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Carbon dots coated with molecularly imprinted polymers: a facile bioprobe for fluorescent determination of caffeic acid

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Abstract

A new and sensitive method for fluorescent determination of caffeic acid (CA) was proposed based on silane-functionized carbon dots coated with molecularly imprinted polymers (CDs@MIPs). CDs@MIPs were prepared by using CA as the templates on the surface of silane-functionized carbon dots (CDs) with a sol-gel process. The as-prepared CDs@MIPs were characterized by Fourier transform infrared spectroscopy, transmission electron microscopy and fluorescence spectroscopy. The CDs@MIPs exhibited distinguished selectivity and high binding affinity to CA templates, and also showed good reusability. Under optimal conditions, the fluorescence intensity of CDs@MIPs decreased linearly with the increase of CA in the range of 0.5-200 μM . The limit of detection was 0.11 μM ($3\sigma/K$). Finally, the proposed method was successfully applied to the detection of CA in human plasma. The result indicates that the method built has promising potential for monitoring CA concentration in clinic.

Key words: Carbon dots, molecularly imprinted polymers, caffeic acid, fluorescent sensor

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