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**Recycling chocolate aluminum wrapping foil as to create electrochemical metal strip electrodes**
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**Abstract**
The development of low-cost electrode devices from conductive materials has recently attracted considerable attention as a sustainable means to replace the existing commercially available electrodes. In this study, two different electrode surfaces (surfaces 1 and 2, denoted as S1 and S2) were fabricated from chocolate wrapping aluminum foils. Energy dispersive X-Ray (EDX) and field emission scanning electron microscopy (FESEM) were used to investigate the elemental composition and surface morphology of the prepared electrodes. Meanwhile, cyclic voltammetry (CV), chronoamperometry, electrochemical impedance spectroscopy (EIS), and differential pulse voltammetry (DPV) were used to assess the electrical conductivities and the electrochemical activities of the prepared electrodes. It was found that the fabricated electrode strips, particularly the S1 electrode, showed good electrochemical responses and conductivity properties in phosphate buffer (PB) solutions. Interestingly, both of the electrodes can respond to the ruthenium hexamine (Ruhex) redox species. The fundamental results presented from this study indicate that this electrode material can be an inexpensive alternative for the electrode substrate. Overall, our findings indicate that electrodes made from chocolate wrapping materials have promise as electrochemical sensors and can be utilized in various applications. 

**Author Keywords**
Aluminum; Conductive chocolate wrapper; Electrochemical metal strip electrode; Low-cost electrode; Sustainability

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