Development of an Electrochemical Approach for Proline Content Detection in Winter Wheat

Lijie Liu1,*, Dongxiang Zhang1, Zhongmin Jin1, Zhenzhu Zhang1, Shanshan Li1 and Jing Cang2,*

1 College of Life Science and Agriculture Forestry, Qiqihar University, Qiqihaer, Helongjiang, P.R. China
2 College of Life Science, Northeast Agricultural University, P.R. China
*E-mail: cangjing321@163.com

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A novel glassy carbon electrode (GCE) modified with polymerized film of acid chrome blue K (ACBK) was successfully synthesized by electropolymerization. The electrochemically synthesized poly-ACBK film was characterized by attenuated total reflection (ATR)-FTIR, voltammetric methods and electrochemical impedance spectroscopy (EIS) as well. The as-prepared poly-ACBK/GCE displayed excellent electrocatalytic activity towards the oxidations of proline in comparison with bare GCE. The effect of various experimental parameters such as electrolyte and thickness of poly-ACBK on the oxidation performance of proline on poly-ACBK/GCE electrode was studied. The proposed sensor exhibited linear response in the proline concentration ranging from 1 to 1500 μM with the detection limit of 0.25 μM. In addition, the proposed proline sensor exhibited outstanding performance in the determination of proline in winter wheat samples as well owing to its remarkable stability and repeatability.

Keywords: Proline; Electrochemical sensor; Poly-ACBK; Winter wheat; Determination

FULL TEXT

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