Title: Poly (bromocresol green) Flakes-Decorated Pencil Graphite Electrode for Selective Electrochemical Sensing Applications and Pharmacokinetic Studies

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A square wave voltammetric method for selective determination of meropenem (MRP) and ertapenem (ERP) was developed using pencil graphite electrode modified with poly (bromocresol green) (PGE/PBCG). The modified electrode film was characterized by scanning electron microscopy and electrochemical impedance spectroscopy. Under the optimized conditions, the prepared electrode has good linearity over concentration range 1.0–60.0 and 0.3.0–75.0 µM for MRP and ERP, respectively. The developed method was validated according to ICH guidelines. In addition, the diffusion co-efficients of MRP and ERP were estimated to be $1.24 \times 10^{-6}$ and $9.09 \times 10^{-6}$ cm$^2$ s$^{-1}$, respectively using chronoanperometric technique. The developed method was highly sensitive and selective for the determination of MRP or ERP in the presence of their corresponding open beta-lactam ring degradation products. Consequently, it was successfully utilized for in-vitro and in-vivo applications in spiked and real
plasma samples of healthy rabbits for their pharmacokinetic studies. Furthermore, the method was applied for the assay of the available dosage forms of both drugs.

**Keywords:**

Meropenem and ertapenem, Bromocresol green, Square wave voltammetry, Chronoamperometry, Diffusion coefficient, Pharmacokinetics.