Voltammetric Determination of Bergenin with Graphene Modified Glassy Carbon Electrode

Xiaobao Li¹, Ruyi Zou¹, Yanyan Niu¹, Taiming Shao², Yong Chen¹, Wei Sun^{1,3*}, Mengxiong He¹

¹ Key Laboratory of Tropical Medicinal Plant Chemistry of Ministry of Education, College of Chemistry and Chemical Engineering, Hainan Normal University, Haikou 571158, P R China

² Key Laboratory of Medicinal and Edible Plants Resources of Hainan Province, School of Chemical and Material Engineering, Hainan Institute of Science and Technology, Haikou 571126, P R China

³ Key Laboratory of Soft Chemistry and Functional Materials of Ministry Education, College of Chemical Engineering, Nanjing University of Science and Technology, Nanjing 210094, P. R. China

*E-mail: swyy26@hotmail.com

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This study utilized a sensitive electroanalytical method for the detection of bergenin in phosphate buffer solution (pH 5.0) with a graphene (GR) and chitosan (CS) nanocomposite modified glassy carbon electrode (GCE). Characterization of CS-GR/GCE was carried out by electrochemical impedance spectroscopy. Electrocatalytic oxidation of bergenin on CS-GR/GCE was greatly enhanced with the improvement of the anodic peak current, which allowed the development of a voltammetric sensor for bergenin determination. Under the optimized conditions with differential pulse voltammetry, the anodic peak responses enhanced linearly with bergenin concentration from 2.0×10^{-8} mol/L to 8.0×10^{-6} mol/L with the detection limit of 3.6 nmol/L (3σ). This electrochemical sensor showed high sensitivity and selectivity, excellent reproducibility and good stability. The analytical application of this sensor was successfully proved by the Tabellae Bergenini Compositae sample detection.

Keywords: Graphene, Bergenin, Differential pulse voltammetry, Electroanalysis

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