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Silver nanoparticles for the visual detection of lomefloxacin in the presence of cystine

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Abstract

A novel optical sensors for lomefloxacin based on the Plasma resonance properties of silver nanoparticles (AgNPs) for the first time. The hydrogen bonds and electrostatic force between the lomefloxacin and AgNPs could induce the change in color and absorption spectra of AgNPs suspension, which provided a theoretical basis for the optical detection of lomefloxacin. In addition, we made the AgNPs-lomefloxacin detection system reach the critical point of discoloration by adding cystine to improve the sensitivity. Furthermore, the influence of some factors such as temperature, reaction time and pH on the AgNPs-lomefloxacin detection system was investigated. The results of UV-vis spectra showed that the absorption ratio (A_{520}/A_{395}) was linear with the concentration of lomefloxacin in the range from 0.2 to 5 μmol/L with linear coefficients of 0.991. The proposed method can be applied to detecting lomefloxacin with an ultralow detection limit of 0.6 μmol/L without any complicated instruments and complex pretreatment.The selectivity of AgNPs-lomefloxacin detection system is proved excellent by comparing with other ions and analytes in urine. The method in our study is appropriate to be used to monitor quantitatively entecavir in human urine owing to its rapid response rate, visible color changes, wide linear range and excellent selectivity.