81 with LOD 9.5×10^{-9} M was obtained which is below the WHO guidelines for drinking water. The reproducibility of the analytical signal is 4.5% in indicating a reproducible and reliable detection system. The developed method was applied for the detection of Hg(II) in spiked wastewater and validated against ICPMS. Good agreement was obtained between the developed method and ICPMS. Insignificant interference was observed by As $3+$, Cr $3+$, Cu $2+$, Ni $2+$, Pb $2+$ and Zn $2+$ in detection of Hg(II) thus making the developed system highly potential for electrochemical sensor in Hg(II) detection.

Keyword: Modified electrode; Hg(II) detection; Peptide modified electrode; Cyclic voltammetry.