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[PDF (446K)] [References] [Supplementary Materials]

Spectrophotometric Determination of Cysteine with Gold Nanoparticles Stabilized with Single-stranded Oligonucleotides

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A sensitive and selective spectrophotometric detection method for cysteine has been established in this paper. The assay is based on the displacement of single-stranded oligonucleotide (ssDNA) adsorbed on the surface of citrate-capped gold nanoparticles (AuNPs) by cysteine in 2-[4-(2-hydroxyethyl)-1-piperazinyl]ethanesulfonic acid buffer solution (pH 7.2) and on the phenomenon of salt-induced AuNPs aggregation. Upon addition of cysteine, the red-to-blue color changes of the ssDNA-stabilized AuNPs associated with aggregation under high-salt conditions were easily observed with the naked eye. The absorption ratio at 520 and 600 nm was herein employed to quantify the AuNPs aggregation process. The calibration curve showed that the absorption ratio increased linearly over the concentration range of 0.1 − 1.3 μM with a limit of detection of 100 nM. Subsequently, the assay was successfully employed to determine cysteine in artificial and pharmaceutical injection samples.

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