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One-step synthesis of fluorescent carbon dots for sensitive and selective detection of hyperin

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Abstract

In this article, we presented a new rapid, sensitive and selective method for the determination of hyperin (Hyp) based on the fluorescence quenching of fluorescent carbon dots (CDs). The CDs were prepared by simply mixing an aqueous solution of citric acid with diphosphorus pentoxide. This one-step synthetic route is fast and simple with neither high temperature nor complicated synthesis steps is involved. When Hyp was added to CDs solution, the fluorescence intensity of the CDs significantly decreased. The CDs display high selectivity for Hyp over many potentially interfering substances. Under the optimized conditions, a good linear relationship between the fluorescence intensity ratio F_0/F and the concentration of Hyp is obtained in a range of 0.22-55 μM with a detection limit ($S/N = 3$) of 78.3 nM. The method was successfully applied for the determination of Hyp in *fufangmuji* granules and human serum samples with recoveries in a range of 93.3-107.0%. This paper highlights the usefulness of CDs as an effective fluorescence probe for the Hyp detection due to its easy preparation, low-cost, excellent photostability, favorable biocompatibility and low cytotoxicity.

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