Synthesis of mesoporous carbon for a determination of capsaicin
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Abstract: A glassy carbon electrode (GCE) modified with N-doped mesoporous carbon (N-MC) with high catalytic activity was employed for sensitive determination of capsaicin. The N-MC/GCE was characterized by Scanning Electron Microscopy (SEM) and Energy Dispersive X-ray Spectroscopy (EDX) and its electrochemical property by Linear Sweep Voltammetry (LSV). The SEM images resealed the linear array of connected rod-like particles and confirmed the successful synthesis of the mesoporous carbon. The electrochemical performance study showed that the N-MC/GCE facilitates the adsorption of capsaicin on the electrode surface and provides fast electron transfer due to its high surface area and charge polarization. Furthermore, the presence of N-MC on GCE significantly enhances the oxidation peak current, indicating that the N-MC showed excellent electro-catalytic activity to the redox reaction of capsaicin. Under optimized conditions the proposed electrochemical sensor showed a linear response to capsaicin from 1.0 to 10.0 µM with detection limit of 0.65 µM (S/N=3) and the coefficient of determination (R²) of 0.9995. Thus, the N-MC/GCE demonstrated the promising electrochemical sensor that can be further developed as a sensitive portable electrochemical sensor for the determination of capsaicin in food and pharmaceuticals.

Keywords: Mesoporous carbon; Capsaicin; Linear sweep voltammetry