

A simple and sensitive fluorescence based biosensor for the determination of uric acid using H₂O₂-sensitive quantum dots/dual enzymes

ABSTRACT

A novel optical detection system consisting of combination of uricase/HRP–CdS quantum dots (QDs) for the determination of uric acid in urine sample is described. The QDs was used as an indicator to reveal fluorescence property of the system resulting from enzymatic reaction of uricase and HRP (horseradish peroxidase), which is involved in oxidizing uric acid to allantoin and hydrogen peroxide. The hydrogen peroxide produced was able to quench the QDs fluorescence, which was proportional to uric acid concentration. The system demonstrated sufficient activity of uricase and HRP at a ratio of 5U:5U and pH 7.0. The linearity of the system toward uric acid was in the concentration range of 125–1000 μM with detection limit of 125 μM.

Keywords: Quantum dots; Enzyme; Uric acid; Fluorescence; Quenching