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Electrochemical Sensor Based on Magnetic Molecularly Imprinted Polymer and Graphene-UiO-66 Composite Modified Screen-printed Electrode for Cannabidiol Detection

Xiaosheng Tang[1], Yong Gu[1], Ping Tang[2,] and Liangliang Liu[3,*]*

[1] Hubei Key Laboratory of Edible Wild Plants Conservation and Utilization, National Demonstration Center for Experimental Biology Education, College of Life Sciences, Hubei Normal University, Huangshi, P.R. China, 435002
[2] Hubei Key Laboratory of Mine Environmental Pollution Control and Remediation, School of Environmental Science and Engineering, Hubei Polytechnic University, Huangshi, P.R. China, 435003;
[3] Institute of Bast Fiber Crops, Chinese Academy of Agricultural Sciences, Changsha 410205, China;
*E-mail: pingtang@yahoo.com (P. Tang), liuliangliang@caas.cn (L.L. Liu)

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Cannabidiol (CBD) is a critical compound in *Cannabis sativa* L., having pharmacological effects in treating chronic diseases. To enrich detection methods for *Cannabis sativa* L and related components, we developed an electrochemical sensor to detect CBD. In this research, graphene-UiO-66 composites (Gr-UiO-66) were modified on the screen-printed electrode (SPE) together with magnetic molecularly imprinted polymer (mag-MIP), resulting in a modified sensor marked as mag-MIP/Gr-UiO-66/SPE. The prepared Gr-UiO-66 and mag-MIP were characterized by electron microscope, energy dispersive spectroscopy (EDS), and X-ray powder diffraction (XRD) to confirm the morphology and structure. The fabrication conditions and analytical parameters concerning the composition of modifiers, sequence, concentration, pH, and scan rate were investigated. Under the optimized conditions, the mag-MIP/Gr-UiO-66/SPE exhibited an enhanced electrochemical signal than that in bare electrode, the linear detection from 5 μmol L^{-1} to 100 μmol L^{-1} (r^2 = 0.997), and practicability in real samples. Based on these findings, the utilization of Gr, MOFs, and MIP showed advantages in the fabrication of electrochemical sensors. The proposed mag-MIP/Gr-UiO-66/SPE had the potential to detect natural active compounds in foods, pharmaceutical, cosmetic and health care industries.

Keywords: Cannabidiol; Electrochemical sensor; Graphene; Molecularly imprinted polymer; UiO-66;

FULL TEXT