Determination of Non-Steroidal Anti-Inflammatory Drug (NSAID) Azathioprine in Human Blood Serum and Tablet Samples Using Multi-Walled Carbon Nanotubes (MWCNTs) Decorated Manganese Oxide Microcubes Composite Film Modified Electrode

Akilarasan Muthumariappan¹, Mani Govindasamy¹, Shen-Ming Chen^{1,*}, Kogularasu Sakthivel¹, Veerappan Mani^{1,2}, Tse-Wei Chen¹, Shanthi Selvaraj^{3,4}

¹ Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, Taipei, Taiwan 106 (ROC)

² Graduate Institute of Biomedical and Biochemical Engineering, National Taipei University of Technology, Taipei, Taiwan 106 (ROC)

³ Research Institute of Electronics, Shizuoka University, Japan

⁴ Department of Physics and Nanotechnology, SRM University, India

*E-mail: smchen78@ms15.hinet.net

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The development of sensor for azathioprine (ATP) determination is extremely important as its excess level in blood imposes carcinogenic threats. A sensitive, selective, reproducible and durable azathioprine sensor was demonstrated using a nanocomposite composed of Mn₃O₄ micro cubes and multi-walled carbon nanotubes (MWCNTs/Mn₃O₄ MCs). The composite was prepared through a facile hydrothermal method and its morphology, elemental, impedance and electrochemical properties were studied. The MWCNTs/Mn₃O₄ MCs was modified on the screen-printed electrode, and the resulting modified electrode displayed excellent electrocatalytic ability towards ATP and the reduction peak current was related to the concentration of ATP. The working range was 0.045-2530 µM and the detection limit was 4.3 nM (± 2.53). The method was successfully applied to the determination of ATP in spiked samples of human blood serum and tablets.

Keywords: Analytical Science; Multi-walled carbon nanotubes; Hybrid materials; Manganese oxide; Modified electrode; Signal amplification; Biochemistry.

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